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Dick's Encyclopedia of Practical Receipts and Processes

by: William B. Dick

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Encyclopedia of PRACTICAL Receipts & Processes HOW THEY DID IT in the

How do you make wahoo beer or ginger pop? How do you test gold or silver? How can you remove a ring from a swollen finger? What is the best way to wash a white dog? How can you detect counterfeit money?

For Americana buffs, this re-issue of a century-old encyclopedia with over 6400 receipts and processes is a revealing and unique insight into the do-it-yourself methods of yesteryear. Its purpose was to give "thorough information in plain language applicable to almost every possible industrial and domestic requirement" and, leafing through these pages, it is quite obvious that the purpose was carried out. Americans in the 1870's who had to be mostly self-sufficient in their daily existence must have found this volume indispensable.

There is information on such miscellaneous subjects as how to test mushrooms, how to test the purity of alcohol, how to deodorize putrid whale oil, and how to make candles. There are instructions for dissolving bones for manure, preserving leather, making soap, perfume and fireworks. You can learn how to make imitation French brandy or imitation Bourbon, how to see under water, how to mount small insects under a microscope, how to remove stains from black crape or mourning dresses, and how to polish alabaster.

Perusing these pages will afford hours of pleasure to old and young alike, as either a nostalgic look into another era or as a sort of "Whole Earth" catalog of the 1870's.

Leicester and Harriet Handsfield moved from New York City to a pre-Revolutionary War home in northwestern Connecticut in 1972. In the course of doing some refinishing they wanted to know about milk paint, often used as a coating on furniture. A copy of DICK'S ENCYCLOPEDIA that had belonged to Leicester's grandfather was unearthed and consulted. The Handsfields not only learned all about milk paint, but became so engrossed in the book that they spent hours poring over it. They are confident that others will find it equally good reading.

FUNK & WAGNALLS 666 Fifth Avenue New York 10019

JACKET DESIGN BY JUDITH WORACEK

DICK'S Encyclopedia of PRACTICAL RECEIPTS AND PROCESSES

HOW THEY DID IT IN THE 1870'S

DICKS

Encyclopedia of

PRACTICAL RECEIPTS AND PROCESSES.

containing

OVER 6400 RECEIPTS

embracing

THOROUGH INFORMATION, IN PLAIN LANGUAGE, APPLICABLE TO ALMOST EVERY POSSIBLE INDUSTRIAL AND DOMESTIC REQUIREMENT.

 \mathbf{or}

HOW THEY DID IT IN THE 1870's

BY WILLIAM B. DICK

(This edition prepared by Leicester and Harriet Handsfield)

FUNK & WAGNALLS

NEW YORK

SPECIAL NOTICE

This book is intended solely as an historical record and does not represent an endorsement of any recipe, formula, process or other textual material printed herein, nor do the preparers or publishers vouch for any claims made within this book.

PREFACE.

The original design of the compiler of this work was to prepare a collection of popular and domestic receipts, to contain only those whose practical utility had been established, either by actual trial or by the guaranty of undoubted authorities, thus excluding the mass of antried, and, consequently, unreliable information to be found in Receipt Books, compiled with a view to quantity rather than quality. As the work progressed, it was found in many cases, no easy matter to draw a line between the simple or practical and the artistic or scientific. To meet this difficulty, it was determined to enlarge its scope, increasing the usefulness of the former by the additional light of scientific research, and rendering the latter easy of application by reducing the formulæ and technicalities of scientific writers to plain language, so as to be understood by the uninitiated. To carry out this idea intelligibly, 'he plan has been adopted of classifying the various subjects treated of in the _ncyclopedia, so that each should be presented in a compact form of completeness unattainable by any other method; omitting only, in order to save repetition, such information as could be found in connection with some other subject in another part of the work, but easily reached by the introduction of reference numbers, or by the aid of the Index.

The result of this change of scheme in the preparation of the Encyclopedia is twofold: first, an amount of information on popular and household matters rarely, it is believed, to be found in one volume; secondly, a condensed digest of all the practical information, bearing on the various branches of the industrial arts, that is contained in the best scientific works of modern times, many of which are costly and technical in style, and some of them rarely to be found in this country.

This has necessarily involved an almost incredible amount of patient and persistent labor, rendered unavoidable in order to separate and extract the practical matter from theoretical propositions and speculative deductions, of great value to the expert, but entirely beyond the scope of a popular work; this will be fully corroborated by the annexed list of authorities, which have been quoted or consulted in the preparation of the Encyclopedia. In accomplishing this the compiler has been assisted by a gentleman whose knowledge of languages, and other attainments, have aided him materially in his undertaking.

The various processes and formulæ connected with the Practical Arts form, therefore, a distinguishing feature of the work, of the highest utility both in the laboratory and the workshop. They are further explained, where it has been deemed necessary, with neatly executed illustrations and diagrams, thus giving the

inexperienced a clear insight into many of those scientific operations usually supposed to be attainable only by persons trained and educated for the purpose.

The Receipts containing information more especially applicable to domestic matters and the requirements of every-day life, deserve more than a passing notice, as no pains have been spared to make them comprehensive, thorough, and clearly understood; showing not only what must be done, but how to do it, in order to attain any desired result; giving the materials used, their proper proportions, and how to prepare, mix and apply them; introducing also, wherever advisable or necessary, reliable tests for the purity, strength, etc., of the substances brought into requisition. This principle of testing is a noticeable feature throughout the Encyclopedia.

In the Medical department, each recipe or formula is adopted for its efficacy only, without reference to any particular School of Medicine. Some of them are published for the first time in this work, being obtained from the private memoranda of a distinguished physician, and other similar sources.

With the exception of general, but thorough, directions for Curing, Preserving, Pickling and Canning, Culinary receipts have been avoided, as they may be found in any reliable Cookery Book; the design of this work being to afford only such information as is not otherwise easily attainable.

The Tables of Weights and Measures, and their comparative values, are by a competent mathematician, and founded on official or other well-established data. They include also a careful selection of general statistical information from authentic sources.

The last 24 pages consist of Miscellaneous Receipts, which would not readily admit of classification; including, also, a few additional receipts obtained too late to take their place in the part of the book to which they properly belong. These will always be found by consulting the Index, a course which will insure the finding of all the information connected with the subject desired.

Condensation has been resorted to throughout the work, as far as possible, and repetition greatly avoided by the use of reference numbers, which are introduced wherever it has been found necessary to refer the reader for further information contained in some paragraph in another part of the book.

A carefully prepared Index is appended, in as condensed a form as perspicuity will allow. A glance at the directions given at the commencement of the Index will materially aid in finding the article or paragraph sought for.

In submitting to the public this contribution to the popular resources of general information and practical knowledge, the compiler begs to offer his apologies for any errors or omissions that may occur in it; reserving for future editions such corrections and additions as circumstances may suggest, or the march of improvement demand. By no means assuming the impossible attribute of perfection for this work, he believes that its contents will at least warrant his claiming for the Encyclopedia a marked superiority over other existing works of a similar nature.

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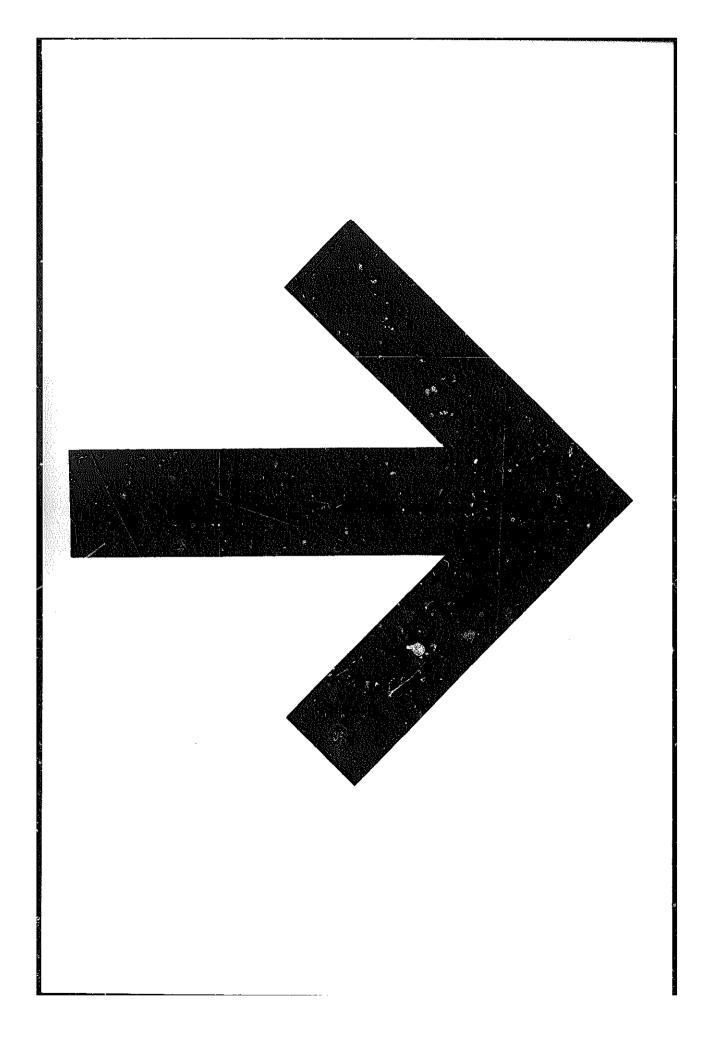
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DICK'S Encyclopedia of

PRACTICAL

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HOW THEY DID IT IN THE 1870'S

DICK'S ENCYCLOPEDIA

PRACTICAL RECEIPTS AND PROCESSES.

heading will be found a brief description of the various methods of chemical manipulation, constantly employed in this work. This is deemed especially necessary, as many, if not all, of the processes described, depend greatly on careful and skillful manipulation in the preparation as well as in the combination of the necessary ingredients. (See No. 3830.)

2. Annealing. The process by which glass is rendered less frangible, and metals, which have become brittle, again rendered tough and malleable. Glass vessels, and other articles of glass, are annealed by being placed in an oven or apartment near the furnaces at which they are formed, called the "leer," where they are allowed to cool slowly, the process being prolonged according to their bulk. Steel, iron, and other metals, are annealed by heating them and allowing them to cool slowly on the hearth of the furnace, or any other suitable place, unexposed to the cold.

3. Bath. In cases where an equable heat has to be sustained at, or not to exceed, a certain fixed degree, it is evident that an open fire or flame would be too variable for the purpose. To obviate this difficulty, the vessel to be heated is immersed or imbedded, to a convenient depth, in another vessel containing water, oil, saline solution, sand, metal, etc., as circumstances require, to which the heat is applied and whose temperature can be regulated, if necessary, by the use of a thermometer. Steem is also applied to this purpose; but, of course, requires special apparatus. The baths most commonly used are the water bath and the sand bath.

Sand Bath. An iron or copper vessel should be employed for this purpose. Sufficient sea or river sand, previously washed clean and dried, must be put in to cover the bottom completely. The vessel to be acted on is then introduced, and the intervening space around it filled up to the desired height with sand, and the whole placed over a furnace. The object of the sand is to cut off direct commu-

anipulations. Under this nication with the fire and produce a gradual

and equable heat.

5. Water Bath, or Bain-Marie. This arrangement is used where the heat required is not over 212° Fah., and consists of one vessel within another, secured so that they cannot come in contact at any point below the level of the water which has been introduced to fill up the space between them. A

double glue-pot is a water bath.

As the temperature of water cannot be increased, in an open vessel, above its boiling point, 212°, a vessel immersed in it can never be heated above that point; and, by keeping the water boiling, this degree can be steadily sustained. Where other degrees of heat are requisite, the following table, showing the boiling points of different substances and saturated solutions, will serve as a guide. A still higher degree of heat may be reached by using, with appropriate vessels, metals whose melting point is known. (See Index for Melting Point of Metals.)

Table exhibiting in degrees of Fahrenheit the Boiling Heat of different liquids.

Ether				96°
do sp.	grav.:	.7365	at 48°	100
Carburet	of Sul	ohur		113
			12	
Muriatio	Acid. s	D. 2T.	1.094	232
Rectified	Petrol	enm		306
			1.848	
do	do			
do	do	do		
	đo			
	ďδ			
	do			
=-	do			
do				
Linged	∩il		• • • • • • • • • • • • • • • • • • •	640
Whale O	:1		· · · · · · · · · · · · · · · · · · ·	630
more cury.				002

various Saturated Solutions.

Saturated solution of	
Muriate of Lime	-285°
Acetate of Soda	-256
Nitrate of Soda	-246
Rochelle Salt	240
Nitre	238
Muriate of Ammonia	-236
Tartrate of Potash	234
Sea Salt	$224\frac{1}{3}$
Muriate of Soda	224
Sulphate of Magnesia	. 222
Borax	222
Phosphate of Soda	222
Carbonate of Soda	-220
Alum	
Chlorate of Potash	218
Sulphate of Copper	. 216
Acetate of Lead.	215
Glauber Salt	
O O 1 - 1 - 41 - 1 - 1 - 411	

8. Concentration. The volatilization or evaporation of part of a liquid in order to increase the strength of the remainder. operation can only be performed on solutions of substances of greater fixity than the menstrua or liquids in which they are dissolved. Many of the liquid acids, solutions of the alkalis, etc., are concentrated by distilling off

circumstances, always assume the same crystalline shape, their crystals afford a means Epsom salts. Sulphur, anhydrous salts, lead, tin, and other fusible substances which are unalterable by heat are crystallized by fusion. They are to be melted at the lowest possible temperature, and allowed to cool very gradudecanted, and the crystals will be found coating the interior of the vessel. Volatile solids, crystals.

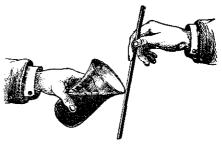
Soluble substances are crystallized by the substance. The solution should be made and, and of the body to be oxidized. if necessary, clarified and filtered at boiling 12. Desiccation. The evaporation or point, in which state more of the substance is drying off of the aqueous portion of solid or mother water, and dried.

If strings be suspended in the hot solution, erystals will form upon them during cooling or evaporation; in this manner rock-candy, blue vitriol (sulphate of copper), alum, etc., are crystallized. Crystallization is also sometimes the result of chemical reaction; silver, for instance, precipitated from its solutions by

zinc, forms a crystalline deposit.

10. Decantation. The operation of poursediment. This is performed either by gently stances with which it may be mixed; for iminclining the vessel, or by means of a syphon. | pregnating a liquid with the volatile princi-

Table showing the Boiling Heat of When a liquid is set aside to settle for future decantation by the first method, it is best to use a bell shaped vessel, or one provided with a lip, for convenience in pouring; as in decanting from a full vessel whose side is straight, the liquid is very apt to flow down the outside of the vessel. This can, however, be obviated by holding a glass rod or stick, previously wested in the liquid, nearly upright, with one end resting in or suspended over the receptacle into which the figuid is to be decanted; the liquid is poured gently down the upper side of the stick, keeping the rim of the vessel in contact with it. The liquid will be more strongly attracted by the wet stick, than by the dry surface of the outside of the vessel. (See illustration.)



their water.

9. Crystallization. Crystals are symmetrical forms assumed by certain bodies in or, from the nature of the vessel, impossible, or, from the nature of the vessel, impossible, a syphon must be used. This is a tube of about 30°, with one leg or end longer than the other. A piece of india-rubber tubing makes an excelof distinguishing substances otherwise similar lent and easily adjusted syphon for decanting in appearance; as for instance oxalic acid and liquids which will not affect that material. The syphon must be first filled and then the shorter leg inserted in the liquid, care being taken to keep its extremity always below the surface, and the liquid will flow continuously out of the longer leg as long as there is any ally. As soon as a crust forms on the surface left in the vessel. For decanting caustic (which then becomes furrowed) it must be liquids, acids, &c., syphons of different kinds pierced with a rod, and the fluid portion are provided, constructed especially for the purpose.

11. Deflagration. The sudden combussuch as iodine, camphor, etc., when heated so tion of any substance, for the purpose of proas to produce Sublimation (see No. 30), yield ducing some change in its composition, by vapors which, in cooling, take the form of the joint action of heat and oxygen. The process is commonly performed by projecting into a red hot crucible, in small portions at a evaporation of a saturated solution of the time, a mixture of about equal parts of nitre

held in solution than when cool; this excess bodies. Plants and chemical preparations is deposited in crystalline form as the solution are deprived of their humidity by exposure cools or evaporates. The crystals thus ob- to the sun, a current of dry air, an atmosphere tained are strained from the remaining liquid, rendered artificially dry by sulphuric acid, or rendered artificially dry by sulphuric acid, or by the direct application of heat by means of a water-bath, a sand-bath, or a common fire. Planks and timber are now seasoned, on the large scale, in this way, by which a condition may be attained in 2 or 3 days, which, on the old system, took as many years to produce.

13. Distillation. Distillation consists

13. Distillation. Distillation consists in vaporizing a liquid in one vessel, and conducting the vapor into another vessel, where 10. Decantation. The operation of pourities condensed and collected. The process is ing off the clear portion of a liquid from its used for separating a liquid from solid sub-

ples of plants, as in the preparation of Eau de accomplished by keeping the neck and re-Cologne and other aromatic spirits, and for ceiver wrapped in wet cloths, on which a separating a more volatile liquid from one less

so, as alcohol from water.

For example, as alcohol is transformed into vapor at the temperature of 176°, while water remains, at this temperature, in a liquid state, it is only necessary to heat the mixed liquids to 176°, when the alcohol rises in vapor, and the water is left behind. The vessel in which the liquids are heated is closed by an air-tight cover, and from this cover a pipe is led and coiled through a cask of cold water; as the alcoholic vapor enters this cold pipe it is condensed to the liquid form. This process of evaporating and condensing a liquid is called distillation; the apparatus is called a still or retort, and the coiled pipe is the "worm of the still," or the condenser.

On the small scale distillation is performed in the simplest way by means of the common glass retort (a,) and the receiver (b,) as in Fig. 1. The retort may be either simple, as

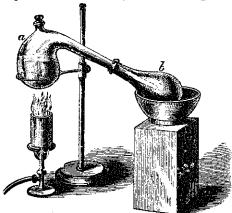


Fig. 1.

in Fig. 2, or tubulated as in Fig. 1, and sometimes the receiver has a tubulure to allow the escape of gas or expanded air, as in Fig. 3. The great advantages of the glass retort are that it admits of constant observation of the materials within, that it is acted upon or injured by but few substances, and may be cleaned generally with facility. Its great disadvantage is its brittleness.

The tubulated retort is more liable to crack than the plain one, on account of the necessarily greater thick-



ness of the glass in the neighborhood of the tubulature; nevertheless it is very convenient the introduction of the materials.

are used for the distillation of liquids, care should be taken not to apply the luting until the atmospheric air is expelled (see Lute), unless the receiver has a tubulure for its escape. The operator should aim at keeping the body of the retort hot, and the neck and receiver cool. A hood of pasteboard will long tin pipe, bent in the form of a screw, and

stream of cold



water is kept running. This may be conveniently done by means of a syphon, made by dipping one end of a strip of cotton in a vessel of water, and ailowing the other end to hang down upon the cloths,

bound loosely around the receiver and the neck of the retort. Retorts are heated in a water or sand bath, placed over the naked fire, or they may be held by a circle of metal, in which case the retort may be heated by the argand gas flame, as in Fig. 1, or by live coals. Where it is to be subjected to a heat sufficient to soften the glass, the bulb may be previously coated with a mixture of clay and sand, and dried. (See Nos. 1695 and follow-

Even on the small scale it is sometimes necessary to employ distillatory apparatus. constructed of other materials besides glass.

The still in general use (see page 12) may be considered as composed of three or four parts:

I. The cucurbit or body of the still, A. This portion of the apparatus receives the direct action of the fire, and contains the liquid to be distilled when the process is to be conducted by a naked fire. It is in the form of a truncated reversed cone, A, mounted on a rounded portion, a a, which rests on the furnace, X X, and terminated at the top by a collar of somewhat smaller diameter than

the lower part.
C is a hole by which the liquid is introduced into the body of the apparatus; d d are the

II. The water-bath, B, a cylindrical vessel of tin or tinned copper, which is placed in the cucurbit, A, closing it lightly by means of the collar, m, which rests on the collar, b b. This vessel is used only when the mixture to be distilled is not exposed to the direct heat of the fire; in this case the cucurbit, A, fulfills the office of a water-bath, and the vessel, B, takes the place of the cucurbit.

When, instead of distilling by the naked fire, the water-bath is employed, water only is put into the cucurbit, in which the vessel, is placed containing the liquid to be dis-

III. The head of the capital, G. This part may be placed either on the cucurbit, when distilling by naked fire, or on the vessel, B, if used, care having been taken to make both openings of the same size; it is very nearly on account of the facility which it offers for the shape of the upper part of a retort, and is e introduction of the materials.

| furnished with a large pipe by which the When the common glass retort and receiver vapor is to be carried off to the worm or cooler.

n. A hole which, during the operation, is kept closed by a screw top, e, and its use is to introduce fresh liquid into the cucurbit without having to disconnect the apparatus.

IV. The cooler or worm, D. This is a facilitate the former; and the latter will be enclosed in a copper or wooden vessel full of cold water. The upper part of the pipe. which is often enlarged in a globular form, receives from the beak of the capital the vapors arising from the cucurbit; the lower portion is open be-low, so that the condensed liquid flows into a vessel placed underneath.

All the joints of the apparatus are to be luted with bands of paper soakedin paste; the joint of the cucurbit, when used as a waterbath, must not be tight, in order to allow of the escape of the steam from the X boiling water. (See Lute.)

g g. Tin rests for supporting and fixing the worm in the vessel.

h. A vertical pipe fixed to the side of

the vessel, open at both ends and terminated to another vessel, and allowed to deposit the at the top by a funnel.

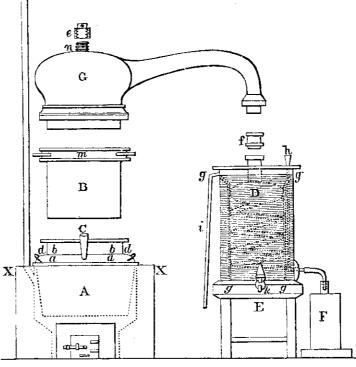
This pipe serves to renew the water in the cooler; cold water is poured in at the top

water, forces it out at the escape pipe, i. k. A tap, by which all the water in the worm tub can be discharged.

is of precisely the same height as the collar, solely on the density of the powder, and the m, of the cucurbit, B, and is only used in distilling by the water-bath; when a naked fire is used this pipe is unnecessary, as the beak will reach down to the collar of the still without it.

In distilling perfumes and cordials, the object is to extract or separate the odorous and aromatic principle from the roots, flowers, seed, or spices used to impart the characteristic odor and taste to the liquor, and it is usual to macerate such ingredients in strong alcohol several days before distillation. Great care should be taken that the heat should, in all cas 3, be as gentle and uniform as possible. Remember that accidents may be effectually prevented by distilling spirits in a water-bath, which, if sufficiently large, will perform the operation with all the dispatch requisite for the most extensive business.

14. Elutriation. In chemistry, the opedeep vessel, from which, after the subsidence to the surface of the liquid, wide shallow of the grosser portion, the liquid is poured invessels are the best for the purpose; the pro-



fine powder it still holds in suspension. When this has taken place, the clear supernatant liquor is decanted, and the sediment which flows to the bottom of the vessel, and drained and dried. The coarse sediment de-being of a lower specific gravity than the hot posited in the first vessel is now submitted to a fresh grinding and diffusion through water, and the entire operation is repeated, until the whole of the pulverizable portion is f. A connecting pipe inserted between the washed over. The proper length of time for beak of the capital and the collar of the still the liquid to remain in the first vessel, depends degree of fineness required in the product; heavy powders subsiding almost immediately, while light ones often take several minutes to deposit their coarser portion. Sometimes three or more vessels are employed, and the muddy liquor, after remaining a short time in the first, is poured into the next one, and this, in a short time longer, into the third, and so on, until the last vessel is filled, by which means, powders of different degrees of fineness are obtained; that deposited in the last vessel being in the minutest state of division.

15. Evaporation. The conversion of a fluid into vapor by means of heat, diminished atmospheric pressure, or exposure to a dry atmosphere. The process of evaporation is resorted to;—1. For the vapor as a source of heat or power, as in steam boilers, &c.;-2. To separate volatile fluids from other bodies ration of washing insoluble powders with which are either fixed or less volatile;—3. To water, to separate them from foreign matter, or the coarser portion. It is usually per-To concentrate or strengthen a solution by formed by grinding or triturating the mass expelling a portion of the liquid;—5. To with a little water, until reduced to a very purify liquids by expelling any volatile mat-fine powder, and this paste is suddenly difters which they may contain. As evaporafused through a large quantity of water in a tion is, under ordinary circumstances, confined

in a similar

way to a fan.

observingso

to open it

(see Fig. 2) and lay it on

the funnel

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cient inter-

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the air be heated. On a small scale, shallow filtering small quantities of liquids in the capsules of glass, wedgwood ware, porcelain or laboratory. A piece of the paper is taken, of a metal, are commonly employed, and are ex- size proportionate to the quantity of the subposed to heat by placing them over a lamp, stance to be filtered, and is first doubled from open fire, or in a water or sand-bath. (See No. 44.)

16. Fermentation. Chemists distinguish fermentation into five kinds, viz:

The saccharine fermentation, by which starch and gum are converted into sugar.

The alcoholic or vinous fermentation, by which sugar is converted into alcohol.

The viscous or mucilaginous fermentation, which converts sugar into slime or mucilage, instead of alcohol.

The acetous fermentation, by which alcohol is converted into winegar.

The putrid fermentation, or putrefaction, which is exhibited in its most marked form in

the putrefaction of animal substances.

17. Filtration. The word filtration is absolutely synonymous with straining; but, in the language of the laboratory, the former is usually applied to the operation of rendering liquids transparent, or nearly so, by passing them through fine media, as filtering paper, for instance; the latter to the mere separation of the grosser portion, by running them through coarse media, as flannel, horsehair cloth, etc., through which they flow with considerable rapidity. • Filtration is distinguished from clarification, by the former removing the solid matter, or cause of opacity or foulness, by mere mechanical means, whereas the latter consists in the clearing of a liquid by depuration, or the subsidence of the suspended substances or fæces, arising from their gravity being naturally greater than the fluid with which they are mixed, or being rendered so by heat or the addition of

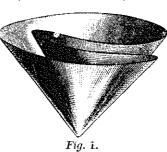
some foreign substance. (See Fining.)
The apparatus, vessels, or media, employed for filtration, are called filters, and are commonly distinguished from strainers by the superior fineness of their pores, as above noticed.

principles as the common sieve on powders; they all, in like manner, retain or hold back the coarser matter, but permit the liquid or smaller and more attenuated particles to pass through. The term medium has been applied to the substance through the pores of which the liquid percolates.

The forms of filters, and the substances of which they are composed, are various, and depend upon the nature of the liquids for which they are intended. On the small scale, funnels of tin, zinc, copper, wedgwood ware, earthenware, glass, or porcelain, are commonly employed as the containing vessels. The filtering medium may be any substance of a sufficiently spongy or porous nature to allow of the free percolation of the liquid, and whose pores are, at the same time, sufficiently fine to render it limpid or transparent. Unsized paper, flannel, linen, muslin, cotton-wood, felt, sand, coarsely-powdered charcoal, porous stone or earthenware, and numerous other substances of a similar kind are employed for this purpose.

Filters of unsized paper are well suited for

cess is greatly facilitated by exposing the all liquids that are not of a corrosive or viscid surface to a current of dry air, especially if nature, and are universally employed for corner to corner into a triangle (see Fig. 1, below), which is again doubled into a smaller triangle, and the angular portion of the margin being rounded off with a pair of scissors, constitutes a paper cone, which is placed on a funnel and nearly filled with the liquid. A piece of paper so cut, when laid flat upon a table, should be nearly circular. Another method of forming a paper filter, preferred by some persons, is to double the paper once, as above described, and then to fold it



tion of the liquid. (See Fig. 3.)

To promote the same object, a funnel should be deeply ribbed inside, or small rods of wood or



bed or fluted outside, to Fig. 2. ticed.

Both strainers and filters act on the same free outward passage of the air when it is placed in a narrow-mouthed bottle or receiver. Unless this is the case, the filtration will proceed but slowly, and the filtered liquid will be



Fig. 3.

driven up the outside of the neck of the funnel by the confined air, and will be continually hissing and flowing over the mouth of the vessel. The breadth of a funnel, to filter well, should be about threefourths of its height, reckoning from the throat or neck. If deeper, the paper is liable to be continually ruptured from the pressure of the fluid; and when shallower, filtration proceeds slowly, and an unnecessacipitates, it is usual to support them on linen or outsides. muslin to prevent their breaking. This is best A very done by folding the cloth up with the paper and cutting the filter out of the two, in the same way as would be done with doubled paper, observing so to place it in the funnel that the paper and muslin may remain close together, especially towards the bottom.

The filtration of small quantities of liquids, as in chemical experiments, may often be conveniently performed by merely placing the paper on the circular top of a recipient; or on a ring of glass or earthenware laid on the top of any suitable vessel. A filter of this kind, that will hold one fluid ounce, will filter many ounces of some liquids in an hour.

Good filtering paper should contain no soluble matter, and should not give more than one two hundred and fiftieth to one two hundred and thirtieth of its weight of ashes. The soluble matter may be removed by washing it, first with *very dilute* muriatic acid, and secondly with distilled water.

For filtering a larger quantity of a liquid than can be conveniently managed with a funnel, and also for substances that are either too viscid or too much leaded with feeringe to allow them to pass freely throug paper, conical bags made of flannel, felt, twilled cotton cloth or Canton flannel, linen, or muslin, and suspended to iron hooks by rings or tapeare commonly employed. (See Fig. 4.) The

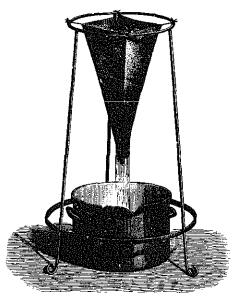


Fig. 4.

first two of the above substances are preferable for saccharine, mucilaginous, and acidulous liquids; the third for oily ones; and the disadvantage of sucking up a considerable be obtained.

rily large surface of the liquid is exposed to | quantity of the fluid poured into them, and evaporation. To lessen this as much as possible, the upper edge of the glass is frequently quantities, or when continued in actual uso ground perfectly smooth, and a piece of smooth as filters for some time. On the large scale, plate-glass is laid thereon. When paper fil- a number of them are usually worked toters are of large dimensions, or for aqueous gether, and are generally enclosed in cases to fluids that soften the texture of the paper, or prevent evaporation, and to exclude dirt from for collecting heavy powders or metallic pretthe filtered liquor that trickles down their

A very simple mode of filtering aqueous fluids, which are not injured by exposure to the air, is to draw them off from one vessel to another, by means of a number of threads of loosely twisted cotton or worsted arranged in the form of a syphon. The little cotton rope at once performs the operations of de-cantation and filtration. This method is often convenient for sucking off the water from small quantities of precipitates.

When pulverulent substances, as sand, coarsely-powdered charcoal, etc., are employed as the media for filtration, vessels of



Fig. 5.

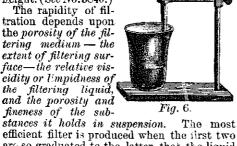
wood, or stoneware, are employed to contain them and the supernatant liquid. In these cases, the filtering medium is usually arranged as a shelf or diaphragm, and divides the vessel into two compartments; the upper one being intended to contain the liquid, and the under one to receive the same when filtered. Such an apparatus is set in operation by merely time, be readily cleaned out by reversing it and passing clean water through it in an opposite direction. The following is a filter of this description, and very simple in its arrangement. (See Fig. 5.) A is a common cask, B and C are false bottoms, fitting in perfeetly air tight, but perforated with one-fourth inch holes. C should be covered with canvas, and above that a sheet of cotton wadding; above the wadding is a bed of perfectly clean sand, 3 inches deep. The sand should be covered over with flannel, and above the flannel should be a bed of granulated animal charcoal (sifted and fanned from the dust), 4 inches in depth. After having done this, fit in the false bottom, B, and cover it with a piece of cotton cloth. D is a bag made of Canton flannel to prevent the liquor being filtered from coming with too much force upon the false bottom. By substituting cotton wadding remainder for tinctures, weak alkaline lyes, instead of the charcoal in the above filter, a and similar solutions. These bags have the fine filter for brandy and other liquors may

by placing a stratum of sponge between two permit of the sponge being compressed to any required degree. Brandy or water, under gentle pressure, flows with great rapidity through the pores of compressed sponge.

filter self-acting, or to construct it in such a way that it may feed itself, so that it may continue full and at work without the constant attention of the operator. On the small scale, this may be readily effected by an ar-

rangement as represented in Fig. 6; and on the large scale by placing the essel containing the unfiltered liquid on a higher level than the filter, and by having the end of the supply-pipe fitted with a ballcock, to keep the liquid in the filter constantly at the same height. (See No. 3840.)

tration depends upon the porosity of the filtering medium - the extent of filtering surface—the relative viscidity or Empidness of the filtering liquid, and the porosity and



efficient filter is produced when the first two are so graduated to the latter, that the liquid filters rapidly and is rendered perfectly trans-

parent. (See No. 3838.) (Cooley.)

Tinctures and dilute spirits are usually filtered through bibulous paper placed on a funnel, or through thin and fine cotton bags. In general, tinctures clarify themselves by the subsidence of the suspended matter, when allowed to repose for a few days. Hence it is through a small hair sieve, a piece of tow or some other coarse medium, to remove an, floating substances, as pieces of straw, & 3. Spirits largely loaded with essential oil as those of aniseed, &c., run rapidly through paper or muslin, but usuall require the addition of a spoonful or two of magnesia before they will flow quite clear. When possible, tinctures, spirits, and all similar volatile fluids, are better cleared by subsidence or clarification than by filtration, as, in the latter way, part is lost by evaporation. (See Nos. 3834, &c.)

18. Gun-cotton as a Filter. Gun-cotton, carefully prepared, is scarcely acted on by the most energetic chemical agents at or-dinary temperatures. It may therefore be used as a fifter for solutions containing strong acids, alkalies, etc.

19. Fusion. Aqueous fusion is the dison a small scale, washed with a solving of crystalline compounds in their own less concentrated. (See No. 14.) water of crystallization, by the application of 25. Pulverization. The reduction of

A filter which possesses the advantages of being easily and cheaply cleaned when dirty, liquefaction of bodies by heat a me. The and which very thoroughly purifies brandy containing vessels used for ignored sustaining or water with great rapidity, may be formed should be of a material capable of sustaining the requisite degree of heat witness either perforated metallic plates, united by a central melting or cracking. Crucibian the de of very serew, and arranged in such a manner as to refractory clay are used for high temperatures, metallic or earthenware vess als for lewer degrees of heat.

Granulation. The reduction of 20. metals into grains, drops or coarse powder. It is often of great accantage to render a This is done by pouring them, in the melted state, into water. The same effect is obtained by violently agitating the molten metal until cool, in a wooden box, well chalked inside. (See No. 25.) In many cases the metal is allowed to run through the holes of a kind of colander or sieve to produce minute division; if the drops are allowed to fall from a sufficient height, they will become spherical; in this

way lead shot is made.

21. Liquation. The process of sweating out, by heat, the more fusible metals of an alloy.

22. Liquefaction. The conversion of a solid into the liquid state, either by heatfusion, (se : No. 19); absorption of water from the air—deliquescence; or the action of a fluid body—solution. (See No. 29.) The liquefaction of gases and vapors is effected by pressure and cold.

23. Lixiviation. The process of disolving out or extracting the saline matter of bodies, more especially of ashes, &c., by means of ablution or digestion in water. solution so obtained is called a lye or lixivium, and the salts resulting from the evaporation of such solutions, lixivial salts.

24. Precipitation. This is the method for obtaining solid matter, by mixing two or more solutions of substances containing certain elementary equivalents which have a strong mutual chemical affinity. That fluid which is added to another to produce precipitation is called the precipitant. If a solution is to be precipitated, it is best, unless otherwise directed, to first heat it by means of a sand bath. (See No. 4.) A tall bell-shaped glass with a mouth is the best for precipitating. The precipitant is to be added gradually, the bottoms alone that require filtering; the stirring the mixture continually with a glass supernatant clear portion need only be run rod, until precipitation ceases. The liquid should then be allowed to settle until clear. cotton placed in the throat of a funnel, or In order to ascertain whether there is any matter left in the liquid unprecipitated, let one drop of the precipitant fall into the mixtero; if any signs of precipitation ensue, more must be added; if the mixture remains unchanged and clear, the operation is complete. The liquid may then be carefully decanted and the precipita ad matter, which is called a precipitate, filtered and dried. When the precipitate is the chief object of the process, it is usually necessary to wash it after filtration. This operation requires but little attend or when the precipitate is insoluble in water; but when it is in some degree soluble in that liquid, great attention is required to prevent the loss which might result from the use of too much water. Precipitates soluble in water, but insoluble in alcohol, are frequently, on a small scale, washed with spirit more or

milling. A few soft substances, as carbonate the acid, and vice versa. of magnesia, carbonate of lead, &c., may be 28. Sifting. This is a means employed the substance to be pulverized must be very inside with chalk or whiting. Glass, quartz and silicated stones require to be heated red hot and then thrown into cold water, to make them sufficiently friable for pulverization. When powdering very dusty or costly articles in a mortar, it should be covered with a loose skin of leather, fastened firmly round the top of the mortar and the pestle, to prevent loss of the dust, and possible injury to the operator's lungs. When a substance is required to be reduced to an impalpable powder, a slab liquid receives the name of alcoholic solution, and muller are used; this process is termed spirit, or tineture, while substances dissolved porphyrization.

26. Reduction. This term is applied to a process by which the oxygen is withdrawn from a metallic oxide, leaving the base in its original state. This is effected by heating the oxide with carbon or hydrogen; or by exposing it to the action of some other body which has a powerful affinity for oxygen. A portion of the metallic oxide to be reduced, is mixed with finely powdered charcoal and ex-posed in a crucible to the heat of a furnace. The metallic residue, which remains after reduction by this means, is usually mixed with coal dust. This is prevented by lining the crucible with charcoal dust made into a dough mixed with charcoal, as in the former instance; The water surrounding it becomes saturated, the crucible must be covered, and then heated. and being heavier, remains also at the bot-The reduction in this way is slower, but the tom, so that the solution proceeds very slowly.

glass or porcelain tube, and subjected to a coarse bag, at the surface of the liquid. As current of hydrogen gas, which absorbs the the particles of water take up the particles of oxygen, and leaves the metal pure. Other salt, they become heavier and sink; other agents are sometimes used for reducing, as particles take their places, dissolve more of tallow, oil, resin, sugar, and starch; but car- the salt, and sink in turn, so that the action bon and hydrogen are the agents generally of a constant current of liquid is kept up on employed.

27. Saturation. A liquid is said to be portion most capable of dissolving them."
saturated with some other substance when it 30. Sublimation. The process by which

any substance to dust or powder is generally ceases to dissolve any more of it. An acid is performed by means of a pestle and mortar, or, saturated with an alkali when sufficient of the on a larger scale, by stamping, grinding or alkali has been added to completely neutralize

pulverized by simply rubbing through a fine to obtain uniformity of fineness in a pulversieve; while many hard and gritty, and some ized substance; and is also of use in mixing soft substances, such as chalk, antimony, &c., different substances powdered to the same are pulverized on a large scale by elutriation. degree of fineness. The sieves used for this (See No. 14.) Others will only yield to a purpose are furnished with cloths of various rasp or file. Whichever method is adopted, materials and different degrees of fineness; consisting of brass wire, horse hair, buckram, dry, and may even require artificial drying book muslin, gauze, or raw silk; this last or desiccation. (See No. 12.) On the other constituting a bolting cloth for sifting imhand, a few substances, as rice, sago, nux palpable powders. These are stretched over vomica, &c., are often soaked in water, or a wooden cylinder in the same manner as the steamed, before being pulverized. In some head of a drum. During the process of pulcases, some other substance or intermedium is verizing, the use of the sieve is necessary from introduced to aid in the operation; thus, time to time to separate the finer powder from sugar is used in pulverizing civet, musk, nut- the coarser particles, which have to be remeg, and vanilla; absorbing the moisture turned after each sifting, to the morter for which could not otherwise be readily got iid further trituration. The powder is made to of. The addition of a very small quantity of pass through the meshes of the sieve by alcohol renders the powdering of camphor gently agitating it between the hands; a easy. Gold leaf is pulverized by mixing with rough jarring motion will force through some sulphate of potassa, and then removing the of the coarser particles, and destroy the unipotassa by washing with water. (See also formity of the powder. A sieve should be No. 2517:) Fusible metals are reduced by fitted with a drum head, top and bottom, the melting and rubbing in a mortar until cold, upper one to confine the dust of the substance or by agitating when melted in a box covered being sifted, and the lower one to catch the sifted powder as it falls through the sieve. An arrangement of this kind is called a drum or box sieve.

29. Solution. Under the head of solutions, are properly included only those liquids which consist of water or an aqueous men-struum, in which has been dissolved an appropriate quantity of any soluble substance to impart to the liquor its peculiar properties. When spirit is the dissolving medium, the spirit, or tincture, while substances dissolved in water form aqueous solutions. In cases where a substance is dissolved in an acid or alkaline solution, whose acid or alkali is afterwards neutralized by means of an alkali (to counteract the acid), or an acid (to destroy alkali), the solution is then termed a neutral solution. A saturated solution is a solution

made according to No. 27.

Professor Youmans, in the "Hand Book of Household Science," says: "Solids should be crushed or pulverized, to expose the largest surface to the action of the solvent liquid. Substances which in the lump would remain for days undissolved, when reduced to powder are liquefied in a short time. When a solid, with clay and water, leaving a space in the as common salt or alum, is placed in a vessel middle to receive the metallic oxide, not of water to dissolve, it rests at the bottom. metal will be pure and free from coal dust.

When hydrogen is employed for reduction, takes up much time. The best plan is to the metallic oxide is heated to redness in a suspend the salt in a colander, basket, or the suspended crystals, and always at that

volatile solid substances are reduced to the case necessary, and should be avoided, espestate of vapor by heat, and again condensed cially in decoctions prepared from aromatic in solid form. It differs from ordinary distillation only in being confined to dry solid substances, and in the heat employed being. in general, much greater. Calomel, corrosive sublimate, and sal ammoniac, are thus pre-

effected on a small scale by means of a pestle and mortar; and on a large scale by grinding in a mill, or with a muller or a slab made of porphyry or other hard substance; this latter is termed porphyrization.

32. Washing. This is resorted to in chemistry for two widely different purposes. When a substance contains both soluble and insoluble matter, the soluble portion can be separated from the insoluble by washing; this is called Lixiviation. (See No. 23.)

When it is desired to cleanse or remove impurities from an insoluble powder, this is also effected by washing. (See Nos. 14 and 3841.)

reparations. The following methods of preparing decoctions, extracts, tinctures, &c., are from the best practical sources. Other directions for making extracts, essences, attars, we., for the special purposes of Perinner, &c., will be found under their respective handings.

34. To F epsil Decoctions. Decoctions are solutions of the properties of vegeta-

bles obtained or borning, which is presumed to be a more effect an neithod of extracting

be removed with a sieve, as its presence would tend to make the product thick and disagreeable, and also more troublesome to The vessel in which the boiling is conducted should be furnished with an accurately fitting cover, the better to exclude the air, and the heat should be so regulated that the fluid may be kept "simmering," or only gently boiling, as violent boiling is not only quite unnecessary, but absolutely injurious. In every case the liquor should be strained while hot, but not boiling, and the best method of doing this is to employ a fine hair sieve, dissolving a larger portion of vegetable matter than it can retain in solution when cold. This deposit for the most part consists of the and should be scrupulously avoided; as, how-

vegetables, or those abounding in extractive. The colleges, in such cases, direct the ingredients "to be boiled for a short time," or "for 10 minutes," or they limit the time of boiling by stating the quantity that must be volatilized, as—"boil to a pint, and strain," the latter method being generally employed for 31. Trituration. The reduction of a ter method being generally employed for solid body to powder by rubbing. This is those substances that do not suffer by lengthened boiling.

Distilled water, or perfectly clean rain water, should alone be used for decoctions. Spring and river water, from their containing

lime, have less solvent powers.

Decoctions of all vegetables not exerting a very powerful action on the human system may be made by boiling 1 ounce of the vegeta-ble matter in 1 pint of water for 10 or 15 minutes. The ordinary dose of such a decoction is the same as that of a similar infusion. (See No. 37,)

When the medicinal properties of vegetables are volatile, or are injured by a strong heat, infusion should be had recourse to, in preference to boiling; but when a solution of the fixed constituents is alone sought, decoction is preferable. In preparing compound decoctions, those ingredients should be boiled first which least readily impart their active principles, and those which most readily impart them should be added afterwards. In many cases it will be proper simply to infuse the more aromatic substances in the hot decoction of the other ingredients, by which means their volatile principles will be preserved.

35. To Prepare Tinctures. Tinctures For making decoctions, the substances should be well bruised, or reduced to a very coarse powder, or, if fresh and soft, they should be sliced small. In the former case, any very fine powder or adhering dust should be seen any very fine powder or adhering dust should be seen as the solutions of vegetable and animal drugs, and sometimes of mineral substances, in spiritions liquids. The spirit most commonly employed is proof-spirit; sometimes rectified spiritis used, and occasionally ether. Ammonia is sometimes conjoined with the spirit in which tincture. Rectified spirit is alcohol, with 16 per cent. of water, and its specific gravity is .838. Proof-spirit is composed of 5 parts of rectified spirit mixed with 3 parts of water, the resulting compound containing 47.5 per cent. of water, specific gravity .920. The choice between proof and rectified spirit depends on their respective solvent powers over the active principles of the drugs employed.

Tinctures are usually prepared by reducing the solid ingredients to small fragments, coarse powder, or fine powder, macerating them for 7 days or upwards in proof or recor a coarse flannel bag. In general it is tified spirit, straining the solution through found, that as decoctions cool, a sediment is linen or muslin, or paper, and finally express-formed, in consequence of the boiling water ing the residuum strongly, to obtain what fluid is still retained in the mass. They are also prepared by the method of displacement. (See No. 41.) All tinetures should be preactive principles of the solution, and should be mingled with the clear liquid by agitation, when the decoction is used. It will thus be maceration. Tinctures are better clarified by when the decoction is used. It was been seen that the common practice of leaving the repose than by filtration, as in the latter case a filtration until the liquid has become cold, and considerable portion is retained by the filtering medium, and lost by evaporation. In er much decoctions so prepared may please the tineture to settle for a few days, and then tage eye, they are not only inferior in strength, to pour off the clear supernatant portion but, in many cases, nearly inert. It may be through a funnel loosely choked with a piece further remarked, that long boiling is in no of sponge or tow, to keep back any floating

after which the remaining foul portion of the tion is just as effective. (See French Coffee.) liquid may be filtered through paper. When it is absolutely necessary to filter a tincture, exert a very powerful action on the human and the quantity is large, conical bags should frame, may be made by pouring 1 pint of be employed. The filtration should be con-ducted as rapidly as possible, for the double matter and allowing it to macerate for from purpose of lessening the amount lost by evaporation, and the action of the air on the fluid. Tinctures long exposed to the air frequently lose their transparency within a few days after their filtration, owing to the oxidation and precipitation of some portion of the matter previously held in solution. Resinous and oily tinctures, as those of myrrh, tolu, and lavender, may be usually restored to their former brightness by the addition of a quantity of spirit, equal to that which they have lost by evaporation; but many tinetures resist this mode of treatment, and require refiltering. Ethereal tinctures are best prepared by percolation, and should be both made and kept in

stoppered bottles.
When both the substances are fluid, as in the case of certain balsams, the spirituous solution is made by merely mixing the two together in suitable proportions. For instance
—Tincture or essence of Tolu consists of 3 drachms balsam of Tolu and 1 quart of al-

The tinctures of the drug-stores are usually only is their manufacture carelessly conducted, without reference to the respective characters of their ingredients, but the ingredients themselves are often deficient in strength and quantity.

We will now proceed to explain the various methods by which good tinctures are obtained.

36. To obtain Tinctures by Infusion, Maceration, and Digestion. In order to extract the soluble principles of substances which cannot be advantageously distilled, infusion is often resorted to. This consists in submitting them for a greater or less period of time to the action of a liquid, with or without the aid of heat.

This is known by the name of infusion, digestion, or maceration, terms all signifying the same process with different modifications

in the way of conducting it.

When the principles to 87. Infusion. be extracted are soluble in water, and at the same time but slightly volatile, boiling water is poured on the substance of which the infusion is required, the vessel is carefully covered, and the whole allowed to remain untouched for some minutes or even some hours, according to the greater or less penetrability of the substance, and the required strength of the infusion; the result is an infusion, properly

If an infusion is required of dried leaves or flowers, they are first moistened with a little boiling water, and a time allowed for them to swell and soften before adding the rest of the water. Infusions made by adding all the water at once, as is still frequently practiced, are deficient both in flavor and perfume. The infusion of tea is an every-day illustration of this; as all who can make a good cup of tea lations this method is made use of to soften know how necessary it is to first draw the the substances before putting into the still; tea with a small portion of water; and yet, and to facilitate the extraction of their odorstrange to say, this principle is utterly ne- ous principle.

fragments of straw or other light substances; | glected in the case of coffee, where its applica-

Infusions of all vegetables that do not to 1 hour. The ordinary dose of such infusions is 1 to 2 ounces three or four times a day

Infusions, like decoctions, are liable to undergo spontaneous decomposition by keeping especially in warm weather, when a few hours are often sufficient for their passage into a state of active fermentation; they should therefore be prepared for use daily, as beyond 24 hours they cannot be depended on.

Infusions should be made in vessels which cannot be attacked by any of the substances with which they are in contact, and closed sufficiently tight to prevent the loss of the

most volatile principles.

The tin cucurbit, with cover, is in these two respects best adapted for infusions in water.

Concentrated Infusions. These are now very generally met with in trade, and are made of 8 times the pharmacopeial strength. They are mostly prepared by employing 8 times the usual quantity of ingredients, and only three-fourths of the proper quantity of water, and adding to the strained very uncertain and inferior preparations. Not liquor, when cold, sufficient spirit of wine to bring the liquid up to the proper strength (about one-third of the weight of the strained infusion). A still better plan is to treat 8 times the usual quantity of the ingredients with a mixture of rectified spirits 1 part and cold water 3 parts; in the usual way for making tinctures, either by maceration for 7 to 14 days, or by percolation. Concentrated infusions made in this way keep well, and deposit scarcely any sediment. Many houses, that are remarkable for the brilliancy and beauty of these preparations, employ onethird spirit of wine and two-thirds water as the menstruum. It may, however, be taken as a general rule, that for vegetable substances that abound in woody fibre, and contain but little extractive matter soluble in water (as quassia for instance), one-sixth to one-fifth part of spirit is sufficient for their preservation; while for those abounding in mucilage or fecula, or that readily soften and become pulpy and glutinous in weak spirit (as rhubarb) one-fifth to one-third is required. By macerating in the infusion as much bruised mustard seed as can be added without flavoring the liquor, along with a little bruised cloves, most vegetable infusions may be pre-served without either fermenting or becoming mouldy with very little spirit (one-ninth or one-tenth).

39. Maceration. When an infusion is made without the aid of heat it is termed maceration. This takes a much longer time than an infusion, properly so called; it rarely requires less than 7 days, sometimes several Those substances to which heat weeks. would be injurious, or which are easily soluble, are treated in this way. In many distil-

vessels well stopped.

with the principles of a substance which a slower percolation. would be but slowly extracted without the aid of a certain amount of heat, such as that by all who have made sufficient trial of it to of the sun or of hot ashes.

called digestion.

Maceration and digestion are usually performed in vessels of stoneware or glass, which the crude drug in the fluid employed. But are placed on the sand-bath, in cases where a

regular and uniform heat is required.

vessels employed, care must be taken not to fill them full, also to cover those which are most soluble parts of the drug. to be placed on the sand-bath with a damp piece of parchment tightly tied round the top, with many pin holes pricked in it. If this latter precaution be neglected, the increased volume produced by the heat and also the ex-chiefly composed of resin and volatile oil dispansion of the air may burst it. Moreover, vessel that is too full.

41. To obtain Tinctures by Displacement or Percolation. The kind of filtration commonly called the process of displacement, for extracting the essence from roots, in a drug mill to the condition of a coarse powder; then weigh each powder by itself, and mix them together in the proportions demanded by the recipe, and moisten the mass thoroughly with alcohol, allowing it to macerate for 12 hours in a vessel well covered. Next is required a hollow instrument of cylindrical form, having one end shaped liked a funnel, so that it can be inserted in the neck of a glass bottle, and having inside, near the lower end, a partition pierced with numerous small holes, like the strainer of a French coffee-pot, which is a simple coffee percolator; in the absence of such a partition, soft cotton, or ary insoluble substance, may be substituted, and being placed in the inside at the lower end of the instrument, will answer as well as the strainer. This instrument is called a percolator. Boullay's filter or percolator is usually employed. Macerate the ingredients to be acted upon, for the time named-introduce them into the percolator, and slightly press-them upon the partition. Any portion of the liquid used in the maceration, not absorbed by the powder, should be poured upon the mass in the instrument, and allowed to percolate. Now gradually pour into the per-colator sufficient of the alcohol, or other liquid to be filtered, to drive before it, or displace, the liquid contained in the mass; the portion introduced must in like manner be displaced by another portion; and so on, till the required quantity of filtered liquor is obtained. This extract is called a tincture. In case the liquor which first passes through should be thick and turbid, again introduce it under treatment has become exhausted, the

Tinctures, when prepared by maceration, into the instrument, being very careful not to should be frequently shaken during the pro- have the powder too coarse or loosely pressed, cess, which should be conducted in glass or it will permit the liquid to pass too quickly; and on the other hand it should not be too 40. Digestion is a prolonged infusion fine and compact, or it may offer an unneceswhich is usually conducted at a medium tem-sary resistance. Should the liquor flow too perature between that required for an infusion, rapidly, return it to the instrument, and close properly so called, and that of a maceration, it beneath for a time, and thus permit the Its object is usually to impregnate alcohol finer parts of the powder to subside, and cause

The method of percolation is now preferred

apply it correctly.

Mixing together two or more liquors and The first portion of liquid obtained by the allowing them to stand for some days, is also method of displacement is always in a state of high concentration. In general it is a simple solution of the soluble ingredients of sometimes the solvent, if compound, is resolved into its compound parts, and the fluid Whatever may be the form or nature of the which passes through it at any given time is only one of these, holding in solution only the

Thus, if diluted alcohol be poured over powder of myrrh in the cylinder of the percolator, the fluid which first drops into the receiver is a solution of an oily consistence solved in alcohol. In like manner when the the process is never so well conducted in a powder of gall-nuts is treated in the same way by hydrated sulphuric ether, two layers of fluid are obtained, one of which is a highly concentrated solution of tannin in the water of the ether, and the other a weak solution of the same principle in pure ether. herbs, seeds, barks, &c., is effected in the cases, therefore, in which it is not otherwise following manner: It is first necessary that directed, it is absolutely necessary to agitate directed, it is absolutely necessary to agitate the articles to be acted upon should be ground the several portions of the liquid obtained by percolation together, in order to insure a product of uniform strength, or activity.

To illustrate the operation of displacement,

and describe an excellent percolator for making perfume tinctures, we will suppose that benzoin is under treatment. The apparatus made wholly of glass, hav-ing been arranged as shown by the engraving, and a plug of raw cotton dropped loose d ly at b, the benzoin in coarse powder is then poured into the tube portion, A, until it reaches the line, c. Alcohol (95 per cent.) is next added, until it rises to the line, d. As soon as the first portion sinks into the benzoin, a fresh addition must be made; and thus the succeeding relays go on displacing those which preceded them without mingling with them. Each stratum becomes more and more charged with soluble matter as it descends; and when it reaches the bottom of the mass, under the pressure of the superincumbent liquor, it runs out saturated. When, by successive additions of fresh alcohol, the benzoin



into the receiver, B, as tasteless and colorless important perfume tinetures: as when first poured in. This indicates the

completion of the process.

As atmospheric pressure is an important element in the operation, it will not answer to shut it off by closing the top of the displacer, without making some compensating arrangement; and, therefore, a communication between the upper and lower vessels is established by means of a latent-tabe arrange-

alcohol must always be used.

The method of displacement has the advanrequires considerable experience to adapt it to all substances. The art rests in properly to all substances, but especially those of a glutinous or mucilaginous nature, is to mix sand, before rubbing it up with the menstruum. The coarseness of the powder must also be attended to. Substances that readily become soft and pappy when wetted by the menstruum, displacement answers well for the preparation of all tinctures that are not of a resinous nature, and for most infusions of woody and fibrous substances, as roots, woods, barks, leaves, seeds, insects, &c. It is especially adapted for the preparation of concentrated infusions and essences, as they may thus be obtained of any required strength, without loss, or requiring concentration by heat, which is so destructive to their virtues.

When ordinary tinctures are made in large quantities, displacement is never likely to supersede maceration, on account of any practical advantages it may possess. If the prescribed directions be duly attended to, the process of maceration is unexceptionable. The process is more simple than the other; the mode of operating more uniform; it is, in fact, always the same; it requires less of skill and dexterity in conducting it; it requires less constant attention during its progress, which, in operating on large quantities, is a consideration; and finally, the apparatus required is less complicated. When, however, only small quantities of tincture are to be made at a time. is formed, which differs considerably in its and kept in stock, the adoption of the process of displacement will often be found convenient and advantageous. It offers the means of making a tincture in two or three hours, which, by the other process, would require as

liquid passes through the mass, and falls the proportions usually employed for the most

.		_	
Tincture.		Trov.	Alcohol.
Vanilla	Vanilia bean, rasped	1 lb	8 pts.
Musk	Grain musk	.2 drack	ıms.8 ota.
Frangipani	Powder a la frangipani	.1 ib	6 pts.
Rhodium	Rhodium-wood, rasped	.1 lb	2 ots.
Civet	Civet, orris-root	. 34 oz	2 ats.
Tonguin	Pouka bean	.í lb	8 pts.
	Orris-root		
Alkanet-red col	Alkanet	ez	1 at.
Turmeric-vellow.	Turmeric		1 at.

ment, D. In this manner the apparatus is kept close, and the evaporation of alcohol are milky liquids, formed by the mechanical prevented, while the pressure produced is dis-admixture of oil, balsam, or resin, with water, tributed throughout the apparatus, and ren- by means of some other substance that dered uniform. As the runnings are clear, possesses the property of combining with filtration is rarely necessary. The quantity of both. There are numerous preparations of ale hot thus consumed need not be more than the kind in pharmacy and medicine, which, lent to exhaust the material; and the in the later pharmacopæias, have received resulting tineture must therefore be diluted to the name of "mixtures." There are also the proper strength. For perfumes, deodorized several emulsions employed as cosmetics, either alone, or as vehicles for other ingredients. The common name of emulsions is "milk," but the term is often incorrectly tage of expedition, economy, and yielding pro-milk," but the term is often incorrectly ducts possessing uniformity of strength; but it extended to opaque white liquids of an en-

tirely distinct character. The successful preparation of emulsions is packing the ingredients in the cylinder, some a matter requiring some little skill and care, substances requiring considerable pressure to In some instances, as with the almond, the be used, while others, when even lightly two substances necessary to produce a perfect packed, searcely permit the fluid to pass emulsion are presented by nature, ready to through them. An excellent plan applicable our hand, in the same vegetable production; nothing more is necessary than to reduce it with the pestle, and triturate it with water, graduthe powder with an equal bulk of well-washed ally added. In other cases, and which are far the more numerous, we have to operate on oily or resinous ingredients in their common form. These we are enabled to suspend in water, or mechanically combine with it, by should not be used so fine as those that are the intervention of thick mucilage, almonds, more woody and fibrous. The method of or yolk of egg. It is found that 1 drachm or yolk of egg. It is found that 1 drachm (60 grs.) of the first—made with equal parts of good gum-arabic and water (powdered gum is sometimes used instead of mucilage) 1 ounce of the second, (usually about 26 in number), and one of the last, will form 2 drachms of oil or resinous matter into an emulsion with about 1 fluid ounce of water, gradually added; and such an emul-sion, if properly made, will then, in most instances, bear further dilution with water. (The yolk of an ordinary-sized hen's egg is referred to. It should be remembered, that emulsions formed with yolk of egg will not keep long, owing to the putrescible nature of the latter.) Of these, mucilage is the medium most commonly employed. According to Montgomery, for conversion into permanent emulsions, "oils require about three-fourths their weight; balsams and spermaceti, equal parts; resins, twice their weight; and musk and ambergris 5 times its weight." In some cases instead of the above substances, a little liquor of potassa is employed, when a saponaceous emulsion

In making an emulsion, the gum, or other medium employed, should be first put into many weeks. (See No. 4572.) the mortar, and rendered thoroughly holds are for making Tinctures. The following are used, they should be treated as noticed under

properties from an emulsion of the same ingredients produced by means of a bland

medium.

"almond-paste" (see No. 1123), a few drops This is effected by either maceration, percola-of water being added to prevent "oiling," and tion, infusion, or decoction, as circumstances to reduce them to a smooth, soft paste. The require: the solution thus obtained is poured oil or resinous matter may then be gradually off and the remaining soluble matter either added and rubbed in, carefully observing not pressed or washed out, and added to the soluto add it more quickly than it can be subdued tion; it is next allowed time to settle, then by the pestle; and if, during this part of the decanted, and strained or filtered; and if this manipulation, the mixture should begin to rains to render one inquite creations. The exhibit a "breaking" or "curdling" appearance by white of egg, and filtered; Canton flannel, at the edges, a few drops of water must be first soaked in water, being generally employed for this purpose. When water acidmanipulation, the mixture should begin to fails to render the liquid clear, it is clarified immediately incorporated with it, before adding the remainder of the oil. If this be not done, the emulsive mixture in the mortar substances are usually maccrated in it in the will, in general, suddedly lose its tenacious consistence, and the process will fail. After bruised plant, if fresh, and the juice expressed the whole of the oil, balsam, or resinous by strong pressure.

The water is the principles to be extracted are instanced by the principles to be extracted as a principle by the principles to be extracted as a principle by the principles to be extracted by the principle or other aqueous vehicle intended to form the bulk of the emulsion, should be added gradually and with care, each portion being perfectly blended with the liquid mass in the mortar, by patient trituration, before adding the next. If any alcoholic liquid is employed, it should be added at the very end of the process, and then only very gradually, as otherwise it will cause the separation of the ingredients.

It must be observed that soluble salts, spirit, acids, and astringents, are, as a rule, incompatible with the emulsive form. If saline matter must be introduced, it should only be added in a very minute quantity, and emulsion; and in this case emulsion of almonds is the most suitable vehicle. (See No. occurs with emulsions made with liquor of potassa, or other alkaline medium, owing to the absolute incompatibility of acids and alkalies in the same liquid.

It is found that volatile oils are more readily the almond or olive, before proceeding to operate on them.

All emulsions should be well shaken before

se. (Cooley.)
44. To Prepare Extracts. The process of obtaining an extract of a substance involves two distinct operations: First, the production of a solution of the soluble portion of the substance operated on; and next, the reduction of this solution to a proper consistence by evaporation. The substance is first, where practicable, reduced to coarse powder by bruising, or sliced with a knife, so that every portion may be fully exposed to the action of the solvent. Refractory substances are first softened by the solvent and then sliced. Other substances whose nature does not require reducing, are used without prepa-

Different fluids are used for solvents, as best adapted to the solubility of the substance under treatment. Some bodies, such as fresh vegetables, yield their juice by expression alone. In the preparation of aqueous extracts, the ingredients are treated with rain or distilled water, until all the soluble matter that solution; it should be of a proper consistence

ulated with acetic acid is employed, vegetable cold, or the dilute acid is sprinkled over the

soluble, or only slightly soluble, in water, alcohol is employed, either in the form of rectified spirit, proof spirit, or diluted. These produce alcoholic or spirituous extracts; and are generally obtained by either maceration or digestion.

Ether is well adapted for obtaining extracts from bodies whose principles consist of volatile oils or resin, on account of its strong affinity for those substances. Such are termed ethereal extracts. In nearly all cases, filtration is necessary to insure a pure extract.

The means usually employed for evaporating an aqueous solution, are rapid boiling over a fire until the extract is thick enough in the state of solution, to the ready-formed to offer some risk of burning, and the evaporation finished over a water bath or in shallow vessels at a moderate neat, the further 1125.) Spirits and acids act by precipitating escape of vapor being promoted by continuthe mucilaginous matter, or yolk. Even the ous surring with a wooden spoon or stick. It addition of a very little lemon juice, or of a is not always advisable to heat a solution to portion of slightly accescent syrup, will often the boiling point, but if boiling is resorted to, entirely destroy an emulsion. This inevitably it cannot be done too rapidly, as the heat cannot rise above its boiling point, and rapid ebullition hastens evaporation. The fluid must never be stirred while ebullition is going on.

Two fundamental rules are:-to conduct evaporation at as low a temperature as is made into emulsions if mixed with an equal consistent with other objects; and,—to exvolume of some simple fixed oil, as that of clude atmospheric air; or, at least, to expose the liquid to its action for as short a time as possible, as most solutions lose more or less of their active principles by heat and exposure. Solutions which will not bear boiling without loss of strength are evaporated in a vacuum, either in a closed still, or under the receiver of an air pump, in which a vessel is placed containing strong sulphuric acid; this has a powerful affinity for water and absorbs its vapor as quickly as it comes in contact with it.

A good plan for evaporation, though slow, is to place the liquid in a broad shallow vessel, exposed in a stove or drying room to a tem-perature of about 100° Fahr., allowing free access for the air. The extracts thus evaporated are said to be lighter in color and more transparent than by most other ways.

The method for evaporating an alcoholic or

an ethereal solution is substantially the same as that pursued with an aqueous solution; except that, as a matter of economy, the vapor may be led off and condensed again.

A good extract should be free from grit, and wholly soluble in 20 parts of the solvent used for making the extract, forming a nearly clear is desired to obtain from them is dissolved, and of uniform texture and color, smooth and

glossy in appearance; this latter can only be: arrived at by assiduous and laborious stirring as the extract thickens; and may be promoted by adding 3 or 4 per cent. each of olive oil and gum arabic, with 1 or 2 per cent. of spirit of wine. Extracts should be put into pots as soon as made, securely tied down with bladder, and kept in a dry place. Any tendency to become mouldy may be prevented by adding, the last thing before removing from the evaporating pan, a few drops of oil of cloves, or a still less quantity of creosote, dissolved in a little alcohol; or by moistening with oil of cloves or creosote, the inside of the

bladder used for covering the pots.
45. To obtain Vegetable Juices by Expression. The juices of plants are obtained by bruising the fresh leaves in a marble mortar, or in a mill, and expressing the juice which, after defecation for some hours in a cool situation, is either filtered through paper, or strained after coagulating its albuninous matter by heat. Some plants require the addition of 1 its quantity of water before pressing. The expression of the juice of lemons, oranges, quinces, &c., is facilitated by previously mixing the pulp with clean chop-Mulberries, &c., after being ped straw. crushed between the hands, are left 3 or 4 days to undergo a slight fermentation, before pressing. A very powerful screw press is required for this purpose. The PRESERVATION of the juices of the narcotic plants, and some other vegetables, has lately assumed considerable interest, from these preparations having been proposed as substitutes for the common tinctures. It appears that the juice of young plants just coming into flower, yields only the amount of extract which may be obtained from the same quantity of juice expressed from the matured plant, or when the flowers are fully blown; and the strength of the product is also inferior. The leaves alone should be preferably employed, and should be exclusively of the second year's growth, when the

plants are biennials. Bruise the leaves in a marble mortar (on the large scale, in a mill), and submit them to the action of a powerful press; allow the than in fresh water, and it is more difficult to juice to remain for 24 hours in a cold place, swim in the latter than in the sea. The then decant the clear portion, add 1 part by measure of spirit (90 per cent.), agitate, and in 24 hours again decant the clear, and filter it through paper. Keeps well under ordinary circumstances.

The method directed by the Paris Codex is as follows: to the fresh leaves, bruised in a marble mortar, is added an equal weight of days, the whole is pressed, and the resulting tincture filtered.

The commencing dose of the narcotic juices is about 5 drops. In the above manner are prepared the preserved juices of aconite, belladonna, colchicum (corms), hemlock, henlydregen gas bane, foxylove, lactuca virosa, taraxacum. &c. 48. To fi

into a bottle, and pour upon it a spoonful of ether; keep in a cool place a few hours, and then fill the bottle with cold water; the essential oil will swim on the surface, and may weight in water, or, in other words, the weight

pecific Gravity is the density of the matter of which any body is composed, compared with the density of another body, assumed as the standard, or 1.000. This standard is pure distilled water for liquids and solids, and atmospheric air for gaseous bodies and vapors. In the United States and England the specific gravity, unless when otherwise expressed, is always taken at 60° F.; but in France at 32°, or the temperature of melting ice. In most cases, however, it is sufficient merely to note the temperature, and to apply a correction, depending on the known density of water or air, at the different

degrees of the thermometric scale.

The above plan has been adopted, because the weight of an equal bulk of different substances varies greatly. Thus, as gold is 19 and silver 10 times heavier than water, those numbers, 19 and 10, are said to represent the specific gravity of gold and silver. The heaviest of all known substances is the very hard metal used for making points to the so-called diamond gold pens. It is called iridium; its specific gravity is 23. Next comes platinum, 21; gold, 19; mercury, 13.5; lead. 11.3; silver. 10; copper, 8; iron, 7; zinc, 6; different kinds of stones, from 4 to 1; aluminum, 2.5. Flax and all woody fibres have a specific gravity of 1.4, and are thus heavier than water, but wood will float or sink according to the number of its pores into which the water does not penetrate. So ebony and many kinds of hard wood sink, pine and all kinds of soft wood float. Cork is the lightest wood, its specific gravity being only 0.24, less than one-quarter that of water. Alcohol is about three-quarters the weight of water, and as the strength of liquor depends on the amount of alcohol it contains, this strength is simply found out by its specific gravity indicated by the more or less floating of a little instrument called a hydrometer, the weaker liquid being little lighter than water has the strongest buoyant power; solutions of dif-ferent salts, sugar, etc., being heavier than water, have a stronger buoyant power; vessels therefore will draw less water in the sea lightest of all liquids has a specific gravity of 0.6; it is called chimogene, and is made from petroleum; it is exceedingly volatile and combustible; in fact, it is a liquefied gas. Carbonic acid gas or choke damp is about 500 times lighter than water; common air, 800; street gas about 2,000, and pure hydrogen, the lightest of all substances, 12,000 times. rectified spirit, and after maceration for 15 The heaviest substance has thus $23 \times 12,000$ or more than a quarter of a million times more weight than an equal bulk of the lightest; and the substance of which comets consist, has by astronomers been proved to be even several thousand times lighter than

46. To Extract Essential Oil from Substance heavier or lighter than Wawood, Barks, Roots, Herbs etc. Take ter. In order to ascertain the specific gravity balm, mint, sage, or any other herb, &c., put of a body heavier than water, the following 48. To find the Specific Gravity of a method is adopted. First weigh it in air, then weigh it immersed in water. The difference between these two weights will be its loss of of the water displaced. Then divide the weight

the specific gravity.

Thus, suppose a substance weighs, 12 pounds in air, and 10 pounds in water.

Its loss is 2 pounds in water.

Divide 12 (weight in air) by 2 (loss in water), and the result is its specific gravity, 6.-That is, the substance is, bulk for bulk, 6 times as heavy as water.

If the substance will not sink in water, then weight must be added to make it just; sink below the surface. This extra weight, added to the weight in air, show its loss in water. Thus, if a substance weighs 8 pounds in air, but requires 2 pounds to be added to submerge it in water, its loss of weight in water is 2 added to 8=10 pounds.

Proceeding as before, we divide its weight in air, 8, by its loss in water, 10 and we have

ti specific gravity $\frac{1}{10} = 8$.

49. To find the Specific Gravity of a Liquid or a Gas. Weigh it in a specific gravity bottle, glass flask, or other vessel of known capacity; and dividing that weight by the weight of the same bulk of water, the quotient is, as before, the specific gravity

50. To find the Specific Gravity of a Solid Body Soluble in Water. Take its specific gravity in regard to some liquid which does not dissolve it, and multiply by the specific gravity of the liquid. Thus, a piece of sugar, whose weight is 400 grains, is found to lose 217.5 grains if weighed when immersed in oil of turpentine; this would make its specific gravity, as compared with oil of turpentine, $\frac{400}{2173} = 1.84$. The specific gravity of the turpentine is 87; then, 1.84×.87=1.6, the real specific gravity of the sugar.

51. To find the Specific Gravity of a

Body in Powder Insoluble in Water. Introduce it into a bottle whose capacity is known; fill the bottle with pure water at 60°. It will hold as much less water as is equal to the bulk of the powder, and the weight of the powder in air divided by this difference will give the specific gravity. Thus, supposing the bottle to hold 1000 grains of water, 100 grains of emery are introduced, and the bottle filled up with water. If no water were dis-placed the two should weigh 1100 grains; they really weigh 1070; the difference, 30 grains, is the weight of water displaced; 100-30-3.333,

specific gravity of the emery.

52. To Determine the Weight of a
Body from its Specific Gravity. A cubic
foot of water weighs 1000 ounces; hence, to determine the weight of a given bulk of any body the specific gravity of which is known, multiply the cubic content in feet by 1000, and this by the specific gravity, and the product will be the weight in ounces avoirdupois.

lcoholmetry. The percentage of absolute alcohol in any spirituous liquid may be given either by volume or weight, but as liquors are sold by ume or weight, but as liquors are sold by at the point when the horizontal line running measure, not weight, it is generally preferred from 53.0 meets the column headed 60°, will to know the percentage by volume. The be found the number 50. We thus ascertain per cent. of weight remains the same in all that a spirit at 75° having an observed strength temperatures, but the per cent. by volume of 53 has only a real percentage of 50 at the

in air by its loss in water, and the result is varies with the temperature or heat of the liquid. Many instruments have been introduced to determine the quantity of absolute alcohol contained in any spirituous liquors, and these are known as hydrometers, or alcoholmeters. Hydrometers made by different inventors have come into use in different countries; thus the hydrometer made by Tralles has been adopted by the governments of the United States and Prussia; that made by Gay Lussac has been legally sanctioned in France and Sweden; while that invented by Sikes has been approved and made the excise standard in Great Britain.

54. Tralles' Hydrometer. Tralles' hydrometer is the instrument used by our government to ascertain the strength of imported liquors, and is made of glass. Tralles has adopted as the standard of comparison pure or absolute alcohol in volume at the temperature of 60° Fah., the strength of which he expresses by a scale divided into 100 degrees or parts, each of which represents τ_{00} part of alcohol. When floated in any spirituous liquor at a temperature of 60° Fah., it immediately indicates the strength. For instance, if in a brandy at that temperature it sinks to 65, it shows that 65 parts of the liquor is absolute alcohol, and 35 parts water; should it sink to 90, it indicates that the liquor is 90 parts or per cent. strong, and so on.

An increase of heat causes liquids to expand in volume, and a decrease produces contraction; therefore spirits over the normal temperature of 60° Fah. appear stronger than they really are, and below 60° they are really

stronger than they appear to be.

It is therefore evident that the degrees of percentage of this hydrometer are only correct when the spirit under trial has the normal temperature of 60° Fah. When the temperature varies from 60°, the percentage can only be ascertained by a long and tedious calculation. To avoid this Mr. Tralles has constructed a simple table by which the real percentage of alcohol is found in liquids of different temperatures from the results exhibited by the instrument. (See No. 55.) The horizontal line at the top shows the various temperatures given by the thermometer; the column of figures under 60° shows the true percentage of strength at the normal or standard temperature of 60°; the figures under the other degrees of temperature show the observed or apparent degrees of strength as indicated by the hydrometers.

As an example of the simple manner by which this table may be used, we will suppose that the temperature of the spirits to be tested is at 75°, Fah., and that the hydrometer sinks to 53° on the scale; this would be the observed or apparent degree or percentage of strength. Now to find the real percentage of strength at 60°, we turn to the table and find the upright or vertical column of figures headed 75°, we then run down the figures until we arrive at 53.0; having ascertained this, we then trace the horizontal line to the left or right to the outside column headed 60°, and

normal or established temperature of 60°. the true percentage of the brandy at 60° Fah. select the column headed 50°, and run down be found to express its actual strength at 60° the figures until we find 53.0, then by tracing Fah. the horizontal line until we arrive at the outside column headed 60° (either the first or are sufficient to show the manner by which

Suppose that another sample of brandy, instead of being at 75° is at 50°, and the instrument still sinks to 53. In the same way we by volume, by reference to the table 30 will

We might multiply examples, but the above

last column), we find the number 55, which is the table may be worked.

55. Table to find the true percentage of Absolute Alcohol by volume in a liquid at 60° from the observed percentage indicated by a Glass Hydrometer at any other temperature.

60°	300	35 °	400	45°	$_{-}50^{\circ}$	55°	650	700	75 ⁰	80°	85 °	60°
0	-0.2	0.4	-0.4	0.5	-0.4	-0.2	+0.2	+0.6	+1.0	+1.4	+1.9	0
5	+4.6	-4.5	+4.5	+4.5	+4.6	+4.8	5.3	5.8	6.2	6.7	7.3	5
10	9.1	9.0	9.1	9.2	9.3	9.7	10.4	11.0	11.6	12.3	13.0	10
15	13.0	13.1	13.3	13.5	13.9	14.5	15.6	16.3	17.1	18.0	19.0	15
[20 [16.5	16.9	17.4	17.8	18.5	19.2	20.8	21.8	22.8	23.8	24.9	20
25	19.9	20.6	21.4	22.2	23.0	24.1	25.9	27.0	28.2	29.4	30.5	25
30	23.5	24.5	25.7	26.6	27.7	28.8	31.1	32.2	33.4	34.5	35.7	30
35	28.0	29.2	30.4	31.6	32.7	33.3	36.2	37.3	38.4	39.5	40.6	35
40	33.0	34.2	35.4	36.7	37.8	39.0	41.1	42.2	43.3	44.3	45.4	40
45	38.4	39.6	40.7	41.8	42.9	43.9	46.1	47.1	48.2	49.2	50.3	45
50	43.7	44.7	45.8	46.9	47.9	49.0	51.0	52.0	53.0	54.0	55.1	50
55	49.0	50.0	51.0	52.0	53.0	54.0	54.9	56.9	57.9	58.9	59.9	55
60	54.2	55.2	56.2	57.1	58.1	59.0	60.9	61.9	62.9	63.8	64.9	60
65	59.4	60.3	61.2	62.2	63.1	[-64.0]	65.9	66.8	67.7	68.6	69.6	65
70	64.6	65.5	66.4	67.3	68.2	69.1	70.8	71.7	72.6	73.5	74.5	70
75	69.8	70.7	71.5	72.4	73.3	74.2	75.8	76.7	77.6	78.4	79.3	75
80	75.0	75.8	76.6	77.5	78.4	79.2	80.8	81.7	82.4	83.2	84.1	80
85	80.3	81.1	81.8	82.6	83.5	84.3	85.7	86.5	87.3	88.0	88.8	85
90	85.6	86.4	87.1	87.9	88.6	89.3	90.7	91.4	92.0	92.7	93.4	90

The following table gives the rickness or when tested; it therefore requires that the the per cent. of alcohol by volume, in reference liquor should be tested exactly at the same to the volume of the liquid at the temperature | temperature at which it was measured.

56. Table to find the true percentage of Absolute Alcohol in a liquid of any temperature from the observed percentage indicated by the Glass Hydrometer at the same temperature.

True per ci.		Observed per cent. indicated by the Glass Hydrometer.											
of Alcohol by Volume.	30℃	350	400	450	500	55°	65°	70°	75°	80 ⁰	850		
0	0.2	0.4	-0.4	0.5	0.4	-0.2	+0.3	+0.6	+1.0	+1.4	+1.9		
5	+4.0	- 4.5 ′	+4.5	+4.5	+4.6	+4.8	5.3	5.8	6.2	6.7	7.3		
10	9.1	9.0	9.1	9.2	9.3	97	10.4	11.0	11.6	12.3	13.6		
15	13.0	13.1	13.3	13.6	14.1	14.5	15.6	16.3	17.1	18.0	19.		
20	16.5	16.9	17.4	17.9	18.5	19.2	20.8	21.8	22.9	23.9	25.		
25	19.8	20.5	21.3	22.2	23.0	24.1	25.9	27.1	28.3	29.5	30.		
30	23.3	24.3	25.5	26.5	27.6	28.8	31.2	32.3	33.5	34,6	35.		
35	27.5	28.9	30.2	31.4	32.6	33.8	36.3	37.5	38.6	39.7	40.		
40	32.5	33.8	35.1	36.5	37.7	38.9	41.2	42.4	43.5	44.6	45.		
45	37.8	39.1	40.3	41.5	42.7	43.8	46.2	47.3	48.5	49.6	50.		
50	43.1	44.2	45.4	46.6	47.7	48.9	51.1	52.2	53.4	54.5	55.		
55	48.3	49.4	50.5	51.6	52.8	53.9	56.1	57.2	58.3	59.4	60.		
60	53.4	54.5	55.6	56.7	57.8	58.9	61.1	62.2	63.3	64.4	65.		
65	58.4	59.5	60.6	61.7	62.8	63.9	66.0	67.1	68.2	69.3	70.		
70	63.5	64.6	65.7	66.8	67.9	69.0	71.0	72.1	73.2	74.3	75.		
75	68.6	69.7	70.7	71.8	72.9	74.0	76.0	77.1	78.2	79.2	80		
80	73.7	74.8	75.8	76.9	78.0	79.0	81.0	82.1	83.1	84.1	85		
85	78.8	79.8	80.9	81.9	83.0	84.0	86.0	87.0	88.0	89.0	90		
90	84.0	85.1	86.1	87.1	88.1	89.1	91.0	91.9	92.8	93.7	94		

Thus, if the Hydrometer indicated 59.4 per cent. in a liquid at 80° Fah., the table in No. 57 would give its true percentage (richness) to 55 per cent.; that is, 100 volumes of the liquid at 80° contains 55 volumes of alcohol. Tralles' Hydrometer gives the per cent. by volume only. If it be desired to know the per cent. by weight, it may be ascertained from the percentage in volume of the liquid at 60° Fah. by table in No. 57.

57. Table of Comparison between the per cent. of Alcohol by volume at 60° (Tralles')

and percent, by weight.

Рe	r Cent.	. I e	r Cent.	Per	Cent.		Cent.
by Vol	by Weight.	by Yal	Weight.	by Weight.	Volume.	hy Weight	Volume.
0	0.	55	47.29	0	0.	55	63.97
0 5	4.00	60	52.20	5	6.25	60	68.97
10		65	57.25	10	12.42	65	73.79
15	12.15	70	62.51	15	18.52	70	78.40
20	16.28	75	67.93	20	24.57	75	82.80
25		80		25	30.55	80	86.97
30		85		30	36.43	85	90.88
35		90		35	42.25	90	94.46
40	33.39	95	92.46	40=	47.92	95	97.61
45			100.00	45	53.43	100	100.00
50				50	58.79		

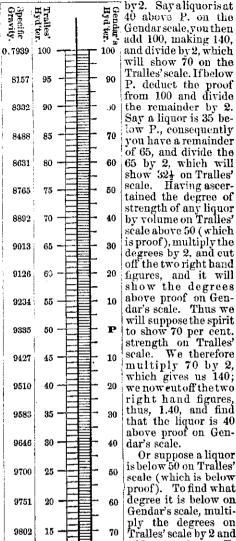
58. Gendar's Hydrometer. Annexed we give a comparative view of the scales of Tralles and Gendar, the former used by the revenue officers of the United States for imported liquors, and indicating the per cent. by volume of alcohol in spirituous liquors, and the latter used throughout the whole country for domestic liquors, determining the per cent. above and below proof.

This is inserted for the convenient comparison of the American standards. other areometers reduced to specific gravity

will be found in Nos. 6155. &c.
The first column of the table exhibits the specific gravities at 60° Fah., for mixtures of pure alcohol and water :- taking water at the temperature of its greatest density, about 39.5° Fah., as 1.0000, and, therefore, having at 60° Fah. a specific gravity of 0.9991. Of the above mixtures, each 100 gallons or measures contain the number of gallons or measures of alcohol indicated in the second column (Tralles' hydrometer scale) if measured at 60° Fah.

In the Tralles' hydrometer scale there is no reference to proof of any denomination; and in that of Gendar's there is but one proof, marked P. on the hydrometer; the others, such as 2d, 3d and 4th proofs, were, at all times, incorrect and deceptive. The National Tax Law, of August 1st, 1862, says that "the term proof shall be construed, and is hereby declared to mean that proof of a liquor which corresponds to 50 degrees of Tralles' hydrometer at the temperature of 60 degrees Fah." Proof spirit is, therefore, by law, of the alcoholic strength of 50 per cent. by volume, having a specific gravity of 0.9335, or a mixture of equal quantities of absolute alcohol at the specific gravity of 0.793, and distilled water at 60° Fah. In other words, proof spirit is one-half pure water and half absolute alco-

To ascertain what strength any liquor above proof by the Gendar hydrometer would be by



is below 50 on Tralles' scale (which is below proof). To find what degree it is below on Gendar's scale, multiply the degrees on Tralles' scale by 2 and add a number sufficient to make 100; the number required to be added will show the degree below proof.

59. Tralles' Table 100

of Percentage of When the temperature of the Alcohol. spirit is 60° Fah., the first column of the table on page 26 gives at once the percentage of alcohol by measure; when the temperature is below 60° an addition must be made of 1 measure per cent. for every 5 degrees of the thermometer; and when above 60° a like quantity must be deducted. This correction will amount to the fraction } or the decimal 2 for every single degree, and is very easily made. If the specific gravity sought cannot be found exactly in the table, the difference between it and the next greater specific gravity in the table must be taken, which will give the numerator of a fraction, having for its denominator the number found the Tralles hydrometer, add 100 to the given in the third column against the next greater proof if above proof, or deduct, if below proof, number just employed. This fraction, added from 100 on the Gendar scale, and divide to the percentage of alcohol in the first

985

9919

0.9991

column of the table against the said specific gravity, will give the true percentage sought. Thus, if the specific gravity of a spirituous liquor is .9605, what is its alcoholic content? Here .9605 is not in the table, but the next greater number is .9609; the former must greater number is .9609; the former must greater be deducted from the latter, and the

Tralles' Table exhibiting the percentage, by volume, of Alcohol, corresponding to any given specific gravity.

			·P·	cijic gravi	·9·			
Alcohol in 100 Measures of Spirit.	Specific Gravity at 60° F.	Difference of Specific Gravity.	Alcohol in 100 Measures of Spirit.	Specific Gravity at 60° F.	Difference of Specific Gravity.	Alcohol in 100 Measures of Spirit.	Specific Gravity at 60° F.	Difference of Specific Gravity.
Pure water	.9919	00	34	.9596	13	68	.8941	24
1	.9976	15	35	-9583	13	69	8917	$\tilde{24}$
2	-9961	15	36	.9570	13	70	.8892	25
3	.9947	14	37	.9556	14	71	.8867	25
4	.9933	14	38	-9541	15	72	-8842	$\tilde{25}$
5 6	.9919	14	39	-9526	15	73	.8817	25
6	-9906	13	40	-9510	$\tilde{16}$	74	.8791	26
7 8	-9893	13	41	-9494	16	75	.8765	26
8	-98-4	12	42	-9478	16	76	8739	$\tilde{2}^{\circ}_{6}$
9	-9869	12	43	-9461	l iř	77	-8712	27
10	-9857	12	44	-9444	17	78	.8685	27
11	-9845	12	45	-9427	17	79	.8658	27
12	-9834	11	46	-9409	18	80	.8631	27
13	-9823	11	47	.9391	18	81	.86Ca	2 8
14	.9812	11	48	-9373	18	82	.8575	28
15	.9802	10	49	-9354	19	83	.8547	28
16	-9791	11	50	-9335	19	84	.8518	29
17	.9781	10	51	-9315	20	85	-8488	30
18	-9771	10	52	-9295	20	86	.8458	30
19	.9761	10	53	-9275	20	87	.8428	30
20	-9751	10	54	-9254	21	88	.8397	31
21	.9741	10	55	-9234	20	89	.8365	32
22	.9731	10	56	-9213	21	90	.8332	33
23	.9720	11	57	-9192	21	91	-8299	33
24	.9710	10	58	.9170	22	92	.8265	34
25	.9700	10	59	-9148	22	93	-8239	35
26	-9689	11	60	.9126	22	94	.8194	36
27	-9679	10	61	.9104	22	95	.8157	37
28	.9668	11	62	.9082	22	96	-8118	39
29	-965 7	11	63	-9059	23	97	.8077	41
30	-9646	11	64	-9036	23	98	.8034	43
31	-9634	12	65	.9013	23	99	.7988	46
32	.9622	12	66	-8989	24	Pure)	.7939	49
33	-9609	13	67	.8965	24	Alcohol	.7939	45

60. Table for reducing the strength of Alcohol. The following Table given by Booth, shows the quantity of water that must be added to alcohol of a given strength, in order to produce an alcohol of inferior strength.

The upper horizontal column contains the

	Por north	omun con		outino taro	THE UNIO TO	To nanu C	oruma,		
Desired strength in per cent.	90	85	80	75	70	65	60	55	50
85	6.56								
80	13.79	6.83							
75	21.89	14.48	7.20						
70	31.05	23.14	15.35	7.64					
65	41.53	33.03	24.66	16.37	8.15		,		
60	53.65	44.48	35.44	26.47	17.58	8.56		-	
55	67.87	57.90	48.07	38.32	28.63	19.02	9.47		
50	84.71	73.90	63.04	52.43	41.73	31.25	20.47	10.35	
45	105.34	93.30	81.38	69.54	57.78	46.09	34.46	22.90	11.41
40	130.80	117.34	104.01	90.76	77.58	64.48	51.43	38.46	25.55
35	163.28	148.01	132.88	117.82	102.84	87.93	73.08	58.31	43.59
30	206.22	188.57	171.05	153.61	136.04	118.94	101.71	84.54	67.45
25	266.12	245-15	224.30	203.53	182.83	162.21	141.65	121.16	100.73
20	355.80	329.84	304.01	278.26	252.58	226.98	201.43	175.96	150.55
15	505.27	471.	436.85	402.81	368.83	334.91	301.07	267.29	233.64
10	804.54	753.65	702.89	752.21	601.60	551.06	500.59	450.19	399.85

Illustration. If we have alcohol of 70 per materials. This variety of Baumé's hydromcent. strength, and desire to reduce its eter is usually called a saccharometer, and strength to 40 per cent.—we look for 40 in when plunged in pure water at 58° Fahr, marks line with it in the column headed 70, we find to be 77.58. This shows that we must add 77.58, or a trifle over 77½ gallons of water to 100 gallons of our 70 per cent. alcohol, to produce a spirit of 40 per cent. strength.

61. Baumé's Hydrometer for Liquids etc. The temperature at which Baumé's hydrometer was originally adjusted was 54½° Fahr.:

Lighter than Water. In Baumé's hydrometer for liquids lighter than water, the instrument is poised, so that the 0 of the scale is at the bottom of the stem, when it is floating in a solution of 1 ounce common salt in 9 ounces water, and the depth to which it sinks in distilled water shows the 10th degree; the space between these fixed points being equally divided.

62. Table showing the Specific Gravity corresponding with the several degrees of Baumé's Hydrometer for liquids lighter than

Degrees Baumé	Specific Gravity.	Degrees Baumé	Specific Gravity.
6 0°	-745	340	.859
59	-749	33	-864
58	.753	32	.869
57	-757	31	.874
56	-760	30	.880
55	-764	29	-885
54	.768	28	.890
53	.773	27	896
52	.777	26	.901
51	-781	25	.907
50	.785	24	.913
49	-789	23	-918
48	.794	22	.924
47	.798	21	.930
46	-802	20	.936
45	.807	19	.942
44	-811	18	.948
43	.816	17	954
42	.820	16	.960
41	.825	15	.967
40	.830	14	.973
39	-834	13	.980
38	.839	12	986
37	-844	11	.993
36	.849	10	1.000
35	-854	(1

63. Baumé's Hydrometer for Liquids Heavier than Water. In the hydrometer for liquids heavier than water, the position of the fixed points is reversed; for the 0 is at the top of the stem, and denotes the level to which the hydrometer sinks in distilled water the 10th degree is lower down, and shows the level to which it sinks in the saline solution,

and the gaduation is continued downwards.

64. Baume's Areometer, or Saccharometer for Liquids Heavier than Water. This instrument is generally in use in this country and in France, when it is necessary country and in France, when it is necessary to ascertain the strength or density of a liquid heavier than water. In England, Twaddel's hydrometer is mostly employed for the purpose. Baumé's instrument is principally of the specific gravity.

II. For liquids lighter than water.—Add the degree of Baumé to 130, and divide it into the quotient is the specific gravity. del's hydrometer is mostly employed for the purpose. Baumé's instrument is principally used by confectioners to test the density of syrup; also by brewers and distillers to distillers cover the quantity of saccharine matter in wort; and by soap manufacturers and dyers to prove the strength of their lyes and dyeing than water.—Divide the specific gravity into

the left-hand column, and the figures on a 0 upon its scale; in a solution containing 15 per cent. of common salt and 85 of water by weight, it marks 15°; so that each degree on

> eter was originally adjusted was 5410 Fahr; it is now commonly adjusted to 58° or 60° Fahr.; hence arise the discrepancies observable in the published tables of the "correspond-ence between degrees of Baumé's and real

> specific gravities."
>
> 65. Table showing the Specific Gravity corresponding with the several degrees of Baumé's Hydrometer for liquids heavier than water.

Degrees of Baumé.	Specific Gravity.	Degrees of Baumé.	Specific Gravity.
0	1000	39	1372
1	1007	40	1384
2	1014	41	1398
3	1022	42	1412
4	1029	43	1426
5	1036	44	1440
6	1044	45	1454
7	1052	46	1470
8	1060	47	1485
9	1067	48	1501
10	1075	49	1516
11	1083	50	1532
12	1091	51	1549
13	1100	52	1566
14	1108	53	1583
15	1116	54	1601
16	1125	55	1618
17	1134	56	1637
18	1143	57	1656
19	1152	58	1676
20	1161	59	1695
21	1171	60	1715
22	1180	61	1736
23	1190	62	1758
24	1199	63	1779
25	1210	64	1801
26	1221	65	1823
27	1231	66	1847
28	1242	67	1872
29	1252	68	1897
30	1261	69	1921
31	1275	70	1946
32	1286	71	1974
33	1298	72	2002
34	1309	73	2031
35	1321	74	2059
36	1334	75	2087
37	1346	76	2116
38	1359	11 , ,	~~~

66. To Convert Degrees Baumé into Specific Gravity. I. For liquids heavier than water.—Subtract the degree of Baumé

145, and subtract from 145; the remainder should be used for stirring, and the test liquid is the degree of Baumé.

II. For liquids lighter than water.—Divide

and dveing establishments in Scotland, and 1000 added makes 1150, the specific gravity, a drop at a time to avoid the risk of loss by To find the degree of Twaddell corresponding excessive effervescence. to any specific gravity, deduct 1000 from the specific gravity, and divide the remainder by 5; the quotient will be the corresponding de-

Twaddell corresponding to 1150 specific gravity, deduct 1000 from 1150, and divide the remainder, 150, by 5, and the quotient, 30, gives the degrees of Twaddell required. In this bonate of potassa, may be used either 135 bonate of potassa, may be used either 135 bonate of potassa. degrees of Baumé are equivalent to a specific grains dry carbonate of soda. (See No. gravity of 1275; and this, according to the 80.) above rule, will give 55 degrees Twaddell. By reversing this process, Twaddell can as readily be reduced to Baumé,

cetimetry. The art of deterthe purpose, based on—the quantity of acid required for saturation;—the specific gravity after the liquid has been neutralized with hydrate of lime; -and the simple specific be taken of any mineral acid which may have been added, as is common with vinegars, to

are referred to in many places, in speaking testing, deducted from the previous weight of of strengths, it may be convenient to know that 51 parts of dry acetic acid are equal to 60 parts of glacial. (See No. 81.) Hence the weight of glacial acid multiplied by .8512, gives the weight of dry acid; and the weight of glacial by 1.1748 gives a very

71. Precautions in Testing Acids. It of a sample under inspection, add cautiously is essential to success, in testing acetic or from a weighed quantity of powdered pure other acids by saturation, to hit the exact dry bicarbonate of potassa, sufficient to propoint of neutralization. It will be found greatly duce exact neutralization; carefully re-weigh to simplify matters to tint with litmus (see No. the bicarbonate unconsumed. Double the 78) either the sample under examination, or loss in grains will indicate the percentage of the test liquid; but when litmus is used, it is acid in the liquid tested. advisable to apply a gentle heat to the test

added drop by drop.

72. To find the strength of Acetic the specific gravity into 140 and subtract 130 Acid by its Saturating Power. Dissolve from the quotient; the remainder will be the 196½ grains pure crystallized bicarbonate of degree of Baumé. 68. Twaddell's Hydrometer. This sufficient water to make up exactly 1000 min-Hydrometer is much used in the bleaching ims, or the 100 divisions of an acidimeter, a graduated glass tube of 100 divisions, each some parts of England. According to this division representing 10 minims. (See illustrascale 0 is equal to 1000, or the specific gravity tions, No. 82.) A solution is thus formed, of distilled water, and every additional 5 de- which, when added by degrees to 100 minims grees of specific gravity adds 1 degree to of the acetic acid or vinegar under examina-Twaddell's scale. So that, in order to find the tion, until the latter is exactly saturated, specific gravity corresponding to any degree indicates the exact amount of acid present in of Twaddell's scale, multiply the degree by the sample. Each minim of the alkaline solu-5 and add 1000; thus, if this hydrometer tion thus employed represents 1 per cent. of shows 30°, 30 multiplied by 5 gives 150, and dry acetic acid. The test liquid must be added

73. To find the strength of strong Acetic Acid. If strong acetic acid be under inspection, it will be found convenient, pre gree of Twaddell.

Thus, if it be required to find the degree of to 8 times its weight of distilled water, according to its degree of concentration. Dilute cording to its degree of concentration. Dilute

way the corresponding degrees of Twaddeli grains dry (see No. 12) carbonate of potassa, and Baumé can easily be found. Thus, 31 281 grains crystallized carbonate of soda, or

By using 981 grains (half the quantity) of the bicarbonate of potassa, we obtain a still more delicate test liquid; as each minim used for saturating a sample of acid will rep-

resent only ½ of 1 per cent. of dry acid.

74. To find the strength of Acetic Acid by Saturation without an Acidimeter. The foregoing method can also be vinegar. Several methods are employed for applied to test by weight, instead of by an acidimeter; 1000 grains of the test liquid are used in testing 100 grains of acid. Every grain of the test liquid necessary to produce saturation indicates 10 grain of dry acid, and gravity. In all these methods, account should every ten grains are equal to 1 per cent. Schuster's alkalimeter is a convenient instrument for this process. (See No. 82.) 1000 grains of the test liquid are introduced into impart artificial strength.

70. To find the Comparative Weights of Dry and Glacial Acetic Acid. As weight of the bottle and solution, after using both dry and glacial (or hydrated) acetic acid such portion of its contents as is required for such portion of its contents as is required for

weight of glacial acid multiplied by .8512, gives the weight of dry acid; and the weight of dry acid, multiplied by 1.1748 gives a very close approximation to the weight of glacial acid.

71 Precautions in Testing Acids. It of a sample under inspection, add cautiously gives a weight of gracial purposes, is as follows:—To 100 or 1000 parts (or grains) of a sample under inspection, add cautiously gives a weight of glacial weight of powdered pure

76. Ure's Test of the strength of Acettube when saturation appears nearly reached; ic Acid. Ure's test gives very accurate rethe heat will expel from the liquor the free carbonic acid, which itself has the property proper specific gravity. To 100 grains of a of reddening litmus. A glass or wooden rod sample, very slightly reddened with neutral

monia of specific gravity .992 from an acidimeter (see No. 82) until perfect neutralization is therefore by the rule of proportion, since effected, indicated by the original blue color 100: 40::60:24, the sample contains 24 per of the litmus being restored. The number of acidimetric divisions of ammonia expended, multiplied by 51 (for dry) or by 60 (for glacial) and the product divided by 100, will give, respectively, the percentage of dry or glacial acid in the sample. Thus:—if a sample of vinegar takes 10 acidimetric divisions of ammonia to neutralize it, then 10 multiplied by 51, and divided by 100, gives 5.10, equivalent to $5\frac{1}{10}$ per cent. of dry acid:—or, 10 multiplied by 60 and divided by 100, gives 6 per stoppered bottle, and will be always ready for to 5½ per cent. of dry acid:—or, 10 multiplied by 60 and divided by 100, gives 6 per

cent. of glacial or hydrated acid in the sample.
77. Ure's Test, by Grains, of the strength of Acetic Acid. The same strength of ammonia is to be used in the acidimeter as in the preceding test, and the number of grain-measures of ammonia employed for a multiplier instead of acidimetric divisions. The only difference is, that the product in each case must be divided by 1000 instead of 100, to give the percentage of acid.

Acidimetry. The estimation of the quantity of an acid contained in any given sample.

The methods used are founded chiefly on the capacity of acids to saturate or neutralize alkaline bases; and, in some of the liquid

acids, on specific gravity.

The accuracy of the tests, when satura-tion is resorted to, depends greatly on the exact point of neutralization, as already remarked under the head of Acetimetry. proper point is arrived at when the liquid, after being slightly 'ested, ceases to redden litmus, or does not after the color of turmeric paper (see Test Papers); if it turns the latter brown, too much test-liquid has been added, and the operation becomes useless. A good method is to tint either the acid sample or the test-liquid with a few drops of litmus (see No. 71), when the reddish shade will gradually deepen to purple as the point of saturation is approached, and the blue color be restored as seen as that point is reached.

79. To test the strength of an Acid by Saturation. Place in a test tube 100 grains of the acid to be examined; if the acid be liquid, dilute it-if solid, dissolve it-in 6 or 8 times its weight of distilled water. Then exactly neutralize it with an alkali added drop by drop. The known quantity of alkali consumed for this purpose represents an equivalent quantity of the actual acid contained in the test tube. The common practice is to dissolve 1 equivalent (see No. 80) of an alkaline test in water, and to make up the solution to 1000 grains (100 acidimetric divisions). The equivalent value of the test-liquid is then 100; hence, the quantity of the sample tested will bear the same proportion to the equiva-lent number (see No. 81) of the acid under examination, that the acidimetric divisions of the test-liquid consumed, bear to the percent-tilled water, termed grain measures.

(blue) tincture of litmus, add liquor of am- | the percentage of the acid? The equivalent of dry sulphuric acid is 40 (see No. 81);

cent. of dry sulphuric acid.

In this method the choice of the re-agent must depend on the operator. Some prefer the ammonia test (see No. 76), which is very convenient and easily applied; others give a preference to bicarbonates or carbonates of potassa or soda. Whichever be adopted, it must application.

80. Table of Equivalents of Alkalis.

-	GRAINS.
Pure ammonia	17
Dry carbonate of soda	53
Crystallized carbonate of soda	143
Crystallized bicarbonate of sod	
Dry carbonate of potassa	
Crystallized carbonate of potas	sa. 87
Crystallized bicarbonate of pota-	
Pure or caustic soda	31
Pure or caustic potash	47
Sesquicarbonate of soda	
Neutral carbonate of ammoni	a 43 1
Sesquicarbonate of ammonia.	59
Bicarbonate of ammonia	79
AAA 4	

1000 grain measures of pure water of ammonia of specific gravity .992, contain 17 grains or 1 equivalent of pure gaseous ammo-

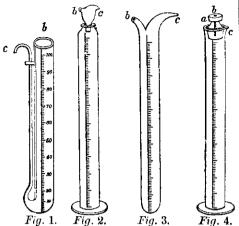
nia.

It is understood that all crystals must be perfectly free from attached water, but not in the least effloresced.

81. Table of Equivalents of Acids. This table is based on the foregoing table of alkalis; so that, for instance, 1 equivalent (17 grains) of pure ammonia will exactly neutralize 1 equivalent (22 grains) dry carbonic acid,

0 G +	
	GRAINS.
Anhydrous acetic acid	51
Hydrated or crystallized acetic acid	60
Dry benzoic acid	
Crystallized benzoic acid	122
Dry boracic acid	35
Crystallized boracic acid	62
Dry earbonic acid	22
Dry citric acid	
Crystallized citric acid	
Dry hydrochloric acid	
Liquid hydrochloric acid (sp.gr.1.16	
Dry malie acid	58
Dry nitric acid	54
Liquid nitric acid (sp. gr. 1.5)	67
Liquid nitric acid (sp. gr. 1.5) " " (sp. gr. 1.42)	90
Dry oxalic acid	36
Dry oxalic acid	63
Dry sulphuric acid	40
Liquid sulphuric acid (sp. gr. 1.845	
Dry tartarie acid	
Crystallized tartaric acid	
OO A-Idi An acidimat	

82. Acidimeter. An acidimeter is a glass tube, graduated with 100 divisions, each division representing 10 grains of disage of acid sought. For example: Suppose acidimeter is used for testing acids and alka100 grains of a sample of sulphuric acid require 60 acidimetric divisions (600 grains) of venience in pouring by drops. Where great the test-liquid to neutralize them; what is delicacy is required in pouring or dropping, the outward flow can be instantly arrested, by adding sufficient of the test acid drop by merely by placing the finger or thumb on an drop. If the saturation is complete, it will



the contained liquid; b, the orifice for the ingress of air, to be stopped by the finger or thumb; in Fig. 2, both orifices are in a hollow movable stopper; in Fig. 4, the air-hole

only is in the stopper, a.

Fig. 1 represents Gay Lussac's Pouret. Fig. 2, Normandy's modification of Schuster's Alkalimeter.

Fig. 3, Birck's Alkalimeter.

Fig. 4 is a simple acidimeter, with a stopper fitted to it, having a groove to correspond with the lip, and a vent-hole drilled through it to admit the air.

These modifications of the simple acidimeter are employed to allow of the test-liquid being added a single drop at a time, which is absolutely necessary during the first part of the process, to prevent undue effervescence, and consequent danger of loss of the liquid; and in the latter part it is equally indispensable in order to attain exact saturation. They dispense with the use of a separate pipette, being, in fact, acidimeters and pipettes com-

lkalimetry. Alkalimetry. The method of estimating the strength of alkalis. The processes used are the same as in acidimetry; only that the unknown quantity sought is an alkali, and the test applied is an acid. The test acid is 1 equivalent (40 grains, see No. 81) of sulphuric acid sp. gr. 1.032 at 60° Fahr. inserted in an acidimeter (see No. 82) and made up with distilled water to 100 acidimetric divisions

To find the strength of an Alkali Place 100 grains of the alkali in a tube, and agitate it with about ½ ounce hot water. When settled, pour off the clear into a vessel for trial. Repeat this process until nothing soluble remains in the test tube, shown by the last washing not affecting the color of turmeric paper. Care must be taken not to waste the smallest portion of the liquid, as it would render the results inaccurate.

various appliances are resorted to, by which | Next, exactly neutralize the alkaline solution merely by placing the finger or thumb on an arop. If the saturation is complete, to the orifice arranged for the ingress of air. In the neither turn litmus paper red, nor turneric illustrations, c denotes the place of egress for paper brown. (See No. 78.) The weight of alkali tested, bears the same relation to its equivalent weight (see No. 80), that the acidimetric divisions of acid used, do to the percentage of alkali sought.

Thus:-If we test 100 grains of potash and find it requires 35 acidimetric divisions of test acid to saturate it, we refer to table No. 80, and find that the equivalent of pure potash is 47 grains. Then 100:47::35:16.45.

That is, the sample of potash under examination contains nearly 161 per cent. of purc potash. (See No. 587.)

The Thermometer. In Fahrenheit's Thermometer, which is universally employed in this country and Great Britain, the freezing point of water is placed at 32°, and the boiling point at 212° and the number of intervening degrees is 180.

The Centigrade thermometer, which has long been used in Sweden under the name of Celsius' thermometer, and is now employed on the continent of Europe generally, marks the freezing point at Zero or 00, and the boiling point at 100° .

In Reaumur's thermometer, used in France before the revolution, the freezing point is Zero, and the boiling point 80°.

Degrees below zero are distinguished by prefixing the minus sign, thus -; so that -17° Fahr, represent a temperature of 17° lower than zero, equivalent to 49 degrees below freezing point.

To Convert degrees of Centigrade into degrees of Fahrenheit. Multiply the degrees of Centigrade by 9, and divide the result by 5:—then add 32.

Thus: to find the degrees of Fahrenheit

equivalent to 30 degrees of Centigrade.

30 degrees Centigrade. Multiplied by 9

Divided by 5)270

Add 32

Answer, 86 degrees Fahrenheit.

87. To reduce degrees of Fahrenheit to the corresponding degrees of Centigrade. Reverse the above process—First deduct 32 from the degrees of Fahrenheit, then multiply the difference by 5, and lastly divide the result by 9.

> Thus, 86 degrees Fahrenheit. Deduct 32

Multiplied by

Divided by 9)270

Answer, 30 degrees Centigrade.

88. To Reduce degrees of Reaumur to the corresponding degrees of Fahrenheit. Multiply the degrees of Reaumur by a divide the result by 4, and then add 32.

Thus, 24° Reaumur.

Multiplied by 9

Divided by 4)216

54

Add 32

Answer, 86° Fahrenheit.

89. To reduce degrees of Fahrenheit to corresponding degrees of Reaumur. Reverse the above process.

90. To reduce degrees of Reaumur to Centigrade. Add to the degrees of Reaumur their one-fourth part.

Thus, 40° Reaumur. Add one-fourth, 10

Answer 50° Centigrade.

91. To reduce degrees of Centigrade to Reaumur. Deduct one-fifth part.

Thus, 50° centigrade Deduct one-fifth 10

Answer, 40° Reaumur.

92. Table of corresponding degrees of Fahrenheit, Reaumur and the Centigrade.

	Fahrenbeit.	Reaumur.	Centigrade.
Boiling.	212	80	100
J	203	76	95
	194	72	90
	185	68	85
	176	64	80
	167	60	75
	158	56	70
	149	52	65
	140	48	60
	131	44	55
	122	40	50
	113	36	45
	104	32	40
	95	28	35
	86	24	30
	77	20	25
	68	16	20
	59	12	15
	50	8	10
T- 1	41	4	5
Freezing.	32	0	0
	23	— 4	— 5
	14	8	10
	5	—12	— 15
	- 4	-16	-20
	-13	-20	25
	22	-24	30
	-31	-28	- 35
	40	- 32	40

All intermediate degrees can be obtained by the preceding rules.

The Art of Dyeing. art of fixing coloring matters uniformly and permanently in the fibres of wool, silk, linen, cotton, and other substances. Dyeing is a chemical process, and the mode of its performance depends upon the substance operated on. Thus it is found that the process by which wool is dyed black, would only impart a rusty brown to linen. Wool unites with almost all coloring matters with great facility, silk in the next degree, cotton less easily than silk, and linen with even more difficulty. Preparatory to the operation of dyeing, each of these substances undergoes a species of preparation to free the fibres from adhering foreign matter, as dirt, grease, &c, which would prevent the absorption of the aqueous fluid to be afterwards applied, as well as impair the brilliancy of the dye. Wool is cleaned or scoured by means of a weak alkaline lye, soap and water, or putrid urine; the latter being very generally used for this purpose. Silk is cleaned from the natural varnish that covers it, by boiling with white soap and water. Cotton and linen are cleaned with alkaline lyes of more or less density. The substances so prepared are ready to undergo the various operations of dyeing.

Among the various coloring materials employed by dyers, some impart their tints to different substances by simple immersion in their infusions or decoctions, and have hence been called "substantive colors;" but by far the greater number only impart a fugitive dye, unless the fibres of the stuff have been previously filled with some substance which has a strong affinity for the latter on the one hand, and the coloring material on the other. The substances applied with this intention are called "Mordants," and generally exercise the double property of "fixing" and "striking" the color. Thus, if cotton goods be dyed with a decoction of madder, it will only receive a fugitive and dirty red tinge, but if it be first run through a solution of acetate of alumina, dried at a high temperature, washed, and then run through a madder bath, it will come out a permanent and lively red. The principal mordants are the acetates of iron and alumina, sulphate of iron, alum, and some other chemical salts. A perfect knowledge of the effect of mordants on different coloring substances is of paramount importance to the dyer.

After having received the proper mordants, the goods are dried and rinsed, after which they are passed for a shorter or longer time through an infusion, decoction, or solution of the dyeing materials, which constitute the "dye-bath"; they are again dried and rinsed. In many cases, the immersion in the dye-bath is repeated, either with the same materials or with others to vary or modify the color. After the substances have been properly dyed, they are subjected to a thorough rinsing or washing in soft water, until the latter runs off uncolored.

94. Dye Woods, &c. Decoctions of the different woods are prepared for general use in the dye house as they are required. If the wood be in the chipped state, it must be boiled for an hour, in the proportion of 1 pound of wood to 1 gallon of water; a second

quor is not good for dyeing alone, but which employed instead of water for new wood, \(\frac{3}{4}\) 101. To make Caustic Potasn. To pound of new wood is sufficient. The second 3 gallons water add 2 pounds either black or pearl ashes, and boil; when seething add the label time until a small quantity quor is not good for dyeing alone, but when the clear solution which is ready for use. I pound for each gallon of the decoction realong with the goods; no decoctions of these woods are made. Decoctions of bark and coarse canvas bag, and then suspending it in boiling water.

The coloring principle of archil is highly soluble in hot water, and is useful in combination with other dyeing materials; but used alone, does not impart a permanent color.

ounces of pearlash, and 2 ounces of soft is ess soap, and apply heat, stirring until the whole ticity is dissolved. When convenient it is best to 103 boil the solution.

96. To prepare Catechu. To 7 or 8 gallons of water put 1 pound of catechu, and to absorb it, and allow it to stand; if not boil till it is all dissolved; then add 2 breaking down freely, sprinkle a little more ounces of sulphate of copper, stir, and it is water over it. A small quantity is best done ready for use. Nitrate of Copper may also in a vessel, such as an old cask, so that it can be used, taking 1 wine-glassful of the solution be covered with a poard or bag. After being made according to the next receipt.

97. To make Nitrate of Copper Solution. To 1 part by measure nitric acid, and 2 parts water, add metallic copper so long as the acid will dissolve it, then bottle

the solution for use.
98. To make Sulphate of Indigo. Into 5 pounds of the most concentrated sulphuric acid, stir in by degrees 1 pound of the best indigo, finely ground; expose this mix- of lime) and add to it as much water as will ture to a heat of about 160° Fahr. for 10 or 12 make it into a thin cream; take a flat piece upon a window-pane should assume a purpleblue color.

about 4 gallons hot water, and the whole put tions upon a thick woolen filter, over a large vessel, and hot water poured upon the filter, until it passes through nearly colorless; the blackish thoroughly; goods steeped in this should be matter retained upon the filter is thrown covered with the liquor, as pieces exposed matter retained upon the filter is thrown away, and the filtered solution is transferred become dry, which deteriorates the fibre; if to a leaden vessel, and evaporated to about 3 red; the whole is again put upon a wooden the liquor thoroughly, otherwise the goods filter and allowed to drain. The extract rewill be made tender.

of lead in 1 gallon water; in a third vessel ready for use.

boiling is generally given with new wa- dissolve $\frac{1}{2}$ pound crystallized soda; mix all ter, and the liquor obtained used instead of the solutions together and stir well for some water with more new wood. This second li-time, then allow to stand over night; decant

in the dveing of compound colors, such as newly-slaked lime, until a small quantity browns, drabs and fawns. If the wood be taken out does not effervesce when an acid is ground the same quantity is taken—namely, added to it. To test this, take a tumbler half filled with cold water, put a table-spoonful of quired, and is prepared as follows:—on a the boiling lye into the tumbler, and add a piece of coarse cloth stretched upon a frame, few drops sulphuric acid; if the acid were or laid into a basket, put the ground wood, added to the hot lye, it would spurt up and and place it over a vessel, then pour boiling endanger the operator. When the addition water over the wood until the liquor that runs of acid causes no effervescence, the boiling through is nearly colorless. Barwood and and adding of lime is stopped, and the whole Camwood are always used in the ground allowed to settle; then remove the clear listate, the wood being put into the boiler quid into a vessel having a cover, to prevent quid into a vessel having a cover, to prevent it from taking carbonic acid from the air. This serves as a stock for general use. weld are often formed by putting them into a lime sediment remaining may have some hot water added, which will give a strong lye, and may be used for first boils for yarn or heavy eloth

102. To make Caustic Soda. For every gallon water add 1 pound soda ash, or 2 pounds crystallized soda (washing soda); 95. To prepare Annotto. Into 2 gal-boil and proceed by adding slaked lime, and lons of water put 1 pound of Annotto, 4 testing as for potash; boiling for some time boil and proceed by adding slaked lime, and is essential in order to ensure perfect caus-

> 103. To make Lime-water. Take some well and newly-burned limestone, and pour water over it as long as the stone seems slaked, add about 1 pound of it to every 10 gallons cold water, then stir and allow to settle; the clear liquer is what is used for dyeing. This should be made up just previous to using, as lime-water standing attracts carbonic acid from the air, which tends to weaken the solution

104. To Make Bleaching Liquor. Take a quantity of bleaching powder (chloride hours, stirring it occasionally; a little rubbed of wood, and break all the small pieces by pressing them against the side of the vessel, then add 2 gallons cold water for every pound 99. To make Indigo Extract. This is of powder; stir well, put a cover upon the prepared by proceeding exactly as stated for vessel, and allow the whole to settle. This sulphate of indigo and then diluted with will form a sort of stock vat for bleaching opera-

> 105. To make a Sour. To every gallon of water add 1 gill of sulphuric acid, stir left under the liquor the cloth is not hurt by

is ready for use.

100. To make Red Liquor. Into 1 a flask and add to it 8 fluid ounces ammonia gallon hot water place 2 pounds alum: disamble and 8 ounces water; let the whole simmer tosolve, in a separate vessel, 2 pounds acetate gether for a few hours, when the liquor is

107. Acid Preparations of Tin. The acid preparations of tin used in dyeing are or common salt, and I part grain tin. called spirits, with a term prefixed to each denoting their particular application, as red spirits, barwood spirits, &c. The tin emdeeoction of logwood, and then add to it it is a spirits, barwood spirits, &c. The tin emdeeoction of logwood, and then add to it is a spirits, barwood spirits, &c. ployed for making these preparations has to undergo a process called *feathering*, and is as follows:-the tin is melted in an iron pot, and then poured from some height into a vessel filled with cold water; this granulates or

feathers, the tin. (See No. 3319.)

108. Red Spirits are made by mixing together in a stoneware vessel, 3 parts by measure hydrochloric acid, 1 part nitric acid, and 1 part water, and adding to this feathered tin in small quantities at a time, until about 2 ounces tin to the pound of acid used are dissolved. In this operation the temperature

should not be allowed to rise. (See No. 4124.)

103. Yellow Spirits are prepared in the same way, only substituting sulphuric acid for the nitric acid. This is used for the same purposes as red spirits, with the alvantage of the economy of sulphuric over nitric acid.

110. Barwood Spirit is prepared by using 5 measures hydrochloric acid, 1 nitric feathered tin for every pound of the whole mixture. 11 ounces tin may be used if the red dye is required to be very deep

111. Plumb Spirit is made by using 6 to 7 measures hydrochloric acid to 1 nitric acid and I water, dissolving in it 1½ ounces tin for each pound of the acid mixture. This spirit is named from a preparation made with it and a decoction of logwood. A strong solution of logwood is made and allowed to cool, then to each gallon of the solution there is added from 1 to 11 pints of the spirit; the whole is well stirred and set aside to settle. This preparation has a beautiful violet color, and silk and cotton are dyed of that shade by dipping them into this plumb liquor without any previous mordant. The depth of tint will depend on the strength of the solution.

112. Plumb Spirit for Woolen Dye-ig. This is prepared by adding tin to nitric acid in which a quantity of chloride of ammonium (sal ammoniae) has been dissolved. Observe, that all these spirit preparations are varied by different operators, some preferring more or less of the two acids, and also of the tin; but the proportions given form good convert the tin into a persalt, the operator will not fail in his processes as far as the quality of the spirit is concerned.

113. Tin Spirits. The for

Tin Spirits. The following are among the best recommended preparations of

in this 11 ounces sal ammoniae, and then add, by degrees, 2 ounces pure tin, beaten into ribbons.

Or: dissolve 1 part sal ammoniac in 8 parts nitric acid at 30° Baumé; add, by degrees, 1 one-fourth its weight of water.

Or: 4 parts hydrochloric acid at 17° Baumé, 1 part nîtric acid at 30° Baumé; dissolve in this mixture 1 part pure tin.

Or: 8 parts nitric acid, 1 part sal ammoniac the common spirit used by dyers.

pound alum for every pound of logwood used.

115. To Test the Purity of Alum. The usual impurity which renders alum unfit for the uses of the dyer, is the ferro-sulphate of potassa, but if iron be present in any other shape it is equally injurious. Common alum frequently contains ammonia, from urine or the crude sulphate of the gas works having been employed in its manufacture. This may be detected by adding a little quickline or caustic potassa. Pure alum should form a colorless solution with water and give a white precipitate with pure potassa soluble in an excess of the latter. It should suffer no change on the addition of tincture of galls, prussiate of potash, or sulphureted hydrogen.

116. Nitrate of Iron is used in the dyehouse for various purposes. Its principal use is for dyeing Prussian Blue, and is obtained as follows: Take 4 parts nitric acid and 1 part water in a glass or stoneware vessel; place it acid and 1 water, dissolving in this 1 ounce in a warm bath, and add clean iron so long as the acid continues to dissolve it with effervescence; take out any iron that remains undissolved, and, after settling for 1 hour, the clear solution is ready for use. The fumes given off during the operation should be guarded against, being deleterious to health and injurious to any metal or vegetal with which they come in contact. This solution should be kept in the dark, as it loses some of its strength by exposure to light.

117. Chloride of Iron is another salt used in the dye-house for dyeing silks and woolens a deep blue, and is preferred, for that purpose, to copperas. It is prepared for use thus: To 4 parts hydrochloric acid add 2 parts water, and apply a gentle heat; then add iron in pieces, or filings, so long as it continues to be dissolved; then pour off the clear liquid into a basin, and evaporate, when greenish colored crystals of chloride of iron will be obtained. This salt crystallizes with difficulty, deliquesces in the air, and should not be exposed. Instead of evaporating and crystallizing, the solution may be put in a bottle and reserved for use.

118. To make Iron Liquor. Into a working spirits, and if care be taken in their large cast-iron boiler, or pot, a quantity of preparation not to *fire* them, that is, not to iron turnings, hoops or nails, are introduced, allow the temperature to get so high as to and acetic acid—the crude pyroligneous acid from the distillation of wood-is poured in upon them. The strength of the acid is generally of 5° Baumé, or specific gravity 1.035. A temperature of 150° Fahrenheit is maintained till the solution of protoacetate of iron tin spirits, used for dyeing scarlet:

is obtained. During the solution of the iron
1 pound nitric acid, 1 pound water; dissolve much tarry matter separates, which is skimmed off, and the solution frequently agitated, to free it, as much as possible, from the tar. As soon as a strength is gained of a specific gravity of i.09, at 60° Fahrenheit, the solution is allowed to cool, for a further quantity of part pure tin; and dilute the solution with impurities to separate. When clean turnings are operated on, the process of solution is completed in 5 to 7 days.

119. To make up a Blue Vat. Take 1 pound indigo, and grind in water until no grittiness can be felt between the fingers; ally used—with about 12 gallons water; then and hanked up by the hand, taking the end add 2 prounds copperas, and 3 pounds newly-through the hank and tying it loosely, techof a greenish yellow color, with blackish which it has obtained in weaving: it is then veins through it, and a rich froth of indigo on thoroughly rinsed in clean water. Where the surface. After standing 8 lours to settle,

the vat is fit to use.

120. To make Blue Stone. Sulphate of copper is known in commerce as Blue stone, Roman vitriol, and Blue vitriol, and may be prepared by exposing pure copper in thin sheets to the joint action of dilute sul further preparation is needed; but if light, phuric acid and air; or by treating freshly the cloth has to be bleached as follows: precipitated oxide of copper with diluted pure diluted with an equal bulk of water. These which may be reduced to a crystalline form by evaporation. The crystals assume a well-defined rhomboidal form of a fine sapphireblue color.

121. To make Solutions for Dyeing. In making solutions of copperas, blue stone, chrome, &c., there is no fixed rule to be fola vessel, and boiling water poured upon in the sour, finishing, as before, with thorough them and stirred until dissolved. Some washing or drying. salts require less water than others when saturated solutions are wanted; but in the dyehouse saturation is not essential, and therefore there is always used ample water to dissolve the salt. In all cases, however, the proportions are known, so that the operator, when adding a gallon, or any other quantity of per gallon is a common quantity.

122. To Prepare Cotton Yarn for Dyeing. Cotton yarn, when spun, is put up in hanks, a certain number of which combined constitute a head; the number of hanks ranging from 6 to 20, according as the fineness of the yarn varies from very coarse to very fine. Sufficient of these heads are tied together, or banded with stout twine into

bundles are then loosed, and each roll of yarn is put on a wooden pin, about 3 feet long and 14 inches thick, 4 or 6 pins making a bundle. The yarn is now ready for dyeing dark colors; but for light shades, it must be bleached previous to dycing. The bleaching

is performed thus:

123. To Bleach Cotton Yarn. A vessel sufficiently large to allow of the varn being worked in it freely without pressing, is to pint bleaching liquor (see No. 104) to every yarn in this for half an hour. Into another spots is not so effective. The same precauvessel of similar size, two-thirds filled with tions are necessary in washing out the acid, cold water, add one wine-glassful sulphuric acid for every 2 gallons water; stir well, and into this, and work for 10 minutes; then wash soap or steeping in a little soda, washing, and out until all the acid is removed. This will then steeping in bleaching liquor (see No. 104),

124. To Prepare Cotton Cloth for put this into a deep vessel—casks are gener. Dyeing. The cloth is taken out of the fold, slaked lime, and stir for 15 minutes; stir again nically termed kinching; it is then steeped after 2 hours, and repeat every 2 hours for 5 or over night in old alkaline lye, which loosens 6 times; towards the end, the liquor should be and removes the oil, grease and dressing which it has obtained in weaving: it is then there is a dash-whee!, it should be used for this washing. In consequence of the liquor often fermenting with the paste in the cloth, this process has been technically termed the rot steep.

If the cloth is to be dyed a dark color, no

125. To Bleach Cotton Cloth. After oil of vitriol; or by boiling the metal with oil undergoing the rot steep, boil for 3 hours in of vitriol, either in the concentrated state or caustic lye, of the strength of 1 gill of stock lye (see No. 101) to the gollon of water; are the simplest ways of obtaining this salt, wash out, and steep for 6 hours in a solution of 1 pint of bleaching liquor (see No. 104) to the gallon of water; wash, and steep 1 hour in a strong sour of 1 wine-glassful sulphuric acid to 1 gallon water; wash well from this before drying or dyeing.

If the cloth be very heavy, it may be necessary to repeat in their proper order the boiling lowed. A quantity of the crystals are put into in lye, the steeping in bleaching liquor, and

washing or drying.

In bleaching cloth for dyeing, care has to be taken that it is all equally white, otherwise it will show in the color.

The quantity of water used should be sufficient to cover the cloth easily without pressure.

If the goods be old, and have previously been dyed, and if the shade required be a liquor to the dye-bath, knows how much salt deep shade, and the color of the goods light, that portion contains. From ½ to 1 pound in that case nothing is generally required but steeping in alkaline lye to remove any grease or starch; but if the color of the cloth is dark, the best method is to bleach as if they were gray goods.
126. To Remove Oil Stains. When

there are oil spots upon goods, and so fixed or dried in that steeping in an alkaline lye will not remove them, rub a little soft soap upon the stain, and let it remain for an hour, a bundle, to make 10 pounds.

After banding, the cotton is boiled in water for 2 or 3 hours until thoroughly wet. The for cotton, a little caustic lye will do equally well, but the soap is preferable, and seldom fails. It is essential that all oil or grease be

removed before dyeing.

To Remove Iron Stains. Take a little hydrochloric acid in a basin or saucer, and make it slightly warm, then dip the iron stain into the acid for about 1 minute, which will dissolve the oxide of iron; the cloth must be well washed from this, first in water, then in a little soda and water, so as to rebe two-thirds filled with boiling water; add 1 move all trace of acid. A little oxalic acid pint bleaching liquor (see No. 104) to every may be used instead of hydrochloric, but gallon of water in the vessel, and work the more time is required, and with old fixed spots is not so effective. The same precauas oxalic acid dried in the cloth injures it.

128. To Remove Mildew from Cotthen put the yarn from the bleaching solution ton. Proceed with the stains by rubbing in bleach the yarn for dycing any light shade. for by putting a wine-glassful of the stock wards wash, pass through a sour (see No. 105),

and wash again.

129. To Remove Indelible-Ink Marks. Steep in a little chlorine water or a weak soluand moisten the parts stained by the iodine with a solution of hyposulphate of soda, or caustic potassa or soda, until the color is removed; then let the cloth dip in the hot water; after a while wash well and dry.

130. Indigo Blue ye for Yarn. The vats used for dyeing indigo blue are usually wine pipes or other large casks, sunk in the ground to a depth convenient for the operators to work at. Five of these constitute a set, and are worked together and kept of the same strength. The yarn being worked in quantities of 100 pounds, 20 pounds are passed

through each vat.

Each vat is filled about three-fourths with cold water; there are then added 8 pounds of indigo, 16 pounds of sulphate of iron (cophour, and this stirring is repeated every 11

hours for the first day.

The time to stop the stirring is known by the solution becoming a rich cak yellow, having large blue veins running through it and a fine indigo froth on the surface. When these signs are all favorable, the solution is allowed to stand for several hours till all the solid matter settles, when it is ready for use.

The mode of dyeing consists in simply immersing the goods, and working them in the solution for 15 minutes, taking out and wringing or pressing, and then exposing to the air; repeating this operation until the dethe shade required is very deep, the yarn may, previous to washing, be passed through a tub of water acidulated with vitriol till it tastes acid, and then washed; this adds bril-

liancy to the color.

131. Sky Blue Dye for Cotton Goods. To dye 10 pounds of cotton, first bleach the cotton (see No. 125); then, to a tub of cold water sufficient to work the goods easily, add an hour 10 pounds cotton previously bleached ½ pint nitrate of iron, and work in this for 20 minutes; wring out, and pass through a tub Into another tub of cold a permanent dye. of clean water. water add 4 ounces ferrocyanide of potassium in solution, and about a wine-glassful of sulphuric acid; work the goods in this for 15 tities are given for 10 pounds cotton, whether minutes; wring out and wash through cold yarn or cloth. For more or less cotton, the water, in which is dissolved 1 cunce of alum; quantities can be increased or diminished in wring out, and dry. For lighter or darker proportion; but when small articles are to be shades of blue, use less or more of the iron dyed—such as ribbons, gloves, &c.—a little and ferrocyanide; or, should the color be too more of the materials may be used in proporlight after passing through the process detion to advantage. Where washing is referred scribed, add 1 ounce more ferrocyanide, repeat to, it is always in cold water, unless otherthe operation through the same tubs, and the wise specified.

shade will be deepened nearly double.

Wise specified.

138. Common Black. Steep the goods

132. Napoleon Blue.

liquor (see No. 101) in 1 pint of water; after- | Into a tub of cold water put 1 imperial pint of nitrate of iron and 2 gills hydrochloric acid, then add 3 ownces crystals of tin (or 1 pint chloride of tin); stir well and immediately work the goods in it for 30 minutes; wring tion of bleaching liquor (see No. 104), for about half an hour, then wash in ammonia water, which will obliterate the stain; then wash in clear water. They may also be removed by spreading the cloth with the ink marks over a basin filled with hot water; in which is dissolved 2 ounces of alum. If a degree shade of blue is required wash them then moisten the ink marks with tincture of deeper shade of blue is required, wash them iodine, and immediately after take a feather in clean water without the alum, pass them again through the two tubs; and, lastly, wash them in water with the alum.

133. Royal Blue. This is dyed in the same manner as Napoleon Blue, but the liquors are stronger—using 2 pints iron solution, gills hydrochloric acid, and 4 ounces tin crystals. The Prussiate tub is made up by dissolving in it 1 pound ferrocyanide of po-tassium, and adding 1 wine-glassful of sul-phuric acid, and 1 of hydrochloric acid. If not dark enough with putting through once,

repeat.

134. Blue. Copperas (sulphate of iron) is used as a mordant for dyeing blue by ferrocyanide of potassium (prussiate of potassium). The copperas best suited for the blue vat should be of a dark rusty green color, and peras), and 24 pounds newly-slaked lime. The free from copper, zinc, or alumina. Thus, 10 whole is well stirred with a rake for half an pounds cotton may be dyed a good rich blue by working it for 15 minutes in a solution of 4 pounds copperas; wring out; and then work through a solution of 4 ounces of the ferrocyanide; finally, wash in cold water containing ounce alum in solution.

Copperas is also used as a dye by the oxidation of the iron within the fibre. Thus:

135. Iron Buff or Nankeen. pounds copperas, and dissolve in warm water, then add the requisite quantity of water for working the goods; work in this for 20 minutes; wring out, and put immediately into another vessel filled with lime-water, and work in this for 15 minutes; wring out and sired depth of color is obtained. The yarn is expose to the air for half an hour, when the then washed in cold water and dried. When goods will assume a buff color. If the color is not sufficiently deep, the operation may be repeated, working through the same copperas solution, but using fresh lime-water each time. The goods should be finally washed through clean warm water and dried.

136. Nankeen or Buff Dye for Cotton Goods. To a tub of hot water add 1 pint nitrate of iron, and work in this for half (see No. 125); wash out in water, and dry. This process is simple and easy, and produces

137. General Receipts for Dyeing Cotton. In the following receipts, the quan-

For 10 pounds in a decoction of 3 pounds sumach while it is cotton goods, the cotton must be first bleached. hot, and let them lie over night; wring out tion of 2 pounds copperas. They may either wood; lift, and add 1 ounce alum; we be washed from this, or worked again through this for 10 minutes; wring out and dry. lime-water for 10 minutes; then work them 2 ounces copperas in solution; work 10 minutes, then wash and dry.

139. Jet Black. The goods are dyed in the same manner as the last receipt; but

fustic.

liquor (see No. 118) be used instead of the minutes in a decoction of 12 pounds logwood; copperas, or in part mixed with the copperas, it makes a richer shade of black, but 10 minutes longer; wash out and dry. Difcopperas is generally used; if mixed, use half the quantity of each.

140. Blue Black. Dye the goods first a good shade of blue by the vat (see No. 130).

out, and work for 15 minutes in a decoction of the logwood. 3 pounds bark kept at a boiling heat; lift out the goods and add to the bark solution ½ pint 15 minutes in hot water containing 2 pints single chloride of tin; work the goods for 20 catechu, prepared as in receipt No. 96; wring minutes in this, and then wash well in cold out, and work 15 minutes in hot water conwater. This gives a rich yellow.

142. Spirit Brown. First dye the goods

a spirit yelfow, according to the last receipt; alum in solution, and work the goods in it 15 minutes; wash and dry. By varying the proportions of logwood and limawood, a variety

of shades may be produced.

143. Mordant Brown. Steep the goods for six hours in a decoction of sumach, next dye a spirit yellow, according to the receipt given above. Then work for half an hour through a decoction of 2 pounds limawood and 8 ounces logwood; lift the goods, and add 2 ounces alum in solution; work for 15 minutes, wash and dry. This method is well spirits, and more easily performed by the non-practical man. The spirit brown is best for yarn.

144. Cinnamon Brown. Dye a dark spirit yellow (see No. 141), and work for 30 minutes in 3½ pounds limawood and ½ pound logwood; lift the goods and add 2 ounces

alum in solution; wash and dry.

wash and dry.

146. Fawn Brown. Take 1 part annotto liquor (see No. 95), and 1 part boiling water; stir well, and work the goods in it for 10 minutes; wring out and wash in two waof 2 pounds fustic and 1 pound sumach; lift, and add 3 ounces copperns in solution; stir well, and work for 20 minutes longer; then boil 14 ounces cream of tartar in water in a

and work them for 10 minutes through lime-| work for 20 minutes in a decoction of 8 ounces water, then work for half an hour in a solu-limawood, 8 ounces fustic, and 4 ounces log-They may either wood; lift, and add 1 ounce alum; work in

147. Catechu Brown. Work the goods for half an hour in a warm decection of 3 at a boiling heat for 2 hours in 2 pounds of pounds logwood, adding 1 pint chamber lve; catechu prepared according to No. 96; wring before entering the goods, lift and raise with out, and then work for half an hour in a hot solution of 6 ounces bichromate of potassa; wash from this in hot water. If a little soap be added to the wash water, the color is improved. Deeper shades of brown may be dyed by

along with the logwood is added 1 pound repeating the operation.

148. Catechu Chocolates. Dye brown In both the above receipts if 3 pints iron according to the last receipt, then work for 15 lift, and add 3 ounces alum in solution; work ferent shades of brown and chocolate can be produced, by varying the proportion of log-wood, and the strength of the brown dye. 149. Chocolate, or French Brown.

and then proceed as for common black. If Dye a spirit yellow according to receipt No. the blue be very deep, then half the quantity 141; then work for half an hour in a decoeof the materials for dyeing black will suffice. tion of 3 pounds logwood; lift, and add \(\frac{1}{2}\) pint 141. Spirit Yellow. Work through a of red liquor (see No. 100), and work 10 min-solution of protochloride of tin, of the specific utes longer; wash and dry. A deeper shade gravity of 1º Baumé, for 30 minutes; wash may be obtained by adding 1 pound fustic to

> 150. Catechu Fawns. Work the goods taining 1 ounce bichromate of potassa in solu-

tion; wash and dry

151. Catechu Fawns-Another Methafter washing, work for 1 hour in a decoction od. Work in the catechu the same as in the of 2 pounds lima or peachwood and 1 pound last receipt; wring out, and work for 15 minod. Work in the catechu the same as in the logwood; lift the goods out and add 3 ounces utes in warm water containing 2 ounces alum in solution, and work the goods in it 15 acctate of lead in solution; wash in cold water and dry.

152. Catechu Fawns-Another Method. Work in warm water containing 4 pints catechu (see No. 96), lift, and add 2 ounces copperas in solution, and work for 15 minutes; wash in water, and then in another tub of warm water in which sufficient soap has been dissolved to raise a lather, and then dry.

153. Common Red. Make a decoction of 3 pounds sumach, and put the goods in at once; let them steep over night; wring out adapted for cotton goods, is better than the spirits, and more easily performed by the non-red spirits (see No. 108), to every gallon water; wring out and wash well; then work for half an hour in a decoction of 3 pounds limawood and 1 pound fustic, v sing this decoction as hot as the hand can bear it; lift, and add 1 gill red spirits, then work for 15 minutes more; wash out and dry.

154. Barwood Red. To a decoction of 145. Uvanterin Brown. Dye a spirit pollow (see No. 141), then work for 20 minutes in a decoction of 1 pound limawood and 1 pound fustic; lift, and add ½ pint red liquor (see No. 100); work 10 minutes in this; out and wash, then pass through a tub of the set of the warm water; put 10 pounds barwood into a boiler with water and bring it near to the boil, then put in the goods and work among the wood grains for & hour; lift out, wash, wring and dry. Deeper shades may be dyed ters; then work for 20 minutes in a decoction by using larger quantities of the materials in each operation.

155. Scarlet. For 1 pound of goods,

block-tin vessel; add 12 ounces tin spirits, minutes in red liquor (see No. 100) at 5° Baumé; made according to the first receipt in No. 113; wring out, and pass through a tub of hot water; boil for 3 minutes, then boil the goods in it then work for half an hour in a decoction of for 2 hours; drain and let the goods cool. 3 pounds bark; lift, and add ½ pint red liquor Next boil 2 ounce cream of tartar for a few minutes in some water; add to it I ounce powdered cochineal, boil for 5 minutes, adding gradually 1 ounce tin spirits, stirring well all the time; then put in the goods and dye im-

156. Common Crimson. Steen over night in a decoction of 3 pounds sumach; work in spirits diluted 2º Baumé, wash and then work for 30 minutes in a decoction of 3 pounds limawood and 1 pound logwood; lift, and add a gill of red spirits (see No. 108); work for 15 minutes; wash and dry. A beautiful red crimson is obtained by omitting the logwood; and a diversity of tints dyed by varying the proportions of the limawood and

logwood.

157. Light Straw. To a tub of cold in solution, water add 4 ounces acetate of lead in solution, work the goods in this for 15 minutes, and wring out; then work for 10 minutes in another tub of water containing 2 ounces bichromate of potassa; wring out, and work again in the lead solution for 10 minutes; wash and dry

158. Leghorn. This tint is dyed in the by using more or less of these stuffs, without

varying the mode of working.

159. Annotto Orange. Heat the annotto solution (see No. 95) to about 140° Fahr.; work the goods in it for 20 minutes; wring out thoroughly in order to economize the liquor, wash in a couple of waters and dry. If the goods are then passed through water with sufficient acid to taste sour, a very red orange, almost scarlet, is obtained, but the tint fades quickly.

160. Logwood Blue. Dye first a light blue with the vat (see No. 130), then soak the goods for several hours in a hot decoction of 2 pounds sumach; then work for 15 minutes in water containing 1 pint red liquor (see No. 100) and 1 pint iron liquor (see No. 118); wash in two waters, hot; then work for 20 minutes in a decoction of 2 pounds logwood; lift, and add 1 pint red liquor, and work again

for 10 minutes; wash and dry.

161. Fustic Green on Yarn. Dye a blue with the vat (see No. 130), wash and wring, and then pass through red liquor (see No. 100) diluted to 4° Baumé; wash through a tub of hot water, and then work for 20 minutes in a decoction of 4 pounds fustic; lift, and add 2 ounces alum in solution; work for

15 minutes, wash and dry.

162. Fustic Green on Cloth. the goods in red liquor (see No. 100) diluted to 4° Baumé, and dry in a hot chamber, then wet in hot water and work for 20 minutes in a decoction of 3 pounds fustic; lift, and add 2 ounces alum in solution; work again for 15 minutes; wring out and work in chemic (a solution of sulphate of indigo whose acid has been neutralized with carbonate of soda); wring out and dry.

163. Dark Green on Cloth. After the minutes, and wash in clean warm water; goods have been cleaned, work them for 10 wring out and dry.

(see No. 100); work 10 minutes longer, then lift and drain; work next for 20 minutes in a tub of cold water containing 5 gallons chemic (see last receipt); wring out and dry. The depth of shade can be varied by increasing or diminishing the quantities of material in proportion.

164. Green with Prussian Blue. Dye a good Prussian blue (see No. 131) according to the depth of green required; then work 10 minutes in red liquor (see No. 100) at 40 Baumé; wash in warm water, and work for half an hour in a decoction of 3 pounds fustic; lift, and add 2 cunces alum in solution; work again for 10 minutes, wash and dry. A finer tint can be obtained by using bark instead of fustic, but it must not be worked too warm.

165. Sage Green. Dye a Prussian blue (see No. 131), and work 10 minutes in a soiution of 2 pounds of alum; wring out, and work 15 minutes in a decoction of 1 pound fustic; lift, and add a pint of the alum solution already used; work 10 minutes; wash and dry.

166. Olive or Bottle Green. Dye a good shade of Prussian blue (see No. 131); then mordant 10 minutes in red liquor (see same manner as the last but adding \(\frac{1}{2}\) pint \(No. 100\) at 5° Baumé; wring out and wash of annotto liquor (see No. 35) to the chrome in hot water; then work half an hour in a solution. Different shades may be obtained decoction of 3 pounds fustic and 1 pounds for the chrome in the continuous solution. sumach, then add 1 pint of iron liquor (see No. 118), and work 15 minutes; wash in a tub containing 2 ounces alum, and dry.

167. Olive or Bottle Green-Another Method. Work the goods in red liquor (see No. 100) at 5° Baumé, wash out in warm water; then work for haif an hour in a decoction of 3 pounds bark and 1 pound sumach; lift, and add 1 pint iron liquor (see No. 118), and work 15 minutes; wring out and work 15 minutes in the chemic (see No. 162); wring out

and dry.

168. Olive Green. Dye a Prussian blue (see No. 131); then work for 10 minutes in red liquor (see No. 100) at 4° Baumé; wash in hot water, and work in a decoction of 3 pounds bark and 1 pound logwood; lift, and add 1 pint red liquor, and work 10 minutes; wash and dry. By varying the proportions of bark and logwood, different scades of green may be obtained.

If the goods be yarn, a light blue may be dyed by the vat (see No. 130) instead of the Prussian blue, and proceeded with as above.

169. Lilac or Puce. Work for an hour in red spirits (see No. 108) at 1½° Baumé; wring out and wash; then work half an hour in a decoction of 3 pounds logwood at about 140° Fahr.; lift, and add 1 gill red spirits, and work 20 minutes; wash and dry. Half a pint red liquor (see No. 100) or 2 ounces alum, may be aided to the logwood after lifting, instead of the red spirit.

170. Lilac or Puce. Work for 15 minutes in red liquor (see No. 100) at 5° Baumé; wring out and wash in a tub of warm water; then work half an hour in a decoction of 2 pounds logwood at 140° Fahr.; lift, and add pint red liquor, or 2 ounces alum; work 10

the goods in a decoction of 2 pounds sumach; tint, which may be avoided by using a soluwring out, and work half an hour in plumb tion of 1 ounce of alum instead of the alum spirit (see No. 111); wring out, and wash in plumb. clean cold water until no taste of acid is left on the goods, and dry.

advisable to put a sufficiency of it into a add 2 ounces copperas in solution; work for separate vessel for working the goods, return- 15 minutes, and wash in water, then work for

for 20 minutes in red spirits (see No. 108) at 140 Baumé; wash well and then work in plumb spirit, and finish the same as the last receipt.

173. Purple. Steep in a decoction of 2 pounds sumach until cool; work in red spirits (see No. 108) at 14° Baumé for an hour, and wash in cold water; then work for half an hour in a decoction of 3 pounds logwood at 140° Fahr.; lift, and add I gill red spirits, and work 10 minutes more; wash in cold water and dry.

If a browner tint is required, use a little potassa) as a dveing agent. lifting, 1 pint red liquor (see No. 100), or 2 ounces alum, instead of red spirits.

174. Lavender or Peach. Work for 20 minutes in plumb spirit (see No. 111); wring out, and wash in clean cold water till

free from acid taste, and dry.

175. Logwood, Lilac or Puce. Dye a good shade of Prussian blue (see No. 131); then work 15 minutes in a decoction of 1 pound logwood at 140° Fahr.; lift, and add 4 ounces alum; work 10 minutes, then wash in cold water and dry.

176. Logwood Lilac. Dye a sky blue (see No. 131); then work for 15 minutes in a tub of warm water containing 1 gallon alum

plumb (see No. 114); wring out and dry.
177. Common Drab. Work for minutes in a decoction of 1 a pound sumach; lift, and add 1 ounce copperas in solution, and work 15 minutes more; wash out in a tub of cold water, then work 15 minutes in a decoction of 4 ounces fustic, 2 ounces limawood, and 1 ounce logwood; lift, and add 1 ounce alum in solution; work 10 minutes, then wring out and dry.

A great variety of different tints can be produced by varying the proportion of the limawood, fustic, and logwood; and lighter or darker shades by diminishing or increasing the quantities of sumach and copperas.

178. Olive Drab. Work for 15 minutes in ½ pound sumach; lift, and add 1 ounce copperas, and work 15 minutes more; wash in water, then work for 20 minutes in water with $\frac{1}{2}$ pound fustic; lift, and add 1 ounce alum, and work for 10 minutes and dry.

179. Drab. To a tub of hot water add 1 pint annotto preparation (see No. 95), which gives a light salmon color; then proceed as for olive drab in last receipt. varying the quantities a great variety of tints may be obtained.

then work 10 minutes in warm water con-chrome solution } pint muriatic acid. taining \(\frac{1}{2} \) pint alum plumb (see No. 114);

171. Light Purple or Adelaide. Steep wring out and dry. This gives a reddish

181. Catechu Stone Drab. Work the goods 15 minutes in hot water containing 2 When working with the plumb spirit, it is pints prepared catechu (see No. 96); lift, and ing the liquor afterwards to the plumb tub.

172. Light Furple. Steep in a decoction of 2 pounds sumach; wring out and work add \(\frac{1}{2}\) ounce alum; work 10 minutes more, wring out and day.

182. Catechu Drab. Work for 15 minutes in hot water containing 1 pint prepared catechu (see No. 96); lift, and add I ounce copperas; work 10 minutes; wash our and A variety of tints may be obtained by finishing in a weak decection of one or other

of the different dye-woods.

183. Chrome Dyes for Cotton Goods. The following recipes will serve to illustrate the use and value of chrome (bichromate of The quantities more sumach; for a bluer tint, use less given are for dyeing 10 pounds weight of cotsumach and more logwood; and add, after ton, and may be increased or diminished in proportion, according to the quantity of goods to be dyed.

184. Light Straw. To a tub of cold water add 4 ounces acetate of lead, previously dissolved; work the goods through this for 15 minutes, and wring out; into another tub of water add 2 ounces bichromate of potassa; work the goods through this 10 minutes wring out and pass again through the lead solution for 10 minutes; wash and dry.

185. Lemon Color. Into a tub of cold

water put 1 pound acetate of lead, previously dissolved; work the goods in this for 15 minutes, and wring out; into another tub of cold water put 6 ounces bichromate of potassa in solution; work the goods for 15 minutes through this, and wring out; then work it 10 minutes in the lead solution; wring out, wash,

and dry.

186. Deep Yellow. To a tub of cold water add 1 pound acetate of lead, and 1 pound nitrate of lead in solution; work the goods in this for 30 minutes, and wring out; then to a tub of warm water add 12 ounces bichromate of potassa, and work the goods in it for 15 minutes; expose to the air for half an hour, then pass again through both solutions, working them the same time in each as before, and expose to the air for one hour; then pass them through the lead solution; wring out, wash and dry. If the color is not deep enough they may be passed through the

solutions again, observing the same rules.

187. Deep Amber Yellow. Put into a tub of water 1 pound acetate of lead, and to this add gradually caustic potassa or soda, until the precipitate formed be re-dissolved, taking care not to add more alkali than is required for this solution; work the goods in this for 30 minutes; wring out, and work for 15 minutes in another tub of water to which ay be obtained.

8 ounces bichromate of potassa has been
180. Stone Color. Work the goods 20 added in solution; wring out, wash and dry. minutes in a decoction of 1 pound sumach; 2 or 3 ounces sulphate of zinc may be added lift, and add 1 ounce copperas in solution; to the chrome solution with good effect. If a work for 15 minutes, and wash in cold water; deep red amber be required, add to the

188. Chrome Green. Dye a blue by

depth of the blue and yellow will regulate the and present a fawn-colored appearance.

The fourth step is the first dycing. This is

The principal difficulty is when a particular depth or shade of green is wanted, to ascertain the exact shade of blue to be given, as breadth and length of the pieces, from 13, 15, blue cannot be added upon the yellow. is a matter which can only be learned by practice.

189. French Process for Dyeing Turkey-Red. The following process for dveing portion reserved for the second dveing. The

France at present.

The quantities of materials, &c., given, are for dyeing 2200 pounds of cotton, which has already, it is assumed, been subjected to

provide for future use 1300 to 1400 pounds of cleansed, rinsed and dried. fat oil; next divide the goods to be dyed into The fifth stage is the second galling; which

three equal portions.

goods; mix together one-third part of the fat oil and of the solution of potassa, stirring by liquor.

One-third of the goods are padded, that is, drawn through evenly backwards and forwards, in this white liquor; then take them place for 10 or 12 hours, and dry in an atmo-

sphere heated to 140° Fahr.

and subject a second portion of the goods to the same operation as the first; the remaining portion of the goods is in turn subjected to the same treatment, using the remainder of the fat oil for a third tub of white liquor; by this means the process proceeds without intermission, each portion being under different stages of treatment simultaneously.

This routine is repeated several times (generally seven or eight) on each portion, each always in its own tub, according to the quantity of oil which it is desired to fix on

the washings.

The next stage is to remove superfluous oil; this is done by macerating the goods twice, successively, for 24 hours each time, in a solution of carbonate of potassa at 1° Baumé. The liquid which is wrung or 189), and then pass through the blue vat. pressed out of them constitutes the old white (See No. 130.) liquor, which may be employed again for filling up in the ciling operation. The goods

are then carefully rinsed.

The third process is galling or mordanting. Bruise 22 pounds gall-nuts, and boil repeat- No. 122,) is steeped over night in soap lye, edly until thoroughly drawn; add sufficient and then scoured through clean soap to rewater to make up to 66 gallons; dissolve in move all oil or grease that may be upon the this 35 pounds alum with the assistance of wool. Instead of soap, a scouring mixture heat. This is sufficient for working one-half, may be prepared with 1 pound soft soap and that is, 1160 pounds of the cotton, which 1 pound common so must be padded in the liquid at a temperature in 10 gallons water. of about 160° Fahr.; it is next suspended for 2 days in a drying-room heated to 112° Fahr., and scoured in soap and soda. If the readd then passed into a hot concentrated bath maining color be unequal or dark, the goods of chalk. Care must be taken to work the must be worked for a short time in a sour,

the process described in No. 131; then dye a goods very equally in this bath, in order to yellow according to the last receipt. The avoid streaking. The goods are then washed,

performed on 10 pieces at a time, the proportions of madder varying according to the This 17 to 20 pounds madder for each piece. As in the preceding process, the madder is divided into two equal portions, one portion being used for the first dyeing, and the other turkey-red, is the one in general use in one portion is mixed with the requisite quantity of water, from 300 to 400 gallons; the 10 pieces are introduced into this bath at a tepid heat, and kept in it 3 hours, the temperature being gradually increased, until, at the end of thorough washing and scouring in soap.

24 hours, boiling point is reached; and this Dissolve 20 to 22 pounds carbonate of heat is sustained for the remaining 4 hour. potassa in about 330 gallons of water, and The goods must then be washed, thoroughly

is prepared in the same gall liquid, and in the The first step in the process is oiling the same manner as the first galling, finishing with the chalk bath, washing and drying.

The sixth operation is the second ducing, an degrees into the oil sufficient solution to pro- exact repetition of the first dyeing, using the duce an emulsion; this makes the white remaining half of the madder reserved for this

purpose.

The seventh step, first clearing, is performed in a close boiler, two-thirds filled with water containing in solution 13 pounds soap, out and lay together in a heap in a fresh cool and 31 pounds carbonate of potassa; the goods are boiled in this for 8 hours,

The eighth process is a second clearing, con-While the first portion of the goods is dry-ing, ducted in the same manner as the first clearing, prepare a second portion of white liquor, ing, but dissolving in the water 144 pounds soap, and 14 ounces chloride of tin instead of

the potassa solution.

For only very lively reds a third clearing, similar to the second, is required. The goods, after clearing, are exposed for some time in the air; then worked through a bran bath, which adds to the brightness of the color.

The process here described is slightly modified by some French dyers; thus, experience proves that the oil is better fixed in the stuff when the drying is not performed too rapidly; and there are some who, when the season the goods. If the bath begins to fail, either does not admit of exposure to the air, heap a little tepid water is added, or a certain the pieces together, after oiling, in a drying-quantity of old white liquor proceeding from room heated to 95° Fahr., turning them over from time to time to prevent injury from overheating. Some use ox-blood in the proportion of 40 pounds blood to 100 pounds madder.

190. Violet. Dye a turkey red (see No.

191. Preparation and Dyeing of Woolens. To prepare new woolen goods for dyeing, the cloth or yarn (if the latter, it is first banded with twine into spindles, see 1 pound common soda (or 1 pound soda-ash),

goods are always dyed hot, as near boiling the goods for 30 minutes, wash and dry. point as possible; this necessitates the use of boilers, which should be of copper, or copper fabric, boil, in a suitable kettle, 11 pounds and tin, as iron will not answer the purpose. ground Honduras cochinest, 5 pounds half-re-The dye-stuffs are generally put in the boiler, fined tartar or 3 pounds tartaric acid, 2 pounds and the goods worked with it, but it is cleaner oxalic acid, 1 pound tin crystals, 11 pounds to make decoctions (see No. 94), and use the clear liquor. All washings are to be in cold After it has boiled for about fifteen minutes, water unless otherwise specified. The quantities given in the following receipts are for handle them quickly at first, and let them dyeing 10 pounds of woolen goods, either cloth or yarn, unless otherwise specified.

withdraw the fire from the boiler, and submerge the goods in the liquor over night, then wash out. Work for an hour in another bath containing a decoction of 5 pounds logwood and 1 pint chamber lye; lift, and add 4 ounces copperas; work for 30 minutes long-

er, wash and dry.

193. Brown. Work for an hour in a bath made up with 2 pounds fustic, 2 pounds madder, 1 pound peachwood, and 4 ounces of logwood; lift, and add 2 ounces copperas;

work for 30 minutes, wash and dry.

194. Brown Dye. The different shades of this dye vary from pale yellow and reddish brown up to very dark brown, almost black, duced, as the taste of the workman may dictate, by mixtures of reds and yellows with blues and blacks, or by simple dyes, which at once impart a brown,-as catechu, walnut rinds, or oxide of manganese.

common salt dissolved in water, then dye it in a bath of logwood, to which a little green copperas has been added. The proportion of alum should be 2 ounces, and of salt 1 ounce,

to every pound of cloth.

Or boil the goods in a mordant of alum and sulphate of iron, then rinse them through a bath of madder. The tint depends on the relative proportions of the alum and copperas; the more of the latter, the darker will be the dye. The joint weight of the two should not exceed k of the weight of the wool. The best proportions are 2 parts of alum and 3 of copperas.

For other receipts for dyeing black and

brown see Index.

195. Crimson. Work in a bath for one hour with 1 pound cochineal paste, 6 ounces dry cochineal, 1 pound tartar, and 1 pint protochloride (single chloride) of tin; wash out and dry.

196. Scarlet. Work for an hour in a bath with 1 pound tartar, 2 ounces dry cochineal, 8 ounces sumach and 8 ounces fustic;

wash out and dry

197. Red. Work for 30 minutes in a bath made up with 1 ounce chrome and 1 ounce alum; wash in cold water; then work work for 30 minutes in another bath with 2 for 30 minutes in another bath with three pounds peachwood or limawood; lift, and add 1 ounce alum; work for 20 minutes; wash rials used will produce different shades. and dry.

made by dissolving 2 ounces bisulphate of to the camwood bath 4 ounces copperas, 2 potassa in each gallon of water used. Woolen ounces alum, and 8 ounces logwood; work

flavine, 10 pounds scarlet spirit (see below). cool the dye to 180° Fah., enter the goods, yeing 10 pounds of woolen goods, either boil slowly for 1 hour, when they will be a oth or yarn, unless otherwise specified.

192. Black. Work for 20 minutes in a in cold water. If it should happen that the bath with 8 ounces camwood; lift, and add 8 wool or flannel shows some white hair, which ounces copperas; work 20 minutes more, then is generally the case when new wool is used, then add 5 pounds of raw muriatic acid to the dye. This powerful agent will work wonders in scarlets, oranges, and pinks, as it tans the wool, which is perhaps a little greasy, and prevents the tin crystals from fastening too quickly to it, and thereby evener colors are obtained. This latter fact is very valuable, and not generally known.

> Scarlet spirit is thus prepared: Take 16 pounds muriatic acid 22° Baumé, 1 pound feathered tin, 2 pounds water. The acid should be put in a stoneware pot, and the tin added, and allowed to dissolve; the mixture

should be kept a few days before using.

200. Lac Scarlet. Work for 30 minutes every shade of which, however, may be pro- in a bath wit! I pound tartar, 8 ounces sumach, and 2 pounds lac; lift, and add about a gill of bichloride of tin; work for 30 minutes,

wash and dry.

201. Pink. Work for an hour in a bath made up with 1 pound tartar, 8 ounces alum, Boil the cloth in a mordant of alum and 1 pound cechineal paste, and 1 gill red spirits (see No. 108); wash in cold water and dry.
202. Yellow. Work for 20 minutes in a

bath of water containing 8 ounces tartar and 8 ounces alum; lift, and add 2 pounds bark, 8 cunces sumach, 8 cunces fustic, and 1 pint red spirits (see No. 108); work in this for 40 minutes, wash out and dry.

203. Orange. Work for 40 minutes in 2 pounds sumach, 3 ounces dry cochineal, 1 pound fustic, 8 ounces tartar, and 1 pint red

spirits (see No. 108); wash and dry

204. Sky Blue. Work for 30 minutes in a bath containing 8 ounces argol, 1 pound alum, and 1 gill indigo extract (see No. 99); wash out and dry. The shade of blue will depend on the quantity of indigo extract used.

For other shades of blue see Index. 205. Pigeon Blue. Work for 40 minutes in 2 ounces chrome (bichromate of potash). 4 ounces alum, and 1 ounce tartar; wash out in cold water, and then work for 30 minutes in another bath made up with 3 pounds logwood, lift, and add 1 ounce verdigris; work for 15 minutes, wash and dry

206. Apple Green. Work for 30 minutes in a bath with one ounce chrome and 1 ounce alum; wash through cold water, then pounds fustic and 8 ounces logwood; wash and dry. Different proportions of the mate-

207. Green. Work for 15 minutes in 5 198. Claret Red. Work for an hour in pounds fustic, 2 ounces argol, and 5 ounces 5 ounces camwood; lift, and expose the goods alum; lift, and add ½ gill of indigo extract until well drained and cold; meanwhile, add (see No. 99); work for 30 minutes and dry. More or less indigo extract will make the | boil for 1 hour; take it out, cool, and let it

green bluer or yellower, as required.

depth of the green required; then work for and handle it well for an hour, then heat it an hour in a bath with 4 pounds fustic and 2 up to 185° Fahr., but do not let it boil; let it pounds alum; dry out.
209. Olive. Work for an hour in a bath

made up with 10 ounces fustic, 8 ounces logwood; lift, and add 4 ounces copperas in so- that contained in the blue vitriol.

be washed out before drying.

logwood, 2 ounces barwood or camwood, and first with cochineal, as above, and finishing 2 ounces peachwood; lift, and add 2 ounces in the blue vat, the fast purple, or dahlia, so

212. Lilac or Puce. Work in a bath for one hour with 10 ounces logwood, 1 ounce camwood and 8 pounds cudbear; lift, and add 2 ounces copperas in solution; work for half

an hour and dry.

213. Brown Drab. Work for 30 minutes in a bath with 2 ounces ground madder, 1 ounce peachwood, 2 ounces logwood, and 6 ounces fustic; lift, and add 3 ounces copperas in solution; mix well and work the tals of tin (or 1 pint chloride of tin); stir goods for 30 minutes more; then wash and dry. The shade can be adjusted to suit, dye-woods.

214. Properties of Dye-woods. Peachwood reddens, madder gives the drab tint, fustic supplies yellowness, and logwood in-

duces a slate hue.

215. Stone Drab. Work the goods for 20 minutes in a bath containing 1 ounce peachwood or limawood, 2 ounces logwood and 1 ounce fustic; lift, and add 1 ounce copperas in solution; stir well and work in this for 30 minutes; lift out and expose to the air with 8 ounces bichromate of potassa, 6 for a short time; wash and dry. Different shades are made by varying the quantities of the dye-woods. (See last receipt.)

216. Slate. Work for half an hour in a bath with 8 ounces logwood and 1 ounce fustie; lift, and add 1 ounce alum and ½ ounce copperas in solution; work for half an hour; wash and dry. For a bluer tint, use less alum | blue black, the goods must be first dyed blue and more copperas; for more purple, use less

fustic and more alum, &c.

217. Blue. Dyeing woolens blue is performed by dipping in the blue vat (see No. 130), and then exposing to the air, repeating the operation till the desired depth of color is obtained.

218. Blue Furple. 100 pounds wool are first dipped a light blue in the vat, and well rinsed. Then take a stone pot, put in 3 pounds tartar, 3 pounds feathered tin, 5 224. Rich Yellow Brown. Work for pounds blue vitriol, and 20 pounds muriatic an hour in the following bath: 2 ounces biacid; heat all in a sand bath until dissolved.

lay for 24 hours. Then boil out 20 pounds 208. Fast Green. First dye a blue in good legwood for \$\frac{1}{2}\$ hour in fresh water; cool the indigo vat (see No. 130) according to the off the kettle to 150° Fahr., enter the wool, go for 1 hour more, when it will be a dark purple. This color stands the sun remarkably well, perhaps owing to the fact that there is wood, 4 ounces madder, and 2 ounces peach not any alum or sulphuric acid used, except

lution; work for 30 minutes and dry.

210. Wine Color. Work for an hour in a bath with 4 pounds cudbear, and dry. For vat to a light shade, then boiled in a solution a darker shade use more cudbear. If the tint of 15 pounds alum, and 3 pounds half-refined be desired bluer, add, after 30 minutes work, tartar, for 1½ hours; the wool taken out, ing, 1 gill ammonia; if a redder tint is cooled, and let stand 24 hours. Then boil in wanted, add a wine-glassful of hydrochloric fresh water 8 pounds powdered cochineal for acid; but if this last be used, the goods must a few minutes; cool the kettle to 170° Fuhr.; handle the prepared wool in this for 1 hour, 211. Light Violet. Work for an hour in which time let it boil for \{\frac{1}{2}\) hour, when it is in a bath with 4 ounces cudbear, 4 ounces ready to cool, rinse, and dry. By coloring alum in solution, work for 30 minutes and much admired in German broadcloths, will be produced.

220. Royal Blue Dye for Woolen Goods. Woolens may be dved different shades of blue with nitrate of iron, observing the general rule that woolens must be worked

at a boiling heat.

To dye 5 pounds of woolen goods—work for 20 minutes in a bath with 1 pound ferro-cyanide of potassium, and lift; then take 1 pint nitrate of iron and add to it 1 ounce cryswell for a few minutes and then add this mixture to the bath, and work the goods in this varying the quantities and proportions of the for 30 minutes; wash out and dry. For various shades of color, increase or diminish the quantities in proportion.

221. Chrome Dyes for Woolen Goods. The quantities given in the following receipts are for dyeing 5 pounds of woolen goods, unless otherwise stated. It must be understood that the goods must be cleaned before dyeing, and the dveing must always be performed

at a boiling heat.

222. Black. Work for 1 hour in a bath ounces alum, and 4 ounces fustic; lift, and expose to the air for a short time; wash well, and then work for 1 hour in another bath with 4 pounds logwood, 4 ounces barwood, and 4 ounces fustic; lift, and add 4 ounces copperas in solution; work half an hour in this, and then wash and dry. In order to dye a by the vat (see No. 130) or otherwise, and then proceeded with as for black, only using less materials.

223. Brown. Work for half an hour in 8 ounces of bichromate of potassa; lift, and expose till cold; then work an hour in 2 pounds fustic, 4 ounces madder, 3 ounces cudbear, 4 ounces tartar, 2 ounces logwood; lift out and dry; or it may be washed before dry-

ing

224. Rich Yellow Brown. Work for chromate of potassa, 2 ounces argol, 2 ounces From this mordant take 10 pounds in a suit- alum; wash from this bath; then work about able kettle; add 5 pounds tartar to it, stir it 40 minutes in another bath made up with 2 well, and enter the wool at 170° Fahr.; let it pounds fustic, 1 pound madder, 8 ounces peachwood, and 4 ounces logwood; wash out and the amount of goods to be dyed, but there be made by varying the quantities of the last down. bath, the first bath remaining the same.

225. Rich Yellow. Work for half an lound in No. 94. hour in a bath with 3 ounces bichromate of till well cooled and drained; then work for

wash out and dry 226. Bottle Green. Work for an hour in a bath with 2 ounces bichromate of potassa and 4 ounces alum; lift out and expose to the air till cold; then work for an hour in a second bath with 3 pounds fustic, $1\frac{1}{2}$ pounds

logwood; wash out and dry. 227. Invisible Green.

Work for an hour in a bath with 3 ounces bichromate of potassa, 4 ounces alum; lift, and expose to in a second bath with 2 pounds fustic, $3\frac{1}{2}$ pounds logwood; wash out and dry. By seen that the different shades are produced by varying the proportions of the same dye-stuffs, and will serve as a guide for other shades of

with 4 ounces chrome, 2 ounces alum; lift and expose to the air; then work for an hour in a bath with 3 pounds fustic, 1\frac{1}{2} pounds creased.

potassa, 1 ounce alum; lift out and wash in | cold water, unless otherwise stated. cold water; and then work half an hour in a bath with 2 pounds logwood, 1 pound peachwood; lift, and add 1 ounce alum in solution; work in this for 20 minutes; wash and dry. If a lighter and redder shade be required, use less logwood and more peachwood. For a tion; work 15 minutes, wash and dry. darker shade use more of each.

This gives a good black, but not ver

work for half an hour in another bath with 4 ounces logwood, 2 ounces fustic, 1 ounce barwood (or 1 ounce peachwood); wash and dry. The shades is an be varied by using different proportions of the stuffs.

231. Rica Drab. Work for 30 minutes in ½ ounce bichromate of potassa; lift, and add 1 ounce of logwood; work in this for 30 237. Full Deep Black. Work for 1 minutes; lift out, wash and dry. Different hour in a solution of 1 pound copperas and 2 proportions will produce different shades of color.

Chrome Blue. 100 pounds of wool are boiled for one hour in a solution of ounces copperas, and work 10 minutes; wash 3 pounds bichromate of potash, 6 pounds and finish. If the color is not deep enough, 3 pounds bichromate of potash, 6 pounds alum, 1 pound half-refined tartar; then it is taken out, cooled, and rinsed. Boil 6 pounds handle it for $\frac{3}{4}$ of an hour; bring it to a boil in this time. This color ought to be always left a shade lighter when finished, as all chrome colors darken in drying.

Solution in the prepared wood, and finish.

239. Blue Black by Prussiate. Dye a deep Prussian blue according to receipt No. 131, and work, from the prussiate, for

and dry. This gives a very beautiful brown; should always be enough water to cover the and a great variety of tints and shades may goods without the necessity of pressing them

Rules for making decoctions, &c., will be

233. Preparing and Dyeing Silk. potassa and 2 ounces alum; lift, and expose New silk is banded in the same manner as cotton (see No. 122), in quantities convenient hour in another bath with 5 pounds fustic; for making up into skeins when finished. After banding, it is tied up carefully in fine canvas bags and boiled three or four hours in strong soap-water to remove all the gum. Yellow silk must be first worked on sticks for an hour in a solution of soft soap at a temperature of about 200° Fahr., and then boiled in bags. It is then washed from the soap and put on sticks for dyeing.

Silk goods to be re-dyed must be steeped in a strong soap solution at nearly boiling point the air for some time; then work for an hour for a few hours, to remove all stains and grease; they are then washed, and if the color on them is light and equal, and they are to be comparing these last two receipts it will be dyed dark, then no further preparation is required; but if the color is unequal, they must be soaked for 15 minutes in a sour (see No. 105), and then washed out.

The quantities given in the following re-228. Olive. Work for an hour in a bath ceipts are for five pounds of silk. If the goods are tightly spun, such as ribbons, dress silk, &c., the quantities must be slightly in-

camwood, I pound logwood; lift out and dry.

229. Purple. Work the goods half an hour in a bath with 1 ounce bichromate of are washed from the dye, it is always to be in

234. Black. Work for an hour in a solution of 8 ounces copperas; wash well out in cold water; then work in a decoction of 4 pounds logwood, adding to it ½ pint chamber lye; lift, and add 2 ounces copperas in solu-

darker shade use more of each.

230. Rich Green Drab. Work the goods 30 minutes in a bath with 1 ounce in a solution of 8 ounces copperas (sulphate in a solution of 8 ounces copperas). bichromate of potassa, } ounce alum, } ounce of iron), and 2 fluid ounces nitrate of iron; tartar; lift out and wash in cold water; then and, after washing out, work in the decoction of logwood and chamber lye, as in the last re-

ceipt, finishing as there directed.

236. Blue Black. If a blue black is required, follow the same directions, but add a little write soap, instead of the chamber lye, to the logwood decoction, and add no copperas after lifting.

ounces nitrate of iron; wash out, and work for an hour in a decoction of 5 pounds logwood and 1 pound fustic; lift, and add 2

add a little more logwood before lifting. 238. French Black. Work for an hour good logwood in a bag for half an hour in in a solution of 1 pound copperas and 4 fresh water, add 3 pounds cudbear, well ounces alum; wash out well, then work for moistened and dissolved. Cool the dye to an hour in a decoction of 4 pounds logwood, 180° Fahr. Enter the prepared wool, and with a little white soap added; wash out and

In the foregoing receipts, the quantity of half an hour, in 8 ounces copperas; wash well water to be used is not material, but will be out in cold water, and then work for half an regulated according to the size of the vessel hour in a decoction of 2 pounds logwood; lift, and add a little of the copperas solution steep for several hours well under the liquor;

wash and dry.

minutes in a decoction of 2 pounds fustic and 10 minutes, wring out and dry.

1 pound bark; lift, and add 6 ounces acetate 247. Common Red. W of copper and 6 ounces copperas in solution; work for 15 minutes more; then sink the silk pounds legwood, add white soap sufficient to finish. make a lather, and work the silk in it for an

hour; wash out and dry.

(see No. 159); then work for 20 minutes in a are apt to fade. decoction of 3 pounds fustic, 8 ounces sumach ticular tint is not obtained, it may be given in proportion of cochineal. the last alum-wash by adding as follows: little peachwood; for depth or blueness, log- a cochineal crimson according to No. 246. wood. A number of different tints of brown may be obtained by varying the proportions Reds. of fustic, sumach and peachwood. A great many particular hues of brown may be dyed by this method; for instance, by using only fustic and sumach in the second operation, a California brown is obtained, &c. So that any intelligent person may regulate his colors and tints.

242. **Red Brown.** Dye a deep annotto orange (see No. 159); then work for 15 minutes in plumb iquor (see No. 111); wash well and dry. Particular tints can be made by adding fustic, peachwood or logwood to the last washing, as described in the last receipt.

243. Red Brown. Steep the silk for an hour in a solution of 8 ounces alum to each gallon water, then wash out in warm water; next, work half an hour in a decoction of 1½ pounds fustic, 1½ pounds peachwood, and 8 ounces logwood; lift, and add 1 pint of the alum solution; work 10 minutes, wash and dry.

Chocolate Brown. Steep the silk for an hour in a solution of 1 pound alum to each gallon of water; wash once in warm water, and then work for half an hour in a decoction of 3 pounds peachwood and 1 1 an hour; lift, and add 2 ounces pound logwood; lift, and add 1 pint of the its; work for 10 minutes and finish. alum solution, work again for 15 minutes; wash out and dry.

For deeper shades use less peachwood and more logwood; for a still deeper tint, add

about 4 ounces fustic.

245. Bronze Brown. Work for half an hour in a decoction of 8 ounces fustic, to blanket, for a day; take it out and wash in which 4 fluid ounces of archil liquor has been added; lift, and add 2 ounces solution of copperas; work 15 minutes, wash and finish.

246. Cochineal Crimson. To every gallon of water used, add about 2 fluid ounces bichloride (oxychloride) of tin, allow any sediment to settle, and warm the clear solution; work the silk in this for an hour or more. Boil 2 pounds cochineal by suspending it in a bag on the surface of some water; add this to the silk from the tin solution and work it in drops of sulphuric acid; then work the silk in the cochineal solution for 1 hour; then let it it as before.

first used, then work for 10 minutes more; wash out well in cold water. If the shade is not blue enough, add to the water a little 240. Deep Hat Black. Work for 15 cochineal dissolved in ammonia; work in it for

247. Common Red. Work the goods for 15 minutes in a decoction of 2 pounds peachwood and I pound fustie; lift, and add below the surface and let it steep over night; 4 fluid ounces red spirits (see No. 108); lift out and wash; then, to a decection of 5 | work for 15 minutes, wash in cold water and

Different shades are made by varying the proportions, and claret tints are obtained by 241. Brown. Dye an annotto orange adding a little logwood. These common dyes

248. Cochineal Pink. This is dyed in and 8 ounces peachwood; lift, and add 3 the same manner as cochineal crimson (see ounces copperas in solution, and work for 15 No. \$46), using much less cochineal; about minutes; wash out in two waters, adding ½ pint half a pound makes a good pink, and interalum solution in the last water. If the parmediate shades are produced by adjusting the

249. Cochineal Scarlet. First dye a for yellowness, a little fustic; for redness, a deep annotto orange (see No. 159); then dye

250. Mixture for Dyeing Common Make a strong decoction by boiling 1 pound limawood or brazilwood to each gallon of water. Let the wood settle; decant the liquor, and let it stand to cool for 24 hours; decant the clear liquor and add 3 pint plumb spirits (see No. 111) to every gallon of liquor; after standing a few hours it is ready for use.

251. Common Crimson. Put some of the common red mixture (see No. 250) into a copper or stoneware vessel, and work the goods in it for 1 an hour; then wash out thor-

oughly, wring and dry.

252. Common Scarlet. Dye an annotto orange (see No. 159), then dye a common

crimson according to the last rec 2t.

253. Ruby, Maroon, &c. Take 1 pound cudbear, and boil in a bag for 15 minutes; and work the silk in this for \frac{1}{2} an hour.

For a bluish tint, lift, and add 3 fluid ounces liquid ammonia; work 10 minutes, wring and

For a red tint, lift, and instead of the ammonia, add 2 fluid ounces red spirits (see No. 108); work 10 minutes, wring and dry.

For a brownish hue, make a decoction of 1 pound cudbear and 4 ounces fustic; work for an hour; lift, and add 2 ounces red spir-

For a deep violet hue, proceed as in the last receipt, using 4 ounces logwood instead of the

fustic.

254. Sky Blue. To 1 pint sulphate of indigo add 2 or 3 gallons boiling water; steep in this a piece of woolen cloth, such as an old cold water.

If the sky blue is required to be light, warm some water in a vessel to about 98° Fahr., steep the woolen cloth in it for a few minutes, and wring out; this will leave sufficient blue in the water to dye the silk; add 1 ounce alum in solution, and work the silk in it for 20 minutes; wring out and dry.

255. Dark Blue. If a deep blue be required, blue the water as before with the a quantity of water sufficient for working the woolen cloth, add 1 ounce pearlash; then goods, and bring it to a blood heat. Wring add 1 ounce alum in solution, with a few

Half an ounce of indigo extract (see No. | 99) may be used for bluing the water, instead of using the woolen cloth for that purpose. The exact quantity of indigo extract depends

on the shade of blue required.

256. Sky Blue Dye for Silks. 5 pounds of silk goods, add to a sufficient quantity of water to work the goods 1 pint of nitrate of iron; work in this for 20 minutes, then wash out in cold water. Into another vessel of cold water add 3 ounces ferrocyanide of potassium in solution, and 1 fluid ounce of strong sulphuric acid; work through this for 10 minutes, then wash in cold water with 1 ounce of alum dissolved in

it, and finish.

Royal Blue. Into a vessel of cold water add 2 pints nitrate of iron; then take 1 pint water and ½ pint of hydrochloric acid, and add to it 3 ounces crystals of tin; when dissolved, add this (or 1 pint chloride of tin) to the vessel containing the iron; stir well and work the goods in it immediately for half an hour. Into another tub dissolve 8 ounces of the ferrocyanide, and add to it 2 fluid ounces of sulphuric acid; the goods are wrung out of second vessel, and worked for 15 minutes; then wash out in cold water with 2 ounces of alum dissolved in it, and finish. If the shade is not sufficiently deep, before washing them in the alum water, they may be passed through the iron solution, and the ferrocyanide solution, working in each the same time as at first, only adding 2 ounces more ferrocyanide before passing the goods through the second time; then finish as before stated. Deeper shades are obtained by using more iron and tin, or by repeating the dips. Some wash out the iron solution in water before going into the ferrocyanide, and also wash it again in clean water before putting back into the iron; the shade will not be so deep, but there is less risk of an unequal color.

258. Rich Deep Blue Dye for Silk Goods. To dye 5 pounds of silk goods, add to the water required to work the silk, 2 pints chloride of iron and 1 pint double muriate or chloride of tin; work in this half an hour; lift, and work in a solution of 8 ounces ferro-cyanide of potassium; if the color be not deep enough, repeat the operation through both solutions; then wash out in water in which 2 ounces of alum have been dissolved.

259. Deep Blue Dye for Woolen Goods. To dye 5 pounds woolen goods, add to the requisite quantity of water, 2 pints chloride of iron and 1 pint chloride of tin; work in this for half an hour; lift, and work half an hour in a bath with 4 ounces of the ferrocyanide. If the color is required to be deeper, repeat this through the same stuff, adding 2 ounces more ferrocyanide; then wash out in cold water, and dry.

quor (see No. 111) to sufficient water to work the goods easily; stir well and work in this for 20 minutes, then wash in cold water and dry. A darker or lighter tint is obtained by

using more or less plumb liquor.

If a blue tint is required, add to the solution before putting in the goods, 2 or 3 drops either of sulphate, or of extract of indigo. (See Nos. 98 and 99).

261. Fine Lavender. Into a vessel of water as hot as the hand can bear, dissolve a little white soap—enough to raise a lather; then add 1 gill archil liquor, and work the goods for 15 minutes, wring out and dry. obtain a redder tint, boil 1 ounce cudbear. and use instead of the archil liquor. A still redder tint is attainable by leaving out the soap altogether.

262. Violet, Lilac, Wine Color, &c. Work the goods for 20 minutes in plumb liquor (see No. 111) in a copper pan or stone-ware vessel; wash out repeatedly until the goods cease to taste of the liquor, then dry. To obtain a rich blue shade, add to the plumb liquor 1 fluid ounce either sulphate or extract of indigo. For a red shade, first dye a laven-

der by cudbear without soap. (See No. 261.) 263. French and Pearl White. Dissolve in hot water sufficient white soap to make a lather; then add 1 fluid ounce archil liquor; work the goods for 10 minutes, and wash out. A little cudbear may be used instead of archil, less or more, according to the

shade required.

264. French and Pearl White. the iron solution, and put directly into this I fluid ounce plumb liquor (see No. 111) into a vessel of cold water; work the goods in it for 10 minutes; wash out and dry. For these shades the goods must be perfectly white (see No. 233) previous to dyeing.

265. Weld Yellow. Work the silk for an hour in a solution of alum, about 1 pound to the gallon; wring out and wash in warm water. Boil 2 pounds weld, strain the liquor, and work the silk in it for 30 minutes, lift, and add 1 pint of the alum in solution, to the weld liquor: work the silk 10 minutes longer, wring out and dry.

This gives a rich lemon yellow; deeper shades are made by using more weld: straw and amber tints are obtained by the use of a

little annotto.

266. Bark Yellow. The process is the same as for dyeing weld yellow, using 2 pounds bark instead of the weld. The bark

should be boiled in a bag

267. Deep Rich Yellow. Proceed as in the receipt for bark yellow; except that, after lifting, instead of a pint of the alum solution, 2 fluid ounces single chloride of tin are added to the bark liquor; work 10 minutes, wash in water, and finish in a solution of

white soap.
268. Gold and Straw. To warm water containing white soap, add 2 pints annotto liquor (see No. 95), work in this 15 minutes; wash out, then work for 20 minutes in a decoction of 8 ounces bark; lift, and add 1 fluid ounce red spirits (see No. 108); work 10 minutes more, wash out and finish. Different quantities of annotto and bark produce different shades.

r, and dry.

269. Nankeen, Buff, &c. Make a solution of soap in warm water, add to it 1 pint annotto liquor (see No. 95); work in this for 20 minutes, wring out and finish; a deeper

shade is obtained by using more annotto.

270. Salmon, Flesh, &c. Dye a nankeen according to the previous receipt, and add 2 ounces alum in solution to the cold wa-

ter used for finishing.
271. Orange. Work the silk for 15 minutes in a strong warm solution of annotto (see No. 95); wash out in warm water and

warm water put 1 pint annotto liquor (see No. 95); work for 15 minutes and wash; then work for 15 minutes in a decoction of 1 pound sumach and 1 pound fustie; lift, and add 4 ounces copperas and 1 ounce alum in solution: work 10 minutes, wash in cold water and dry. A variety of drabs may be dyed in this way by varying the proportions of the sumach and fustic, and by introducing a little logwood or peachwood.

273. Drab. Work for 15 minutes in a decoction of 8 ounces sumach and 8 ounces fustic; lift, and add 4 ounces copperas; work for 20 minutes, and wash out in cold water; then work 15 minutes in a vessel of warm water containing 1 pint archil liquor, and dry.

274. Greenish Drab. For a greenish drab, add to the archil liquor a decoction of 4 ounces fustic and 4 fluid ounce chemic. (See No. 162).

For a purple tint, use 1 ounce alum in solution, instead of the chemic.

275. Slate or Stone Color. Work the silk for 30 minutes in a decoction of 1 pound sumach. 4 ounces fustic. and 4 ounces logwood: lift, and add a solution of 4 ounces copperas; work 30 minutes more, wash in cold water, and finish.

For different tints, vary the proportion of sumach, &c.

276. Common Green. Steep for an hour in a solution of 1 pound alum to the gallon of water; wash in warm water, then we'r for 30 minutes in a decoction of 6 po ads fustic; lift, and add 2 fluid ounces inutes more, wash and finish. For blue-green use more indigo extract. Darker or lighter shades are dyed by using more or less in proportion of each ingredient.

277. Green. Work for 40 minutes in a decoction of 4 pounds fustic; lift, and add 1 pound alum in solution, and 2 fluid ounces indigo extract (see No. 99); work in this for 30 minutes, wash out in cold water containing ½

pint alum solution, and finish. 278. Pea Green. Steep for an hour in a solution of 8 ounces alum to the gallon of water, then wash out in warm water; boil 4 pounds ebony wood chips for an hour; take the clear liquor and work the silk in it for 30 minutes; lift, and add \frac{1}{2} fluid ounce indigo extract (see No. 99); work for 10 minutes; wash in cold water containing } pint alum solution, and dry.

The indigo extract must be added with caution, as too much will make the green too blue; it is safer to add less, and then, if ne-

blue; it is said to discuss the cessary, lift, and add more.

Pottle Green. Work for an hour in a solution of 2 pounds alum and 1 pound copperas; wash out in warm water, then work for 30 minutes in a decoction of 6 pounds fustic; lift, and add 2 fluid ounces indigo extract (see No. 99); work for 20 minutes, wash out and finish.

fustic. The addition of a little more logwood and woolen fabrics, thus: makes a still deeper shade if required.

281. Olive. Work the silk for 30 minutes in a solution of 1 pound copperas and 4 ounces 272. Yellow Drab. Into a vessel of alum; wash out in hot water, then work for 30 minutes in a decoction of 2 pounds fustic and 4 ounces logwood; lift, and add 2 ounces alum in solution; work 10 minutes, wash and

> A little chemic (see No. 162) added to the last wash water will induce a greener hue if required.

> 282. Light Olive. Dye a light Prussian blue (see No. 256); then work for 20 minutes in a decoction of 2 pounds fustic and $\frac{1}{2}$ pint archil liquor; lift, and add 1 ounce alum in solution; work 10 minutes and finish.

To Dye Mixed Fabrics Two 283. Colors. Mixed fabrics of cotton and wool, such as coburgs, damasks, &c. may be dyed all of one color, or the cotton and wool in them each dyed a different color. This is seldom done except with new goods, or with very light colored goods which are desired to be dyed dark colors. As the process for dyeing woolens will seldom impart the same color to cottons, the two are dyed separately, and the method is quite simple. For most colors it is necessary to dye the woolen portion first, and then the cotton; but in a few cases the cotton must be the first to be acted on

284. Green and Pink. First dye the woolen green by either of the methods given in Nos. 206, 207, &c. The cotton is then dyed pink, according to receipt No. 248.

285. Green and Crimson. Dye the woolen by working for an hour in 2 pounds tartar, 4 pounds alum, and 6 pounds fustic; lift, and add ½ pint indigo extract (see No. 99); wash out, and lay over night in 6 pounds sudigo extract (see No. 99); work for 30 min- mach; then work for 30 minutes in red spirits (see No. 108) made to a strength of $1\frac{1}{2}$ Baumé; wash out, and work for an hour in 5 pounds peachwood at blood heat; lift, and add a little alum; work in this, then wash out and finish.

286. Blue and Orange. First dye the cotton by the blue vat (see No. 130), wash out, and then dye the woolen by working an hour in a bath made up of 2 pounds tartar, 8 ounces cochineal, 2 pounds fustic, and 2 pints bichloride of tin; wash and dry.

In this way almost any two colors may be dyed upon woolen and cotton, although woven together, by proceeding according to the receipt for the color required on each sort of fibre. The wool is always dyed first, excepting in the case where the cotton is dyed in the blue vat, when the cotton has to be treated first. The same principle is applica-ble to silk and woolen fabrics, although in many cases the silk becomes more imbued than the cotton by the woolen dyes. A mixture of silk and cotton can be dyed in the same manner, but it is much more difficult, and cannot be done with all kinds of colors, and the process is seldom resorted to. But the intelligent dyer will be able to combine a variety of tints by following the rules and receipts given.

287. To Dye Mixed Fabrics one Col-280. Bottle Green. Proceed exactly as or. If the mixed fabrics are required to be for common green (see No. 276) with the ad- dyed one uniform color, the double process dition of 1 pound logwood to the 6 pounds has often to be adopted, especially for cotton

288. Black on Cotton and Woolen

Goods. First dye the woolen according to potassa; put the dry piece of cloth in this No. 192; then, after steeping the goods in su-mixture for 6 or 7 minutes, and then wash it mach, dye the cotton by receipt No. 139.

Goods by one Process. Work for 2 hours ether and alcohol, which will dissolve the cotin catechu, as in No. 147; then work at a boilton and not the linen. If the piece being heat for an hour with 8 ounces bichromate weighed before and after putting it into the of potassa and 2 ounces tartar; next work for an hour in 2 pounds fustic and 8 ounces cud- the fabric can be accurately ascertained bear; wash and dry. For a deeper shade, or of a more chocolate hue, add 4 ounces logwood to the cudbear.

290. Black on Silk and Woolens by one Process. Work for an hour in a solution of 8 ounces tartar and 8 ounces copperas; wash out, then work for 15 minutes in a decoction of 4 pounds logwood; lift, and add 1 ounce chrome; work for 30 minutes and

Black on Cotton, Silk and Wool, by one Process. Steep for 6 hours in 2 pounds sumach; then work for an hour in a solution of 6 ounces tartar, 6 ounces sulphate of copper, and 6 ounces copperas; wash out, and inflame them; the cotton burns away and then work for half an hour in a decoction freely and leaves little or no black charcoal; of 4 pounds logwood; lift, and add 1 ounce copperas; work for 10 minutes, wash and charcoal, and give a strong smell.

292. Deep Black. To obtain a very deep black, add 1 pound of bark to the log-

wood, and proceed as in last receipt.

8 ounces copperas and 4 ounces tartar; lift fer materially in appearance. Cotton forms and drain; then work for half an hour in 4 flat, narrow ribbons, curled up in spirals like ounces logwood and 1 ounce bichromate of those of a corkserew; wool fibre is stouter potassa; wash out and dry. By varying the than all others, and may be recognized by its quantity of logwood, and by introducing a scaly surface, while silk is the thinnest fibre, little fustic or peachwood in combination with has the smoothest surface, and possesses the the logwood, a great variety of drabs, slates least structure. These appearances are very or fawns can be produced.

These few receipts for mixed fabrics will show the care required in such operations, although, by practice, they become compara-

tively simple.

wool and silk remain unchanged.

To Detect Mixed Fabrics of Cotwoolen turns yellow, and the cotton white, and may easily be distinguished.

296. To Detect Cotton in Linen. The that is not dissolved becomes opaque white, the portion thus tested, with a similar portion not tried, the quantity of cotton present can easily be estimated.

a small piece of the cloth, boil in water and of the microscope, but their quantity is best dry; then take 3 parts, by weight, of sulfound by dissolving away one fibre, as already phuric acid, and 2 parts of crushed nitrate of directed, and weighing.

in water until there is no taste of acid; dry it 289. Brown on Cotton and Woolen at a gentle heat; next put it into a mixture of ether and alcohol, the quantity of cotton in

> 298. To Distinguish Cotton and Wool. Take a small piece of the cloth and boil in caustic soda; the wool will be dissolved, and the cotton remain. If the threads have been previously counted, their relative mixture can

be found.

299. To Detect Cotton with Silk or Wool. Put a piece of the cloth into chlorine water or bleaching liquor. The cotton is whitened, and the silk and wool turn yellow, and can easily be distinguished by the aid of a pocket lens.

300. To Detect Cotton in Silk or Wool. Take a small piece and unravel the threads,

the wool and silk shrivel up, leave a black

Decidedly the best and safest method, and one applicable in all cases, is a microscopic examination, by which not only the structure, but also the nature of the fibre can be de-293. Drabs on Cotton, Silk and Wool, monstrated. Cotton, wool and silk are easily by one Process. Work for half an hour in distinguished by the microscope, as they difcharacteristic, and any one who has observed them once will ever afterwards recognize them again at first sight.

301. To Distinguish Silk and Wool in Fabrics. Silk can always be identified in To Detect Animal or Vegetable a mixture with any other animal or vegetable Treat the fabric with bichloride of fibre by means of concentrated hydrochloric tin heated to from 130° to 150° Fahr., when acid, which dissolves it completely and imthe cotton and linen become black, and the mediately, without appreciably affecting any woolen or woody fibre with which the silk may have been interwoven. Strong sulton and Wool. Dip a piece of the cloth in phuric acid has also a powerful solvent effect bleaching liquor; after a little while the upon silk, and is likewise much more destructive inits action upon cotton than the other acid. Should it be desired to determine the nature of any fibres remaining after the solution of piece to be tested should be boiled to remove the silk, it is first necessary to wash and colall dressing, and then dried; put a portion of lect them, when they will usually be found the piece into common vitriol for about one destitute of color. To decide whether wool minute; take it out and wash it in water sevils present or absent, a solution of pieric acid eral times, and then into a weak solution of may be employed, which instantly imparts a soda or potash, and all the gummy matter full yellow tint to the wool, but does not in formed is removed by gentle rubbing. By the least affect cotton, linen, or China grass; this process the cotton is dissolved and the so that it is only necessary to immerse the linen remains, or any portion of the cotton fabric in the dye, wring it out, and wash well with water. Should any portion remain of a while the linen is transparent. By comparing yellow color, the presence of wool is indicated. Other methods can be employed similar in principle, but the pieric acid is believed to be best. Discrimination between the different 297. To Detect Cotton in Linen. Take kinds of fibre can best be prosecuted by means

amily Dyeing Receipts. The following receipts and directions are excellent for dyeing on a small scale, and especially adapted for family use. The ingredients required can be obtained at any color store.

303. Black for Worsted or Woolen. Dissolve \{\} ounce bichromate of potash in 3 gallons water. Boil the goods in this 40 minutes; then wash in cold water. Then take 3 gallons water, add 9 ounces logwood, 3 ounces fustic, and one or two drops, D. O. V., or Double Oil of Vitriol; boil the goods 40 minutes, and wash out in cold water. This will dye from 1 to 2 pounds of cloth, or a lady's dress, if of a dark color, as brown, claret, &c.

All colored dresses with cotton warps should be previously steeped 1 hour in sumach liquor; and then soaked for 30 minutes in 3 gallons of clean water, with 1 cupful of nitrate of iron (see No. 116); then it must be well washed, and dyed as first stated.

304. Black for Silk. Dye the same as black for worsted; but previously steep the silk in the following liquor: scald 4 ounces logwood, and \(\frac{1}{4}\) ounce turmeric in 1 pint boiling water; then add 7 pints cold water. Steep 30 or 40 minutes; take out, and add 1 ounce sulphate of iron (copperas), dissolved in hot water; steep the silk 30 minutes longer.

305. Brown for Worsted or Wool. Water, 3 gallons; bichromate of potash, \$\frac{4}{2}\$ ounce. Boil the goods in this 40 minutes; wash out in cold water. Then take 3 gallons water, 6 ounces peachwood, and 2 ounces turmeric. Boil the goods in this 40 minutes; wash out.

306. Imperial Blue for Silk, Wool, and Worsted. Water, 1 gallon; sulphuric acid, a wine-glassful; imperial blue, 1 tablespoonful or more, according to the shade required. Put in the silk, worsted, or wool, and boil 10 minutes; wash in a weak solution of soap lather.

307. Sky Blue for Worsted and Wool-a. Water, 1 gallon; sulphuric acid, a wineglassful; glauber salts in crystals, 2 tablespoonfuls; liquid extract of indigo. 1 tea-epoonful. Boil the goods about 15 minutes; rinse in cold water.

308. Claret for Wool or Worsted. A Short Way of Dyeing the Same. Water, 3 gallons; cudbear, 12 ounces; logwood, 4 ounces; old fustic, 4 ounces; alum, 1 ounce. Boil the goods in it I hour. Wash. This will dye from 1 to 2 pounds of material.

309. Crimson for Worsted or Wool. Water, 3 gallons; paste cochineal, 1 ounce; cream of tartar, 1 ounce; nitrate of tin (see No. 113), a wine-glassful. Boil your goods in this 1 hour. Wash first in cold water, then in another vessel with 3 gallons warm water with a cupful of ammonia, the whole well mixed. Put in the goods and work well 15 minutes. For a bluer shade add more ammonia. Then wash out.

310. Fawn Drab for Silk. Hot water, 1 gallon; annotto liquor (see No. 95), 1 wine-glassful; 2 ounces each of sumach and according to the shade desired.

311. Dark Drab for Silk may be obtained by using a little archil and extract of indigo.

312. Flesh Color for Dyeing Silk. Boiling water, 1 gallon; put in 1 ownee white soap, and 1 ounce pearlash. Mix well, then add a cupful of annotto liquor. (160 No. 95.) Put the silk through several times, and proportion the liquor till you obtain the required shade.

313. Salmon Color for Silk may be obtained by first passing through the above liquor, and then through diluted muriate of (See No. 113.)

314. Magenta for Silk, Wool or Worsted. Water, 1 gallon, heated up to 180 degrees; and magenta liquor, I tablespoonful; stir it well up. This will dye a broad ribbon 4 yards long, or a pair of small stockings. To dye a larger quantity of material, add more magenta liquor and water. The shade of color may be easily regulated by using more or less. Magenta Pink may be obtained by increased dilution.

315. Mauve for Silk, Wool or Worsted. Water, 1 gallon; add 1 table-spoonful sulphuric acid; then heat to boiling point. For a very light mauve, add 1 tea-spoonful imperial violet liquor; boil the same amount of material, as stated under Magenta, about 10 minutes. Rinse in cold water. If the color be too deep, use a little soap in rinsing, using warm water.

Violet Color for Worsted may be · 316. produced by using a table-spoonful of violet liquor instead of a tea-spoonful.

317. Pea Green for Silk. To 1 quart water, put ½ tea-spoonful pierie acid, and rather more than 1 wine-glassful sulphuric acid. and a tea-spoonful paste extract of indigo; boil about 5 minutes, then add water to cool it down to blood heat, or 100° Fahr. Put in the silk, and work it about 20 minutes. The shade may be varied by adding more or less of the picric acid, or extract of indigo; if more of either be added, boil separately in a little water, and add to the previous liquor.

318. Pea Green for Worsted. Use the same materials as the aforesaid; but boil all the time in 1 gallon of water for about 20 or 30 minutes.

319. Dark Green for Worsted. This may be obtained by using a larger quantity of material, in the same way as the last.

320. Plum Color for Worsted, Silk or Cotton. Water, 1 gallon; sulphuric acid, 1 tea-spoonful; glauber salts, in crystals, 2 table-spoonfuls; violet liquor, 1 table-spoonful; magenta liquor, ½ table-spoonful. Boil the article (silk, wool or worsted), about 10 minutes

321. Remarks on Dyeing Cotton. Cotton should be dyed the above colors separately, and by first running them through weak gall liquor, and weak double muriate of tin. Then wash well, and work in the aforetin. said liquor, according to color and shade. The dyeing liquor should be cold.

322. Scarlet on Worsted or Wool. 3 gallons water, 2 ounces dry cochineal, 1 fustic. Add copperas liquor according to the ounce cream of tartar, 1 wine-glassful nitrate required shade. Wash out. It is best to use of tin; boil the goods 1 hour. To give the the copperas liquor in another vessel, diluted goods a yellower hue, add a little young fustic to the above mixture. Wash out as before.

ceed the same as in dyeing pea green, omit- along with every successive two or three dozting the extract of indigo, and using oxalic en of hats suspended upon the dipping matin instead of sulphuric acid.

To Dye Feathers. First steep

them a few hours in warm water.

325. Blue may be dyed by extract of indigo and boiling water. Simmer over the fire a few minutes.

326. Green. Verdigris and verditer, 1 ounce each; and gum water. Dip the feath-Or mix the indigo liquor with Persian berry liquor.

327. Lilac. Use cudbear and hot water. 328. Red. Brazil wood, a little vermil-Use cudbear and hot water. ion and alum, and vinegar. Boil 30 minutes, and then dip the feathers.

Yellow, by turmeric.

330. Scarlet, by cochineal, cream of tartar, and muriate of tin. (See No. 113.)

331. To Dye Dove or Slate Color. Boil a teacup of black tea in an iron pot, adding a tea-spoonful of copperas. The depth of color will depend on the quantity of water used. Dye the articles in this and then hang them up to drain, finally rinsing out in soapsuds.

332. Aniline Red. This produces a color varying from the deepest crimson to a very brilliant and beautiful rose pink, according to the strength of the dye. All that is necessary is to enclose the aniline in a small muslin bag, and having a kettle (tin or brass) filled with moderately hot water, rub the substance out. Then immerse the articles to be colored, and in a short time they are done. The dye is so readily absorbed that care is required to prevent spotting. No mordant is required, although it improves the color to wring the goods out of strong soapsuds before putting them in the dye. This is a permanent color for woolen or silk.

333. Aniline Blue. To 100 pounds of fabric dissolve 1; pounds aniline blue in 3 quarts hot alcohol; strain through a filter and add it to a bath of 130° Fah.; also 10 pounds glauber salts, and 5 pounds acetic acid. Enter the goods and handle them well for 20 minutes; next heat it slowly to 200° Fah.; then add 5 pounds sulphuric acid diluted with water. Let the whole boil 20 minutes longer, then rinse and dry. If the aniline be added in two or three proportions during the process of coloring, it will facilitate the evenness of the color. Hard and close wove fabrics, such as braid, ought to be prepared in a boiling solution of 10 pounds sulphuric acid and 2 pounds tartaric acid before coloring with the aniline, as this will make the fabric more susceptible to the color.

334. To Dye Hats. A bath for dyeing 12 dozen hats consists of 144 pounds logwood, 12 pounds green sulphate of iron or copperas, 71 pounds verdigris. The copper is made of a semi-cylindrical shape, and should be surrounded with an iron jacket, or case, into which steam may be admitted, so as to raise the temperature of the interior bath to 190° Fah., but no higher; otherwise the heat is apt to affect the stiffening varnish, called the gum, with which the body of the hat has been imbued. The log ood having been introduced and digested for some time, the cop- employed to remove grease, varnish or paint

Yellow for Dyeing Silk. Pro-| quantities, and in the above proportions, chine. Each set of hats, after being exposed to the bath, with occasional airings, during 40 minutes, is taken off the pegs, and laid out upon the ground to be more completely blackened by the peroxydizement of the iron with the atmospheric oxygen. In 3 or 4 hours the dyeing is completed. When fully dyed, the hats are well washed in running water.

335. Spirit Stiffening for Hats. 7 pounds orange shellac; 2 pounds gum sandarae; 4 ounces gum mastic; ½ pound amber resin; 1 pint solution of copal; 1 gallon spir-

it of wine, or wood naphtha.

The shellac, sandarac, mastic, and resin are dissolved in the spirit, and the solution of co-

pal is added last.

336. Alkali Stiffening for Hats. 7 pounds common block shellac; 1 pound amber resin; 4 ounces gum thus; 4 ounces gum mastic; 6 ounces borax; 1 pint solution of

copal.

The borax is first dissolved in about 1 gallon warm water. This alkaline liquor is put into a copper pan (heated by steam), together with the shellac, resin, thus, and mastic, and allowed to boil for some time, more warm water being added occasionally until it is of a proper consistence; this may be known by pouring a little on a cold slab, somewhat inclined, and if the liquor runs off at the lower end, it is sufficiently fluid. If, on the contrary, it sets before it reaches the bottom, it requires more water. When the whole of the gums seem dissolved, ½ pint of wood naphtha must be introduced, with the solution of copal; then the liquor must be passed through a fine sieve, and it will be perfectly clear and ready for use. This stiffening is used hot. The hat bodies, before they are stiffened, should be steeped in a weak solution of soda in water, to destroy any acid that may have been left in them (as sulphuric acid is used in the making of the bodies.) If this is not attended to, should the hat body contain any acid when it is dipped into the stiffening, the alkali is neutralized, and the gums consequently precipitated. After the body has been steeped in the alkaline solution, it must be perfectly dried in the stove before the stiffening is applied; when stiffened and stoved, it must be steeped all night in water to which a small quantity of the sulphuric acid has been added; this sets the stiffening in the hat body, and finishes the process.

o Remove Stains, Spots, L &c. The following receipts embrace directions for cleaning, and removing stains of every kind, from clothing, linen, etc., and articles pertaining to the household. Receipts for cleansing other articles will be found elsewhere under their appropriate headings

338. To Remove Resin Spots from Silk. Stains by wax, resin, turpentine, pitch, and substances of a resinous nature, may be removed by pure alcohol. It frequently happens that when common turpentine is peras and verdigris are added in successive stains from silk, the turpentine itself leaves a

one, which it was used to remove. These pend upon skillful and persevering manipulastains are due to the resin which is held in solution by the turpentine, and which remains times valuable, yet good soap, after all, is the in the silk after the volatile or spirituous por chief reliance. Grease spots may generally tion has evaporated. Alcohol applied to the be removed by the patient application of soap alcohol first, and allowed to remain soaked removes grease, and is said to fix and brightfor a few minutes. Fresh alcohol is then applied with the sponge, and with a slight rubbing motion. It is then wiped as dry as possible and afterward permitted to dry perfectly

in the open air. 339. To Remove Pitch, Varnish, or Oil-paint Stains. When pitch varnish, or oil-paint stains have become dry, they should be softened with a little butter or lard, before using turpentine and soap. In these cases, a a cotton or woolen cloth, or a piece of blotsimple way is to soak the part in spirits of turpentine, and, when softened, to wash it off then rub upon the spots some pure benzine, with the same fluid. Burning-fluid combines the solvent powers of both alcohol and turpentine. Benzine is also good. Chloreform will also remove paint from a garment when almost everything else fails. The fats, resins, and unctuous oils, are dissolved by essential oils, as oil of turpentine. Common spirits of turpentine, however, requires to be purified by re-distillation, or it will leave a resinous stain upon the spot where it is used. (See last receipt.)

340. To Remove Paint Stains from **Clothes.** Chloroform is an excellent medium for the removal of stains of paint from clothes, etc. It is found that portions of dry white paint, which resisted the action of ether, benzole, and bisulphide of carbon, are at once dissolved by chloroform. If the paint is fresh, turpentine or alcohol will remove it. (See No. 338.)

To Remove Wax Stains from Silk. Mix powdered French chalk with lavender water to the thickness of mustard. Put it on the stain, and rub it gently with the finger or palm of the hand. Put a sheet of clean blotting paper and brown paper over it, and smooth it with a warm iron. When dry the chalk must be removed, and the silk gent—an uncorked bottle will cause a flame to leap ly dusted with a white handkerchief. If a over a space of several feet. faint mark still remains, a second application of French chalk and lavender water will generally remove it. If the wax stain has fallen thickly on the silk, it should be removed first carefully with a penknife.

To Remove Wax Spots from Cloth. Remove, by scraping with a knife, as much of the wax as you can without injury to the fabric; drop benzine on the spot, then with a sponge rub it gently; repeat it till the spot disappears.

343. To Remove Spermaceti, Stearine Stains. To remove spots spermaceti, scrape off as much as you can with a knife, then lay a thin, soft, white blotting paper upon the spots, and press it with a warm iron. By repeating this you will draw out the spermaceti. Afterwards rub the cloth where the spots have been, with some very soft brownish paper.

344. To Remove Grease Spots. T_0 ric, is sometimes easy, frequently most diffi- warm water, and rinsed or rubbed off clean.

stain almost as objectionable as the original cult, and often impossible. Much may detion; and although various agents are oftenstains with a clean sponge will remove the and soft water, but other means are also emspots, because alcohol dissolves the resin. ployed. Ox-gall is an excellent and delicate The silk stains should be moistened with the cleansing agent. It is a liquid soda soap. It en colors, though it has a greenish tinge, which is bad for the purity of white articles. Aqua ammonia is also good for removing grease spots from any fabric. Use the ammonia nearly pure, and then lay white blotting paper over the spot and iron it lightly. (See also No. 126.)

To Remove Grease and Dirt **34**5. from Cloth and Woolen Articles. ting paper, under the article to be cleansed, and the grease or dirt will disappear as if by magic.

Be sure to place a cloth under the garment to be operated upon, otherwise a circular stain will remain, which cannot be removed. benzine drives the grease through the article to be cleaned, and is absorbed by the cloth placed under it. After the spot is removed, continue to rub with a dry cloth until the benzine is evaporated; this also is done to avoid a stain.

346. Cautions about Benzine. From the facility with which it removes grease spots from fabrics, this substance has come to be regarded almost as a household indispensable. But few persons, however, realize the explosive character of benzine or the dangers attending the careless handling of the liquid. Being one of the most volatile and inflammable products resulting from the distillation of petroleum, it vaporizes with great rapidity, so that the contents of a 4 ounce vial, if overturned, would render the air of a moderate sized room highly explosive. The greatest care should be exercised in handling this substance, in proximity to fire, and it is important to remember that the vapor escaping from over a space of several feet.

347. To Remove Grease from Cloth. Take 1 quart lime; add thereto as much water as will dissolve the lime and leave about 1 quart clear water after it has been well stirred and settled. Let it stand about two hours, and then pour off the clear liquid into another vessel. Now add to it 1 an ounce of pearlash; stir it well, and, when settled, bottle it for use. This liquor is to be diluted with water, to suit the strength or delicacy of the color of the cloth. It is applied with a piece of coarse sponge, rubbing out the grease, and applying clear water afterwards.

This is one of the best receipts known for the extraction of grease; but it is destructive to certain vegetable colors.

To Remove Grease Spots from 348. Cloth. Soft soap, and fuller's earth, of each pound; beat well together in a mortar, and form into cakes. The spot, first moistened with water, is rubbed with a cake, and aldo this without injury to the color of the fab- lowed todry, when it is well rubbed with a little

349. Scouring Balls. Dry fuller's earth, | moistened with the juice of lemons; add a moving Grease. Camphene, 8 ounces; pure small quantity of pearl ashes, and a little soft alcohol, I ounce sulphuric ether, I ounce; soap; knead the whole well together into a essence of lemon, 1 drachm; or, spirits of wine, thick elastic paste; form it into small balls 1 pint; white soap, 3 ounces; ox gall, 3 ounces; and dry them in the sun. When used, moist- essence of lemon, ‡ ounce. en the spot on the clothes with water; then rub it with the ball, and let the spot dry in the sun. When washed with pure water the

spot will disappear.

or Silk. Separate the yolk of an egg from the article in the air, to remove the smell. the white as perfectly as possible. Then stretch the fabric on a board, and with a soft clothes brush dip into the yolk, and rub the Grease Spots from Silk. Take a visiting The yolk will not injure the most delicate colors, but the rubbing may, if too severe. Then rinse with warm rain water, rubbing the

351. To Remove Grease from Silk or silk. Rub the spots on the silk lightly and rapidly with a clean soft cotton rag dipped in chloroform, and the grease will immediately disappear without injuring the colcessary. Be careful to rub the article rapidly and lightly, then finish with a clean dry cloth. first-class druggists, will also immediately remove grease from the most delicate colored

352. To Remove Grease from Silk. Take French chalk finely scraped, and put it on the grease spot, holding it near the fire, or over a warm iron reversed, or on a watercause the grease to melt, and the French wash the part well with a clean cloth, and chalk will absorb it, and it may then be the grease or dirty spot will soon disappear. brushed or rubbed off; or, put a little pow- 359. To Remove Oil Stains from dered French chalk on the spot, cover it with a piece of white blotting-paper, and over that a piece of brown wrapping paper, and apply a hot flat-iron. If any grease remains, proceed as before, until it is all extracted. The French chalk is a fine soluble powder of a dry absorbfuller's earth does upon cloth.

The above plans may be adopted when you desire to extract the grease immediately; but if time is not an object, proceed as follows:

Sprinkle pulverized French chalk upon the spot and put the article in a dark place, and in a few days the grease will entirely disappear. We think this last method the best, as the heat from the iron will sometimes injure silk of a delicate tint.

To Remove Grease Spots from Grease spots may be taken from silks in the following manner: Upon a wooden table lay a piece of woolen cloth or baize, upon which lay smoothly the part stained, with the right side downwards. top, apply a flat-iron just hot enough to scorch the paper. About five or eight seconds is usually sufficient. Repeat until the spot is extracted. Then rub briskly with a plece of writing paper. (See last receipt.)

354. French Scouring Drops for Re-

355. To Remove Grease from Velvet. Grease may be taken out of velvet by a little turpentine, poured over the spot; then rub briskly with a piece of clean dry flannel. 350. To Remove Grease from Cloth Repeat the application, if necessary, and hang

(See No. 351.)

356. Simple Method of Removing spot with it until the grease seems loosened. or other card; separate it, and rub the spot with the soft internal part, and it will disappear without taking the gloss off the silk. This is a simple and valuable receipt. Be edges with a damp cloth, and clapping the careful and rub the silk on the wrong side, as whole between dry towels. If the stain is not the eard sometimes will soil delicate colored quite gone, repeat the process. It will not do silks, but if the above precaution is taken, the so well for fabrics mixed with cotton or linen. spot cannot be seen on the right side of the

357. To Remove Oil from Carpets. To take oil out of a carpet, as soon as it is spilled put on plenty of wheat flour or whiting, to absorb the oil and keep it from spreador of the silk. Repeat the operation if ne- ing. If the oil is near a seam, rip it, so that the spot will not spread, and put whiting on the floor under the carpet. Next day sweep If these precautions are not taken, a slight up all the flour above and under the carpet stain is apt to be the result. Very highly with a stiff brush, and put on plenty of fresh rectified benzine, such as is prepared by the flour. To take out grease spots, rub them with white flannel dipped in raw spirits of turpentine. If they show after a while, rub again on both sides. If there are grease spots on the floor, remove them with potter's clay before the carpet is laid down.

358. To take Grease Spots out of Carpets. Mix a little soap into a gallon of plate in which is boiling water. This will warm soft water, then add 1 ounce of borax;

> 359. To Remove Oil Stains from Leather and Paper. Oil stains may be removed from leather, paper, &c., by applying pipe-clay, powdered and mixed with water to the thickness of cream; leave it on for four hours. This will not injure the best colors.

360. Methods of Removing Various ent quality, acting upon silks the same as Stains. Fruit-stains, wine-stains, and those made by colored vegetable juices, are often nearly indelible, and require various treatment. Thorough rubbing with soap and soft water; repeated dipping in sour butter-milk, and drying in the sun; rubbing on a thick mixture of starch and cold water, and exposing long to sun and air, are among the expedients resorted to. Sulphurous acid is often employed to bleach out colors. It may be generated at the moment of using, by burning a small piece of sulphur in the air, under the wide end of a small paper funnel, whose upper orifice is applied near the cloth. Coffee and chocolate stains require careful soaping and washing with water at 120°, followed by sulphuration. If discoloration has been pro-Having spread a piece of brown paper on the duced by acids, water of ammonia should be applied; if spots have been made by alkaline substances, moderately strong vinegar may be applied; if upon a delicate article, the vinegar should be decolorized by filtering through powdered charcoal.

361. The Effects of Acids and Alka- part, previously washed clean, a weak solutringent substances, it to turn them red. warm water (without soap), and dried. They render yellows more pale, except those produced by annotto, which they turn to an orange color.

Alkalies turn scarlets, and all reds produced by Brazil or logwood, to a violet color; they turn green (upon woolen cloths) to yellow, and they give a reddish cast to the yellow produced by annotto. perspiration is the same as that of the alkalies.

Spots occasioned by acids are removed by alkalies, and vice versd. (See last receipt.)

been Injured by the use of Re-Agents. The colors of cloths are often injured by the re-agents made use of in order to restore them effectively; when such is the case we must | Garments. not only understand the general principles of the art of dyeing, but the nature and composition of the particular dye that was originally employed for dyeing the cloth whose color is to be restored, and thus enabled to modify the means accordingly. Thus, when, after using an alkali to remove an acid spot upon brown, restores the original color. violet, or blue cloth, &c., there remains a yellow spot, the original color is again produced by means of a solution of tin." tion of the sulphate of iron restores the color to those brown cloths which have been dyed with galls. Acids give to yellow cloths which have been rendered dull or brown by alkalies, their original brightness. When black cloths occasioned by acids, alkalies turn such spots acid and a good deal of water. (See No. 360.) to a yellow color, and a little of the astringent principle makes them black again. A solucolors may be restored by means of cochineal. No. 113.)

363. The Choice of Re-Agents for acid. Restoring Color. The choice of re-agents is not a matter of indifference; vegetable acid (Decolorized Vinegar, see Index), is generally preferable to mineral acids. The sulphurous acid (see No. 360), however, may be in cold water very thick; rub it well in, and used for spots from fruit; it does not injure expose the linen to the sun and air till the blue upon silk, or the colors produced by astringents; nor does it affect yellow upon cotton. A volatile alkali (Water of Ammonia) succeeds better than a fixed alkali in removing spots produced by acids. They are usually made use of in the form of vapor, and act quickly, seldom injuring the color of the cloth.

364. To Remove Fruit Stains. Spots acid, or what is still better, by water acidu-A lighted sulphur match held under the stain stains from white napkins. will produce sufficient sulphurous acid.

Stains from Linen. Fruit and other spots 2 ounces powdered alum; to which add 2 on linen may be removed by applying to the ounces common salt; let the liquor settle;

lies upon Different Colors. The effect of tion of chlorine, chloride of lime, spirits of acids upon blacks, purples, blues (except salts (muriatic acid), oxalic acid, or salts of those produced by indigo or Prussian blue), lemon, in warm water, and frequently by and upon all those shades of colors which are merely using a little lemon juice. The part produced by means of iron, archil, and as should be again thoroughly rinsed in clear

Many other stains may be taken out by dipping the linen in sour butter-milk, and drying it in a hot sun. Then wash it in cold water, and dry it, 2 or 3 times a day.

366. To Remove Acid Stains from Linen, &c. These may be removed by the following methods: Wet the part and lay on The effect of the it some salt of wormwood (carbonate of potassa); then rub it, without diluting it with more water.

Or: Tie up in the stained part some pearl-362. To Restore Colors that have ash; then scrape some soap into cold soft water to make a lather, and boil the linen till the stain disappears.

367. To Remove Acid Stains from Chloroform will restore the color of garments, where the same has been destroyed by acids.

When acid has accidentally or otherwise destroyed or changed the color of the fabric, ammonia should be applied to neutralize the acid. A subsequent application of chloroform

Spots produced by hydrochloric or sulphuric acid can be removed by the application of concentrated ammonia, while spots from nitric acid can scarcely be obliterated.

368. To Remove Alkali Stains from Garments. Spots produced by alkalies, such as soap-boiler's lye, soda, ammonia, etc., can generally be made to disappear completedyed with logwood have any reddish spots ly by the prompt application of dilute acetic

369. To Remove Claret or Port Wine Stains. Apply a little table salt to the spot tion of 1 part of indigo in 4 parts of sulphuric stained, and also moisten it with sherry. acid, properly diluted with water, may be After washing, no trace of the stain will be successfully employed to restore a faded blue left. The acid contained in claret decomposes color upon wool or cotton. Red or scarlet the salt, and sets free chlorine (bleaching gas), which removes the vegetable coloring and a solution of muriate of tin, &c. (See matter of the wine. If the stain is from port, sherry should be added, as it also contains

> 370. To Remove Stains of Wine, Fruit, &c., after they have been long in the Linen. Rub the part on each side with yellow soap; then lay on a mixture of starch stain comes out. If not removed in 3 or 4 days, rub that off and renew the process. When dry it may be sprinkled with a little water.

> To Remove Stains of Iodine. 371. Stains of iodine are removed by rectified spirit.

To take out all Stains which are caused by fruit are removed by sulphurous not Metallic. Mix 2 tea-spoonfuls of water with one of spirit of salt (muriatic acid); lated with a little muriatic or oxalic acid, or let the stain lie in it for one or two minutes; salt of lemons; but care must be taken not to then rinse the article in cold water. This apply this liquid to colors that it will injure. will be found particularly useful in removing

373. Prepared Ox-gall for taking out 365. To Remove Fruit and other Spots. Boil together I pint of ox gall and add a few drops essence of lemon, pour it off been washed. Another way to take out ink

into a bottle, and cork tightly.

Scouring Balls for General Pur- cate articles, this is the best way. In order to remove a stain, the cause or origin of which is doubtful, a composition the spots with a solution of chloride of soda is requisite which possesses various powers. (Labarraque's solution), or of chloride of lime The following is a good one for such pur- (bleaching fluid), or with chlorine water, and poses: Dissolve some white soap in alcohol, they will disappear immediately. Fruit and and mix with it the yolks of 4 or 5 eggs; add wine stains of all kinds may be removed in gradually a little spirits of turpentine, and this way. (See also No. 128.) Starched linen sufficient fuller's earth to make the mixture into balls. To remove a stain, wet the spot with soft water, rub it with a ball of the rinsing out and bleaching in the sunshine afabove composition, then rub the cloth and ter each application. This will remove almost any wash out. stain, except ink and other solutions of iron.

Stains. For iron mould or ink stains, lemon a little salt and starch on that. Rub all well juice or salt of sorrel (oxalate of potash) may be used. If the stains are of long standing, it may be necessary to use oxalic acid, which is much more powerful. It may be applied in finely powdered pipe clay, or fuller's earth, or powder upon the spot, previously moistened with water well rubbed on, and then washed off with pure water. It should be effectually washed out, for it is highly corrosive to textile fibres. (See also No. 127.)

diluted with 5 or 6 times its weight of water, when it will be found that the old and new stain will be removed simultaneously. This

is a very effectual method.

from Fabrics. The removal of these stains is a matter of some difficulty if they have remained on a fabric for some time. The usual substances employed for this purpose (oxalic acid or quadroxalate of potassa) require placing, in concentrated solution, in contact with the material for a considerable time, thereby materially weakening ε d rotting the fibre. The following method is free from this objection, and will remove stains of long standing almost immediately: Wet the mark with yellow sulphide of ammonium, by which it minute or so to penetrate; then wash out the excess of sulphide, and treat the black spot with water.

378. spots, and stains from linen and cotton. Take 1 ounce of oxalic acid in fine powder, mix with 4 ounces of cream tartar, and put it up in small oval boxes.

379. To Remove Ink, Iron Mould, &c., from Linen. Wet the finger in water, dip it in the powder (see last receipt), and rub it on the spot gently, keeping it rather moist, and the stain will disappear without injuring the linen in pure water. The salt of lemon used as a beverage is simply tartaric acid, put up in long bottles. The above is poisonous if swallowed.

380. To Remove Iron Mould and Ink carefully removed. from Delicate Linen Fabrics. These may be taken out by wetting the spots in milk, the Hands. Put ½ pound glauber salts, ½ then covering them with common salt. It pound of the chloride of lime, and 8 ounces of

is to dip it in melted tallow. For fine, deli-

381. To take out Mildew Spots. which has contracted mildew spots will require an application each day for 2 or 3 days;

382. To Remove Mildew. Mildew is easily removed by rubbing or scraping a little 375. To Remove Iron Mould or Ink common yellow soap on the article, and then on the article, and put in the sunshine. Or, soap the linen previously wetted, and apply salt and lemon juice to both sides; or apply finely powdered chalk. Expose it for several hours to the atmosphere.

383. To Extract Mildew. Mix soft soap with powdered starch, half as much salt, and the juice of a lemon, and lay on with a brush. 376. To Remove Iron Mould. The Let it lay on the grass day and night till the part stained should be remoistened with ink, and this removed by the use of muriatic acid take 2 ounces chloride of lime, pour on it a control of the con quart of boiling water, then add 3 quarts of cold water; step the linen 10 or 12 hours, when every spot will be extracted.

Mix oxalic acid, citric acid, and milk, togeth-377. To Remove Stains of Iron Mould er; rub into the linen; repeat as it dries;

wash, and bleach on the grass.

384. To Remove Common Ink Stains. Ink stains may be readily removed from white articles by means of a little salt of lemons, diluted muriatic acid, oxalic acid, or tartarie acid, and hot water; or by means of a little solution of chlorine or chloride of lime. When the stain is caused by ink manufactured with logwood, a red mark remains, which may be removed by the application of a little chloride of lime. All strong acids and alkalies tend to injure the fabric; therefore, immediwill be immediately blackened, and allow it a ately the stains are removed, the spots should be well rinsed, and repeatedly, in cold water.

385. To Remove Stains made by with cold dilute muriatic acid, by which it is Hair Dye, or Indelible Ink. The stainimmediately removed. Finally, wash well ing principle of common indelible ink is nitrate of silver. It may be removed by first soaking in a solution of common salt, which Lemons, for removing iron moulds, ink produces chloride of silver, and afterwards washing with ammonia, which dissolves the chloride. Nitrate of silver, or hair dye stains can be removed by a solution of 10 grains of cyanide of potassium, and 5 grains of iodine to 1 ounce of water; or a solution of 3 parts of perchloride of mercury and muriate of ammonia in 125 parts of water. (See Nos. 129 and 387.

386. To Remove Marking-Ink from the fabric. After the stain disappears, wash Linen. Dip the garment in a solution of 1 ounce cyanide of potassium in 4 ounces of water. After a few hours the stain will be obliterated. This is very effectual, but the mixture is highly poisonous, and should be

387. To Remove Silver Stains from should be done before the garments have water, into a little wide-mouthed bottle, and

when required for use pour some of the to evanide, but without any danger. This or yellow soar will do to use over again until exhausted, and use of lemon juice, which not only entirely removes the smell, but whitens the hands.

Hands. Ink stains, dye stains, fruit stains, and water, the marble will appear as though etc., can be immediately removed by dipping it were new. the fingers in warm water and then rubbing drops of oil of vitriol (sulphuric acid) will also as clean as it was at first. remove most stains from the hands without injuring them. Care must, however, be taken lowing is an excellent way of cleaning marble: not to drop it upon the clothes. It will remove the color from woolen, and eat holes in cotton fabrics. The juice of ripe tomatoes will remove the stain of walnuts from the hands, without injury to the skin.

389. To take Ink Stains out of Mahogany. Put a few drops of spirits of nitre (nitric acid) in a tea-spoonful of water, touch the spot with a feather dipped in the mixture, and on the ink disappearing, rub it over immediately with a rag wetted in cold water, or there will be a white mark, which will not

be easily effaced.
390. To take Ink Spots out of Mahogany. Apply spirits of salts (muriatic acid) with a rag until the spots disappear, and immediately afterward wash with clear water.

391. To Remove Ink from Mahogany. To ½ pint of soft water put 1 ounce of oxalic acid, and ½ ounce of butter (terchloride) of antimony; shake it well, and when dissolved it will be very useful in extracting stains from lees, ½ wine-glassful turpentine; mix and mahogany, as well as ink, if not of too long make into a paste with pipe clay. standing.

392. To Extract Ink from Floors. Remove ink from floors by scouring them with sand wet with water and the oil of vitriol, mixed. Then rinse them with strong

saleratus water.

393. To Remove Stains on Mahogany Furniture. Stains and spots may be taken out of mahogany furniture by the use of a little aquafortis, or oxalic acid and water, by rubbing the part with the liquid, by means be removed. of a cork, till the color is restored; observing afterwards to well wash the wood with water

and to dry and polish as usual.

394. To Extract Oil from Boards, Marble or other Stones. Make a strong lye of pearlashes and soft water, and add as much unslacked lime as it will take up; stir it together, and then let it settle a few minutes; bottle it and stop close; have ready remained for a few days wash it off, and resome water to dilute it when used, and scour peat the process if the stain is not quite rethe part with it. If the liquor should lie long moved. on the boards, it will draw the color out of them; therefore do it with care and expedition. When used for marble, the surface may (For Putty Powder, see Index.)

395. To take Oil and Grease out of thick sediment into a saucer, and rub it well Boards. Make a paste with fuller's earth and over the hands with pumice stone or a nail- hot water, cover the spots therewith, let it brush, and it will clean the fingers quite equal dry on, and the next day scour it off with soft

396. To Clean Marble. To clean marshould be kept corked up. The disagreeable ble, mix quicklime with strong lye, so as to smell may be entirely avoided by the liberal form a mixture having the consistency of cream, and apply it immediately with a brush. If this composition be allowed to remain for a To Remove Stains from the day or two, and be then washed off with soap

397. To Clean Marble. Take 2 parts on the stain a small portion of oxalic acid of common soda, I part of pumice-stone, and powder and cream of tartar, mixed together 1 part of finely powdered chalk; sift it in equal quaerities, and kept in a box. When through a fine sieve, and mix it with water; the stain disappears, wash the hands with fine then rub it well all over the marble, and the soap. This mixture, being poisonous, must be stains will be removed; then wash the markept out of the reach of children. A few ble over with soap and water, and it will be

398. How to Clean Marble. The fol-

First, brush the dust off the piece to be cleaned, then apply with a brush a good coat of gum arabic, about the consistency of thick office mucilage; expose it to the sun or dry wind, or both. In a short time it will crack and peel off. If all the gum should not peel off, wash it with clean water and a clean eloth. If the first application does not have the desired effect, it should be applied again.

399. To Clean Marble. Mix & pound soft soap with the same of pounded whiting, 1 ounce soda, and a piece of stone-blue the size of a walnut; boil these together for 1 of an hour; whilst hot, rub it over the marble with a piece of flannel, and leave it on for 24 hours; then wash it off with clean water, and polish the marble with a piece of coarse flannel, or, what is better, a piece of an old hat.

400. To take Stains out of White Marble. Take 1 ox-gall, 1 wine-glass soap on the paste over the stain and let it remain for several days. If the stain is not fully removed a second application will generally prove sufficient.

401. To Remove Oil Stains in Marble. Stains in marble caused by oil can be removed by applying common clay saturated with benzine. If the grease has remained long enough it will have become acidulated, and may injure the polish, but the stain will

402. To Remove Iron Mould or Ink from Marble. Iron mould and ink spots may be taken out in the following manner: Take 1 ounce butter of antimony and 1 ounce oxalic acid, and dissolve them in 1 pint rain water; add flour, and bring the composition to a proper consistence. Then lay it evenly on the stained part with a brush, and after it has

To Remove Stains from Marble. Mix an ox-gall with a quarter of a pound of soap-boiler's lye, and an eighth of a be improved by rubbing or polishing after pound of oil of turpentine, and add enough ward with fine putty-powder and olive oil. | pipe-clay earth to form a paste, which is then to be placed upon the marble for a time, and may be left; but this will be almost inappreciable. Should the spots be produced by oil, these are to be first treated with petroleum, for the purpose of softening the hardened oil, and the above-mentioned application may be made subsequently.

404. To Remove Printing Ink from any Article. Printing ink can be readily oil of turpentine. Pure benzine will also

have a similar effect.

405. To Remove the Varnish from Oil Paintings, &c. Varnish and dirt can be removed by washing over with a weak solution of carbonate of ammonia, wiping it off with a sponge wetted with water as soon as it has fulfilled its object; if allowed to remain too long it will injure the oil colors. Another on long enough to soften it; it may then be removed by washing.

406. To Clean Pictures. Having taken the picture out of the frame, take a clean towel, and, making it quite wet, lay it on the face of the picture, sprinkling it from time to time with clean soft water; let it remain wet for 2 or 3 days; take the cloth off and renew it with a fresh one. After wiping the picture till you find all the dirt is soaked out of it; then wash with a soft sponge, and let it get quite dry; rub it with some clear nut or linseed oil, and it will look as well as when

freshly done. 407. To Clean Oil Paintings. into 2 quarts of strong lye, ½ pound of Genoa soap, rasped very fine, with I pint spirits of wine; let them simmer on the fire for half an hour, then strain them through a cloth. Apply the preparation with a brush to the picture, wipe it off with a sponge, and apply it a second time, which will remove all dirt. Then with a little nut-oil warmed, rub the picture and let it dry. This will make it look as bright as when it came out of the artist's hands. If the canvas is injured by damp, mildew or foul air, the first thing to be done is to

stretch and line it with new canvas. 408. To Clean Japanned Waiters and Urns. Rub on with a sponge a little white soap and some lukewarm water, and wash the waiter or urn quite clean. Never use hot water, as it will cause the japan to scale off. Having wiped it dry, sprinkle a little flour over it; let it rest a while, and then rub it with a soft dry cloth, and finish with a silk handkerchief. If there are white heat marks on the waiters, they will be difficult to remove; but you may try rubbing them with a flannel dipped in sweet oil, and afterwards in spirits of wine. Waiters and other articles of papier maché should be washed with a sponge and cold water, without soap, dredged with flour while damp, and after a while wiped off, much worn on the threads. and then polished with a silk handkerchief.

409. Method of Cleaning Paper Hang-maché articles should be washed with a sponge ings. Cut into 8 portions a loaf of bread 2 and cold water, without soap, dredged with days old; it must neither be newer nor staffour while damp, and polished with a flaunel. ler. With one of these pieces, after having

atterwards scraped off; the application to be re- | cleaned, by the means of a good pair of belpeated until the marble is perfectly clean. It lows, begin at the top of the room, holding the is quite possible that a faint trace of the stains crust in the hand, and wiping lightly downward with the crumb, about half a yard at each stroke, till the upper part of the paper is completely cleaned all round. Then go round again, with the like sweeping stroke downwards, always commencing each successive course a little higher than the upper stroke had extended, till the bottom be finished. This operation, if carefully performed, will taken from any article by means of ether or frequently make very old paper look almost equal to new. Great caution must be used not by any means to rub the paper hard, nor to attempt cleaning it the cross or horizontal way. The dirty part of the bread, too, must be continually cut away, and the pieces renewed as soon as may become necessary.

410. To take Grease Stains out of Wall Papers. Oil marks, and marks where people have rested their heads, can be taken way is to spread a thick coat of wet fuller's from the paper on drawing-room walls by earth over the surface of the varnish, leaving it mixing pipe-clay with water to the consistency of cream, laying it on the spot, and let-ting it remain till the following day, when it may be easily removed with a penknife or brush.

411. To take Grease from Paper. Gently warm the parts containing the grease, and apply blotting-paper so as to extract as much as possible. Boil some clear essential oil of turpentine and apply it to the warm paper with a seft clean brush. A little rectiwith a clean wet sponge, repeat the process fied spirits of wine should be put over after-

ward. 412. To take out Stains of Ink from Oxymuriatic acid removes, per-Books. feetly, stains of ink; and should the paper require bleaching, the operation will answer both ends at the same time. Nearly all the acids will remove spots of ink from paper; out it is important to use such as do not attack its texture. Spirits of salt (muriatic acid) diluted in 5 or 6 times the quantity of water, may be applied with success upon the spot, and after a minute or two, washing it off with clean water. A solution of oxalic acid, citric acid, and tartaric acid, is attended with the least risk, and may be applied upon the paper and plates without fear of damage. These acids taking out writing ink, and not touching the printing, can be used for restoring books where the margins have been written upon, without attacking the text.

413. To Remove Yellow Stains from the Margins of Engravings. The yellow stains on the margin of engravings may be removed by a solution of hydrochloride of soda. This liquid is commonly known under

the name of Labarraque's solution.

414. To Clean Silver or Gold Lace. Lay the lace smooth on a woolen carpet or piece of woolen cloth, and brush it free from dust, then burn rock alum and powder it fine, and afterwards sift it through a lawn sieve; then rub it over the lace with a fine brush, and in so doing it will take off the tarnish and restore it to its brightness, if it be not too

415. To Clean Papier Maché. Papier

416. To Clean Hair Brushes and blown off all the dust from the paper to be Combs. Wash the bristles for a few seconds

in a weak solution of hartshorn, say a table-leasily be known by the knife keeping its polspoonful to a pint of cold soft water. Then ish. If only a plain board, rub the Bath brick rinse in clean cold water, and dry. Do not 2 or 3 times over it; if too much be put on set them near the fire, nor in the sun, to dry, at once it will make the blades of the knives but, after shaking them well, set them on the look rough and scratched. Let the board be point of the handle in a shady place. By this of a proper height, and set so that the person process the brush will be thoroughly cleansed with very little trouble. Observe that the the knives. Take a knife in each hand, holding mahogany or satin-wood back of the brush them back to back; stand opposite the midmust be kept out of the solution, as it is apt dle of the board; lay the knives flat upon it. to discolor wood. Combs may be cleaned in the same manner

To Clean Looking Glasses. Take part of a newspaper, fold it small, dip it in a basin of clean cold water, and when it is thoroughly wet squeeze it out as a sponge, and then rub it hard over the face of the glass, taking care that it is not so wet as to rundown in streams. After the glass has been well rubbed with the wet paper, let it rest a few minutes and then go over it with a fresh dry newspaper, till it looks clear and bright, which it will do almost immediately. The inside of windows may be cleaned in this way, and they will look beautifully clear.

To Clean Straw Matting. Wash it with weak salt and water and dry it well, or boil a small bag of bran in 2 gallons of water, and wash the matting with the water,

drying it well.

419. To Clean Cane-Bottom Chairs. Turn up the chair bottom, and with hot water and a sponge wash the canework well, so that it may become completely soaked. Should it be very dirty you must add soap. Let it dry in the open air if possible, or in a place where there is a thorough draught, and it will become as tight and firm as when new,

provided it has not been broken.

420. To Clean Sheepskin Rugs or Mats. Make a very strong lather, by boiling soap in a little water; mix this with a sufficient quantity of water (rather more than lukewarm) to wash the mat or rug in, and rub boiled soap on those portions of it which require additional cleansing. When the mat has been well washed in this water, prepare second washing must take place, followed by a third, which ought to be sufficient to cleanse it thoroughly. Rinse it well in cold water until all the soap is removed, and then put it in water in which a little blue has been mixed, sufficient to keep the wool of a good white, and prevent its inclining to yellow. After this it should be thoroughly wrung, shaken, and hung out in the open air with the skin part towards the sun, but not while it is scorching, otherwise the skin will become hard. should be frequently turned, being hung up first by one end and then by the other, until it has dried entirely.

421. To Clean Knives and Forks. Procure a smooth board, free from knots, or one covered with leather. If the latter, melt a sufficient quantity of mutton-suet, and put it hot upon the leather with a piece of flannel; then take two pieces of soft Bath brick, and rub them one against the other over the leather till it is covered with the powder, which

may be a little on the stoop while cleaning and do not bear too hard upon them; by this method it will be easier to clean two knives at a time than one, and they will be less liable to be broken, for good knives will snap when pressed on too heavily. Many will say that they cannot clean two knives at once, or that they can get through them faster one by one; but if they will only try it a few times in the way recommended, they will find it not only much more expeditious, but easier. A little practice is all that is necessary

The best way to clean steel forks is to fill a small barrel with fine gravel, brick dust, or sand, mixed with a little hay or moss; make it moderately damp, press it well down, and let it always be kept damp. By running the prongs of the steel forks a few times into this, all the stains on them will be removed. Then have a small stick, shaped like a knife. with leather round it, to polish between the prongs, having first carefully brashed the dust from them as soon as they are taken out of the A knife-board is often spoiled in cleantub. ing forks upon it, and likewise the backs of the knives; to prevent this, have a piece of old hat or leather put on the board where the forks and backs of the knives are cleaned.

422. To Preserve Knives and Forks in Good Condition. Wipe the knives and forks as soon as possible after being used, as the longer they are left with grease and stains on them the harder they will be to clean; particularly if they have been used for acids, salads, tarts, etc.; have then a jug of hot water ready to put them into as soon as done with, and wipe them as before directed.

In order to keep knives and forks in good another lather in the same way in which a condition when they are not in use, rub the steel part with a flannel dipped in oil; wipe the oil off after a few hours, as there is often water in it; or dust the blades and prongs with quicklime, finely powdered and kept in a

muslin bag.

To Clean Spice Mills. It is often 423. desired to grind different spices, orange or lemon peel, in the same mill, without any one being affected by another spice. Grind a teaspoonful of rice through the mill and all impurities will be removed. A coffee mill may be fitmust also be shaken often while drying, for if ted to grind any spice in the same way, using not, it will be quite stiff and crackly. It rather more rice. The rice will of course be flavored by whatever may have been in the mill. It is useful to thicken soups, or gravies, or sauces, when the spice is no objection.

To Keep Oil-Cloths Looking 424. Well. Wash them once a month in skim milk and water, equal quantities of each. Rub them once in three months with boiled linseed oil. Put on very little, rub it well in with a rag, and polish with a piece of old silk. Oil-cloths will last years if kept in this way.

425. To Clean Oil-Cloth. An oil-cloth rub in until no grease comes through when a should never be scrubbed with a brush, but, knife is passed over the leather, which may after being first swept, should be cleaned by

cold water. On no account use soap, or water that is hot, as either would have a bad effeet on the paint. When the oil-cloth is dry, rub it well with a small portion of a mixture of bees' wax, softened with a minute quantity of turpentine, using for this purpose a soft furniture polishing brush. Oil-cloth cared for in this way will last twice the time than with ordinary treatment.

426. To Give to Boards a Beautiful Appearance. After washing them very nicely with soda and warm water and a brush, wash them with a very large sponge and clean water. Both times observe to leave no spot untouched; and clean straight up and down, not crossing from board to board; then dry with clean cloths, rubbed hard up and down

in the same way.

The floors should not be often wetted, but very thoroughly when done; and once a week dry-rubbed with hot sand and a heavy brush,

the right way of the boards.

The sides of stairs or passages on which are carpets or floor-cloth, should be washed with sponge instead of linen or flannel, and the edges will not be soiled. Different sponges when done with, and kept in dry places.

427. To Scour Boards. Lime, 1 part; sand, 3 parts; soft soap, two parts. Lay a little on the boards with a scrubbing-brush. and rub thoroughly. Rinse with clean wavermin.

428. To Clean Stone Stairs and Halls. Boil 1 pound of pipe-clay with a quart water, brush.

429. To Clean Glass Globes. If the globes are much stained on the outside by smoke, soak them in tolerably hot water with of moderately hot water, dip in a flannel a little washing soda dissolved in it; then put a tea-spoonful of powdered ammonia into a pan of lukewarm water, and with a tolerably hard brush wash the globes till the smoke a pound of bran in I gallon of water an hour, stain disappears; rinse in clean cold water, and let them drain till dry; they will be quite as white and clear as new globes.

430. To Clean Decanters. There is often much difficulty experienced in cleaning decanters, especially after port wine has stood in them for some time. The best way is to wash them out with a little pearlash and warm water, adding a spoonful or two of fresh slaked lime if necessary. To facilitate the action of the fluid against the sides of the glass, a few small cinders may be used.

Or, soak the decanters for some hours in warm soda and water; if there is much cutting on the outside, a brush will be necessary to remove the dirt and stains from the crevices. Cut a potato into small dice, put a Be careful to remove from the sides of the jar good handful of these into the decanter with any ammonia that may have been spattered some warm water, shake the decanter briskly water, and let them drain until dry. Vinegar | tact with the liquid. and sauce cruets can be cleaned in the same wav

washing with a soft flannel and lukewarm or up a large potato very fine and put it in the bottle with some warm water, and shake it rapidly until it is clean. Some use shot and

soda, but potato is even more effectual.
432. To Clean Medicine Phials. Cleanse bottles that have had medicines in them, by putting ashes in each, immersing them in cold water, and then heating the water gradually till it boils. After boiling an hour, let them remain in the water till it is cold. Wash them in soap-suds, and rinse them till clean in clear water.

433. To Wash Castor Bottles. Put them 1 full of rice and fill up with warm water; shake them well; this will cleanse

them thoroughly.

434. To Clean Greasy Earthenware. Stone pots and jars in which lard or fat has been kept, and yellow ware pie plates, may be cleaned by putting them in a kettle with ashes or sal soda, covering them with cold water, and allowing them to boil slowly an hour at least. When boiled enough, take them off the fire and leave them in the water until it cools.

To Clean Paint. There is a very **4**35. simple method to clean paint that has become should be kept for the above two uses; and dirty, and if our housewives should adopt it, those and the brushes should be well washed it would save them a great deal of trouble. Provide a plate with some of the best whiting to be had, and have ready some clean warm water and a piece of flannel, which dip into the water and squeeze nearly dry; then take as much whiting as will adhere to it, apter and rub dry. This will keep the boards ply it to the painted surface, when a little of a good color, and will also keep away rubbing will instantly remove any dirt or grease. After which wash the part well with clean water, rubbing it dry with a soft chamois. Paint thus cleaned looks as well as and a quart small beer, and put in a bit of when first laid on, without any injury to the stone-blue. Wash with this mixture, and, most delicate colors. It is far better than when dry, rub the stone with flannel and a using soap, and does not require more than half the time and labor.

Another simple method is as follows:—put a table-spoonfu' of aqua ammonia in a quart cloth, and with this merely wipe over the wood-work; no scrubbing will be necessary.

436. To Clean Varnished Paint. Boil and wash the paint with the bran water.

437. To Clean Soiled Ribbons and Silks. A mixture of alcohol and highly rectified benzine is excellent for cleaning ribbons and silks. It is applied with a clean sponge. Persons who apply these liquids and mixtures to cleaning silks, &c., must be careful to do so in an apartment where there is neither fire nor lamp burning, under the penalty of an explosion. (See No. 346.)

438. To Remove Stains from Kid Gloves. Stains may be removed, even from the most delicately colored gloves, by suspending them for a day in an atmosphere of ammonia. Provide a tall glass cylinder, in the bottom of which place strong aqua ammonia. upon them. Suspend the gloves to the stopuntil the stains disappear; rinse in clean cold per in the jar. They must not come in con-

439. To Clean Kid Gloves. Dr. Reimann gives the following directions, in the 431. To Clean Glass Bottles. Chop | Scientific American, for cleaning kid gloves:-

A bottle 2 feet high, and 1 to 1½ feet wide, smell of benzine is always a sign of carelessgloves which are to be washed are put also chimney. (See No. 346.) into the bottle. On this account the neck of obtained, being much used in pharmacy. then closed, well shaken, and allowed to stand some minutes. The shaking is repeated, the bottle opened, and the gloves taken out with a pair of iron forceps.

any smell, it is a good plan to open the bottle

all the vapor that escapes.

The gloves, when brought by the forceps to the mouth of the bottle, are taken out, one after the other, by the hand, and wrung out, care being taken that the superfluous liquid runs back again into the bottle. It is highly | hole is made, but this time near its bottom, so advisable to perform this operation under a chimney, or the workman will soon suffer from the injurious influence of the volatile a short distance of the bottom. hydrocarbon.

Under the chimney is placed a cord stretched between two pins, and the gloves are hung upon this by means of small S-shaped hooks. After hanging a short time they will

be dry.

The benzine contained in the bottle dissolves all the grease which adheres to the between the tube and the hole. gloves, and the dirt which had been combined with the grease is consequently removed at the same time. The benzine remaining in the bottle assumes a dirty gray color during the process of washing.

When the benzine has become too dirty, it is put into a distilling apparatus, and distilled over. In this way the benzine is restored to its original purity and whiteness, so that it niently fixed in a holder. can be used again in further operations. (For directions how to accomplish this, see next re-

The gloves, when taken out of the bottle, are often not quite clean, in which case it is necessary to rub them with a rag, moistened with benzine, in all places where they are still

dirty.

Thus the last traces of dirt are removed, and the gloves become perfectly clean. In this state they may be hung on a cord under

The gloves soon become dry, but a part of the benzine still remains behind, which is less volatile, and which, when the glove is in contact with the warm hand, causes a strong odor of benzine to be evolved.

To remove this also, the gloves are placed on a common plate, which is put upon an iron pot containing boiling water. The first plate is covered with a second, and the gloves between the two plates are heated at the boiling temperature of water, until the last traces of the unvolatilized benzine have escaped.

The gloves are now removed from the plate, and put upon a wooden glove-stretcher, or shape. In this way they are made to resume their original form, and are now ready for

that no smell of benzine is perceptible. The benzine has extracted from the gloves.

the stopper of which is also made of glass, is ness on the part of the workman, who can filled with 2 pounds of benzine. Then the readily conduct all the benzine vapors up the

440. To Re-Distill and Purify Benthe bottle must be very wide, perhaps from ½ zine that has been used for Cleaning to a foot in diameter. Such bottles are easily Kid Gloves. If the operation of distilling As the benzine is disagreeable to the glove maker, many gloves may be introduced into the bothe can have it purified at the apothecary's or tle as the liquid will cover. The bottle is chemist's. It is, however, an operation which

he can readily perform himself

The apparatus is neither complicated nor expensive. A small wooden pail, such as is used in every establishment, is furnished with To prevent the possibility of there being two holes. The first of these is drilled near the upper margin of the pail, so that, when under a good chimney, which thus carries off the pail is filled with water, the water runs out through the hole, until the surface of the water within the pail is on a level with the lowest portion of the hole, that is to say, just below the upper margin of the vessel.

On the opposite side of the pail another that water would run through this hole, until the surplus of the contained water was within

A leaden tube, the thickness of which equals the diameter of the hole, is bent so as to form a distilling worm, the upper end of which is inserted into the upper opening, and the lower end into the lower hole.

The tube is tightly inserted into both holes, so that no water can run through the space

The pail is then filled with cold water.

The upper and lower ends of the leaden tube must project a little beyond the outer surface of the pail—perhaps two inches.

The lower end is bent downward a little.

The upper end is a little enlarged, so that the tube forms a sort of funnel above.

In this is inserted a glass retort, conve-

The space between the neck of the retort and the enlarged end of the leaden tube is conveniently filled with moistened cotton, so that no vapors can escape through it.

It is a good plan to employ a glass retort with a tube, so that any fluid can be poured into it when the apparatus is already fixed.

Having placed the retort on a vapor bath, where it can be heated at 212° Fahr., the neck of the retort is connected with the worm, as above mentioned, and the pail filled up with cold water. The retort is then filled with the impure benzine or petroleum essence which has been used in washing gloves.

After pouring in the benzine, the tube of the retort is closed by a stopper, and then the apparatus is completed by a bottle placed under the lower end of the leaden tube; which projects beyond the outer surface of the pail, so that the liquid running down this flows

directly into the bottle.

The vapor bath is now heated, the retort soon becomes warm, and the volatile liquid begins to distill over, either quickly or slowly, according to the way in which the heating process is conducted.

The vapor of the hydrocarbon condenses in the worm, and a stream of liquid flows out of its month. In a short time there remains The whole operation must be so conducted behind in the retort only the grease which the evaporate to the consistence of a thick syrup, in a water bath; then spread it thinly on a dish, and expose it before the fire, or to a current of dry air, until nearly dry. It will then keep for years in wide-mouthed bottles or pots, covered over with bladder. For use, a little is dissolved in water.

Or:-fresh gall, 1 pint; boil, skim, add pounded alum, I ounce; boil again until the alum is dissolved, and when sufficiently cool, pour it into a bottle, and loosely cork it down; in a similar manner boil and skim another pint of gall, and add to it 1 ounce of common salt; boil till dissolved, and cool and bottle as above. In three months decant the clear from both bottles, and mix them in equalquantities; the clear portion must then be separated from the coagulum by subsidence or filtration. It is employed by artists to fix chalk and pencil drawings before tinting them, and to remove the greasiness from ivory, tracing paper, &c. It is also used to extract grease and oil from clothes: for the latter

purpose it answers admirably.

442. To Clean Cloth Clothes. Dissolve 4 ounces washing soda in 1 quart boiling water; when dissolved, add to it I moderate sized fresh beef's gall; lay the garment to be cleaned on a clean table or board, and with a sponge or brush (a brush is the best) wetted in the liquid, rub well the grease spots first, and afterwards the whole garment, frequently dipping the sponge or brush in the liquid; when sufficiently rubbed, rinse in cold water until the water is clear, then squeeze the washape to prevent shrinking. When still slightly damp, press it on the wrong side with a warm iron, and then finish airing. Clothes cleaned in this way, if the directions great improvement in this operation, as it hasthe last 15 years with the most satisfactory results. For dark-colored cloth garments, it is a common practice to add some fuller's cil, should be passed over it several times;

this will give it a superior finish.
443. To Clean Woolen Clothes. Mix ½ ounce sulphuric ether and ½ ounce hartshorn (ammonia water) with 3 ounces water. Rub the article well with a sponge frequently wetted with the mixture, which will remove the dirt; then sponge with clean warm water; next lay a coarse towel, which has been saturated with hot water and wrung out, cloth, brush it down with a clothes brush.

be cleaned as follows: Take them up rubbing each clean and dry as you go. Keep

441. To Refine Ox-gall for Fixing and shake and beat them, so as to render Chalk and Pencil Drawings, and Re-them perfectly free from dust. Have the moving Grease. Allow fresh ox gall to re-floor thoroughly scoured and dry, and nail the pose for 12 or 15 hours, decant the clear, and carpet firmly down upon it. If still much soiled it may be cleaned in the following manner: Take a pailful of clear cold spring water, and put into it about 3 gills of ox-gall. Take another pail with clean cold water only. Now rub with a soft scrubbing brush some of the ox-gall water on the carpet, which will raise a lather. When a convenient sized portion is done, wash the lather off with a clean linen cloth dipped in the clean water. Let this water be changed frequently. When all the lather has disappeared, rub the part with a clean dry cloth. After all is done, open the window to allow the carpet to dry. A carpet treated in this way will be greatly refreshed in color, particularly the greens. Any particularly dirty spots should be rubbed by nearly pure gall first; and every spot of grease must be removed from the carpet by the following process: Scrape and pound together, in equal proportion, magnesia in the lump and ful-ler's earth. Having mixed these substances well together, pour on them a sufficient quantity of boiling water to make them into a paste. Lay this paste, as hot as possible, upon the grease spots upon the carpet, and let it dry. Next day, when the composition is quite dry, brush it off, and the grease spot will have disappeared. (See No. 357.) 445. To Clean Hearth Rugs and

Stair Carpets. Hearth rugs and stair carpets may be treated in the same manner as given in the last receipt, only that these may

be spread and washed upon a table.

446. How to Clean Carpets. Carpets may be washed on tables or on the floor. In ter out thoroughly (but without twisting-if either case they must be taken up and well possible, use a patent wringer), shake well and beaten and swept. Grease is taken out by hang in the air to dry. While drying, shake rubbing hard soap on the spot, and scrubbing the garment occasionally and pull it into it out with a brush dipped in clean cold water. Each spot must be rubbed dry with a cloth as it is washed. Dissolve a bar of soap in 2 gallons of water, by cutting it into the water and heating to a boil. Lay the carpet on be strictly followed, look almost equal to new. the floor and tack it down, or have a heavy Tho use of the patent wringing machine is a board, 3 feet wide by 12 feet long, laid on stout stands, or horses, and throw the carpet tens drying, and prevents shrinking. The over that, keeping a clean board or sheet uneditor has used this receipt in his family for derneath to receive the carpet as it is cleansed. Provide brushes, and a quantity of coarse cotton cloths, fiannels, and a large sponge. Take 2 pails filled with blood-warm water, earth to the mixture of soap and gall. When put 2 quarts of the melted soap into one of nearly dry, the nap should be laid right, and them to scour the carpet with, and use the the garment carefully pressed, after which, a other for rinsing. Dip the brush in the brush, moistened with a drop or two of olive soap-suds, and scour a square yard of the carpet at a time, using as little water as possible, not to soak it through. When the soap has done its work, rub it well out of the carpet with a flannel or coarse sponge, sucking up with these all the wet and dirt left by the brush, rinsing the article used in clean water repeatedly. Have ready a pail of clean cold water, with enough sulphuric acid or sharp vinegar in it to taste sour; dip a clean sponge in this, squeeze and rub it well into over the article, and press it with a hot the spot just cleansed. Afterward wipe dry iron; while the steam is still rising from the with coarse cloths, rinsing and hanging them oth, brush it down with a clothes brush. where they will be dry when the next yard is 444. To Clean Carpets. Carpets may washed. Finish yard after yard in this way,

a good fire in the room to dry the carpet thoroughly. If scoured on a frame, nail the Silk and Worsted Damask, Terry, or carpet against the side of a house in the sun Brocatelle Curtains. Silk and cotton, or same way, beating and brushing them well, bing with 1 a gallon camphene and a brush, and tacking on a large board before washing. first dipping the curtain into the camphene, Scrub one-sixth of it at a time unless you are then cleaning on the wrong side, and lastly on expeditions, and dry well with an old sheet. The secret of having carpets look well is to just used, and rinse in the same amount of wash and riuse them thoroughly, without fresh camphene. Let it drain a minute, then soaking them through. Ingrain, tapestry, Brussels, and Turkish carpets are all cleaned all the moisture possible is absorbed, and in this way. Good authorities recommend a brush it with a dry brush of soft hair. Hang tea-cupful of ox-gall to a pail of soap-suds, rinsing with clean water. (See No. 444.)

447. To Sweep Carpets. Before applying the broom, scatter over the carpet the refuse tea-leaves from the tea-pot. These should be set apart and saved in a pot kept for the purpose, squeezing the water out thoroughly in the hand. First rub the leaves into the carpet with the broom, and then sweep as usual. This will prevent dust and brighten the colors. Indian meal is recommended for this purpose by many experienced

housekeepers.

448. To Clean Colored Silks, Moreens, Chintzes, and Printed Cottons. Colored or black silks, moreens, printed cottons, and chintzes, may be cleaned, without injury to their colors, by potato liquor. Grate raw potatoes to a fine pulp; add water in the pro- Printed Cloth. Dissolve 1 bar of the best portion of 1 pint to 1 pound of potatoes; pass mottled soap in 4 gallons of scalding water, the liquid through a coarse sieve into a vessel, and allow it to remain till the fine white starch subsides to the bottom. Pour off the ter and 3 gallons of soap liquor; in the second, clear liquor, which is to be used for cleaning. Spread the article to be cleaned upon a table, which should be covered with a linen cloth; dip a sponge in the liquor, and apply it until have 6 pails of cold water, with a table-spoon-the dirt is removed. Then rinse the article in ful of oil of vitriol in it. If the cover is cotclean cold water several times.

449. To Clean Old Tapestry on the Wall. Old tapestry is cleaned on the wall, beginning at the top. Melt a bar of good common soap in a gallon of water, and put 1 quart of it in a gallon of cold water. A clothes brush of fine broom straw or long bristles is best to dust with; a soft brush, piece of wash-leather, some flannels, and dry sheets are also needed. Brush all dust from the tapestry first, cleaning the corners well. hang it to dry in a warm room. Dip a flannel in the suds, squeeze it slightly, rub the tapestry to a lather, and brush well liquors; if one has a variety of table-cloths, with a soft brush. Wring the flannel out of different mixtures, they may be put through the soap, and rub the tapestry dry with it and the same suds in the order given in these diwash-leather; lastly wiping the whole as dry as possible with a sheet, as it must not be the printed cloth, after the last soap-liquor. rinsed. Melt 4 ounces of tartaric acid in a two cold waters, with a table-spoonful of vitpint of boiling water, and add to it 2 gallons of clean water. Squeeze a clean sponge in this acid, and rub it well into the place just room, or the colors will run into one another. cleaned and dried; then finish with the dry sheet at once before going to the next yard of sheet, and iron with a heavy iron. surface. Renew the suds and rinsing water 453. To Clean White Jean Boots. If work may be cleaned in this way.

450. To Clean Silk and Cotton, or This is a tedious, but thorough prosilk and worsted dumask, terry, or brocatelle Hearth rugs may be cleaned in the curtains, are cleaned over a board by scrubthe right. Dip it again into the camphene wipe it off with a linen or cotton sheet till them in the air a few hours to take away the smell of camphene. I gallon is enough for each curtain width. Next roll the curtains in half-dry sheets to damp them; take them out; brush and rub them; then iron, with a damp cloth laid over them, and they will look like new.

451. To Clean Worsted Reps. Worsted rep sofas, and worsted furniture of any kind, are freshened by dusting damp Indian meal over them, and rubbing off with a stiff brush. Dry bran is said to answer the same purpose, or very light, dry snow, not suffered to melt on the surface. A large sheet should be spread under each piece of furniture, as it

is cleaned, to catch the falling litter.
452. To Clean Table-Covers of Cotton and Worsted, Silk and Worsted, or with 1 pound of pearlash in it. Have 3 tubs ready, and put in the first, 1 pail of cold wa-1 pail of cold water and 2 gallons of soap liquor; and in the third, 2 pails of cold water and 1 gallen of soap liquor. In another tub ton and worsted, wash and wring it through the three soap-waters; rinse it five minutes in the vitriol tub, and wring out of cold, clear water; fold it up smoothly to drain, and hang it to dry without wringing.

For a silk and worsted cover use three soapwaters; rub it well, and, instead of the vitriol, put a pound of common salt in 2 pails of water, and work the cloth well in this. Rinse it in 2 cold waters after the salted one, and

A printed cloth wash through three soapof different mixtures, they may be put through rections, using different rinses for each. Give riol in each; after these, a cold, clear water. Fold and drain it, and dry quickly in a warm To press table-cloths, lay them under a damp

frequently, as well as the towels, flannels, you have not boot-trees, stuff the boot as full etc., for everything must be used clean. A as possible with common cotton wadding or good fire should be kept in the room when old rags, to prevent any creases; then mix tepestry is cleaned. When dry, rub a lump some pipe-clay with water to rather a stiff of pipe-clay well into it, and brush it out paste, wash the jean boots with soap and wasome pipe-clay with water to rather a stiff paste, wash the jean boots with soap and wawith a good clothes brush. This takes the ter and a nail brush, using as little water as soap out and brightens the colors. Worsted possible to get the dirt off. When they look tolerably clean, rub the pipe-clay with a flanWhen dry, beat out the superfluous clay with This receipt is an excellent one. the hand and rub them till they look smooth.

of hartshorn into a saucer, dip a bit of clean flannel in it and rub it on a piece of white the nap the right way. curd soap; rub the boots with this, and as

fresh piece; the boots will look like new.

455. To Clean White Satin Shoes. White satin shoes may be cleaned by rubbing like fine muslin, it will look as good as new. them with stone blue and flanuel, and after-

up, strain it, and add I dessert-spoonful of alco- and the steam will raise the plush. light kid gloves. It will do without the alcohol, but is better with it.

457. To Clean Black Silks. Steep a of the Black Reviver in $\frac{1}{2}$ a gallon of water, and a cupful of ox-gall. Make hot, and sponge the silk. Dry and smooth with an iron. (See

next receipt).

Rusty black silk may be cleaned in the same way. Some persons clean black silk by rubbing it with a flannel dipped in gin.

458. Black Reviver, to Restore the Color of Black Silk, Cloth or Leather. Take of blue galls, bruised, 4 ounces; logwood, copperas, iron filings free from grease, and sumach leaves, each 1 ounce. Put all but vinegar, and set the vessel containing them in a warm water bath for twenty-four hours, then add the iron filings and copperas and shake occasionally for a week. It should be kept in a well-corked bottle. It may be applied to faded spots with a soft sponge. It is good also to restore the black color of leather when it turns red, the leather being previously well cleaned with soap and water.

459. To Restore Black Silk. To oxgall, add boiling water sufficient to make it warm, and with a clean sponge rub the silk well on both sides; squeeze it well out, and sponge in glue-water, and rub it on the wrong

460. To Clean Silks, Satins, Colored Woolen Dresses, &c. 4 ounces of soft soap, 4 ounces of honey, the white of an egg, and a wine-glassful of gin; mix well together, and scour the article (which must be unpicked, and laid in widths on a kitchen table) with a rather hard brush, thoroughly; afterwards rinse it in cold water, leave to drain, and iron | Heat some rain or soft water, and while on whilst quite damp, with a piece of thin muslin the fire cut into it slices of good yellow soap, between it and the iron, or it will be marked to make a lather; put the stockings in while on the ironed side. The silk, when laid on the lather is warm, but not scalding, and table, must be kept quite smooth, so that wash them in two such waters (a wine-glass-

nel well over them and hang them to dry. White silk requires a little blue in the water.

461. To Raise the Nap on Cloth. Flake white may also be used.

Soak in cold water for ½ an hour, then put on 454. To Clean White Kid Boots.

Soak in cold water for ½ an hour, then put on a board, and rub the threadbare parts with a the kid boots are not very soiled they may be half-worn hatter's card, filled with flocks, or cleaned in the following manner: Put ½ ounce with a prickly thistle, until a nap is raised. Hang up to dry, and with a hard brush lay

462. To Renovate Black Crape. Skimeach piece of flannel becomes soiled, take a milk and water, with a little bit of glue in it, made scalding hot, will restore old rusty black Italian crape. If clapped and pulled dry,

463. To Raise the Pile on Velvet or wards cleaning them with bread.

456. To Clean Black, and Other over the steam arising from boiling water, Hold the wrong side of the velvet Silks, with old Kid Glovés. Cut up a until the pile rises-or dampen lightly the black kid glove in small pieces and pour a wrong side of the velvet and hold it over a pint of boiling water over it. Cover it and pretty hot iron, not hot enough to scorch, how-let it stand all night where the water will keep ever: or, make a clean brick hot, place upon warm if possible. In the morning let it boil it a wet cloth, and hold the velvet over it,

hol. Keep it warm while sponging the silk on the right side and iron immediately on the Creased ribbons may be restored by laying wrong side. For light silks use white or them evenly on a board, and with a very clean sponge damping them evenly all over. Then roll them smoothly and tightly on a ribbon block, of greater breadth than the ribfew hours in cold water. Then put 1 a pint bon, and let them remain until dry. Afterwards transfer to a clean dry block. Then

wrap in brown paper, and keep until wanted.
465. To Wash China Crape Scerfs. If the fabric be good, these articles of dress can be washed as frequently as may be required, and no diminution of their beauty will be discoverable, even when the various shades of green have been employed among other colors in the patterns. In cleaning them, make a strong lather of boiling water, suffer it to cool; when cold, or nearly so, wash the scarf quickly and thoroughly, dip it immethe iron filings and copperas into I quart good | diately in cold hard water in which a little salt has been thrown (to preserve the colors); rinse, squeeze, and hang it out to dry in the open air; pin it at its extreme edge to the line, so that it may not in any part be folded together. The more rapidly it dries the clearer it will be.

466. To Wash a Black Lace Veil. Mix bullock's gall with sufficient hot water to make it as warm as you can bear your hand in, and pass the veil through it. It must be squeezed, not rubbed; and it will be well to perfume the gall with a little musk. Rinse the veil through two cold waters, tinging the proceed again in like manner. Rinse it in last with a little blue. After drying, put it spring water, and change the water till per-linto some stiffening made by pouring boiling feetly clean; dry it in the air, then dip the water on a very small piece of glue; squeeze it out, stretch it, and clap it. Afterwards, pin side; pin it out on a table, and dry before a fire. it out on a linen cloth to dry, laying it very streight and even, and taking care to open and pin the edge very nicely. When dry, iron it on the wrong side, having laid a linen cloth over the ironing blanket.

Any article of black lace may be washed in

this manner.

467. To Wash White Silk Stockings. every part may come under the brush ful of gin in the first water is an improve-

ment); rinse them well in lukewarm water, upright in a strong cold lather of white soap when first purchased, tack them to the sheet more, if the scallops are not very small. convenient to have them mangled (run bebetween a piece of muslin, lay them on a a pasteboard box.
stone doorstep, and beat them with the rolling pin. They must not be mangled or beaten in towels, as the pattern of the towels would be impressed on them. If the stockings have lace fronts they will more particularly require the tacking mentioned above to make them look nice. No soda or washing powder of any kind must be put to them, and they must be done quickly, and not left lying about.

468. To Clean Soiled Bed Ticks. Apcloth, then put the tick in the sun. When dry, rub it with the hands. If necessary, repeat the process, and the soiled part will be as clean as new.

469. To Restore the Gloss Finish on Woolen Goods, removed by Washing. Brush the cloth over, the way of the cloth, with a brush wetted with very weak gumof cloth, and put it under a weight or in a screw-press until dry. This will restore the original gloss to the dull spot often left after

washing out a stain.
470. To Remove Stains from Black Crape and Mourning Dresses. Boil a handful of fig-leaves in 2 quarts of water, until reduced to a pint. Squeeze the leaves, strain the liquor, and put it into a bottle for use. Bombazines, crape, cloth, &c., should be rubbed with a sponge dipped in this liquor, and most stains will be instantly removed.

471. To Clean a White Lace Veil. Boil the veil gently for 15 minutes in a solution of white soap; put it into a basin holding warm water and soap, and keep gently squeezing it (do not rub it) till it is clean, and then rinse it from the soap. Then take a vessel of cold water, into which put a drop or two of chemic (see No. 162) or liquid blue; rinse the veil in it. Have ready some very clear flannel should be well soaped, being made gum arabic water, or some thin rice-water. Pass the veil through it. Then stretch it out even, and pin it to dry on a linen cloth, making the edge as straight as possible; opening out all the scallops, and fastening each with pins. When dry, lay a piece of thin muslin smoothly over it, and iron it on the wrong side.

clean linen or muslin, and wind the blond surface must be done at a time than can be round it (securing the ends with a needle and spread perfectly flat upon the table, and the thread), not leaving the edge outward, but hand can conveniently reach; likewise the

having ready a second rinsing water, in and very clear soft water, and place it in the which is mixed a little blue (not the common | sun, having gently with your hand rubbed the kind, but such as is used for muslins and suds up and down on the lace. Keep it in the laces), or rose pink, which can be procured at sun every day for a week, changing the lather the chemist's, and is used in the same way as daily, and always rubbing it slightly when you the blue, by tying it up in a piece of flannel renew the suds. At the end of the week, and squeezing it into the water. After rins take the blond off the bottle, and (without ing, put the stockings between towels and let rinsing) pin it backward and forward on a them get almost dry; place them on a small large pillow covered with a clean tight case. sheet, lay them out quite flat, as they are Every scallop must have a separate pin; or with a needle and thread, turn the sheet over plain edge must be pinned down also, so as to them, and have them mangled. If it is not make it straight and even. The pins should be of the smallest size. When quite dry, take tween weighted rollers), the next best plan is it off, but do not starch, iron, or press it. to put four or six stockings one upon the other | Lay it in long loose folds, and put it away in

manner.

473. To Clean Thread Lace. Thread lace may be cleaned in the same manner as in last receipt. Or, when the thread lace has been tacked to the bottle, take some of the best sweet oil and saturate the lace thorough-Have ready in a wash-kettle, a strong cold lather of clear water and white Castile soap. Fill the bottle with cold water, to prevent its bursting, cork it well and stand it upply starch by rubbing it in thick with a wet right in the suds, with a string round the neck secured to the ears or handle of the kettle, to prevent its shifting about and breaking while over the fire. Let it boil in the suds for an hour or more, till the lace is clean and white all through. Drain off the suds and dry it on the bottle in the sun. When dry, remove the lace from the bottle and roll it round a white ribbon-block; or lay it in long water; lay over it a sheet of paper or a piece folds, place it within a sheet of smooth white paper, and press it in a large book for a few days.

.În washing laces, put 12 drops aqua ammonia in warm suds.

474. To Prepare Silks for Washing. Most colors are really improved by the following method, especially red, purple, orange, blue, olive, puce, &c. The more delicate greens are not improved, neither are they injured. This is likewise the case with lavender. If the silk is to be washed in a dress, the seams of the skirt do not require to be ripped apart, though it must be removed from the band at the waist, and the lining taken from the bottom. Trimmings, or furniture where there are deep folds, the bottom of which is very difficult to reach, should be undone so as to remain flat.

To Wash Silks. **475.** should be laid upon a clean smooth table. just wet with lukewarm water, and the surface of the silk rubbed one way, being careful that this rubbing is quite even. When the dirt has disappeared, the soap must be washed off with a sponge, and plenty of cold water, of which the sponge must be made to imbibe as much as possible when the washing is done. As soon as one side is finished, the other must To Wash White Silk Lace or be washed precisely in the same manner. Take a black bottle covered with Let it be understood that not more of either covering it as you proceed. Set the bottle soap must be quite sponged off one portion,

portion. The treatment of silks, after they ing out all settlings that may yet be remain-have been thus washed, will be described ing) then throw in your clothes and boil them

hereafter. (See next receipt.)

Satin ribbons, both white and colored, and even satin dresses, may be cleansed with good effect by this process, which is likewise very effective in renovating all kinds of silk ribbons and trimmings.

476. To Stiffen Silk for Trimmings. Sponge the surface of the silk with a weak solution of gum arabic, or with equal parts of ale and water, and iron, while damp, on the wrong side. This is excellent when old silk is to be used for trimming, and it is ne-

cessary to keep it stiff

To Wash Silk Pocket Handkerchiefs. Silk pocket handkerchiefs require to be washed by themselves, and those containing snuff should be put to soak in separate lukewarm water. Two or three hours after, they should be rinsed out and put to soak with the others in cold water for an hour or two. They should then be washed out in lukewarm water, being soaped as they are washed. If all the stains are not out of them, they must be washed through a second water of the same description. When finished, they should be rinsed in cold soft water, in which a handful of common salt has been dissolved. They may be rinsed all together, being thrown, as fast as they are done, they are transferred to the rinsing tub.

478. To Wash Point Lace. By following the directions laid down in this receipt, ladies may wash and finish their own point lace as thoroughly as any French laundress. Mix a tea-spoonful powdered borax in a basin cotton, upon two thicknesses of flannel. Soak the lace, thus arranged, in the soap-suds mixture for 24 hours, or longer if very dirty, changing the suds two or three times. Then let it lie for 2 or 3 hours in clean water to rinse, changing the water once. Squeeze it out (do not wring it), and, when partially dry, place the flannel with the lace on it, lace downwards, on two thicknesses of dry flannel During the whole process, the lace must remain basted on the flannel; and when it is pressed, must lie sandwiched between the latter. When the lace is perfectly dry, rip it

Twelvetree's Washing Fluid for White Linen and Cotton Articles. aside the flannels and colored things, as they must not be washed in this way, then select from the clothes to be washed, all the coarse and dirtiest pieces from the fine; then put them in separate tubs of soft water to soak over night (the night previous to washing.) Then prepare in a separate vessel, the liquid for a large washing, namely, 1 pound of good brown soap, cut in small pieces; ½ pound soda, and 3 ounces fresh, unslacked lime, mixed in milkiness will have no injurious effect. 1 gallon of boiling soft water. Stir well up, so as to mix the ingredients, and let it stand un-

before the soaped fiannel is applied to another the boiler, pour in the prepared liquid (keeptwenty minutes or half an hour. to which, put an earthen plate at the bottom of the boiler, to prevent the clothes from burning. After boiling the appointed time. take them out; scald them, blue them, and rinse them in clean soft water, warm or cold, and the clothes will be as clean and white as By this method, the finest linens, snowlaces, cambries, etc., can be readily and easily cleansed with very little trouble.

Should there be only a small washing, and less than 10 gallons of water required to boil them in, less of the liquid of lime, soap, and soda, can be used in proportion. When there is any difficulty in procuring fresh lime, a quantity of the liquor may be made at once from the lime, which will keep for years,

corked in bottles, and ready for use.

480. Bingham's Patent Wash Mixture. Take 5 pounds of bar soap, shave fine, add 1 quart of lye, ‡ ounce pearlash, dissolved over a slow fire. When dissolved, put into a vessel prepared for it to stand in; then add 1 pint turpentine, 1 gill hartshorn; stir

well, and it is ready for use.

481. To Make Washing Fluid. To 1 gallon of common soft soap, (such as is made by the usual method of boiling the lye of wood ashes and fat together), take 4 ounces washed, into a dry tub, whence, when all are sal-soda, \frac{1}{2} gallon rain or soft water, and \frac{1}{2} gill spirits of turpentine; place them all in a pot over the fire, and allow the mixture to boil a few minutes; it is then ready for use, and can be kept in any earthen or stoneware vessel.

Washing Made Easy. The wash-**482**. erwomen of Holland and Belgium, so proverof strong white Castile soap-suds. Baste the bially clean, and who get their linen so beautilace to be washed, very carefully, with fine fully white, used refined borax as washing powder instead of soda, in the proportion of a pound of borax powder to 10 gallons of water. They save soap nearly one half. the large washing establishments adopt the same mode. For laces, cambrics, etc., an extra quantity of powder is used; and for crinolines (requiring to be made stiff) a stronger solution is necessary. Borax, being a neutral salt, does not in the slightest degree laid on a table, and smooth it with a hot iron. injure the texture of the linen. Its effect is to soften the hardest water, and therefore it should be kept on the toilet table.

White Lve for Washing. dry and damp flannel, and pressed upon the is made by pouring a pailful of boiling water over 4 or 5 quarts of ashes. Let it stand a while to infuse; then pour in cold water to settle it, when you can pour it off clear. This is very good to boil dirty clothes in. When made nice, is equal to soda, and does not, unless made extremely strong, injure the

clothes.

484. To Wash Linen in Salt Water. Drop into sea water a solution of soda or potash. It will become milky, in consequence of the decomposition of the earthy salts, and the precipitation of the earths. This addition renders it soft, and capable of washing. Its

485. To Wash an Alpaca, Mousseline-de-Laine, or Lama Dress that has til morning. Then strain off the liquid, being Bright or Delicate Colors. Boil 1 pound careful to leave all sediment behind. Having best rice in 1 gallon water for three hours. ready about 10 gallons of boiling soft water in When boiled, pour off what will be sufficient was kept for that purpose, and hang it before table-spoonful of ox-gall. (Sec No. 489.) the fire to dry. When dry enough, iron with a cool iron, as it is liable to seorch. If some Clothes. No colored articles should ever be parts of the dress get too dry, they must be boiled or scalded. Neither should they be aldamped with a wet cloth whilst ironing. No soap must be used. The best way is to boil bly injured. They should be ironed immedithe rice on the previous day, and merely warm it up the next morning, for then you have the day before you to complete the whole, as the dress must on no account lie damp, even for an hour, or the colors will be sure to run. This receipt will be found equally well suited to delicate painted muslins and piqués as to

lama and alpaca dresses.

several very essential points to be observed, whereby the colors are preserved from injury. In the first place, they should not be soaped or soaked over night, as the more delicate of the hues would be deteriorated by such When ready for washing, they should, if not too dirty, be put into cold water and washed up very speedily; if very dirty, the water may be lukewarm and no more. But above all, be careful not to use the smallest particle of soda. The best soap for washing articles made of this material is the common vellow. It is much better than the mottled, because it is less harsh, and repiece of alum should be boiled in the water in which the lather is made. The soap should 491. To Render the not be allowed to remain any time on the linen; the latter should be soaped and washed as rapidly as possible, and not lie in the water any length of time. One article should there-fore be washed at a time, and immediately rinsed through two cold waters, the others remaining in a dry state by the side of the tub until they are taken to be washed each in its turn. The liquid in which the articles are to be rinsed in succession immediately as they are washed, should consist of 3 or 4 gallons of cold soft water, with a handful of table salt dissolved in it. Should alum not be added to the lather, then a tea-spoonful of vinegar should be stirred into the water for each rinsing; this will help to fix and brighten the colors. The moment an article is taken from the rinsing tub, it should be wrong very gently, being twisted as little as can be helped. After rinsing, they should be hung out immediately to dry.

To Preserve the Colors of Merino. Mousselines - de - Laine, Gingham, Chintz, and Printed Lawns. Before washing almost any colored fabrics, it is recommended to soak them for some time in water to every gallon of which is added a spoonful of ox-gall. A tea-cup of lye in a pail of water is said to improve the color of bear when the articles are put in. The flanblack goods, when it is necessary to wash A strong clean tea of common hay will preserve the color of French linens. Vinegar in the rinsing water, for pink or of the wool together; hence the thickening of green, will brighten those colors, and soda the fabric and consequent shrinking in its

to starch the dress; wash the dress well in served by using a strong milk-warm lather of the remainder, rice and all, using the rice for white soap, and putting the dress into it. insoap; rinse it in clean cold water, wring it stead of rubbing it on the material, and stirring well, then starch it with the rice water that into a first and second tub of water a large

> lowed to freeze, or the colors will be irreparaately they are dry enough, and not be allowed to lie damp over night, nor be sprinkled. They should not be smoothed with a hot iron. Pink and green colors, though they may withstand the washing, will frequently change as soon as a hot iron is put over them.

489. To Prepare Ox-gall for Washing Colored Articles. Empty the gall in 486. To Wash Colored Muslins. In a bottle, put in it a handful of salt, and keep washing colored muslins and linens, there are it closely corked. A tea-cupful to 5 gallons of water will prevent colored articles from

fading.

490. The French Method of Washing Colored Muslins, Piqués, &c. Prepare some rather warm (not hot) lather, made with soft water and the best white soap; wash the dresses one at a time, but do not soak them. As soon as the first lather looks soiled, squeeze the dress from it, and at once wash it again in a fresh lather. When thoroughly clean, rinse in pure cold water, lastly in water slightly blued; squeeze (not wring) the water completely from the dress, and hang it in a shaded place to dry; if wet weather, moves the dirt in a shorter period. A small dry it by the fire. The best prints will fade

491. To Render the Colors of Cotton Fabrics Permanent. Dissolve 3 gills of salt in 4 quarts of water; put the calico in while hot, and leave it till cold, and in this way the colors are rendered permanent, and will not fade by subsequent washing.

492. To Wash Chintz, so as to Preserve its Gloss and Color. Take 2 pounds of rice and boil it in 2 gallons of water, till soft; when done, pour the whole into a tub: let it stand and cool till about the usual warmth for colored linens; put the chintz in, and use the rice instead of soap; wash it in this till the dirt appears to be out; then boil the same quantity as above, but strain the rice from the water, and mix it in warm water. Wash it in this till quite clean; afterwards rinse it in the water the rice was boiled in; this will answer the end of starch, and no dew will affect it, as it will be stiff while it is worn. If a dress, it must be taken to pieces, and when dried, hang it as smooth as possible; when dry, rub it with a smooth stone, but use no iron.

493. To Wash Flannels or other Woolen Articles. Have the suds ready prepared by boiling up some good white soap in soft water, but do not use the suds when boiling; let them be as hot as the hand will nels should not be rubbed with soap, nor should the material itself be rubbed, as in washing linen, &c., rubbing knots the fibres answers the same end for both purple and dimensions. Sluice the articles up and down blue.

The colors of the above fabrics may be pre- (not wring) out. The patent clothes-wringers are a great improvement upon hand labor, as, shirt should be the last part ironed, as this without injury to the fabric, they squeeze out will prevent its being soiled. All starch the water so thoroughly that the article dries should be strained before using. in considerably less time than it would do beaten out or brushed off prior to washing.

All flannels should be soaked before they

ter, in order to shrink them.

After this it will not shrink in washing. Fill a also good (much diluted) for thin white mustub with spring water, place the flannel in it, lin and bobbinet. and take out as soon as it sinks to the bottom. when dry.

495. To Wash Red Flannel. To wash red or scarlet flannel when soiled, mix a handten minutes. Add this to some warm suds, and wash the flannel gently; rinsing rather cost is but a trifle. than rubbing it (see No. 493), rinse it in three soap should be used for woolen goods in prefer-

ence to bar soap.

496. Woolen Shawls. Scrape 1 pound soap, beil it down in sufficient water. When cooling, beat it with the hand; it will be a sort of jelly. Add 3 table spoonfuls spirit of turpentine, and 1 of spirit of hartshorn. Wash the articles well in it, then rinse in cold water until all the soap is taken off, then in salt and water. Fold between two sheets, taking care not to allow two folds of the article washed to lie together. Iron with a very cool iron. Shawls done in this way look like new. Only use the salt where there are delicate colors that may run.

497. To Make Starch for Linen, Cotton, &c. To I ounce of the best starch add just enough soft cold water to make it (by rubbing and stirring) into a thick paste, carefully breaking all the lumps and particles. When rubbed perfectly smooth, add nearly or quite a pint of boiling water (with bluing to suit the taste), and boil for at least half an hour, taking care to stir it well all the time, to prevent its burning. When not stirring, keep it covered, so as to protect it from dust, upon it. To give the linen a fine, smooth, ing, and ½ a tea-spoonful of the finest table-salt. If you have no spermaceti, take a piece of the purest, whitest hog's lard, or tallow (mutton is the best), about as large as a nut-them in a towel, and then fold the rest, turning them, before ironing, with a clean white towel, to mildew. Sheets and table linen should be dampened in soft water. The bosom of a shaken and folded.

498. Gum Arabic Starch for Making even after the most thorough hand wringing. Shirt-Bosoms Glossy. Procure 2 ounces After rinsing, squeeze out the water, and dry of fine white gum arabic, and pound it to in the open air, if the weather is such as to powder. Next put it into a pitcher, and pour admit of the articles drying quickly; if not, on it a pint or more of boiling water, accorddry in a warm room, but avoid too close ing to the degree of strength you desire, and proximity to a fire. Let any dust or mud be then, having covered it, let it set all night. In the morning, pour it carefully from the dregs into a clean bottle, cork it, and keep it are made up, first in cold and then in hot wa- for use. A table-spoonful of gum water stirred into a pint of starch that has been made 494. To Shrink Flannel. Flannel in the usual manner, will give a beautiful gloss should be coaked in cold hard water before to shirt-bosoms, and to lawns (either white or making, and hung up to drain and dry without printed) a look of newness to which nothing any squeezing or handling in the water, else can restore them after washing. It is

To Make Starch for Colored Ar-499 It does not lose the appearance of new flannel ticles. For starching muslins, ginghams, and calicoes, dissolve and add to every pint of starch, a piece of alum the size of a shellbark. By so doing, the colors will keep ful of flour in a quart of cold water, and boil | bright for a long time, which is very desirt, blo when dresses must be often washed, and the

500. To Starch Muslins and Piqués. or four warm waters, and the brightest scarlet In getting up muslins and piqués, the failure will never lose its color. Soft soap or olive is not generally in the washing, but in the starching. A good-sized panful of starch should be used, in which 3 or 4 inches of Scotch Method of Washing spermaceti candle has been melted whilst hot. Shawls. Scrape 1 pound soap, The articles should be thoroughly squeezed from the starch, and folded whilst wet, be-tween folds of old sheeting or table linen. They should then be passed through a wringing machine. All lumps of starch are thus removed.

> Piqués should be ironed as lightly as possible, and the iron ought never to come into contact with the outside surface of the piqué. An old cambric handkerchief is the best thing to use under the iron where absolutely

necessary to iron on the right side.

501. To Clear-starch Lace, Cambric and Book Muslin. Starch for laces should be thicker and used hotter than for linens. After the laces have been well washed and dried, dip them into the thick hot starch in such a way as to have every part properly starched. Then wring all the starch out of them, spread them out smooth on a piece of linen, roll them up together, and let them remain for about half an hour, when they will be dry enough to iron. Laces should never be clapped between the hands, as it injures etc. Also keep it covered when removed them. Cambrics do not require so thick from the fire, to prevent a scum from rising starch as net or lace. Some people prefer cold or raw starch for book-muslin, as some of this glossy appearance, and prevent the iron from kind of muslin has a thick, clammy appearsticking, add a little spermaceti (a piece as ance if starched in boiled starch. Fine laces large as a nutmeg) to the starch, when boil- are sometimes wound round a glass bottle to

meg, or twice this quantity of the best refined them all the right side outward. Lay the colloaf sugar, and boil with the starch. In iron-ing linen collars, shirt bosoms, etc., their ap-pearance will be much improved by rubbing might be injured, and starched fabrics are apt

503. To Iron Clothes. In ironing a shirt, first do the back, then the sleeves, then Flannel which has become yellow with use the collar and bosom, and then the front. may be whitened by putting it for some time Iron calicoes generally on the right side, as they in a solution of hard soap, to which strong thus keep clean for a longer time. In ironing a frock, first do the waist, then the sleeves, then the skirt. Keep the skirt rolled while ironing the other parts, and set a chair to hold the sleeves while ironing the skirt, unless a skirt-board be used. Silk should be ironed on the wrong side, when quite damp, with an iron which is not very hot, as light colors are apt to change and fade. In ironing velvet, turn up the face of the iron, and after dampening the wrong side of the velvet, draw it over the face of the iron, holding it straight; always iron lace and needlework on the wrong side, and put them away as soon as they are dry.

504. To Restore Scorched It is almost needless to premise that if the tissue of linen is so much burnt that no strength is left, it is useless to apply the following composition; for nothing could prevent a hole from being formed, although the composition by no means tends to injure the fabric. But if the scorching is not quite through, and the threads not actually consumed, then the application of this composition, followed by two or three good washings, will restore the linen to its original color; the marks of the scorehing will be so totally effaced as to be imperceptible, and the place will seem as white and perfect as any other part of the linen. Mix well together 2 ounces fuller's earth reduced to a powder; 1 ounce hen's dung; 1 ounce of cake soap, scraped; and the juice of 2 large onions, obtained by the onions being cut up, beaten in a mortar, and pressed. Boil this mass in 1 pint strong vinegar, stirring it from time to time, until it forms a thick liquid compound. Spread this composition thickly over the entire surface of the scorched part, and let it remain on 24 hours. If the scorehing was light, this will prove sufficient, with the assistance of two subsequent washings, to take out the stain. however, the scorching was strong, a second coating of the composition should be put on after removing the first; and this should also remain on for 24 hours. If, after the linen has been washed twice or thrice, the stain has not wholly dissappeared, the composition may be used again, in proportion to the intensity of the discoloration remaining, when a complete cure will seldom fail to be effected. It has scarcely ever happened that a third application was found necessary. The remainder of the composition should be kept for use in a gallipot tied over with bladder.

505. To Remove the Stain of Perspiration. For removing the stain of perspiration a strong solution of soda is first to be applied, with a subsequent rinsing with

506. To Bleach Yellow Linen. Linen that has acquired a vellow or bad color by careless washing, may be restored to its former whiteness by working it well in water containing a clear solution of chloride of lime, rinsing it well in clean water, both before and after using the bleaching liquor. Never attempt to bleach unwashed linen, and avoid using the liquor too strong, as in that case the linen will be rendered rotten.

507. To Bleach Yellow Flannel. ammonia has been added. The proportions are 11 pounds hard curd soap, 50 pounds of salt water and & pound strong ammonia. The same object may be attained in a shorter time by placing the garments for a quarter of an hour in a weak solution of bisulphite of soda to which a little hydrochloric acid has been added.

508. How to Whiten Flannel and Foolen Hose. Wet the flannel yarn or Woolen Hose. hose (whatever you wish to whiten) in weak suds; wring out. Then hang on sticks or cords across a barrel with 2 table-spoonfuls of pulverized brimstone or sulphur burning under it; cover the barrel tightly. If they are not white enough, repeat the process; hang in the open air a day, then wash and rinse in bluing water. Be careful not to have the sulphur blaze and seorch the garments.

To Bleach Brown Sheeting. 509. Having soaked the cloth 12 hours in strong soap-suds, take ‡ pound chloride of lime for every 12 yards of sheeting, and dissolve it in enough boiling water to cover the cloth when dipped into it. As soon as the lime is dissolved, strain the solution through a flannel or other coarse cloth, then put the brown sheeting in the strained lime-water, stirring constantly, and after it has remained thus in this liquor for about half an hour, take out the cloth and rinse it well in pure water, so as to be sure to remove all the lime-water; and then boil it up in strong soap-suds, and hang out to dry, and the work of weeks will have been accomplished in a day or two.

510. Bleaching by Oil of Turpentine. A German authority recommends the use of oil of turpentine in bleaching white goods. Dissolve 1 part oil of turpentine in 3 parts strong alcohol, place a table-spoonful of the mixture in the water used for the last rinsing The clothes are to be immersed in this, well wrung out, and placed in the open air to dry. The bleaching action of the oil consists in its changing oxygen into ozone when exposed to the light, and in this process the turpentine disappears, leaving no trace behind.

511. To Clean Straw Bonnets. First brush them with soap and water; then with a solution of oxalic acid.

512. To Clean Door-Plates. To clean silver door-plates, use a weak solution of ammonia in water, applied with a wet rag. wash is equally useful for silver plate and jewelry.

513. To Clean Plated-Ware. Make a paste with whiting and alcohol, apply it to the plated articles, and after it is dry, rub it off with a brush (if rough), or a soft rag, if smooth.

514. To Remove Rust Spots from Marble. Rust spots can be made to disappear by treatment with a weak solution composed of 1 part nitric acid and 25 of water, and afterward rinsing with water and ammonia.

To Remove Ink Spots from Marble. Ink spots may be removed by first washing with pure water, and then with a weak solution of oxalic acid. Subsequent

polishing, however, will be necessary, as the thus of two kinds, hard and soft, this condifustre of the stone may become dimmed, tion being influenced both by the fat and This can be best secured by very finely alkali employed. The firmer and harder the linen cloth first dipped in water and then With the same alkali, therefore, tallow will into the powder. If the place be subsequentiated make a harder soap than palm or olive oil, ly rubbed with a dry cloth the lustre will be and stearic acid than oleic acid. But the restored.

516. To Remove Copper Spots from Marble. Copper spots may be removed by diluted sulphuric acid and ammonia, and sub-

sequently with water and ammonia.
517. To Remove Match Stains from Marble. Spots from sulphur and phosphorus, caused by lucifer-matches, can be extracted from marble by sulphide of carbon.

the Art of Soap-Making. Soap is a chemical combination of a fatty substance with caustic lye, the base of which is either potash or soda; the former producing soft, and the latter, hard soaps.

To Make Soap-makers' Lye. To 1 part of quicklime, slacked by sprinkling on it sufficient water to crumble it, add a solution of 3 parts soda in 5 parts water. For soft-soap lye, an equal quantity of potash is mon yellow hard soap consists of soda, with substituted for the soda. Stir the mixture and allow it to settle; the clear liquid is then of a strength of 25° to 30° Baumé; the second, third and fourth lye is each obtained by adding successively 5 parts water, stirring thoroughly, allowing it to settle, and pouring off the clear liquid; producing respectively a lye of from 12° to 18°, 8° to 10°, and 2° to 5° Baumé.

To Make Soap. Having thus 520. prepared the lye, the first, second and third lyes being sufficient for general purposes, take 20 pounds of pure grease, and melt it slowly in an iron vessel; keep it at a moderate heat, and stir in, a little at a time, 10 pounds third lye; after stirring for about an hour, let the mixture get up to a boiling heat, and then stir in, by degrees, 10 pounds second lye; this will complete the first stage of the process, which is termed saponification. The next step, called cutting up the pan, is to add, by degrees, a mixture of soda and lye with from 2 to 3 pounds common salt; this separates the excess of water from the curd, leaving a scapy paste; boil and stir for some time, then let it settle, and draw off the water. The third operation, clear boiling, has now to be performed; stir into the paste, by degrees, 5 pounds first lye; and, when perfectly mixed and smooth, boil the whole for two hours; should the soap, during the intervals, become too liquid, which may happen when too weak a lye has been used, some salt, or a weak lye containing salt, must be added. The boiling is terminated when large, regular, dry scales appear on the surface; when this is the case let it settle, and draw off the fluid which remains. Put the soap into frames lined with cotton cloth which has been well powdered with a mixture of lime and starch, and as soon as the soap has become firm, lay it out to

powdered soft white marble, applied with a fat, the solider will be the resulting soap. consistence of soaps depends far more upon the alkali employed. Potash is very deliquescent, that is, has a strong attraction for water. so that when exposed it will absorb it from the air and run down into a fluid or semi-fluid state. The potash retains this water in the condition of soap, so that potash soaps are always liquid and soft. The hard soaps, therefore, all contain soda, those with tallow or stearic acid being the hardest. Potash soaps will not dry, but retain their soft, jellylike condition, while some kinds of soda soap become so hard by drying that at last they can be pulverized. The admixture of a very small quantity of sulphate of soda hardens soap and also checks waste from too rapid solubility in hot water. When soda and potash alkalies are used in combination, a proportion of from 10 to 20 per cent, of the latter is employed, according to the degree of hardness the soap is desired to possess.

522. Common Yellow Soap. oil or fat and resin. Resin is a feeble acid, and allow it to settle; the clear liquid is then capable of combining with alkali, but neu-poured off, and constitutes the *first lye*, and is tralizing it less completely than oil, so that the compound or soap formed is too powerfully alkaline. But when resin is worked with an equal or larger proportion of oil, it makes an excellent soap for many purposes.

523. Beef Tallow. This fat, on account

of its abundant supply, is the most used by soap and candle makers. It is not as white as many other animal fats, and the best quality, the North American, contains about 70 per cent. of stearine. It does not melt below 1110 Fahr., but may afterwards be cooled down to 102° without solidifying, and when cold, is firm, and even brittle.

524. Mutton Suet. This is generally firm, white, and very rich in stearine; this latter quality gives it a tendency to produce a soap of too hard and brittle a nature for general use, which is obviated by mixing about one-fifth or one-sixth part of lard, or some other more oleaginous fat; thus modified it is specially adapted for stock for toilet soaps.

525. Lard. The best quality of lard melts at 81° Fahr., and contains about 60 per cent. of oily fat, known as lard oil, and about 30 per cent. solid stearine. It makes a pure, white soap, and is frequently combined with tallow or other saponaceous fat.

526. Bone Fat, obtained by boiling fresh bones, split open lengthways, is very well adapted for making soaps, but generally undergoes a process of purification before being thus employed. (See No. 534.)

527. Cocoanut Oil possesses two prominent qualities which specially recommend it as an ingredient in soap-making. It imparts a great degree of firmness to the soap, probably owing to the solid form of the fatty acids found in it. It will also unite permanently with soda lyes in any proportion; and, in combination with other fat substances, im-521. Hard and Soft Soap. Soaps are parts whiteness and emollient properties to

water, which is not the case with tallow soap to 10 parts of the grease; next warm the

soaps worked with soda.

in the manufacture of soap. Its genuine quality is easily tested by its solubility in tinctive qualities and white color are greatly increased by bleaching. (See No. 537.) 529. To Clarify Fat Used in Making

Fine or Toilet Soaps. Heat the fat in a clean iron or copper kettle, applying just heat enough to melt it thoroughly; then filter it

through fine linen or muslin.

530. To Deodorize Fat for Making Perfumed Scap. Boil for 10 minutes 100 pounds of the fat with about 35 pounds water the fat rest for some hours before using.

minutes with the salt and alum solution, as is to put it while warm into water nearly in last receipt; strain the water off, and then cold. Any importies it may contain will gently simmer the clarified fat with 4 ounces sink to the bottom. benzoin and 1 gallon rose water; skim off and let it cool. Fat thus treated will keep

532. To Grain or Granulate Tallow. Melt the tallow and stir it with twice its cold; strain the fat from the water, and dry by exposing it to a current of dry air. Tallow in this granulated form combines more readily with lye for soap-making purposes. (See No.

535.)

533. To Purity Tanow and Tallow and other fats are commonly ats. Tallow and other fats are commonly with water, Fats. purified by melting them along with water, passing the mixed fluids through a sieve, and sufficiently bleached, the operation has to be fetting the whole cool slowly, when a cake of repeated, using less proportion of chrome cleansed fat is obtained. Another plan is to and acids. When the bleaching is complete, cleansed fat is obtained. Another plan is to keep the tallow melted for some time, along with about 2 per cent. of oil of vitriol largely diluted with water, employing constant agitation, and allowing the whole to cool slowly; then to re-melt the cake with a large quantity of hot water, and to wash it well. Another method is to blow steam for some time through low to make soap, and is serviceable in resin the melted fat. By either this or the preceding process a white hard tallow may be obtained. Some persons add a little nitre to the melted fat, and afterwards a little dilute ally made according to the process before denitric or sulphuric acid, or a solution of bisulscribed (see No. 520), the excess of water being phate of potash. Others boil the fat along with water and a little dilute nitric or chromic acid, and afterwards wash it well with water.

534. To Purify Bone Fat. Melt the fat with a small quantity of saltpetre (nitrate of potassa); then add sufficient sulphuric acid to decompose the saltpetre. The mass. after the scum is removed, becomes a light yeloffensive smell and animal impurities.

535. To Keep Tallow from Turning

them; it also froths as well in cold as in hot dissolve in the water about 1 part of clean grease to a blood heat and pour it into the bar-528. Palm Oil. This substance is used rel of water, stirring it together until cold; let it rest until the fat has risen to the surface, when the water must be drawn away acetic ether, the imitations sometimes sold through a hole in the bottom of the barrel, under the same name being insoluble in hitherto tightly corked. The fat in a granuit. It is used in its natural state, but its dis-lated state must be thoroughly dried by exposure to a current of dry air; and, when perfectly dry, packed in barrels or other vessels. The graining of the fat at the same time greatly facilitates its combination with lye for the purposes of soap-making.

536. To Preserve Grease. Boil all the scraps, rinds, and bones, in a weak lve, and the purer grease in clear water. Let the mixture cool, take off the cake of grease, and strain it. It is well to do this occasionally, containing 6 ounces common salt and 3 ounces as you save it; for when kept a long time impowdered alum; strain the water off, and let pure grease becomes offensive. You must be careful to dry off all the water before laying 531. To Prevent Fatty Substances it away in the grease tub, if you wish it to from Turning Rancid. Boil for about 10 keep sweet. The best plan to collect dripping

537. To Bleach Palm Oil. Dissolve 4 pound powdered red chromate of potassa in about a quart hot water. 100 pounds palm oil are heated in a wooden tank, by steam, to a temperature of 120° Fahr. The steam is quantity of water at a blood heat until it is then turned off and a portion of the chrome solution is stirred in, followed by a proportional quantity of 1 pound strong muriatic acid. After the whole of the solution and of the acid has been thoroughly mixed with the palm oil, stir in 1 pound sulphuric acid. The oil becomes black, then dark green, and finally light green, with a thick froth on the surface. If, when the mixture has settled, the oil is not the oil is allowed to stand for an hour to clear; it is then run into a wooden tank with some water, and heated again, to wash out any salts that may remain in it, and after a time drawn off ready for use. Palm oil is usually combined with from 3 to 5 times its weight of talsoap to brighten its color and disguise the resin.

> separated from the paste by the use of salt: this class of soap is termed grained soap. But there are some kinds-cocoanut oil and soda soap, for instance—that are so hard in their nature that the operation of salting, or graining, is needless, the water remaining incorporated in the paste; soaps of this class are called *filled* soans

To Make Tallow Soap. 539. low color, and is completely deprived of all French Method. Melt in a boiler, by a moderate heat, 500 pounds tallow; stir in, by degrees, 35 to 40 gallons caustic soda lye of Rancid. Cut 50 pounds tallow into slices, 10° to 12° Baume, and let it boil gently for and boil it in about 21 gallons water containing several hours; then add, gradually, 18 to 20 2 ounces alum and 4 ounces salt; strain the gallons caustic soda lye of 15° to 18° Baumé, fat from the liquid, and wash it in clean wa- and mix until the whole becomes a homogeneter; put into a clean barrel twice as much ous mass of a grayish color; keep the mixwater at a blood heat as there is grease, and ture boiling gently for some hours, adding to

20° Baumé. This will occupy 10 or 12 hours. The salting process then follows, and is conducted as described in No. 520. After the separation or graining is finished the paste is allowed to stand for a few hours, and the lye is drawn off through a faucet inserted for the purpose in the side of the boiler, near the bottom. The mass is again boiled for some hours, adding every hour 2½ gallons so la lye of 25° Baume, until the hard scales rise to the surface. (See No. 520.) The fire should then be extinguished, and after an hour the under-lye is to be drawn off. Then boil again for 11 to 2 hours with about 25 gallons soda lye of 4° Baumé, stirring from time to time. The fire should then be removed, and the pan covered up; the soap will rise to the top of the lye, and may be poured into the frames, care being taken that no lye gets mixed with the soap. This should yield about 850 pounds of soap. **540.**

Tallow Resin Soap. About 15 per cent. of resin can be mixed with tallow without injuring the color and firmness of the soap. A larger proportion deteriorates the quality and produces an inferior soap. Some soap-makers melt the resin and tallow together before saponifying; but it is better to make a soap of each in separate boilers, and then mix and boil them together thoroughly

541. To Make Resin Soap. Boil 12 gallons caustic soda lye of 30° Baumé in a kettle, and add 100 pounds well pulverized resin, 10 or 15 pounds at a time, stirring conup to or nearly at boiling point. Saponification will be effected in about 2 hours.

lightest resin is the best for soap.

before filling the frames.

542. Cocoanut Oil Soap. pounds cocoanut oil and 100 pounds caustic soda lye of 27° Baumé into a soap kettle; boil and mix thoroughly for 1 or 2 hours, until the paste gradually thickens; then diminish the heat, but continue stirring till the cooling paste assumes a white, half-solid mass; then transfer quickly to the frames. A mixture of make a very fine filled soap. (See No. 538.) Cocoanut oil mixed with almost any fats, if they are not in too large proportions, will produce filled soaps.

543. Palm Oil Soap. Palm oil is seldom used alone as a saponaceous fat, but is employed in conjunction with other fats, and with resin; this latter being usually saponi-No. 540.) The directions for making tallow soap apply equally well to palm oil. The fol-lowing are among the best mixtures and pro-

portions of palm oil for soaps:

2 pounds resin.

30 pounds palm oil, 50 pounds tallow, and

20 pounds resin.

90 pounds palm oil and 10 pounds cocoanut

15 pounds palm oil, 55 pounds lard, 5 and left to harden pounds eccount oil, and 5 pounds clarified for use in a month. resin.

Tallow. Mix 6 pounds caustic soda and 2 sides terminate in a point, and having an ori-

it every hour 3 to 4 gallons caustic soda lye of pounds caustic potash with 17 to 20 gallons hot water; put a portion of this lye into a clean barrel; stir in by degrees 25 pounds grained tallow; add the rest of the lye and stir it briskly for at least an hour; then let it rest, and before it is cold pour it into a frame or box, and finish according to No. 520.

545. Dawson's Patent Composite Soap. Strong potash lye, 75 pounds; taltow, 75 pounds; cocoanut oil, 25 pounds. Boil until the compound is saponified in the

usual manner.

To make 30 pounds of the new composi-tion, take 2 gallons boiling soft water in a kettle, add ½ pound sal soda, 2 ounces borax, 2 table-spoonfuls spirits of turpentine, and 1 tea-spoonful linseed oil. Stir this mixture until the borax and soda are dissolved; then add 15 pounds of the above soap made from lye, tallow, and cocoanut oil; and continue the boiling with stirring for 15 minutes, until the whole is incorporated and dissolved. Now add 2 ounces spirits of hartshorn, and stir. It may be scented with any essential oil, or odor, and colored, if desired; then run off and molded into cakes fit for toilet use. It is a good soap for chapped hands, and is free from any disagreeable odor.

546. Chemical Soap. Powdered fuller's earth, 1 ounce; just moisten with spirits of turpentine; add salt of tartar, 1 ounce; for half an hour, and strain through a sieve best potash, I ounce; work the whole into a paste with a little scap. It is excellent for

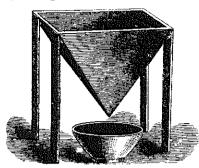
removing grease spots. 547. To Make Hard White Tallow 547. Dissolve 2 pounds sal soda in 1 gal-Soap. lon boiling soft water; mix into it 2 pounds stantly and thoroughly, the heat being kept fresh slacked lime, stirring occasionally for a few hours; then let it settle, pour off the clear liquid, and boil 2 pounds tallow in it until all the tallow is dissolved. Cool it in a flat box, and cut it into bars or cakes. It can be scented by stirring in the desired perfume when cool

548. To Make Home-made Caustic Soda. Dissolve 6 pounds common washing soda in 4 gallons warm water; slack 6 pounds clean fresh quicklime in a tub, using only as much water as is needed to crumble it perfectequal parts of cocoanut oil and tallow will ly; add the slacked lime to the solution of soda; stir the two together, adding 4 gallons boiling water; stir thoroughly and let it settle; then pour off the clear lye for use.

549. To Make Domestic Soap. Put the caustic soda lye, prepared in the manner and quantity given in the last receipt, into a clean iron kettle, and add, during continual stirring, 12 pounds clarified grease, dusting in, fied separately and mixed afterwards. (See a little at a time, 4 ounces finely powdered borax; let it boil gently for 10 or 15 minutes, until it thickens and becomes ropy; then have in readiness a tight box, lined with a piece of muslin large enough to hang well over the 30 pounds palm oil, 20 pounds tallow, and sides, to allow of the contents being afterward conveniently lifted out; pour the mixture from the kettle into the box, and let it stand for a few days to harden; when sufficiently firm, turn it out onto a table, and cut it into bars with a thin wire. Soap thus made, and left to harden in a dry room, will be fit

550. To Make Home-made Caustic 544. To Make Soap from Grained Lye from Ashes. Provide a box whose

fice at the lower end (see illustration); this ty of bleached palm oil is to be added to them. should be mounted high enough to allow Cocoa oil and pale yellow resin suponaceous of a vessel being placed underneath it, to re- matters also enter into the composition of cer-The box is then well lined with straw (see obtained as wanted from any well-conducted No. 607), upon which fresh wood ashes are soap factory. To be adapted to the purposes placed, adding to the ashes about one twen-



tieth the quantity of fresh slacked lime (see No. 519); then pour hot water upon it, and the lye will filter through into the vessel below. For the purposes of soap-making, this lye must be concentrated by boiling until a sound potato will not sink below the surface.

To Make Home-made Soap. Fill an iron kettle two-thirds full of the concentrated lye prepared according to the last receipt; add to it melted fat, a ladleful at a time, stirring constantly until the mass besalt at a time, stirring without intermission until a perfect ring can be made on the surface with a stick; then let the fire go out and the soap will rise to the surface and harden as it cools; the lye can be drawn from under it by tilting the kettle, or the soap may be lifted off and laid out to dry until hard enough to cut it into bars. (See No. 549.)

552. Ox-gall Soap. Gall soap, for the washing of fine silken cloths and ribbons, is prepared in the following manner: vessel of copper 1 pound cocoanut oil is heated to 60° Fahr., and 1 pound caustic soda is added, with constant stirring. In another vessel 1 pound white Venetian turpentine is heated, and when quite hot, stirred into the copper kettle. This kettle is then covered and left for 4 hours, being gently heated, after which the fire is increased until the contents are perfectly clear; then 1 pound ox-gall is added. After this, sufficient perfectly dry Castile soap is stirred into the mixture to cause the whole to yield but little under the pressure of the finger; for which purpose, from 1 to 2 pounds of soap are required for the above quantity. After cooling, the soap is cut into pieces. It is excellent, and will not injure the finest colors.

oilet Soaps. To this class belong the finer kinds of scented soaps, which have emollient properties. They are rarely made direct by the perfumer, the body or basis being a weli-selected white soap, subsequently cleaned and purified. For the choicest grades, the body should be made of a mixture of olive and sweet-almond oil, as the fat rior with some appropriate device, or impress-

ceive the liquid that runs out of the bottom, tain toilet soaps. These body soaps may be of perfumery they must be perfectly neutral. firm, free from unpleasant odor and all tendency to crust in cold, or sweat in damp weather. They should, moreover, give a rich lather without wasting too rapidly in the water. Soaps, generally, in their original condition, are usually deficient in many of those points; and must, for the purposes of perfumery, undergo a refining process, which is as follows:

554. To Refine Soap for Making Toilet Soap. The soap, as purchased in bars or blocks, being piled upon the shelf of the rasping machine, is next placed in the hopper, and as the wheel revolves, knives come against the soap and cut it into meal, which falls into the reception box beneath. It is now in a state fit to be melted readily. for which purpose it is transferred to a steam bath, and mixed with rose and orange-flower waters, each half a gallon, to every hundred pounds of soap. The steam being let on, and the containing kettle covered, its contents become gradually fluid, and in this state must be stirred with a crutch—which is a long stick having the form of an inverted T-until the paste becomes uniformly consistent and comes creamy; next add small quantities of smooth throughout. It is then allowed to cool, again melted, but without fragrant water, and crutched as before. When the contents of the vessel comprise several kinds of soap, great care must be observed not to put in all at once, but to add and melt each successively, and to crutch constantly, so as to effect an intimate mixture. When the paste begins to cool, coloring matter as may be desired is then added, and subsequently the perfume, which is reserved to the last, to avoid any unnecessary loss by evaporation from the hot paste.

555. To Perfume, Cut and Stamp Toilet Soap. When extracts or bouquets are used, they must be added to the compound in meal, and incorporated with the mass by kneading it with the hands; for the application of heat would impair the delicacy of the odor, as well as occasion loss by its evaporation. In large establishments this is done by passing the meal repeatedly between marble rollers.

The soap is now ready to be put into the cooling frames, which is a rectangular well, made of a series of wooden frames, resting successively one upon the other. In a day or two it is sufficiently hard to be cut into tablets of the size of the sections of each frame; they are set up edgewise, and left for several days to dry, and are then barred by means of a wire. The sections or lifts of the frames regulate the width of the bars, and the gauges adjust their breadth—these latter being made so as to cut bars or squares of four, six, eight or any required number to the pound of soap. The bars are further subdivided into tablets, and subjected to pressure for the purpose of imparting solidity, and ornamenting the extestock. Lard and beef tallow make the next ing upon it the maker's name; the shape of best stock; and for palm soap a small quanti-

tories the pressure is more effectually accommade to give three blows, directly vertical, to each tablet of soap. Savonettes or soap-balls are shaped by rotating blocks of soap upon a soap scoop made of brass, with sharp edges.

556. To Marble Soap. The mottled or marble appearance is usually given to soap, on the large scale, by watering the nearly finished soap with a strong lye of crude soda; (preferably one rich in sulphurets), by means of attars of cloves and sassafras, each \(\frac{1}{2}\) ounce; a watering-pot furnished with a rose-spout. In latter of thyme, 1 ounce; atter of neroli, 1 Castile soap it is given with a solution of sulphate of iron, used in the same way. On the small scale, with toilet soaps, the mottle is either given in the way noticed under "Mottled" Soap Balls" (sec No. 576), or, in a like manner, by combining some of the soap, colored at the time of scenting it, with the remaining uncolored portion.

557. Almond Soap. This is a very white soap, which, when genuine, is made by from pure oil of sweet almonds. The kind, however, generally met with, is made as fol-White curd soap, 100 pounds; cocoanut oil, 15 pounds; purified as before directed

of cloves and caraway, each 8 ounces.

558. White Windsor Soap. The genuine old white Windsor is made from a body of which a mixture of lard and olive oil is the fat stock; and attars of caraway, lavender, and rosemary, constitute the perfume.

fine white curd soap, 115 pounds; cocoanutoil soap, 20 pounds; perfumed with a mixture of attar of caraway, $1\frac{1}{2}$ pounds; attars of times stimulated by the addition of a little thyme and rosemary, each 8 ounces; and attars of cassia and cloves, each 4 ounces.

559. Brown Windsor Soap. Curd soap, 100 pounds; cocoanut oil soap, and pale caramei (see No. 694), 8 ounces; and perfume with a mixture of attars of caraway, cloves, thyme, cassia, petit-grain, and lavender, each 8 ounces. Morfit's oleic soap, of first grade, is peculiarly adapted as a body for brown a handle. Windsor soap, as it gives a rich lather, and is very smooth and highly emollient. Moreover, it contains its normal moisture for a great length of time.

560. Heney Soap. White curd soap, 40 pounds; melted and crutched with white honey, 10 pounds; storax, 2 pounds; and powdered benzoin, 1 pound.

561. Imitation Honey Soap. An imitation honey soap is made by melting together pale yellow soap, 100 pounds; soft soap, 14 pounds; and perfuming with attar of citronella, $1\frac{1}{2}$ pounds.

Frangipani Soap. colored brown with caramel, 7 pounds; perfumed with a mixture of attars of neroli and vitivert, each 4 ounces; attar of rose, 2 drachms; attar of santal, 11 ounces; and civet, 2 drachms. The latter is to be previously triturated with the attars.

mould or die-box in which it is pressed. The mixture of olive oil soap, 60 pounds; and press is of ordinary construction, with spiral curd soap, 40 pounds; colored with 1 pound springs to throw out the soap tablet from the of finely bolted vermilion. The perfume condie-box as soon as it is pressed. In some fac- sisting of attar of rose, 6 ounces; attars of santal and geranium, each 1 ounce; and tincplished by means of a steam hammer, which is ture of musk, 8 ounces; must be added to the cold soap in meal, and incorporated by kneading. The oil soap may be replaced by curd soap, but the quality of the rose soap will not then be so fine.

> 564. Savon au Bouquet. White soap. 60 pounds; perfumed in the cold with 8 ounces of extract bouquet; or in warm paste with a mixture of attar of bergamot, 8 ounces; ounce. The soap body must be previously colored brown with 1 pound of caramel. The soap scented with the attars is inferior to that perfumed with extract bouquet. The perfume, and with it the title of the soap, can be varied according to the caprice of fashion.

Poncine Soap. 565. Curd soap, 50 pounds; cocoanut oil soap, the same quantity, melted to paste and crutched with 10 or 20 pounds of finely bolted pumice-stone powthe cold process (see Nos. 582 and 583), and der. The perfume is a mixture of attars of thyme, cassia, caraway, and lavender, each 1

pouna.

The genuine 566. Spermaceti Soap. spermaceti soap is superior to all others in (see No. 554), and perfumed with a mixture of emollient properties; but it is rarely made attar of bitter almonds, 1½ pounds; and attars from pure stock, owing to the difficulty in saponifying it. As generally vended it consists of white curd soap, 14 pounds; perfumed with a mixture of attar of bergamot, 21 ounces, and attar of lemon, 8 ounces.

t stock; and attars of caraway, lavender, drosemary, constitute the periume.

The modern Windsor soap is made from the remainder olive oil or spermaceti, constitute the periume. tutes the body of palm soap. Its natural

of cloves.

568. Floating Soap. All the hard soaps increase bulk by mechanical batting of yellow resin soap, each 25 pounds; color with the paste; the loss of density thus produced gives them the property of floating in water. The batting is best accomplished by means of a churn-twirl, rotating on a pivot in the bottom of the melting pan, and put in motion by

> Expose 5 pounds olive-oil or almond soap, and 11 pints soft water in a bright copper pan, to a steam or water heat, and assiduously beat and agitate the mixture until it has more than double its volume; then pour it into a cold frame, cool it cakely, and, when hard, cut it into bars or cakes. It may be colored and scented at will. Floats on water, and lathers freely, but will not bear soaking or much wet,

as it rapidly softens.

569. Transparent Soap. This amberlooking soap is made by dissolving hard white soap, previously reduced to meal and thoroughly dried, in alcohol. A steam-bath, fitted with a still-head, makes a good containing vessel. The alcohol and soap are taken in about equal proportions; and, as the solution proceeds, any spirit which may distill over must be allowed to condense in a worm, and collected in a receiver. The heat should 563. Rose Soap. This is made from a not exceed 212°. After solution, the whole the sediment into wooden frames; or globular moulds of britannia metal, if it is desired to cast it in ball form. Previous to settling it may be colored as desired—red, with tineture of alkanet; yellow, with tincture of turmeric; orange, with a mixture of the two tinctures; green, with tincture of chlorophyle; blue, Transparent with tincture of indigo carmine. soap is rather translucent when first made, and does not clear until perfectly dry. The perfumes are the same as for the other soaps.

570. Glycerine Soap. Any mild toilet soap (as the basis of bouquet, rose, or Wind- red bole, sesquioxide of iron, or jeweler's sor soap) with which about $\frac{1}{25}$ to $\frac{1}{20}$ of its weight of Price's glycerine has been intimately incorporated whilst in the melted state. It is generally tinged of a red or rose color, with a little tincture of archil or of dragon's blood; or orange yellow, with a little annatta. It is variously scented; but oil of bergamot, or rose-geranium (giager-grass), supported with a little oil of cassia, or cassia supported with essential oil of almonds, appear to be its favorite perfumes.

571. Musk Soap. Best tallow soap, 30 pounds; palm oil soap, 20 pounds; powdered cloves, pale roses and gilliflowers, of each 41 ounces; essence of bergamot and essence of musk, of each 31 ounces; Spanish brown, 4

ounces.

572. Orange Flower Soap. Best tallow soap, 30 pounds; palm oil soap, 20 pounds; essence of portugal and essence of ambergris, each 7½ ounces; yellowish green coloring, made of ochre and indigo, 8½ ounces;

vermilion, $1\frac{1}{4}$ ounces. 573. Cinnamon Soap. This is usually a mixture of tallow and oil soaps, like that of "savon au bouquet," colored with about 1 pound yellow ochre, and scented with 1 ounce oil of cinnamon (supported with a little oil of of this soap, and is very fine:

finest palm oil soap; 1 pound olive oil soap; English oil of lavender; and about 1 pound

levigated yellow ochre.

Oil of cassia is commonly substituted for the oil of cinnamon; and always so in

second and inferior qualities.

574. Glycerine Scap Balls. To any recently made toilet soap, sliced, and melted by a gentle heat, without water (if possible), add Price's glycerine, in the proportion of 1 ounce to the pound; thoroughly incorporate them by vigorous stirring, which should be continued until the mass has cooled considerballs.

575. Sand Soap Balls. These are prepared by adding to the melted soap about half well washed) for the purpose. For the finer qualities, finely-powdered pumice-stone is now usually employed. Used to prevent rough-ment produced in refining whale oil. ness and thickening of the skin in cold weather; also to clean the hands when dirty. The prepared cocoanut-oil soap, 150 parts, and fuse;

must be allowed time for settling; after best yellow soap, with or without the addition which, the clear fluid is to be drawn off from of 1 its weight of white soft soap and a little sweet oil, is the best for these balls.

576. Mottled Soap Balls. Cut the soap (recently prepared, and not too dry) into dice, or small square pieces, roll them in colored powder (see below), and then mould them into balls by powerful pressure, observing to mix

the colors as little as possible.

The colors usually employed, and which should be in very fine powder, are: Blueindigo, powder-blue, or smalts. Green-powder-blue and bright yellow-ochre. Orange—yellow de pened with a little red. Red rouge. Yellow-bright yellow-ochre, or Dutch

pink.

By varying the shade of color, which is done by diluting it with a little farina or chalk, and by using soap-dice separately coated with two or more colors, "mottled savonettes" of any color, or mixture of colors, may be pro-

duced at will.

577. Mercurial Soap. Take of corrosive sublimate (crushed small), 1 drachm; rectified spirit (to dissolve, say) 1 fluid ounce; white Castile soap (in powder), 4 ounces; beat them to a uniform mass in a wedgwood-ware mortar, adding a few drops of attar of roses, or of a mixture of the oils of cassia and bitter almonds. Nothing metallic must touch it. This is the "sapo hydrargyri bichloridi" of medical writers. above has been recommended in various skin diseases, including itch; also as "Savon Antisyphilitique," under which name it is often sold.

578. Sulphur Soap; Sulphuretted Soap. Take ½ pound white curd or Castile soap (recent); 1 ounce best flowers of sulphur (levigated); 1 fluid ounce rectified spirit (strongly colored with alkanet); and sufficient attar of roses to strongly scent the mass. Beat the whole together, to a smooth paste, bergamot and sassafras), to each 7 pounds. Beat the whole together, to a smooth paste, The following is the form of a celebrated maker in a marble or wedgwood ware mortar. This is Sir H. Marsh's formula. Recom-6 pounds finest white curd soap; 31 pounds mended in itch, and various other skin diseases. It is particularly serviceable as a com-11 ounce oil of cinnamon; 1 ounce oil of mon toilet soap, to persons troubled with bergamot; 1 ounce oil of sassafras; 1 drachm slight cutaneous eruptions. Its daily use tends to render the skin fair and smooth. The spirit and coloring may be omitted at will; and, as a toilet soap, only half the above quantity of sulphur is amply sufficient.

Caution in using Medicated Before using mercurial or sulphur 579. Soaps. soap, finger-rings, ear-rings, and bracelets of gold, &c., should be removed, and not replaced until some short time after the hands have become quite dry; as otherwise they will be tarnished, and even blackened and corroded. The same applies to all other cosably, when it should be at once made into metics containing the same mineral ingre-

dients. 580. Whale-oil Soap to Destroy Insects. Render common lye caustic, by boilits weight of fine siliceous sand. Sifted sand ing it at full strength on quicklime; then is usually employed. Some persons prefer take the lye and boil it with as much whalethe shelly sea-sand (sifted from the shells and oil foot as it will saponify (change to soap), pour off into moulds, and, when cold, it is tolerably hard. Whale-oil foot is the sedi-

581. Carbolic Acid Soap. Take freshly

To be poured into moulds.

Coap by the Cold Process.

Although the commoner kinds of soap are usually made by boiling, they can be made by the cold process if desired; and the fatty substances employed are substantially the same in both methods. The cold or littlepan process is, however, almost exclusively adopted in the manufacture of fancy or toilet soaps, and for these purposes the fat requires any delicate scent is to be used in perfuming it. (See Nos. 533 and 530.) The lye employed for saponification without boiling must be much stronger than that used in the boiling process, and should be entirely clear and colorless; a strength of about 365 Baumé is

usually necessary.
583. To Mak To Make Soap by the Cold Process. Incorporate by degrees 50 pounds concentrated caustic lye of 36° Baumé, into 100 pounds fat at a temperature not higher than 104° Fahr. (see No. 523); continue to stir thoroughly with a broad wooden paddle, until a complete ring can be drawn on its surface with the paddle. In making scented soap, the perfuming ingredients must now be stirred The paste is then run into frames lined with linen, flaps of which should be left above the edges of each frame, wide enough to admit of their being laid over the surface of the paste, with which the frame must be entirely filled. The paste being thus completely cona wooden cover and left for 12 hours. During this interval the temperature of the paste in the frames rises spontaneously to a much higher degree, producing complete saponification. The soap is afterwards taken out of the frames, cut, and dried. The hardness of the soap will depend on the description of fats and lyes used. (See No. 521.)

commercial caustic soda or potash can only be ascertained by analysis. given below are simple, and will determine, with sufficient accuracy, the percentage of water, caustic alkali, and carbonated alkali

quantity of impurity, if any.
585. To Find the Percentage of Water in a Caustic Soda or Potash. Weigh carefully 100 grains of the alkali into a capsule (a flat evaporating dish of suitable size, a watch glass is a small capsule), and dry them by heating over a flame; a cold glass held over the contents of the capsule will show the slightest evaporation of water. When no more moisture can be detected, allow them to cool; then weigh the residue in the capsule, and the difference of the weights before and after drying will be the number of purest German soda at 95 degrees of strength, grains of water contained in 100 grains of the or (which is better for the purpose) from alkali; that is, the percentage of water.

Caustic Alkali in a Caustic Soda or merce, is not to be used, as it produces a bad **Potash.** Powder 100 grains of the alkali to article.

then add a solution of alcohol, 10 parts; car- be tested; put it into a flask containing an bolic acid, 6 parts; caustic potassa, 2 parts; ounce of 95° alcohol, and shake thoroughly; oil of lemon, 1 part; and mix with stirring, the alcohol dissolves the caustic alkali perfeetly, but will not take up any other ingredients. After standing for a few hours to settle, decant the clear liquid, and evaporate on a porcelain capsule until thoroughly dry; the weight of the dry residue will be the number of grains, i. e., the percentage, of caustic alkali in 100 grains of the soda or potash.

587. To Find the Percentage of Carbonated Alkali in a Caustic Soda or Potash. Dissolve 100 grains of the sample in 4 ounces water in a flask; next weigh out 100 grains finely powdered crystals of oxalic acid; add small portions of this acid at a time to to be purified and deodorized, especially where the alkali in the flask, stirring thoroughly with a glass rod, and apply heat; continue to add the acid until the hot mixture tinges litmus paper slightly red; the saturation is then complete, and the acid has neutralized or combined with all the alkali, both carbonate and caustic. Weigh the oxalic acid which remains; and, by deducting from 100, we know how much we have used. Now every 7.87 grains oxalic acid that have been used, have neutralized 5 grains soda or 7 grains potash, according as the sample consists of caustic soda or caustic potash; hence we find the total number of grains of alkali in the 100 grains under test. By the previous method we can find the percentage of caustic alkali in 100 grains of the sample; deducting the grains of this latter from the weight of the whole alkali eliminated by the oxalic acid, the balance or remainder will be the percentage ef carbonated alkali.

By these three steps we get the percentage of water, the percentage of caustic alkali, and fined by the linen, the frames are closed with the percentage of carbonated alkali; these added together and deducted from 100 give the percentage of foreign matter or impurity in the matter tested. (See Alkalimetry.

588. To Make Soap-makers' Concentrated Caustic Lye. Boil 85 gallons water in a kettle capable of holding 150 gallons; Method of Testing Caustic is all dissolved; then mix in gradually, by the strength and practical value of stirring, 48 pounds freshly sleeked limits of stirring, 48 pounds freshly sleeked limits. stir in, a little at a time, 100 pounds powdered creamy consistency; the boiling must not be The methods allowed to slacken during the whole process, until complete causticity is obtained, which may be ascertained by taking a little in a test glass, and, when cool, adding to it a few drops contained in a given sample; and hence the of nitric acid; if this causes effervescence, the causticity is imperfect and the boiling must be continued until a test with nitric acid causes no effervescence. When this is the case, the contents of the kettle should be allowed to cool and settle for about 12 hours. The clear liquor can then be drawn off into a vat lined with lead-a syphon may be used for this purpose with advantage. The lve can be made to any desired strength by evaporation.

589. To Make Concentrated Caustic Soda Lye—Kurten's Method. The lye fit for toilet soap must be either made from the kali; that is, the percentage of water. crystallized soda. English soda of 80 to 83 degrees, such as is generally found in com-

100 pounds lime are added to 100 pounds come smooth and uniform throughout, it is German soda at 95 per cent., whereas 45 pounds lime to 100 pounds crystallized soda is left in a room of moderate temperature for a the general proportion.

The soda is dissolved in the boiler with to be cut into tablets and pressed. state like broth. This mixture must boil 2

hours and be left to deposit.

The next day; the lye, which probably may be at 12 degrees (Baumé) must be taken out, and the boiler filled afresh. The lye drawn from the lime and at 8 degrees, is poured in attar of bitter almonds, and then left for with it to evaporate. By this method a lye is produced at a medium of 9 or 10 degrees, but areometer, it shows 34 degrees. After the cooling it will weigh 36 pounds. This evapprecipitate to the bottom, which can be done in a day if it is sufficiently strong.

The clear lye is then drawn off from the dirty deposit, and put either into vitriol bottles or into an iron vessel well covered. If vitriol bottles are used, they must be filled with water in which some lime has been dissolved, to take away any acid remaining in the bottle, which would, if this precaution be not taken, absorb much of the causticity of the lye; and this must be done several days before using the bottles. The dirt and deposit from the salt remaining at the bottom after the boiling, can be added to the lime in the weak lyes.

We have not made the experiment of using the lye stronger than 11 degrees before evaporation, as we have learned from France that it must not be stronger than 11 degrees. Yet, after mature experience, it appears to us now that a lye can be obtained quite as good by adding more soda and lime to the lye, and thus increasing the strength to 18 or 20 degrees, by which the evaporation is spared. In this case more vessels are wanted, which must not be of wood, but of iron, because the wood will color the lye, which must be especially avoided for fine soap, for the only means of obtaining a perfect soap, free from defect, is to use none except the finest and whitest lye, and oil or grease of the greatest purity.

590. strength of lyes with a hydrometer, an exact result could be obtained if the caustic alkali employed by soap-makers and dyers were absolutely pure; but as this is seldom, if ever, the case, the impurities which exist in the lyes under examination, influence the specific weight of the lye, and due allowance must be made for this; thus, an indication by the hydrometer of 20 per cent. does not prove that the lye contains 20 per cent. of pure caustic alkali, but includes the foreign matter. Still, this method of testing will give com-

parative strengths exactly.

White Soap. Lard, 40 pounds; *5*91. and caustic soda lye, of 35° Baumé, 20 pounds. Melt the fat by a heat not exceeding 150° Fahr.; add, during constant stirring, 10 pounds of the lye. After one hour's stirring, the heat being continued all the time at a moderate degree, the remaining 10 pounds of oil-generally olive oil-with the addition of

When the lye for finer soap is to be made, | lye are to be added. When the paste has betransferred to a cooling frame, perfumed, and few days to set and ripen. It is then ready

water, or with a weak lye remaining from a former operation at 20 degrees of strength, and afterwards added to the lime slacked to a state like broth. This mixture must boil 2 pounds, the latter being gradually added to the former at a temperature between 125° to 150°, and the whole stirred constantly until the mixture is a smooth paste. It is then transferred to a cooling frame, perfumed with several days to set and ripen.

593. Ordinary Cocoanut Oil Soap. 100 pounds cocoanut oil—or 90 pounds cocoait must be evaporated till, according to 100 pounds cocoanut oil—or 90 pounds cocoanureometer, it shows 34 degrees. After the nut oil and 10 pounds of either tallow or palm cooling it will weigh 36 pounds. This evaporation of the lye is to increase its causticity, and to cause all the dirt contained in it to pounds of salt water of 12° Baumé, will compounds of salt water of 12° Baumé, will compound to the cold process with 225 pounds of salt water of 12° Baumé, and 75 pounds. bine to form 400 pounds of cocoanut oil soap.

594. Cocoanut Oil Soap. 100 pounds cocoanut oil and 56 pounds caustic sodalye of 36° Baumé, treated according to the cold process, will produce 153 pounds cocoanut oil

595. Paris Toilet Tablet Soap. pounds of this soap can be made by the cold process by using the following ingredients: 20 pounds tallow, 30 pounds cocoanut oil, 8 pounds lard, 31 pounds caustic soda lye of 36° Baumé, and 5 pounds caustic potash lye of the same strength.

596. Paris Toilet Round Soap. pounds cocoanut oil, 75 pounds lard, 50 to 52 pounds caustic sodá lye of 36° Baumé, will

produce 150 pounds of the soap.

597. Shaving Soap. Either 66 pounds tallow and 34 pounds cocoanut oil-or 33 pounds of tallow, the same quantity of palm oil, and 34 pounds cocoanut oil—treated by the cold process with 120 pounds caustic soda lye of 27° Baumé, will make 214 pounds of shaving soap. An addition of 12 pounds of salt water of 12° Baumé to the palm oil mixture, will add 12 pounds to the yield of soap.

598. Washing Soap. A mixture of either 60 pounds tallow—or 30 pounds each of tallow and palm oil-with 40 pounds of cocoanut oil, treated by the cold process with 125 pounds caustic soda lye of 27° Baumé, and To Test Lye. In testing the 25 pounds salt water of 12° Baumé, will turn out 244 pounds washing soap.

599. Cheap Washing Soap. 60 pounds cocoanut oil with 40 pounds of either tallow or palm oil, treated cold with 135 pounds caustic soda lye of 27° Baumé, and 50 pounds salt water of 15° Baumé, will produce 278

pounds washing soap.

Soft Soaps. These differ from the hard soaps in having potash in place of soda as their alkaline base. They are all more or less pasty or gelatinous; and they may be made either by the boiling or cold process. Of the soft soaps used in perfumery, that known as fig soap is the only one that is boiled.

601. Fig Soap. The fat stock is chiefly

a little tailow to give it the granular appear-(it the next day; stir it very frequently during

ance called fig.

602. Shaving Cream. This is made by melting 20 pounds of lard in a steam bath at a temperature of 212°, and then letting 5 pounds of caustic potassa lye of 36° Baumé run in very slowly, during constant stirring with a wooden paddle; when the paste becomes thick, 5 pounds more of lye are added in the same manner. After several hours' stirring the paste becomes firm, and is finished. It is then transferred to a mortar and triturated until the soap becomes perfectly even throughout, and assumes a pearly appearance. Attar of almonds is the perfume for almond cream; and attar of rose for rose cream. They are dissolved in a little alcohol, and added during the trituration. The rose cream is colored at the same time with tineture of alkanet.

603. Rypophagon Soap. mixture of equal parts of pale yellow resin soap and fig soft soap, perfumed with attars

of anise and citronella.

604. Essence of Soap or Shaving Cream. Take 1 pound white soft soap (see No. 606), 2 fluid drachms liquor of potassa; 1 pint rectified spirit, and perfume at will; put them into a strong bottle of glass or tin, cork it close, set it in warm water for a short time, and occasionally agitate it briskly until solution be complete. After repose, pour off the clean portion from the dregs (if any) into clean bottles for use, and at once closely cork them. If the solution be not sufficiently used to perfume it, the transparency of the

product will be lessened.
605. Soft Olive Oil Soap; Medicinal or Toilet Soft Soap is soap made of olive oil and potash. It is yellowish-white, inodorous, and of the consistence of thick honey. It is the soft soap (sapo mollis) of the British

Pharmacopœia.

606. White Soft Soap is soap made of lard and potash. Only used in cosmetics and

as a toilet soap.

607. Fine Shaving Cream. Take of clarified lard, 7 pounds (avoirdupois); potash lye (26 per cent. of caustic potash), 34 pounds; rectified spirits, 3 ounces; oil of bitter almonds, 2 drachms. Melt the lard in a porcelain vessel, by a salt-water bath; then run in the lye, very slowly, agitating the whole time; when about half the lye is in, the mixture begins to curdle; it will, however, become so firm that it cannot be stirred. It in a mortar, and slowly adding the alcohol, holding the oil of almonds in solution. This furnishes a splendid shaving cream.

608. To Make Good Common Soft Soap. For a barrel of soap take 12 pounds of potash to 14 pounds of grease. Dissolve the potash over night in 2 pailfuls of hot soft water, in the morning pour it hot over the grease, which must have been previously rendered down and put in the barrel, put more water on the potash that remains undis- the lye and the fat; stir thoroughly, and add solved; when hot, add as before, and so on the lye and the fat, a single ladleful of each until all the potash is dissolved; fill up the at a time, until the whole is thoroughly

the day and for several successive days. Allow it to rest for three months in the cellar.

Shaker Method of Making Soft Soap. Place a shallow iron kettle, to hold from 4 to 6 barrels, just out of the wash-room, under cover of a shed. Extend ½ or ¾ inch pipe for steam to the middle of the bottom, bending it to form of surface, and terminating with open end. Take another pipe to discharge cold water over the top of the kettle. Use the best quality of first sorts of potash, in the proportion of 6 pounds of potash to 7 pounds of grease, for a barrel of 40 gallons. Break up the potash into small lumps, and dissolve it in say 2 pails of hot water to 24 pounds. It dissolves rather slowly when the potash is good. When dissolved, put the solution into the kettle, add the grease quite warm, and stir the mixture together. it to stand over night, if convenient. In the morning, apply a moderate jet of steam until the mixture appears ropy, or rather scapy. Shut off the steam and open the cold water valve, stirring the mixture as the water runs, until the kettle is full, or the required quantity obtained for the materials used

610. To Make Good Lye. ashes are the best for making common washing soft soap (when it is not desirable to use the potash lye), but those from sound beech, maple, or almost any kind of hard wood, except oak, will answer well. A common barrel, set upon an inclined platform, makes transparent, a little rectified spirit should be a very good leach, but one made of boards set added to it before decantation. A little spirit in a trough in V shape is to be preferred, for (fully proof) may be added if it be desired to the strength of the ashes is better obtained, render it thinner. If much essential oil be and it may be taken to pieces when not in use, and laid up. First, in the bottom of the leach put a few sticks; over them spread a piece of carpet or woolen cloth, which is much better than straw; put on a few inches of ashes, and from 4 to 8 quarts lime; fill with ashes, moistened, and tamp down well-tamp the firmest in the centre. It is difficult to obtain the full strength of ashes in a barrel without removing them after a day's leaching, and mixing them up and replacing. The top should be first thrown off, and new ashes added to make up the proper quantity. Use boiling water for second feaching. This lye should be sufficiently strong to float a potato.

611. To Make Soft Soap. Take about 4 gallons the above lye, and boil up thoroughly with 12 pounds of clear grease, then add the lye as it is obtained, keeping a slow fire, and stirring often, until you have a barrel of soap. After boiling the grease and 4 gallons of lye together, it may be put will assume a pearly appearance by triturating in a barrel and the rest of the lye added there, which will form good soap if frequently stirred, but the heating process is the best when weather and time will permit the work to be done.

612. To Make Soft Soap. Break up 8 pounds potash into small lumps, and put it into an iron pot with about 3 gallons boiling water; melt in another iron pot 8 pounds clarified fat; put 3 or 4 gallons hot water into a clean barrel, and add to it a ladleful each of barrel more slowly with cold water, finishing mixed; then stir in a ladleful of hot water at

mixture becomes a creamy mass; put it away for 3 months in a moderately cool place and it will be ready for use.

613. To Make Turpentine Soap. Cut up 3 pounds brown soap and melt it in 7 quarts water, then put it in a stone pot and add 9 table-spoonfuls spirits of turpentine and 6 of alcohol.

614. To Use Turpentine Soap. Make very hot suds with some of the soap (see last receipt), and let the clothes remain in it half an hour. Then wash them out and rinse as other clothes are done. It is particularly nice for blankets and quilts, as it removes the dirt

and requires very little rubbing.

615. To Make Soft Soap Hard. Put into a kettle 4 pailfuls of soft soap, and stir in it, by degrees, about 1 quart of common salt. Boil until all the water is separated from the curd, remove the fire from the kettle, and draw off the water with a syphon (a yard or so of india rubber hose will answer). Then pour the soap into a wooden form in which muslin has been placed. (See No. 549.) For this purpose, a wooden box, sufficiently large and fight, may be employed. When the soap is firm, turn it out to dry, cut into bars with a brass wire and let it harden. A little powdered resin will assist the soap to harden, and give it a yellow color. If the soft soap is very thin, more salt must be used.

Labor-saving Soap. Take 2 pounds sal soda, 2 pounds yellow bar soap, and 10 quarts water. Cut the soap in thin slices, and boil together 2 hours; strain, and it will be fit for use. Put the clothes in soak the night before you wash, and to every pail of water in which you boil them, add a pound of soap. They will need no rubbing; merely rinse them out, and they will be perfectly

clean and white.

617. To Estimate the Quality of Soap. The quality of soap may be properly estimated from the amount of fatty acids which any given specimen contains. following simple analysis may be performed by any one, and may be relied upon as giving good results. The soap to be examined should be dissolved in water. If distilled water cannot be readily obtained, rain water will answer well enough. When a perfect solution is obtained, add hydrochloric acid. After a little while the fatty acids will be found to be separated from the other constituents of the soap. These should be colleeted, and their relative weight for any given quantity estimated. The relative weight thus found will be a sufficiently just indication of the quality

618. To Test Soap. The readiest way to find whether soap will injure the delicate skin of women or children is to test it with the tongue. Good soap, in which the caustic alkali is neutralized by thorough combination with the fat, will not have a sharp taste. The soap used in medicine, and the transparent soaps, are neutral and good. Many toilet soaps, and especially the imitation marbled castile soap, so abundant in the trade, contain too much free alkali. They have not been thoroughly boiled, and are very sharp. It is not advisable to use such soaps upon delicate skins, as they induce redness of appearance,

a time until the barrel is full, and stir till the and give the skin a tendency to roughen or chap, especially when exposed to the wind.

619. To Pulverize Hard Soap. Hard bar soap should be scraped or planed into fine shavings, dried in the sun, or by heat, thoroughly, and then pounded or crushed. After this, it should be placed in a bowl or kettle, and a small cannon ball should be used to pulverize it; when thoroughly pulverized it may be sifted through a very fine sieve.

620. To Analyze Soap. Take a small portion of the soap, place it in a suitable vessel (a beaker glass), add ether to it, and next acetic acid in a somewhat smaller quantity. The liquid will separate, after a while, into two distinct layers, the upper of which contains in solution the fatty acids, while the lower layer contains the alkalies and salts, and such substances as might happen to be insoluble in the two fluids just named. By means of a pipette, the fluids are separated from each other. The ethereal solution is poured into a previously weighed beaker glass, and the ether evaporated upon a water bath, and next again weighed with the fatty acids it contains. The aqueous acetic acid is evaporated to dryness, and the quantity of alkali determined according to well-known methods. (See No. 586).

621. Analysis of Soda and Potassa Lyes. The following tables will show at a glance all the practical information necessary for analyzing or testing the strength of lyes, either simple or caustic, as well as affording thorough guidance in mixing or adjusting the strength of lye for any specific purpose.

622. Lormé's Tables. The following tables are used to transform stronger lyes into weaker of a definite degree of strength, and are by Mr. Eugène Lormé.

The first column at the left of each table shows the quantity and the degree of the lye

to be diluted.

The second indicates the quantity of water to be added to the lye.

The third gives the amount of the lye obtained by the admixture of both liquids.

The fourth exhibits the degrees of Baumé's areometer of the lye.

Table showing the different Areometric Degrees resulting from a mixture of 10 gallons of soda lye, of 36 degrees Baume, with quantities of water varying from 10 to 90 gallons.

Number of gailons of Lye of 36 degrees.	Number of gallons of Water.	Number of gallons of obtained Lye.	Degrees of Baumé of the mixture.
10	10	20	23°
10	20	30	17
10	30	40	14
10	40	50	12
10	50	60	10
10	60	7 0	9
10	70	80	8
10	80	90	7 <u>‡</u>
10	90	100	64

10 gallons of lye, of 36 degrees Baumé, weigh 112½ lbs.

624. Table showing the different Areometric Degrees resulting from a mix-ture of 10 pounds of soda lye, of 36 de-ture of 10 pounds of soda lye, of 36 degrees Baumé, with quantities of water varying from 10 to 90 pounds.

Number of pounds of Lye of 36 degrees.	Number of pounds of Water to be employed.	Number of pounds of Lye obtained.	Degrees of Baumé of the mixture.
10	10	20	210
10	20	30	14½
10	30	40	111
10	40	50	10
10	50	60	9
10	60	70	8
10	70	80	64
10	80	90	54
10	90	100	5 nearly

8.8 gallons of lye, of 30 degrees Baumé, weigh 100 pounds.

625. Table showing the different Areometric Degrees resulting from a mix-ture of 10 gallons of soda lye, of 30 degrees Baumé, with quantities of water varying from 10 to 90 gallons.

Number of gallons of Lye of 30 degrees.	Number of gallons of Water to be employed.	Number of gallons of Lye obtained.	Degrees of Baumé of the mixture
10	10	20	190
10	20	30	nearly 14
10	30	40	11
10	40	50	9
10	50	60	8
10	60	70	7
10	70	80	6
10	80	90	5
10	90	100	41/2

10 gallons of soda lye, of 30 degrees, weigh 104 pounds; 75 gallons of this lye and 25 gallons of water give 100 gallons of lye of 25 degrees Baumé. There are 231 pounds of caustic soa wanted for making 10 gallons of lye of 30 degrees Baumé.

626. Table showing the different Areometric Degrees resulting from a mixture of 10 pounds of soda lye, of 30 degrees Baumé, with quantities of water varying from 10 to 90 pounds.

Number of pounds of Water to be employed.	Number of pounds of Lye obtained.	Degrees of Baumé of the mixture.
10	20	170
20	30	12
30	40	94
40	50	74
50	60	$6\frac{7}{2}$
60.	70	5 1
70	80	5 or 51
80	90	41
90	100	4
	\$\text{Water to be employed.}\$ 10 20 30 40 50 60 70 80	Water to be employed. of Lye obtained. 10 20 20 30 30 40 40 50 50 60 60 70 70 80 80 90

9.6 gallons of lye, of 30 degrees Baumé, weigh 100 pounds.

Per cent.	Specific Weight.	Per cent.	Specific Weight.
1	1.00914	27	1.26787
$\bar{2}$	1.01829	28	1.27893
3	1.02743	29	1.28999
4	1.03658	30	1.30105
5	1.04572	31	1.31261
6	1.05513	32	1.32417
	1.06454	33	1.33573
7 8	1.07396	34	1.34729
9	1.08337	35	1.35885
10	1.09278	36	1.37082
11	1.10258	37	1.38279
12	1.11238	38	1.39476
13	1.12219	39	1.40673
14	1.13199	40	1.41870
15	1.14179	41	1.43104
16	1.15200	42	1.44338
17	1.16222	43	1.45573
18	1.17243	44	1.46807
19	1.18265	45	1.48041
20	1.19286	46	1.49314
21	1.20344	47	1.50588
22	1.21402	48	1.51861
23	1.22459	49	1.53135
24	1.23517	50	1.54408
25	1.24575	51	1.55723
26	1.25681	52	1.57048

Schiff's Table, showing the percentage of Crystallized and Anhydrous Soda in Solutions of Carbonate of

Specific Weight.	Per cent. of Crystallized Soda.	Per cent. of Anhydrous Soda.
1.0038	1	0.370
1.0076		0.741
1.0114	3	1.112
1.0153	2 3 4	1.482
1.0192	5	1.853
1.0231	5 6	2.223
1.0270	7 8	2.594
1.0309	. 8	2.965
1.0348	9	3.335
1.0388	10	3.706
1.0428	11	4.076
1.0468	12	4-447
1.0508	13	4.817
1.0548	14	5.188
1.0588	15	5.558
1.0628	16	5.929
1.0668	17	6.299
1.0708	18	6.670
1.0748	19	7.041
1.0789	20	7.412
1.0830	21	7.782
1.0871	22	8.153
1.0912	23	8.523
1.0953	24	8.894
1.0994	25	9 264
1.1035	26	9.635
1.1076	27	10.005
1.1117	28	10.376
1.1158	29	10.746
1.1200	30	11.118
1.1242	31	11.488
1.1284	32	11.859
1.1326	33	12.230
1.1368	34	12.600

Schiff's Table (Continued).

Garage Water	Per cent. of	Per cent. of
Specific Weight.	Crystallized Soda.	Anhydrous Soda.
1.1410	35	12.971
1.1452	36	13.341
1.1494	37	13.712
1.1536	38	14.082
1.1578	39	14.453
1.1620	40	14.824
1.1662	41	15.195
1.1704	42	15.566
1.1746	43	15.936
1.1788	44	16.307
1.1830	45	16.677
1.1873	46	17.048
1.1916	47	17.418
1.1959	48	17.789
1.2002	49	18.159
1.2045	50	18.530

629. Table showing the percentage of Anhydrous Potassa in Caustic Potassa Lye.

	Specific Gravity.	Potassa in 100.	Specific Gravity.	Potassa in 100.
	1.3300 1.3131	28.290	1.1437	14.145
	1.2966	27.158 26.027	$1.1308 \\ 1.1182$	13.013 11.882
	$egin{array}{c} 1.2805 \ 1.2648 \end{array}$	24.895 23.764	$egin{array}{c} 1.1059 \ 1.0938 \end{array}$	10.75 9.619
	1 -2493 1 -2342	22.632 21.500	1.0819 1.0703	8.487 7.355
	$1.2268 \\ 1.2122$	20.935 19.803	$1.0589 \\ 1.0478$	6.224 5.002
	1 -1979 1 -1838	18.671 17.540	1.0369 1.0260	3.961
] :	1.1702	16.408	1.0153	2.829 1.697
<u>_</u> :	1.1568	15.277	1.0050	0.5658

630. Table showing the percentage of Caustic Soda in Soda Lye.

	. •	
Per cent.	Specific Gravity.	Per cent.
30.220	1.2392	15.110
29.616	1.228	14.506
29.011	1.2178	13,901
28.407	1.2058	13.297
27.802	1.1948	12.692
27 200	1.1841	12.088
26.594	1.1734	11.484
25.989	1.1630	10.879
25.385	1.1528	10.275
24.780	1.1428	9.670
24.176	1.1330	9.066
23.572	1.1233	8.462
22.967	1.1137	7.857
22.363		7.253
21.884		6.648
		6.694
21.154		5.540
		4.835
		4.231
19.341		3.626
18,730		3.022
	·	2.418
	,	1.813
16.923		1.209
	1	.604
15.814	1.0040	.302
	30.220 29.616 29.011 28.407 27.802 27.200 26.594 25.989 25.385 24.780 24.176 23.572 22.967 22.363 21.884 21.894 21.154 20.550 19.945 19.341 18.730 18.132 17.528 16.923 16.319	30.220 1.2392 29.616 1.228 29.011 1.2178 28.407 1.2058 27.802 1.1948 27.200 1.1841 26.594 1.1734 25.989 1.1630 25.385 1.1528 24.780 1.1428 24.176 1.1330 23.572 1.1233 22.967 1.1137 22.363 1.1042 21.884 1.0948 21.894 1.0855 21.154 1.0764 20.550 1.0675 19.945 1.0587 19.341 1.0500 18.730 1.0414 18.132 1.0330 17.528 1.0246 16.923 1.0163 16.319 1.0081

To Make Home-made Tallow Candles. Tallow Candles. Tallow candles are made in two different forms; the mould candle is the easiest to make, but involves the expense of a mould made expressly for the purpose; the dip candle requires more trouble, but no apparatus to make it; the first cost, however, of a candle mould is fully compensated for by the superiority of the candles made by it over those made by dipping.

632. To Make Candle Wicks. The wicks are composed of cotton yarn (what is known as No. 16 is a good size for the purpose); for candles of 8 to the pound, about 40 threads, and for 6 to the pound, about 50 threads of yarn should be very loosely twisted together. The light from a tallow candle can be improved in clearness and brilliancy by using small wicks which have been dipped in spirit of turpentine and thoroughly dried.

633. To Make Mould Candles. wicks are secured in the centre of each mould by passing over thin sticks, one of which is laid over the top of the mould (corresponding to the bottom of the candles), and the other against the bottom points of the moulds. The end of the twisted wick is fastened to the stick on the top of the mould, and is drawn by a piece of hooked wire, through each mould in succession, leaving a loop outside the bottom points of the mould; the loops are secured there by the bottom stick passing through them; the wicks are to be drawn ight and the last end tied to the upper stick. The melted tallow is then poured into the moulds and allowed to stand about 6 hours in a cool place, after which the bottom stick must be taken out of the loops, and the candles withdrawn from the moulds. The tallow should not be heated much more than is necessary to melt it.

634. To Make Dip Candles. Dip candles are made by looping a number of separate wicks over a rod, and dipping them into very liquid tallow, until the required thickness is attained, allowing the tallow which adheres after each dipping to set or harden before dipping again. Before the second dip, it is well to lay the wicks on a flat surface, and straighten them, and a suitable contrivance adopted for holding the rod while drying between the dips

tween the dips.

635. Tallow for Making Candles. A good tallow for candles consists of about \$\frac{1}{2}\$ beef and \$\frac{2}{3}\$ mutton suet. If required for summer use it will be improved by hardening according to receipts No. 639 or 640; it can, if needed, be so hardened as to have almost the appearance of stearine. (See No. 638.)

836. To Make Lard Candles. To every 8 pounds of lard add 1 ounce of nitric acid. Having carefully weighed the lard, place it over a slow fire, or at least merely melt it; then add the acid, and mould the same as tallow; this makes a clear, beautiful candle. A small proportion of beeswax will make them harder.

637. To Harden Tallow Candles. The following mixtures for hardening tallow candles are patented in England. The candles are successively and rapidly dipped, first in Mixture I., which consists of stearic acid, 50 parts; tallow, 44 parts; camphor, 3 parts;

When cool and hard they are dipped into Mixof stearic acid, 90 parts; tallow, 5 parts; spongy and inferior in quality.

camphor, 3 parts; white wax, 2 parts.
638. To Harden Tallow by Capaccioni's Process. Melt 1000 parts tallow, and lime water and a dung bath, are slightly gradually stir into it 7 parts sugar of lead tanned in a bath of sumach, and subsequently previously dissolved in water, being careful to keep the mass constantly agitated during the remain warm until the insoluble parts of the incense settle to the bottom, usually several 645. To Tan any kind of Fur Skins. hours. By this process the sugar of lead so

weak lye before the second boiling. third day simmer, and skim it, in water containing I pound of alum and I pound saltpeit can be taken off the water for use. Tallow thus treated will make good hard white can-

dles for summer purposes

640. To Harden Tallow for Making Candles. Use 1 pound of alum for each 5 pounds of tallow. Dissolve the alum in waare melted together, then run in moulds.

641. To Harden Tallow with Resin. To 1 pound tallow take 1 pound common resin; melt them together, and mould the candles the usual way. This will give a candle of superior lighting power, and as hard as a wax candle; a vast improvement upon the common tallow candle, in all respects except color.

lanning. When the skin of an animal, carefully deprived of hair, fat, and other impurities, is immersed in a dilute solution of tannic acid, the animal matter gradually combines with the acid as it penetrates inwards, forming a perfectly insoluble compound, which resists putrefaction completely; this is tanned leather. In practice, lime water is used for cleansing and preparing the skin; water acidulated with oil of vitriol (sulphuric acid) for raising or opening the pores; and an infusion of oak bark or some other astringent matter for the source of the tannic The process is necessarily a slow one, as dilute solutions only can be safely in it, carefully squeezing out all the dirt from

white resin, 2 parts; and gum damar, 1 part. | about 3 weeks; thick hides, suitable for soleleather, take from 12 to 18 months. Various ture II., which consists of stearic acid, 70 modifications have been introduced into the parts; tallow, 24 parts; camphor, 3 parts; process, for the purpose of reducing the time white wax, 2 parts; gum damar, 1 part; and required for tanning, but so far with only mod-finally into Mixture III., which is composed erate success, as the leather so produced is

> 643. Morocco Leather is prepared from goat or sheep skins; which, after the action of

grained and dressed.

644. Russia Leather is generally process. In a few minutes diminish the heat, and add 15 parts incense (powdered) with 1 which it is dyed, and curried with the empypart turpentine, keeping the mass constantly reumatic oil of the birch tree. It is this oil stirred as before. Then allow the mixture to which imparts to Russia leather its peculiar

This will be found an excellent plan for tanhardens the tallow that it yields a material ning any kind of skin with the fur on. After very similar to stearine (stearic acid), while having cut off the useless parts, and softened the incense improves its odor. It is said that the skin by soaking, remove the fatty matter tallow treated in this way, when made into from the inside and soak it in warm water for candles, will not gutter or run.

639. To Harden and Whiten Tallow saltpetre, and glauber salts (sulphate of soda), for Summer Use. Gently boil the tallow in the proportion of about ½ ounce of each for with the addition of a little beeswax, 1 or 2 each skin, with sufficient water to make a hours a day for 2 days, in a suitable kettle, thin paste; spread this with a brush over the adding weak lye and skimming often; cut it inside of the skin, applying more on the thickout of the pot when cold, and scrape off the er parts than on the thinner: double the skin underneath soft portion, adding fresh but together, flesh side inwards, and place it in a The cool place. After standing 24 hours, wash the con-skin clean, and apply, in the same manner as before, a mixture of 1 ounce sal soda, 1 ounce tre for each 30 pounds of tallow. When cold borax, and 2 ounces hard white soap, melted slowly together without being allowed to boil; fold together again and put away in a warm place for 24 hours. After this, dissolve 4 ounces alum, 8 ounces salt, and 2 ounces saleratus, in sufficient hot rain water to saturate the skin; when cool enough not to scald the ter, then put in the tallow and stir until both hands, soak the skin in it for 12 hours; then wring out and hang it up to dry. When dry Candles made in this way will be as hard and repeat this soaking and drying 2 or 3 times, till white as wax.

the skin is sufficiently soft. Lastly, smooth the inside with fine sand paper and pumice

> To Tan Sheep's Pelts with the 646. Wool On. Wash the pelts in warm water, and remove all fleshy matter from the inner surface; then clean the wool with soft soap, and wash clean. When the pelt is perfectly free from all fatty and oily matter, apply the following mixture to the flesh side, viz.: For each pelt take common salt and ground alum, ‡ pound each, and ‡ ounce borax; dissolve the whole in 1 quart hot water, and when sufficiently cool to bear the hand, add rye meal to make it like thick paste, and spread the mixture on the flesh side of the pelt. Fold the pelt lengthwise, and let it remain 2 weeks in an airy and shady place; then remove the paste from the surface, wash, and dry. When nearly dry, scrape the flesh side with a crescent-shaped knife. The softness of the pelt depends much on the amount of working it receives.

> 647. To Prepare Sheep Skins for Make a strong lather with hot water, Mats. and let it stand till cold; wash the fresh skin

used. Skins intended for curriers, to be the wool; wash it in cold water till all the dressed for "uppers," commonly require soap is taken out. Dissolve a pound each

the skin into a tub sufficient to cover it; let quite dry, and afterwards with dry bran. it soak for 12 hours, and hang it over a pole The wet bran should be put or with flannel. to drain. When well drained, stretch it care- and the dry with a piece of book-muslin. fully on a board to dry, and stretch several The light furs, in addition to the above, times while drying. Before it is quite dry, should be well rubbed with magnesia, or a sprinkle on the flesh side I ounce each of piece of book-muslin, after the bran process. finely pulverized alum and saltpetre, rubbing Or dry flour may be used instead of wet bran. it in well. Try if the wool be firm on the Ermine takes longer than Mineyar to clean. skin; if not, let it remain a day or two, then They should be rubbed against the way of rub again with alum; fold the flesh sides to- the fur. gether and hang in the shade for 2 or 3 days, turning them over each day till quite dry. Scrape the flesh side with a blunt knife, and stretching, which may be managed as follows: rub it with pumice or rotten stone. Very beautiful mittens can be made of lamb skins

prepared in this way.

wheat bran, ½ pint old soap, 1 ounce bords; ing may be quickened by placing the skin a by adding 2 ounces sulphuric acid the soaking little distance from the fire or stove. may be done in one-half the time. If the hides hides should not be soaked more than 8 or 10 hours. Dry ones should soak till very soft. For tan liquor, to 10 gallons warm soft water add 1 bushel bran; stir well and let stand in a warm room till it ferments. Then add 4 hours; then take out and rub with a fleshbeam until entirely dry.

649. To Cure Rabbit Skins. inside, draw it quickly backwards and forquite soft, then roll it in the contrary way of phor may be sprinkled among the woolens. the skin, and repeat the operation. Skins prepared thus are useful for many domestic

purposes.

To Clean Furs. Furs may be 650. cleaned as follows:-Strip the fur articles of and the mixture cool enough for the hand to their stuffing and binding, and lay them as much as possible in a flat position. They must then be subjected to a very brisk brushing, squeezed out of them, pass them through a with a stiff clothes brush; after this, any clean lather with some blue in it, then rinse moth-eaten parts must be cut out, and be in cold water with blue to give them a good neatly replaced by new bits of fur to match.

chinchilla, squirrel, fitch, &c., should be a fire. When perfectly dry, curl each fibre treated as follows: Warm a quantity of separately with a blunt knife or ivory papernew bran in a pan, taking care that it does folder. not burn, to prevent which it must be actively stirred. When well warmed, rub it thoroughly into the fur with the hand. Repeat this as directed for the ostrich feathers. They two or three times; then shake the fur, and give it another sharp brushing until free from dust.

White To Clean Light Furs. furs, ermine, &c., may be cleaned as follows: swansdown may be washed in soap and Lay the fur on a table, and rub it well with water; after washing, shake it out, and when

salt and alum in 2 gallons hot water, and put | bran made moist with warm water; rub until

653. To Improve Furs by Stretching. Furs are usually much improved by To 1 pint of soft water add 3 ounces salt; dissolve; with this solution sponge the inside of the skin (taking care not to wet the fur) nn-648. To Tan Muskrat Skins with til it becomes thoroughly saturated; then lay the Fur On. First wash the hide in warm it carefully on a board with the fur side downwater, and remove all fatty and fleshy matter. wards, in its natural disposition; then stretch Then soak it in a liquor prepared as follows: as much as it will bear, and to the required To 10 gallons cold soft water add 8 quarts shape, and fasten with small tacks. The dry-

654. To Preserve Furs and Woolen have not been salted, add 1 pint salt. Green Clothing from Moth. Moths deposit their eggs in the early spring. This, therefore, is the time to put away furs and woolens for the summer. It is not the moth, but the maggot of the moth that does the mischief with furs and woolens. To effectually preslowly 2½ pounds sulphuric acid; stir all the serve them from the ravages of these insects, while. Muskrat hides should remain in about thoroughly beat the furs with a thin rattan, and air them for several hours, then carefully ing knife—(an old chopping knife with the comb them with a clean comb, wrap them up edge taken off will do.) Then work it over a in newspapers, perfectly tight, and put them away in a thoroughly tight chest lined with Lay tin, or cedar wood. Take them out and exthe skin on a smooth board, the fur side un-amine them in the sun at least once a month, dermost, and fasten it down with tinned thoroughly beating them. This, indeed, is tacks. Wash it over first with a solution of the secret of the fur-dealers in preserving salt; then dissolve 24 ounces alum in 1 pint their stock. Camphor, which is so much used of warm water, and with a sponge dipped in to preserve furs, impairs their beauty by turn-this solution, moisten the surface all over; reling them light. The printing ink on the peat this every now and then for three days; newspapers is just as effectual as camphor, when the skin is quite dry, take out the tacks, being very distasteful to the moth. The and rolling it loosely the long way, the hair above method may also be adopted to preserve feathers, and all kinds of woolen clothwards through a large smooth ring, until it is ling, omitting, of course, the combing; cam-

655. To Clean Ostrich Feathers. Cut some white curd soap in small pieces, pour boiling water on them, and add a little pearlash. When the soap is quite dissolved, bear, plunge the feathers into it, draw the feathers through the hand till the dirt appears color. Beat them against the hand to shake To Clean Dark Furs. Sable, off the water, and dry by shaking them near

> 656. To Clean Grebe. Carefully take out the lining, and wash it in the same way must not be shaken until quite dry, and any rent in the skin must be repaired before making up again.

657. To Clean Swansdown. White a clear fire to dry.

658. To Curl Feathers. Heat them the back of a knife, and they will curl.

imal Oil. Mix well with 1 gallon clear water, lime-water for use. Put the feathers to be cleaned in a tub, and add to them a sufficient stirring every day, and then filter.

quantity of the clear lime-water to cover them about 3 inches. The feathers, when thoroughly moistened, will sink down, and should lon 95 per cent. alcohol. This is used in comremain in the lime-water for 3 or 4 days; after | bination with other flavors for brandy which, the foul liquor should be separated.

To Deodorize Skunk Skins, with chloride of lime; or, wrap them in green filter. hemlock boughs, when they are to be had, and in 24 hours they will be deodorized.

661. To Stiffen Bristles. These are usually stiffened by immersing for a short

time in cold alum water.

662. To Dye Bristles. Bristles are dyed by steeping them for a short time in any of the common dyes used for cotton or wool.

mitation Liquors. The li-L quors generally met with for sale and consumption are, it is well known, rarely genuine; and even if genuine, are often adulterated with water and various deleterious compounds. The imitations of liquor innocently imbibed by the unsuspecting as wholesome stimulants, contain, too frequently, combinations that are most hurtful, if not actually poisonous. Receipts are here given for making imitation liquors, which are at least as wholesome as genuine spirits, and contain no ingredient that can hurt the system more than alcohol itself does. They are the receipts furnished by a practical French chemist, who has made this business a specialty for some thirty years.

664. Prune Flavoring for Liquors. Mash 25 pounds prunes, infuse for 15 days with 6 gallons proof spirit, stirring it every

day; press and filter.

665. Raisin Flavoring for Liquors. Subject 25 pounds mashed raisins to the same process as the pranes in the last receipt.

666. St. John's Bread Flavoring for Liquors. Cut 50 pounds St. John's bread into small pieces. Infuse for 15 days with 12 gallons proof spirits, stirring every day; filter.

667. Orange Peel Flavoring for Liquors. Steep 1 pound orange peel in 1 gallon 95 per cent. alcohol for 15 days; filter.

668. Vanilla Flavoring for Liquors. Slice 1 drachm vanilla in small pieces; infuse

669. Orris Root Flavoring for Liquors. Infuse 2 ounces powdered orris root

Granulate 4 pound sassafras bark, and infuse hol. Then pour 2 quarts boiling water over 2

the down is somewhat raised, shake it before it in ½ gallon 95 per cent. alcohol for 20 days; filter.

671. Hickory Nut Flavoring for Lislightly before the fire, then stroke them with quors. Crush 1 bushel hickory nuts, and infuse for 1 month in 12 gallons 95 per cent. 659. To Cleanse Feathers from An- alcohol; strain and filter.

672. Flavoring Compound for Bran-1 pound quicklime; and, when the lime is pre- dy. Mash 25 pounds raisins, 12 pounds cipitated in fine powder, pour off the clear prunes, 6 pounds figs, and 1 pineapple sliced; lime-water for use. Put the feathers to be infuse for 15 days in 20 gallons proof spirits,

> 673. Coffee Flavoring for Liquors. Infuse 1 pound ground roasted coffee in 1 gal-

674. Peach Flavoring for Whiskey. Steep for 1 month, 10 gallons dried peaches, or articles of clothing scented, hold them 10 gallons oak saw-dust, and 5 pounds black over a fire of red cedar boughs, and sprinkle tea in 40 gallons proof spirits; strain and

> 675. How to Prepare Essence of Cognac. Take 1 ounce oil cognac-the green oil is the best; put it in ½ gallon 95 per cent. spirits. Cork it up tight, shake it frequently for about 3 days; then add 2 ounces strong ammonia. Let it stand 3 days longer; then place in a stone jar that will contain about 3 gallons, 1 pound fine black tea, 2 pounds prunes, having first mashed the prunes and broken the kernels. Pour on them 1 gallon spirits 20 above proof. Cover it close, and let it stand 8 days. Filter the liquor, and mix with that containing the oil and ammonia. Bottle it for use. This makes the best flavoring known for manufacturing brandies, or for flavoring cordials, syrups, etc. The above proportion should flavor 100 gallons brandy.

676. To Imitate Brandy with Essence of Cognac. Take 1 pint essence of cognac (see No. 675), 15 gallons pure spirits (very fine) 20 per cent. above proof, ½ pint

plain white syrup. Color with caramel.
677. Simple Test for Alcohol in Oil
of Cognac. Take a half ounce phial or test tube, and fill it exactly half full of oil of cognac; then fill up the remaining space with water, and shake it well. The alcohol, if there be any present, having a much greater affinity for water than for the oil, will leave the oil and combine with the water; denoting, by the decrease in the bulk of the oil, or the increase in that of the water, the quantity of alcohol present. Other tests for essential oils will be found under its heading. (See Index.)

Highly Flavored Domestic 678. Brandy. To 40 gallons French proof spirits, add 2 quarts raisin flavoring (see No. 665), 2 quarts prune flavoring (see No. 664), 2 quarts St. John's bread flavoring (see No. 666), 1 gallon best sherry wine, 2 drachms oil of cognac and 20 drops oil of bitter almonds, both dissolved in a little 95 per cent. alcohol; 1 gallon Jamaica rum (or ‡ ounce Jamaica rum essence), and 2 pints wine vinegar. Ten gallons of this mixture, mixed with 30 gallons for 20 days in 1 pint 95 per cent. alcohol; French spirits, make an excellent domestic brandy, and 1 pound of glycerine gives it age.

679. Imitation Cognac Brandy. 36 gallons French proof spirits, add 4 gallons for 20 days in 1 quart 95 per cent. alcohol, and Pellevoisin or Marette cognac. } gallon best sherry or Madeira wine, and 20 drops oil of 670. Sassafras Flavoring for Liquors. cognac, dissolved in a little 95 per cent. alcoounces black tea; when cold, filter through flannel, and add a little maraschino; mix this Bourbon Whiskey. with the other ingredients, and color the whole sul; hate of copper in 1 pint water, filter, and to suit, with caramel. (See No. 694.)

Another excellent formula is as follows: Dissolve 20 drops oil of eognac and 15 drops oil of bitter almonds in a little 95 per cent. alcohol; add it to 40 gallons 60 per cent. French spirit, with 2 pints tineture of raisin, 2 pints tincture of prunes, 3 pints best Jamaica rum, 3 pints best sherry wine, and ½ ounce

acetic ether. Color with caramel.

680. Imitation Brandy. Take 40 gallons French spirit; add to it 1 pint tineture of raisins (see No. 665), 1 quart prune flavoring (see No. 664), ½ gallon best sherry or Madeira wine, and 1 pint wine vinegar. Then add 1 drachm oil of cognac, 12 drops oil of bitter almonds, 1 to 1 drachm tannin powder, each dissolved separately in 95 per cent. alcohol. Color to suit with caramel. (See No. 694.)

681. Imitation French Brandy. 40 gallons French proof spirit, add 1 quart tincture of orris root (see No. 669), 1 pint vanilla flavoring (see No. 668), ½ gallon best sherry or Madeira wine, and 1 pint wine vinegar. Dissolve separately, 1 drachm oil of cognae and 12 drops oil of bitter almonds, each in a little 95 per cent. alcohol, and add them to the mixture, coloring the whole to

suit with caramel. (See No. 694.)
682. Imitation Pale Brandy. Infuse 1 drachm star-anise (breaking the star only) for 8 hours in 4 pint 95 per cent. alcohol, and filter; add this to 40 gallons proof spirits; then add 1 gallon best Jamaica rum, and 1 pint of the best raspberry syrup. Dissolve 1 drachm oil of cognac, and 12 drops oil of bitter almonds, separately, in a little 95 per cent. alcohol, and mix them with the whole.

Imitation Bourbon Whiskey. Mix together 40 gallons proof spirits, ½ gallon peach flavoring (see No. 674), ½ gallon hickory nut flavoring (see No. 671), ½ gallon highly flavored brandy (see No. 678), 1 pint wine vinegar, and 1 pint white glycerine. Add to these 12 drops oil of cognac dissolved in 95 per cent. alcohol, and color with caramel. (See No. 694)

Or: 36 gadons proof spirits, 4 gallons highly flavored proof rye whiskey, 1 gallon domestic brandy (see No. 680), together with the same proportions of vinegar, glycerine, and

oil of cognac, as before.

Imitation Bourbon Whiskey. To 36 gallons proof spirits, add 4 gallons highly flavored proof Bourbon, 1 gallon New England rum, 1 gallon sweet Catawba wine (or 1 quart sherry wine), and 1 pound white glycerine. Color to suit with caramel. (See No. 694.)

685. Imitation Bourbon Whiskey. 36 gallons proof spirit, 4 gallons highly fiavored proof Bourbon, 1 gallon malt whiskey, 1 pint wine vinegar, 1 pint syrup, and 12 drops oil of cognac dissolved in 95 per cent. alcohol. Color with caramel. (See No. 694.)

Imitation Bourbon Whiskey. To 40 gallons proof spirit, add 1 gallon hick-ory flavor (see No. 671), 1 gallon domestic brandy (see No. 680), 1 pint wine vinegar, nice experiments is best conducted in a bath and 1 pound white glycerine, with 12 drop; and carainel (see No. 694) sufficient to color. | about 435°; a little powdered resin or char-

687. Imitation Copper - Distilled Dissolve 1 drachin add it to 40 gallons proof spirit, with 1 gallon peach flavor (see No. 674), 1 gallon brandy flavor (see No. 672), 1 pint wine vinegar, 1 pound white glycerine, and 12 drops oil of cognac dissolved in 95 per cent, alcohol. Color with caramel. (See No. 694.)

688. Imitation Rye Whiskey. To 40 gallons proof spirit, add 2 gallons peach flavoring (See No. 674), 1 pint white vinegar,

and 12 drops oil of cognac in 95 per cent. alcohol. Color with caramel. (See No. 694.)
689. Imitation Sweet Rye Whiskey.
30 gallons proof spirit, 10 gallons proof rye whiskey, and 1 gallon raisin flavor (see No. 665), colored with sufficient caramel. (See No. 694).

690. Imitation Irish Whiskey. 36 gallons French spirits 20 above proof, 4 gallons Scotch (Ramsay) whiskey, 3 pints best sherry wine, 2 pints syrup, and 10 drops sassafras flavor. (See No. 670.)

691. Imitation Scotch Whiskey. 36 gallons French spirits 20 above proof, 4 gallons Scotch whiskey, and 1 quart syrup.

692. To Impart a Smoky flavor to Whiskey. The simplest way to impart this peculiar flavor to whiskey is by preparing the barrel. Insert securely a large sheet iron funnel into the bung-hole of a dry 40-gallon barrel; provide a small open furnace, containing a charcoal fire; put I pound of birch bark on the fire, and support the barrel, with its funnel downwards, over the furnace, so that the funnel, which should be considerably wider than the furnace, will receive the smoke from the bark. When the bark ceases smoking, remove the funnel and bung the barrel up tight. After it has stood 24 hours, put the spirit in the barrel, and keep it there for 36 hours, frequently rolling the barrel, in order that the spirits may be thoroughly impreg-nated with the smoke and smoky deposit on the inside of the barrel. The spirits will then be found to have acquired the desired flavor. Creosote, diluted with alcohol, is sometimes used to impart the smoky flavor to spirits.

693. To Give the Appearance of Age to Brandy Barrels. Dissolve in 3 gallons water, 3 pounds sulphuric acid and 1 pound sulphate of iron. Wash the barrels with it

on the outside.

694. To Make Caramel. Dissolve 7 pounds crushed sugar in 1 pint water; boil it in a 5-gallon copper kettle, stirring occasionally until it gets brown; then reduce the fire and let the sugar burn until the smoke makes the eyes water. When a few drops, let fall inte a tumbler of cold water, sink to the bottom and harden sufficiently to crack, it is done. Then pour on it, by degrees, about 2 quarts warm water, stirring all the time. When well mixed, filter it hot through a coarse flannel filter. Some use lime-water to dissolve the burnt sugar. Care must be taken not to overburn it, as a greater quantity is thereby renof melted tir, to which a little bismuth has oil of cognac dissolved in 95 per cent, alcohol, been added, to reduce its melting point to coal, or a little oil, being put upon the surface | must be kept in a dry, well corked bettle or

of the metal, to prevent oxidation.

695. To Plaster Brandy Pipes. First crevice. When the plaster is fully set, wash it over with a wet sponge. If you wish to color the plaster, add a little Venice red.

696. Wax Putty for Leaky Casks, Liquor. By using double the quantity of

add 4 pounds tallow; and, when thoroughly

tine, and let it cool.

697. Imitation Schiedam Gin. Dissolve 31 drachus oil of juniper in sufficient of sweet fennel.

698. Imitation Old Tom London Gin. Dissolve in 1 quart 95 per cent. alcohol, 1 drachm oil of coriander, 1 drachm oil of cedar, 🕯 drachm oil of bitter almonds, 🖟 drachm oil of angelica, and 1 drachm oil of sweet fennel; sufficient 95 per cent. alcohol to be clear.

Imitation Santa Cruz Rum. Cruz rum, and 1 drachm vanilla flavoring.

(See No. 668.)

700. Imitation Batavia Arrack. 35 gallons French spirit (rice spirit is preferable), tolu, and ½ ounce tincture of flowers of ben-

pineapple. Digest with occasional agitation for a month; then add 4 pint raw milk. to a gallon, or a few d Agitate well for 15 minutes, and rack in a will usually decolor it.

week. A fine imitation.

702. Imitation Jamaica Rum. 20 gallons spirit 10 above proof, 20 gallons New maica rum essence, 1 gallon St. John's bread 5.) It will, however, be necessary to substiflavoring (see No. 666), and 1 pound white tute cotton wadding in place of the charcoal. glycerine. Color to suit with caramel. (Sec proof, 1 pound Jamaica rum essence, 10 drops oil of cloves, 1 gallon St. John's bread flavoring (see No. 666), and I pound white glycerine. If desired, there may be added 1 ounce gum kino and ½ drachm oil of caraway, each dissolved in 2 ounces 95 per cent. alcohol.

703. To Make Spirit Finings. Pulverize 1 pound ordinary crystals of alum, divide into 12 equal portions, and put up in 2½ gallons water, and 18 gallons syrup made blue papers marked No 1. Next take 6 ounces of 108 pounds white sugar. Color with caracarbonate (the ordinary sesquicarbonate) of mel. (See No. 694.) soda, divide it into 12 parts and put them up. 711. To Make Wine Punch. Disin white papers marked No. 2. In place of solve 2½ drachms oil of lemons and ½ drachm the 6 ounces carbonate of soda, 4 ounces dry oil of cloves in 95 per cent. alcohol; make an salt of tartar may be substituted, but the infusion of 3 ounces ground alispice, as in last

jar.

704. To Clarify Gin or Cordials. To notch over the bottom of the casks with a clarify from 30 to 36 gallons gin, dissolve the hatchet or adze; then, for the bottom of a 1 contents of one of the blue papers, as prepared pipe mix & gallon plaster with I gallon water, in No 703, in about a pint of hot water, and and pour it on; while the plaster is setting, stir it into the liquor thoroughly. Then distant the cask gently with a mallet, in order solve the contents of one of the white papers that the plaster may penetrate into every in about 1 pint hot water, and stir well into

Bungs, &c. Melt 8 pounds yellow wax and finings, that is, 2 of each of the powders, as 12 pounds solid turpentine over a slow fire; laid down in the foregoing receipt, the liquor will be blanched as well as clarified. It is mixed, remove the whole to a distance from well to recollect, however, that the more finthe fire and stir in 2 pounds spirits of turpen-lings are employed, the greater the risk of injuring the liquor, which may have a tendency

to become flat when "on draught."

706. Finings for Gin. To 100 gallons 95 per cent. alcohol to make a clear liquid; gin, take 4 ounces roche alum, and put it into add it to 40 gallons French spirits 10 above 1 pint of pure water; boil it until it is disproof, with 8 ounces orange peel flavoring solved, then gradually add 4 ounces salts of (see No. 667), 1 quart syrup, and 30 drops oil tartar; when nearly cold put it into the gin, and stir it well with a staff for 10 minutes. The liquor must not be covered until it is fine; when this is accomplished, cover it up tight to prevent it from losing its strength.

707. To Remove the Blackness from Gin. Some gin has a particular blackness; add it to 40 gallons French spirit 10 above to remove which, take 1 ounce pulverized proof, with 1 pint orange-flower water, 1 quart | chalk and 2 or 3 ounces isinglass, dissolved; syrup, and I drachm oil of juniper dissolved in put this into the gin and it will become transparent. The above is enough for 50 gallons. The blackness which gin sometimes contracts gallons New England rum, 5 gallons Santa by coming in contact with iron, may also be carried down by putting a solution of 2 ounces isinglass and 1 quart skimmed milk into the spirit. When the color is very black, which will happen by merely an iron nail having 5 gallons Batavia arrack, founce balsam of fallen into the liquor, there is no remedy but to have the liquor distilled over again.

708. To Clarify Stained Gin. 701. Imitation Batavia Arrack. To gin has once become much stained, the only 12 gallons pale rum add 2 ounces flowers of remedy is to re-distill it; when it is only benzoin, 11 ounces balsam of tolu, 1 sliced slightly stained the addition of a few pounds acetic acid to a pipe or butt, 1 or 2 spoonfuls to a gallon, or a few drops to a decanterful,

709. Brandy Filter. When necessary to filter an imitation brandy, an excellent utensil may be used for that purpose which England rum 10 above proof, ½ pound Ja has already been described. (See No. 17, fig.

> 710. To Make Rum Punch. Dissolve Or:-40 gallons spirit 10 above in 1 pint 95 per cent. alcohol, 3 drachms oil of lemon, and 4 drachm oil of cloves; infuse 3 ounces ground allspice for 10 days in 1 quart 95 per cent. alcohol, and filter it. Mix these with 18 gallons spirit 30 above proof, 2 gallons Jamaica rum, and 1 pound Jamaica rum essence (or 20 gallons New England rum 30 over proof and 1 pound Jamaica rum essence). Next add 21 pounds tartaric acid dissolved in

white papers containing this latter substance receipt; add these to 10 galland proud spect.

gallons proof spirit, ald 10 gallons Marsala afterwards charged. or Catalonia wine. Take 10 gallons syrup 717. To Prep made of 35 pounds sugar; peel the rind, thinly, of 120 lemons; bring the syrup to a boil, and the champagne into a cask, add the brandy simmer the lemon rinds in it for \frac{1}{2} hour or more, then strain it through a fine flannel. Mix all the above with the juice of the lemons. Instead of boiling the lemon peel in the syrup, it may be infused for 5 or 6 days in 95 per cent. alcohol. The color can be deepened up the cask. In 3 or 4 days, if bright, draw with cherry juice. Brandy, rum, whiskey and arrack punch may be made as above, substituting the liquor for the wine and spirits.

hampagne. The process of making American and imitation French champagne is one requiring great care, especially in producing a not only clear, but ingredients, fining, filtering and gassing; inwhich will compare favorably with the best

genuine importations.
714. To Make a Filter for Filtering Wines. A filter for wines is usually made of felt, shaped like a cone or sugar loaf; those without any seam are the best. A lining of paper pulp is prepared in the following manner: Tear from 2 to 4 sheets filtering paper into small pieces and put it into a pail; pour over it a little boiling water, sufficient, by thorough beating, to form a fine smooth paste; then add sufficient water to fill the filter. Pour this quickly into the filter, and, 5 minutes after the water has drained through, fill up with the wine to be filtered, taking care to keep the filter always full.

715. To Make Syrup for Champagne Wine. To 25 pounds white sugar, add 2 gallons water and the whites of 4 eggs; stir until the sugar is dissolved. Let the whole simmer to the candy degree; then strain it

through a bag made of fine flannel.

716. To Prepare Isinglass for Fining Wines. Cut up some isinglass (it must be of the very best quality), and put it in a jar, with just enough wine or water to cover it; add daily as much of the wine or water as has been absorbed by the isinglass. In 6 or 8 days it should be completely dissolved, forming a thick fluid mass. Squeeze it through a linen cloth and put it into a bottle, adding 4 or 5 per cent. of 95 per cent. alcohol to make it keep. For 40 gallons wine to be fined, take 1 wine-glassful of dissolved isinglass, add a little wine and a pinch of salt, and beat to a froth with a whisk, adding by degrees sufficient wine to make the mixture up to 4 gallon. When foaming, pour it slowly into the wine, stirring till all the fining is incorporated | wine; 13 gallons water; 1 gallon 95 per cent. with the wine. Isinglass thus prepared and French spirit; I quart raspherry symp over used will precipitate completely; and, after a No. 1372); and 4 gallons syrup now and 25 few days, the wine will be bright. Too much pounds sugar and 2 gallons where the best of the state care cannot be taken in the preparation of 715.) Or: 30 gallons Catamba with the

10 gallons Marsala or Catalonia wine, 10 gal-|fining, as even the finest isinglass contains lons syrup made of 35 pounds white sugar, fibrous matter which dissolves with difficulty; and ½ pound tartaric acid. If not red enough, this is very apt to remain suspended in the add a little cherry juice. Filter. 712. To Make Wine Punch. To 10 bottling, by the gas with which the wine is

717. To Prepare Champagne Wine for Charging. Put the wine used to make spirit, the aroma or flavoring, and the syrup, and stir for 10 minutes. Every day for 4 days draw off 15 or 20 gallons of the mixture and pour it in again; let it rest 4 days more, then add the fining, stir for 10 minutes, and bung off slowly, so as not to disturb the lees. Filter (see No. 714), and it is ready for the fountain of the gassing apparatus.

718. To Charge Champagne with Gas. Matthews' apparatus is the one usually adopted in the United States for generating the gas and charging champagne wine. The fountains, tubes, and valves are silver-lined, and the machines are adapted for pint and quart bottles. The following is a proper bright wine. Full directions are given below charge for a No. 2 apparatus with 2 fountains: for making the necessary syrup, mixing the Charge the generator with 9 gallons water. 6 gallons ground marble, and 3 gallons sulphuric cluding a number of receipts for different acid; put 2 gallons water in the gas washer, kinds of champagne. A careful attention to and 20 gallons wine in each of the fountains. the instructions laid down will produce wines | For a warm climate, a pressure of 70 pounds to the square inch is sufficient. When the wine is made in winter for immediate sale, the pressure may be increased to 80 pounds. Genuine champagne has an average pressure of 50 pounds.

719. Catawba Champagne. Take 40 gallons Catawba wine; } gallon old cognac brandy; and 4 gallons syrup made of 30 pounds sugar and 2 gallons water according to No. 715;—or, 38 gallons Catawba wine; 2 gallons Angelica wine, and 4 gallons syrup as above. A very little tincture vanilla added to either of these makes a fine bouquet.

720. California Champagne. 40 gallons California wine; 1 quart raspberry syrup (see No. 1372); 4 gallons syrup made of 25 pounds sugar and 2 gallons water (see No. 715); and 4 gallons water. Or: 20 gallons California wine; 20 gallons Sauterne or white Bordeaux wine; 1 gallon old cognae brandy; with 4 gallons syrup as before. Add to these 10 per cent. of water.

721. Scuppernong Champagne. 40 gallons Scuppernong wine; ½ gallon old cognac brandy; and 3 gallons syrup made of 20 pounds sugar (see No. 715) and 2 gallons

water.

722. Imitation French Champagne. 40 gallons white Bordeaux wine; 1 gallon muscat wine; 1 gallon old cognac brandy; and 4 gallons syrup made of 25 pounds sugar and 2 gallons water. (See No. 715). In this receipt a little tineture of vanilla, or a small bottle of bouquet venatique, may be used in-stead of the muscat wine. They may be omitted altogether if aroma is not desired.

723. Cheap Champagne. 13 gallons California wine; 13 gallons white Bordeaux

syrup as before.

wine.

726. formation of the ethers which constitute the bouquet of the wine. It is probable, also, delicate fruits are diminished, if not destroyed, that a small quantity of the water is decomby by boiling. posed, setting free oxygen, which forms, with some of the constituents of the wine, new compounds peculiar to old wines. (See No. 6295.)

Home-Made Wines. The various processes in domestic wine-The . making resemble those employed for foreign wine, and depend upon the same principles. The fruit should be preferably gathered in fine weather, and not till it has arrived at a proper state of maturity, as evinced by its flavor when tasted; for if it be employed while unwine is apt to be inferior, and deficient in the makes port; whortleberry (sometimes called flavor of the fruit. The fruit being gathered, huckleberry) wine; makes a good factious it next undergoes the operation of picking, port; blackberry wine and the purpose of removing the stalks and wine apple where grown do

lons water; 2 gallons Angelica wine; 2 gallons unripe or damaged portion. It is next placed 95 per cent. French spirit, and 4 gallons in a tub, and well bruised. Raisins are commonly permitted to soak about 24 hours 724. Cheap Champagne. 20 gallons previously to bruising them, or they may be white Bordeaux wine; 20 gallons German or advantageously bruised or minced in the dry Hungarian wine; 20 gallons water; 2 gallons state. The bruised fruit is then put into a 95 per cent. French spirit; and 6 gallons vat or vessel with a guard or strainer placed syrup made of 35 pounds sugar and 3 gallons over the tap-hole, to keep back the husks and water. (See No. 715.)

725. The Use of Glycerine in Wine. drawn off. The water is now added, and the Glycerine differs from sugar in not fermenting whole macerated for 30 or 40 hours, more or or taking any active part in the process of fermentation. It can, therefore, be made use up with a suitable wooden stirrer. The liquid of atter fermentation, to impart any required portion is next drawn off, and the residuadegree of sweetness to wine, without the risk ry pulp is placed in hair bags and undergoes of further fermentation, as is the case with the operation of pressing, to expel the fluid sugar when used for this purpose; it is said it contains. The sugar, tartar, &c. (in very fine that it can be added with perfect safety to powder, or in solution), are now added to the even a young or new wine, as soon as it has become clear. It is absolutely necessary that the elementary of the sugar start of the sugar tartar, &c. (in very fine powder, or in solution), are now added to the even a young or new wine, as soon as it has become clear. It is absolutely necessary that the elementary of the sugar tartar, &c. (in very fine powder, or in solution), are now added to the even a young or new wine, as soon as it has become clear. It is absolutely necessary that the glycerine should be chemically pure; care from 75° to 85° Fahr.), the vinous fermentais consequently to be taken in purchasing it, tion soon commences, when the liquor is freas there are few articles in the market which quently skimmed (if necessary) and well are liable to contain so many impurities. (See stirred up, and, after 3 or 4 days of this treat-No. 1151.) The proportion of glycerine ment, it is run into casks, which should be should be from 1 to 3 gallons for 100 gallons quite filled, and left open at the bung-hole. of wine, according to the quality of the latter. In about a week the flavoring ingredients, in If the wine is perfectly clear before adding the state of coarse powder, are commonly the glycrine it will be ready for bottling at added, and well stirred in, and in about once. It is best to mix the glycerine first another week, depending upon the state of with an equal quantity of the wine, and then the fermentation and the attenuation of the add the mixture to the remainder of the must, the brandy or spirit is added, and the cask filled up, and bunged down close. In 4 Electricity as an Agent for im- or 5 weeks more the cask is again filled up, proving Whiskey and Wines. From experiments made on a large scale, it has been it is "pegged" or "spiled," to ascertain if it found that electricity in any form, either as a be fine or transparent; if so, it undergoes the regular current or a succession of discharges, operation of racking; but if, on the contrary, renders wine or whiskey mellow and mature, it still continues muddy, it must previously It is supposed that the bitartrate of potassa is pass through the process of fining. Its future decomposed, setting free potash and tartaric treatment is similar to that of foreign wine, acid: the former tending to neutralize the The must of many of the strong-flavored acids of the wine; and the tartaric acid, react- fruits, as black currents, for instance, is iming upon the fatty matters present, favors the proved by being boiled before being made into

728. General Receipt for the Preparation of Home-Made Wine from Ripe Saccharine Fruits. I. Ripe fruit, 4 pounds; clear soft water, 1 gallon; sugar, 3 pounds; cream of tartar, dissolved in boiling water, 11 ounces; brandy. 2 to 3 per cent. Flavoring as required. Makes a good family wine. II. As the last, using 1 pound more each of -5

fruit and sugar. A superior wine.

III. As the first, adding 2 pounds each fruit and sugar. Very strong. Is good without brandy, but better with it. 1½ pounds of raisins may be substituted for each pound of sugar above. In the above way may be made when tasted; for if it be employed while un-ripe, the wine will be harsh, disagreeable, rant wine (red, white or black); mixed fruit and unwholesome, and a larger quantity of wine (currants and gooseberries; or black, sugar and spirit will be required to render it red, and white currants, ripe black-heart cherpalatable. The common practice of employ-ries, and raspberries, equal parts). This is a ing unripe gooseberries for the manufacture of good family wine. Cherry wine: Colepress's wine arises from a total ignorance of the wine, (from apples and mulberries, equal scientific principles of wine-making. On the parts); elder wine; strawberry wine; raspother hand, if fruit be employed too ripe, the berry wine; mulberry wine (when flavored lon; cream of tartar (dissolved), 1 pound; sediment, and bottle. 'If loosely corked for a brandy, 11 to 2 per cent., weak.

II. As the last, but using 51 pounds dried wine, and may be kept indefinitely long

fruit. A superior family wine.

dy 3 per cent. A strong wine. Should the add rum, ½ gallon; brandy, ½ gallon; red or dried fruit employed be at all deficient in white tartar (dissolved), 6 ounces; bitter saccharine matter, 1 to 3 pounds may be almonds and cloves, of each ¼ ounce. The omitted, and half that quantity of sugar, or process of fermenting, clearing and bottling, two thirds of raising added. In the above two thirds of raisins, added. In the above manner may be made raisin wine, fig wine, &c.

9 gallons; crystallized tartaric acid, 1 ounce; of Dr. McCulloch. Gather the fruit when it honey, ½ pound; ferment with sweet yeast 1 is nearly full grown, but before it shows the pound or less; skim frequently, and when the least sign of ripening. Any kind will do, but fermentation is nearly over, add coarse powiti it is advisable to avoid choosing those which, it, bung close, and in 3 months fine it down and the stalks and remains of blossom rewith isinglass, ½ ounce; in 1 month more, if moved by picking or rubbing. The following not sparkling, again fine it down, and in 2 receipt is one of the best on the subject: 40 each bottle. The bottles should be wired, and the corks covered with tin foil.

731. To Make Blackberry Wine. To make 10 gallons of this cheap and excellent wine, press the juice out of sufficient fresh ripe blackberries to make 41 gallons; wash the pomace in 41 gallons soft spring water, and thoroughly dissolve in it 6 pounds white sugar to each gallon of water (brown sugar into this syrup, and mix them. Fill a cask water may afterwards be passed through the over the bung-hole, placing the cask where it may be left, and then added to the juice. 30 will be perfectly undisturbed. In two or pounds loaf sugar are now to be dissolved in three days fermentation will commence, and the juice, and the total quantity of liquid the impurities run over at the bung. Look at made up with water to 10½ gallons. The it every day, and if it does not run over, with liquor is now to be put into a tub, over which some of the mixture which you have reserved in another vessel fill it up to the bung. In about three weeks, fermentation will have Fahr. for from 24 to 48 hours, according to the drive in the bung tight, nail a tin over it, and let it remain undisturbed until the following March. Then draw it off, without shaking the cask, put it into bottles, cork tightly and seal over. Some persons add spirit to the wine, but instead of doing good, it is only an injury. The more carefully the juice is strained, the better the quality of the sugar,

from sour apples (ripe, sound fruit preferred), ferment from 1 to 3 weeks, as the weather is barrel. After a few days this peg is to be warm or cool. When it has attained to a loosened to let out any carbonic acid gas ferment from 1 to 3 weeks, as the weather is lively fermentation, add to each gallon, accord- which has been generated. This must be ing to its acidity, from ½ to 2 pounds white done from time to time, and when there is no crushed sugar, and let the whole ferment until further sign of gas generating to the danger it possesses precisely the taste which it is of the barrel, the spile may be made tight. desired should be permanent. In this condition pour out a quart of the cider and add for a cool cellar, and, if fine, may be bottled on each gallon 1 ounce of sulphite (not sulphate) a clear cold day at the end of February or the of lime. Stir the powder and eider until intibeginning of March, without further trouble. mately mixed, and return the emulsion to the But to ensure its fineness it is preferable to fermenting liquid. Agitate briskly and thor- draw it off at the end of the subsections a oughly for a few moments, and then let the frach cack, to as to clear at from the loss

729. General Receipt for Making cider settle. Fermentation will cease at Wine from Dry Saccharine Fruit once. When, after a few days, the cider has I. Dry fruit, 4½ pounds; soft water, 1 galbecome clear, draw off carefully, to avoid the short time, it will become a sparkling cider

uit. A superior family wine.

733. Honey or Mead Wine. Honey, III. As the last, 7½ pounds fruit, and bran20 pounds; cider, 12 gallons; ferment, then

is similar to the last receipt.

734. Specimen Process to Make Un-730. Imitation Champagne. Stoned ripe Grape, Currant, Gooseberry and raisins, 7 pounds; loaf sugar, 21 pounds; water, Rhubarb Wine, according to the process dered orris root, 1 drachm, and eau de fleurs when ripe, would be highly flavored. All und'orange, 3 ounces; lemon juice, 1 pint. Rack sound and bruised fruit should be rejected, weeks bottle it, observing to put a piece of pounds fruit are to be bruised in small quandouble-refined sugar, the size of a pea, into tities, in a tub which will hold 15 or 20 gallons, sufficient pressure only being used to burst the berries, without breaking the seeds or much compressing the skins. 4 gallons water are then to be poured on the fruit, which is to be carefully stirred, and squeezed with the hands until the whole of the juice and pulp are separated from the solid matter. It is then to rest for a few hours, when it must be pressed and strained through a coarse canwill do for an inferior wine); strain the juice vas bag with considerable force. 1 gallon with it perfectly full, and lay a cloth loosely residue, to remove any soluble matter that spread a blanket, covered by a board, and place in a temperature of from 55° to 60° ceased, and the wine be still; fill it again, signs which it may show of fermentation, when it is to be put into a cask to ferment. The cask must be of such size that the liquor will nearly reach to the bung-hole, so that the scum may run out as it rises. As the fermentation goes on the liquor will decrease, and the cask must be kept filled up nearly to the bung-hole with a portion of the "must" which has been reserved for that purpose. When the and the more scrupulously clean the utensils fermentation has become a little weaker, and casks, the purer and better will be the which may be known by the hissing noise decreasing, the bung is to be driven in, and a 732. Cider Wine. Let the new cider wooden peg, called a spile, made of tough wood, put into a hole bored in the top of the time raising the temperature. When it is loaf sugar, add the latter when it is done transferred to the fresh cask, it should be working. Bottle in 3 months. fined with isinglass. Sometimes it is desirable to rack it off a second time into a fresh and still, and sometimes dry. If sweet, it may be re-made the following season, by adding to it juice from fresh fruit, according to juice; then filter. the degree of sweetness, and fermenting and cask previously furnigated with sulphur (see No. 766), and fining and bottling it in the usual manner. Such dry wines sometimes whole mare or husks, etc., is allowed to remain in the juice during the first fermentation, flavor. If the wine is desired to be very sweet as well as brisk, 40 pounds of sugar may be used; less sweet and less strong, 25 pounds; to be used within a year.

735. Ripe Gooseberry Wine. Put the ripe and well picked red gooseberries into a tub or pan, bruise the fruit well, and leave it uncovered for 24 hours. Squeeze the juice from the pulp through a hair or canvas bag. Put the residue of each squeezing into a vessel; pour upon it ½ gallon of boiling water for each gallon of fruit used, and stir well for a quarter of an hour. Let it stand for 12 hours, squeeze the pulp through the bag, and add the liquor to the juice of the fruit obtained. Add 2½ pounds sugar to each gallon of the liquor, and stir it well. Let it stand to ferment. When it has done fermenting, draw hold it; keep it in a cool cellar for twelve

a splendid wine in 2 years.

736. Ginger Wine. Boil 20 pounds sugar in 7 gallons water for half an hour, pint yeast. Leave the cask open for 3 weeks, keeping it filled up with some of the reserved liquor, and bottle it in from 6 to 9 months.

737. Ginger Wine. down to about 75°, squeeze out the lemons the must will undergo ferrosetation and ginger through a sieve, and add the yeast, it has bemounted, which will be in 15 days. Let it work for about 3 days, and then draw till the case with the same sind of winn said

this time, also, if it is found to be too sweet it off into a cask. Put half of the lemon and for the maker's taste, he should stir up the lees | ginger residue in with it. Some first pare the so as to renew the fermentation, at the same lemons, and having rubbed the rinds with

To Make Aromatic Ginger 738. Wine. Reduce the following to coarse powcask, again fining it. All these removals der: 5 pounds Jamaica ginger root, 6 to 8 should be made in clear, dry, and if possible, ounces cloves, 1 pound allspice, ½ pound cinnacold weather. It must be bottled in March. mon, and ½ pound mace. Infuse these for 10 This wine will usually be brisk, but circum- days in 10 gallons 95 per cent. spirit, stirring stances will occasionally cause it to be sweet every day, and then filter. Then dissolve 50 pounds white sugar in 85 gallons water; mix the whole together, and color with cherry

739. To Make Ten Gallons of Ginger treating it as before. But if it be dry, brisk-ness can never be restored, and it must be treated as a dry wine, by drawing it off into a the whites of 6 eggs to ‡ ounce isinglass, 15 pounds loaf sugar, and the rinds of 6 lemons; boil the compound & of an hour, and skim it clean; when nearly cold put it into a vessel taste disagreeably in the first and second that will admit of its being drawn off; set it year, but improve much with age. If the to work with yeast, and in a few days afterwards draw it off into a cask; then add the juice of the 6 lemons, and 2 quarts spirits; in the process will be more rapid, and the wine a week or ten days bung the cask closely, and stronger and less sweet; but it will have more when thoroughly fine, bottle the wine off. It will be fit to drink in 4 months.

Simple Receipt for Making Grape Wine. Put 20 pounds of ripe, freshit will be brisk, but not so strong, and ought picked, and well selected grapes into a stone jar, and pour on them 6 quarts boiling water; when the water has cooled enough, squeeze the grapes well with the hand; cover the jar with a cloth, and let it stand for 3 days; then press out the juice, and add 10 pounds crushed sugar. After it has stood for a week, seum, strain, and bottle it, corking loosely. the fermentation is complete, strain it again and bottle it, corking tightly. Lay the bot-

tles on their side in a cool place.

741. Fine Grape Wine. In order to make good wine it is necessary to have a good cellar, clean casks, press, etc. First of all, have your grapes well ripened; gather them in dry weather, and pick out carefully it off and add 3 pint brandy to each gallon, all the unripe berries, and all the dried and Let it stand to settle for 4 or 5 weeks, then damaged ones; then mash them; or, if you draw it off carefully into a cask that will just have a proper mill for the purpose, grind them. Be careful not to set the mill so close months or more, when it may be bottled. as to mash the seed, for they will give a bad Choose a clear, dry, cold day. It ought to be taste to the wine. If you wish to have wine of a rose color, let the grapes remain in a large tub a few hours before pressing. The longer time you leave the grapes before pressskimming it well; then put 9 ounces bruised ing, after they are mashed, the more color the ginger in a portion of the liquor, and mix all wine will have. For pressing the grapes, any together. When nearly cold, put 9 pounds press will answer, provided it is kept clean raisins, chopped very small, into a nine-gallon and sweet. After you have collected the cask, add 4 lemons sliced, after taking out the must in a clean tub from the press, transfer seeds, and pour the liquor over all, with ½ it into a cask in the cellar. Fill the cask within 10 inches of the bung; then place one end of a syphon, made for that purpose, in the bung, and fix it air-tight; the other end Another Pro- must be submerged fully 4 inches in a bucket cess. Boil 26 pounds raw sugar in 7 gallons of cold water. The gas thus passes off from water for half an hour, skimming it well; then, the cask, but the air is prevented from coming if the syrup is quite clear from soum, pour incontact with the wine, which would destroy it boiling upon 8 ounces bruised ginger and 16 that fine grape flavor which makes Catawha lemons sliced; when the whole has cooled wine so calchrated. When properly made

which, if all is right, will be in the January off 4 gallons, and put the finings in it; stir or February following. Then, if perfectly it up well, leaving out the bung one day; elear, rack it off into another clean cask, and lung it up tightly until wanted. If the wine remains in the cask till about November, it will improve by racking it again. Be sure to have sweet, clean casks. Do not burn too Porter. much brimstone in the cask (see No. 766); much wine is injured by excessive use of brimstone -- a mistake generally made by new beginners. Different qualities of wine can be made with the same grape by separating the different runs of the same pressing. The first run is the finest to make use of the first season; but it will not keep long without losing its fine qualities. To make good sound vine, that will improve by age, the plan is to mix all up together. The very last run will make it rough, but it will have better body and better flavor when 2 or 3 years old, and will improve for a number of years. The first run will not be good after 2 or 3 years.

To Fine Wine Difficult to Clarify, or Thick in Consequence of an Imperfect Fermentation. To clarify 60 gal-Ions, take 1 ounce of the species of Dock or Runex plant, called Patience root, which boil in 1 quart water. When cold, filter, and add 1 ounce common salt, then 1 glass sheep's blood. Beat all the ingredients well together with a broom until the mixture foams up well, then add it gradually to the wine, stirring continually while pouring it in, and for 15 minutes afterwards. In a few days the

wine will be clear. To Fine Madeira or any kind of Wine with Isinglass. To fine 40 gallons wine, steep 1 ounce isinglass in 1 pint of pure cold water over night, and then melt it over wine and mix the whole in a wooden vessel; whisk it with a clean broom until it foams up. Pour this mixture gradually in the wine you desire to fine, being careful to stir the whole quite colorless by it. continually during the process. Bung up the eask, and in the course of 48 hours the wine perfectly, and leave no particles suspended in the wine.

To Fine White Wine with 744. To fine 60 gallons white wine, take the whites of 5 or 6 fresh eggs, 1 egg-shell nearly reduced to powder, and a small handwhile.

745. clarified in the same way. Roussillon, or the dark wines called vin du midi, which are usually of a deep color, and with a small handful of salt.

and beat them up to a froth in a wooden the kind chiefly attacked with repmess, noth-

bung it loosely for 1 week; then make it bucket; add 1 gallon of Port and whisk it tight. Nothing more is needed till it is clear, well up to a froth with a clean broom; draw then bung it up, and in ten days it will be fit to bottle. If the weather be warm, mix up 1 pint silver sand and add to the finings

To Fine Wine, Cider, Ale, or 747. Take 1 pound finely shredded isinglass, and macerate it in wine, sour beer, eider, or vinegar; add more of the liquid as the isinglass swells, until about a gallon has been used, agitation with a whisk being occasionally had recourse to, for the purpose of promoting the solution. As soon as the whole of the isinglass is dissolved, the mixture is reduced to the consistence of thin syrup, with wine or the liquid that the finings are intended for. The whole is next strained through a cloth or hair sieve, and at once reduced to a proper state of dilution, by the addition of more liquor. A pound of good isinglass will make 10 to 12 gallons of finings. I to $1\frac{1}{2}$ pints is the usual quantity for a barrel of ale or porter; and 1 quart for a hogshead of wine or cider.

748. To Decolor Wine. The color of wine is subject to change; naturally it is precipitated by age and exposure to the light; artificially it is removed by the action of lime-water, skimmed milk, milk of line, and sometimes fresh-burnt charcoal. Wines that have acquired a brown color from the cask, or red wines that have become "pricked" (see No. 752), or dark wines of any kind, may easily be turned into white wine by employing either of the above substances. In this way brown Sherry is commonly changed to pale Sherry; for this purpose 2 or 3 pints of skimmed milk are generally sufficient to decolor a cask of wine; but when it is found a gentle charcoal fire, until a uniform gelatin-ous mass is formed. When cool, mix with it or 3 quarts or more will be required. Char-3 pints wine, and let it repose 12 hours in a coal is not often used, as it affects the flavor moderately warm room. Then add 1 gallon as well as color of wine. A little milk of lime may sometimes be substituted for milk. especially when the wine to be decolored is very acid, and red wines may be rendered

749. To Remedy Ropiness in Wine. The peculiar cloudy, stringy, oily appearance will appear perfectly clear and bright. Isin- in wine, called by the French "graisse," and glass prepared in this way will precipitate by the Americans "ropiness," is occasioned by the presence of a glutinous substance, and is generally observed in those white wines which do not contain much tannin. M. Francois, a chemist, first discovered the cause, and pointed out the proper remedy, in the addition of tannin. He recommended the ful of common salt. Beat the whole together use of 1 pound of the bruised berries of the in a little of the wine, with a small clean mountain ash in a somewhat unripe state, broom, until it foams, then pour it into the well stirred in each barrel of the wine to be wine gradually, constantly stirring it all the improved. After agitation, the wine is to be left to repose a day or two, and then racked To Fine Red Wine. This is off. The tannin in the berries by this time When you have will have separated and precipitated the glutinous matter from the liquid, and removed the ropiness. Wines thus affected cannot be wish to make it of a lighter color, add 5 or 6 fined in the regular way, as they do not coneggs, yellows, whites, and shells together, tain sufficient of the astringent principle to cause the coagulation or precipitation of the To Fine a Pipe of Port Wine, finings; this principle must therefore he sup-Take the whites and shells of ten good eggs, plied, and for pale white wines, which are

troubled by ropiness.

fined and bottled.

various ways to hasten the ripening of wine. One of the safest and best plans for this purkeeping them at a temperature ranging bedraughts, and not too dry. Dealers sometimes remove the bungs or corks, and substitute bladders fastened air-tight. wine treated in this way, and kept at about new wine, immediately gives it the appearance

of being 2 or 3 years old.
751. To Remedy Sour Wine souring of wine is produced by varie a circumstances, sometimes from its having been kept in a warm cellar where it has been exposed to draughts of air, often by the vibration occasioned by the rolling of heavy bodies over the cellar; but most frequently it originates from the wine having been imperfectly The only safe remedy for the fermented. souring of wine is the cautious addition of a or honey, with a little crude tartar (dissolved), little neutral tartrate of potash; it may also be mixed with a larger quantity of rich wine of its kind, at the same time adding a little good brandy. Wine treated in this way should be fined after having stood 2 or 3 weeks, and then immediately bottled, and consumed as soon as possible, for it will never prove a good keeping wine. (See No. 761.)

752. To Restore Pricked or Decaying Wine. If the wine is only thick, add 2 pints of milk to every 30 gallons of wine, and stir 10 minutes. But if the wine has an inferior taste, or is partly or entirely spoiled, treat it as follows: Put the 30 gallons wine into a clean cask, then take 2 pints spirit of wine, 95 per cent.; 3 ounces common salt; 1 pound white sugar. Dissolve the salt and sugar in 1 gallon of the wine, and add the spirit. Then pour the whole gradually into the wine, being careful to stir it continually with a stick during the operation. After the mixture is all poured in the wine, stir the whole for 10 minutes longer. Then add 2 pints milk and continue stirring 10 minutes more. After some days the wine will be completely clarified and restored. "Pricked" wine signifies wi which has been slightly soured.

753. To Remedy Excessive Acidity in German Wine. Simply add a little chalk. This mode of correcting the sourness of wine is perfectly harmless, whereas the pernicious practice of using white and vitrified lead for this purpose cannot be too much condemned. Lead in any form is a poison.

To Restore Sour Wine with To 25 gallons wine, add 4 ounces potash dissolved in a little water, and stir well

with a stick for 10 minutes.

ing equals a little pure tannin or tannic acid | ning to decompose (called in French the dissolved in proof spirit. Red wines contain Poux), and that in which the acetous fermenso much tannic acid that they are never tation has commenced. The Poux appears at Wine, after having the bottom of the barrel, while acetification been cured of ropiness, should immediately be begins at the top. For the first stage of the Poux the wine becomes thick, and has a pecu-750. To Ripen Wine. Dealers adopt liar taste termed flat. For the second stage the wine becomes still more troubled, and has the taste of stagnant water. Finally, in the pose, especially for strong wines, is to let them last stage, when the decomposition has remain on the lees 15 to 18 months before reached its maximum, the wine becomes racking off, or, whether "crude" or "racked," grayish and appears like muddy water. If grayish and appears like muddy water. If some of the wine is put into a champagne tween 50° to 60° Fah., in a cellar free from glass and a pinch of tartaric acid is added, a red color will be produced, which will not be the case if the wine is in a state of acetons Bottled fermentation.

756. Remedy for Decomposition in 70° Fah., ripens very rapidly. 4 or 5 drops of Wines. As soon as discovered add tartaric acetic acid added to a bottle of some kinds of acid in the proportion of 12 ounces to every acid in the proportion of 15 ounces to every 20 gallons of the wine, and let it rest for 5 few days, when, if the wine has not regained The its natural color, a little more tartaric acid

must be added.

757. Sweating In and Fretting In Wine. The technical terms "sweating in" and "fretting in" are applied to the partial production of a second fermentation, for the purpose of mellowing down the flavor of foreign ingredients (chiefly brandy) added to wine. For this purpose 4 or 5 pounds sugar are commonly added per hogshead; and when the wine is wanted in haste, 1 or 2 spoonfuls of yeast, or a few bruised vine leaves are also mixed in, the cask being placed in a moderately warm situation until the new fermentation is established, when it is removed to the wine-cellar, and, after a few days, fined down.

758. To Remove Mustiness from Wine. The disagreeable taste in wine, generally known as mustiness, is occasioned by the presence of an essential oil. This may be removed by adding a little sweet or almond oil, and then violently stirring the wine for some time. The fixed oil attracts and seizes on the essential oil, and rises with it to the surface, when it is easily skimmed off, or the liquid under it drawn off. A few slices of burnt or toasted bread, or a little bruised mustard seed or coarsely powdered charcoal, will often

have the same effect.

759. Pasteur's Method of Preserving Wines. M. Pasteur announced some time ago that wines became spoiled in consequence of the presence of microscopic organisms, which could be destroyed by exposing the wine, for a few moments only, to a temperature of 131° Fahr. A committee of experts was appointed to make a comparative examination of wines which had and which had not been subjected to heat; M. Lapparent being President, and M. Dumas and M. Pasteur assisting. They concluded that the preservation of wine in bottles is greatly improved by heating; that the destruction of the germs is perfect, without the least impairment of the taste, color, or limpidity of the wines.

760. To Determine the Nature of Acidity in Wine. If wine has undergone 755. To Test Wines Beginning to the acctous fermentation, then convert it at Decompose. Many persons are unaware of once into vinegar by one of the usual modes the difference between a wine that is begin-! But if its acidity proceeds from an excess of

tartaric acid, this defect may be remedied by shaking the wine with a concentrated solution of neutral tartrate of potassa, which, with the surplus of tartaric acid, will form bitartrate of potassa, and precipitate as such. discover the nature of the acidity, neutralize an ounce or so of the wine with some earbonate of soda, then add a small quantity of sulphuric acid, and boil up; if acetic acid or vinegar be present, it will be perceptible by

its odor. (See No. 751.) 761. Parent's Method of Preserving This consists in the addition of a small quantity of tannin or tannic acid to the wine, which perhaps acts in a similar way, by destroying the vitality of the spores of the fungus, since a microscopic examination of wine known to contain these germs, within a few weeks after being treated with the tannin, has failed to detect the slightest trace. Indeed, wine which has already begun to change, and become turbid, can be restored to its primitive clearness, and with a great improvement in its taste. Care must be taken, however, to use only tannin which has been prepared from the constituents of the grape, since the slightest proportion of the extract of nut-gall, although accomplishing the general object of destroying the fungus, will impart a peculiar taste, which never disappears. Antiferments. Substances used

in small quantities for arresting fermentation in cider, wine, and malt liquors. The following formulæ are effective, and have the advantage of being harmless. (See No. 835.) 763. Antiferments for Cider. Antiferments for Cider. and as newly prepared as possible. Or. 2

parts sulphite of lime and 3 parts ground black mustard seed.

764. Antiferments for Cider, Wine, Malt Liquors. &c. Grind or bruise together 13 pounds new mustard seed and 1 pound cloves. This mixture may be used with or without the addition of 10 ounces ground

capsicum. To Induce Fermentation. fermentation does not begin within a reasonable time, raise the temperature by covering the vessel with blankets, and moving it near to a fire. Or, warm a portion of the must and add it to the rest. A small quantity of yeast, previously well mixed with some of the liquor, gently stirred in, will have the same effect. Or, the must may be warmed by placing large stone bottles, filled with boiling water

and well corked, in the liquor.

766. To Arrest Fermentation. Dip a strip of linen or cotton, an inch wide and seven inches long, into melted sulphur. Fasten a wire into the bung of a 60-gallon cask, so that the end will hang about the middle of spirit; and add 10 pounds sugar dissolved in the inside of the cask, bend the end up to 5 gallons water. form a hook, place the sulphur tape on the hook, ignite it, and insert it in the cask, bunging loosely. In about an hour the cask will anise dissolved in 95 per cent. alcohol, and 105 be impregnated with sulphurous acid; then gallons syrup of 10° Baumé. Stir for 1 an withdraw the match, and fill up with wine, and bung up tight. This will stop further

ordials or Liqueurs. The materials employed in the preparation of cordials are rain or distilled water, white sugar, and clean, perfectly flavorless spirit. To these may be added the substances from which the flavor and aroma are extracted, which distinguish and give character to the particular cordial to be made, and also the articles employed as "firings" when artificial clarification is had recourse to. In the preparation or compounding of cordials, one of the first objects which engages the operator's attention is the production of an alcoholic solution of the aromatic principles which are to give them their peculiar aroma and flavor. (See No. 812.) This is done either by simple infusion or maceration, or by maceration and subsequent distillation, or by flavoring the spirit with essential oils. In the preparation of liqueurs, giveering has been found to be admirably adapted for preserving the characteristic flavors of those compounds, and it has consequently become the great favorite of this class of manufactures. (See No. 725.)

768. Cordials Made by Maceration, with Essential Oils. When essential or with Essential Oils. When essential oils are employed to convey the flavor, they are first disso ved in a little of the strongest rectified spirit of wine, and when added to the spirit they are mixed up with the whole mass as rapidly and as perfectly as possible by laborious and long continued agitation. stronger spirit may be reduced to the desired strength by means of clear soft water, or the clarified syrup used for sweetening. The sugar employed should be of the finest quality, phite (not sulphate) of lime in fine powder, and is preferably made into syrup before adding it to the aromatized spirit; and this should not be added until the latter has been rendered perfectly fine by filtering or fining. Some spirits, as anise seed, etc., frequently require this treatment, which is best performed by running them through a fine and clean filter, having previously mixed them with a spoonful or two of magnesia. By good management, cordials thus made will be perfectly clear and transparent; but should this not be the case, they may be fined with the whites of about 12 or 20 eggs to the hogshead, or by adding a little alum, either alone or followed by a little carbonate of soda or potassa, both dissolved in water. In a week or a fortnight the liquor will be clear.

769. To Make Doppelt Kummel or Caraway. Dissolve separately, each in a little 95 per cent. alcohol, 1 drachm oil of anise, and 5 drops each of the oils of calamus, bitter almonds, and coriander; dissolve also 1 to 12 ounces oil of caraway in sufficient alcohol (95 per cent.) to make a clear solution. Incorporate these with 40 gallons French proof

770. To Make Anisette. To 30 gallons French proof spirit add 4 ounces essence of star

hour, settle and filter.

To Make Curaçoa. Slice the out-771. fermentation. This is a good plan for white side peel very thin from 60 bitter oranges; wines, but not for red wines, as sulphur in- infuse for 15 days with 4 drachus bruised jures their color. Sulphite (not sulphate) of cinnamon, and 2 drachurs bruised mace, in 5 lime is also sometimes employed to arrest fer-gallons 95 per cent. French spirit, stirring mentation. (See No. 835.) every day. Then add 25 pounds white sugar

in 11 gallons 95 per cent. alcohol, 11 ounces essence of maraschino, 11 drachms essence of rose, ½ drachm essence of noyau, 5 drops essence of cloves, and 8 drops essence of cinnamon; add lons 95 per cent. alcohol. Dissolve 31 ounces gallon orris root flavoring. (See No. 669.) essence of green anise seed in 1 gallon 95 Mix the above with 12 gallons 95 per cent.

Stir thoroughly and filter.

773. Superfine Maraschino. 4 ounces in the barrel 26 gallons sugar syrup essence of noyau; 1 ounce essence of rose; 1 ounce essence of neroli (genuine); 4 drachms of mace, infused in 95 per cent. alcohol; \(\frac{1}{2}\) pound cinnamon, infused in 1 quart of water; 2 ounces cloves, infused in 1 pint of water; 2 pounds orris root (powdered), infused in 2 gallons 95 per cent. alcohol for 15 days. Dissolve the essences in 2 gallons 95 per cent. gether for at least half an hour, and let the mixture stand two weeks; then filter and put in the filter two or three sheets of filtering (See No. 811.)

Maraschino. 12 ounces essence of maraschino, 1½ drachms essence of rose, ½ drachm essence of noyau, 8 drops essence of cinnamon, 5 drops essence of cloves, 1 pound orris root (powdered), infused in ½ gallon 95 per cent. alcohol for 15 days. Dissolve the essences in 1 gallon 95 per cent. alcohol. Mix, put in a barrel 12 gallons 80 per cent. alcohol and add 2 gallous 95 per cent. perfumed alcohol (as described above); sugar syrup, 26 gallons 25° Baumé's saccharometer. Mix and

filter as directed in the last receipt.

775. Maraschino: 3½ ounces essence of noyau, 6 drachms essence of rose. Dissolve the above in ½ gallon 95 per cent. alcohol, and add 4 spoonfuls of magnesia, 1 gallon orange flower water, † pound cinnamon (bruised) infused in † gallon water, † pound cloves (bruised), infused in # gallon of water, 4 drachms mace infused in alcohol, 2 pounds orris root (powdered) infused in 2 gallons 95 per cent. alcohol for 15 days. Mix 41 gallons 80 per cent. alcohol, 90 gallons syrup 25 degrees Baumé, and add 4 gallons perfumed spirits, as described above. Stir and filter as already directed.

776. Curaçoa d'Hollande. 2 pounds Curaçoa orange peel, ½ pound Ceylon cinnamon. Let them soak in water; boil them for 5 minutes with the juice of 32 oranges and 14 gallons of white plain syrup; then add 6 gallons of 95 per cent. alcohol; strain, filter; color dark yellow with sugar coloring.

receipt will make a splendid curaçoa.
777. Curação. 2 ounces each essence of bitter oranges and neroli; ‡ ounce essence of cinnamon; 3 drachms mace infused in alcohol. saffron or turmeric.

778. Champion Anisette. Put into a barrel 30 gallons 85 per cent. alcohol. Add alcohol. 5 ounces essence of noyan, 2 drachus

dissolved in 2 gallons water; color with 4 ounces essence of anise seed, which dissolve caramel (see No. 694); stir thoroughly, and in 2 gallons 95 per cent. alcohol. Add 103 gallons sugar syrup 10° Baumé. To Make Maraschino. Dissolve minutes and let it rest 4 or 5 days, then filter. Add 2 or 3 sheets of filtering paper. (See No.

779. Anisette. Put in a barrel 13 galper cent. alcohol, and add 1 gallon orange alcohol and 26 gallons syrup of 30° Baumé. Hower water, 8 or 10 drops infusion of mace, and 5 drops essence of cinnamon. Then put Baumé. Stir and filter as directed in the last receipt.

780. Anise Seed Cordial. Dissolve 3 drachms of oil of anise seed in 24 gallons of 95 per cent. alcohol; then add 2½ gallons of fine white syrup, mixed with 44 gallons of

water. Stir and filter.
781. Malliorca d'Espagne. 40 gallons alcohol. Mix, put into a barrel 41 gallons 85 | 55 per cent. alcohol, 5 ounces essence green per cent. alcohol; add the aromas, in 4 gallons anise seed and 5 ounces essence of star seed be per cent. alcohol; sugar syrup, 90 gallons dissolved in 95 per cent. alcohol, ½ drachm 32° Baumé. Stir all the ingredients well to- ether (to give the ordial age). Stir and filter.

782. Blackberry Brandy. To 10 gallons blackberry juice, and 25 gallons spirits 40 above proof, add 1 drachm each of oil of cloves and oil of cinnamon dissolved in 95 per cent. alcohol, and 12 pounds white sugar dissolved in 6 gallons water. Dissolve the oils separately in a pint 95 per cent. alcohol; mix both together, and use one half the quantity; if the cordial is not sufficiently flavored, use the balance.

783. Blackberry Brandy. each of cinnamon, cloves, and mace, I drachm cardamom. Grind to a coarse powder; add to 16 pounds of blackberries, mashed, and 5 gallons of 95 per cent. alcohol. Macerate for two weeks; press it; then add 10 pounds of sugar, dissolved in 3% gallons of water.

784. Cherry Brandy. Mash 16 pounds of black cherries with their stones; 5 gallons 95 per cent. alcohol. Macerate for two weeks; press it; then add 10 pounds of sugar, dissolved in 38 gallons of water. Filter.

785. Peach Brandy. Mash 18 pounds of peaches, with their stones; macerate them for 24 hours with 4% gallons of 95 per cent. alcohol and 4 gallons water. Strain, press, and filter; add 5 pints white plain syrup. Color dark yellow with burnt sugar coloring.

786. Imperial Peach Brandy. 4½ ounces powdered bitter almonds, 3½ gallons of 95 per cent. alcohol, 51 gallons of water. Mix together, and macerate for 24 hours; then add a strained syrup, made of 32 pounds of sugar, 1 pint of peach jelly, 21 ounces preserved This ginger, 1 lemon cut in slices, 1 drachm of grated nutmegs, 1 drachm of allspice in powder, and 5 pints of water boiled for 2 minutes. Mix the whole, and filter.

787. Peppermint Brandy. To 40 gal-Dissolve the above essences in 1 gallon 95 lons proof spirit add 4 ounces essence of pepper cent. alcohol, then put in a clean barrel permint, dissolved in 95 per cent. alcohol. 13 gallons 85 per cent. alcohol, 26 gallons Color with 1 pound powder of turmeric sugar syrup 30 degrees Baumé, and add 1 infused in 1 gallon spirit 95 per cent. Use gallon perfumed spirit, as above. Color with this infusion in such quantity as to get the proper shade.

788. Kirschenwasser. 100 gallons proof

dient in some 95 per cent. alcohol and add a spoonful of magnesia, 2 pounds orris root (powdered), infused 15 days in 2 gallons 95 per cent. a cohol, 11 gallons sugar syrup. Stir. and filter if necessary

789. Caraway Cordial. Dissolve 6 drachms oil of caraway in 3 gallons 95 per cent. alcohol; add a syrup made of 42 pounds of sugar and 44 gallons of water. Filter.

790 Ratafia. This word is derived from the Latin pax ratafiat (let peace be ratified). The Latins used to drink rate fia on signing their treaties of peace. Ratafia may be made with the jnice of any fruit. Take 3 gallons cherry juice, 4 pounds sugar, dissolved in the cherry juice. Steep in $2\frac{1}{2}$ gallons brandy 10 days 2 drachms cinnamon, 24 cloves, 16 ounces peach leaves, 8 ounces bruised cherry kernels. Filter; mix both liquors, and filter again.

To Prepare Cherry Juice by In-791. fusion for making Cherry Bounce and Brandy. Put the cherries into barrels and cover them with 95 per cent. spirit; let them steep for 1 month, and stir them well every 8 days. Use the juice that runs off first, and repeat this operation 2 or 3 times. The last time, you may bruise the cherries and stones, and steep them all together to make cherry

brandy.

792. To Prepare Cherry Juice for Boiling. Put the cherries in a kettle tinned inside, cover them with water, and boil them at a gentle heat for 1 hour. When cold put them into barrels and add 1 gallon 95 per cent, spirit to each 10 gallons of the juice.

793. To Make Cherry Bounce (Superfine). To 15 gallons cherry juice, add 15 gallons 80 per cent. spirit; 30 gallons Catalonia or Marseilles wine; 1½ ounces essence of noyau; 3 ounces made infused in 1 quart 95 per cent. alcohol; 1 pound cinnamon infused in 1 gallon water; ‡ pound cloves ground and and swell; then add 12 gallons 95 per cent. infused in 1 quart of water. Put all the alcohol, and steep for 2 or 3 days; next add above ingredients in a clean barrel and add 60 10 gallons water, and let the whole steep for gallons sugar syrup 25° Baumé. Stir up the 1 day more. The water will reduce the alcoingredients well, and filter after 4 or 5 days. If the color is not deep enough add a little sugar coloring. The above receipt is to make absinthe of 65 to 70 per ccut. strength. 120 gallons, but a much smaller quantity may be made by reducing the quantity of each ingredient and observing the same proportion in

794. To make Cherry Bounce (Second Quality). To 12 gallons cherry juice, add 30 gallons 80 per cent. spirit; 30 gallons Catalonia or Marseilles wine; 3 ounces essence of noyau; 1/2 pound cinnamon ground and is made in the same manner as in the former infused in ½ gallon water; ½ pound cloves receipt, with the following ingredients:—40 ground and infused in ½ gallon water; 1½ ounce mace infused in 1 pint 95 per cent. alcohol. Mix all the above ingredients in a the, 1 pound coriander, and 20 gallons water. clean barrel, and add 60 gallons sugar syrup 13° Baumé. Stir up all the ingredients well pounds small absinthe, and heating it again together, and filter after 4 or 5 days. Make the color a little darker with sugar coloring (see No. 694), and to give a good shade add a little archil

essence of rose. Dissolve the latter ingre- per cent. alcohol); ½ gallon cinnamon water (made as in last receipt); † gallon clove water (made as in last receipt); 1½ ounces mace infused in 95 per cent. alcohol. Mix all the above ingredients in a clean barrel, and add 68 gallons sugar syrup 25° Baumé. Stir up the mixture and let it rest 8 days; then strain.

796. Cordials by Distillation. The solid ingredients should be coarsely pounded or bruised before digestion in the spirit, and this should be done immediately before putting them into the cask or vat; as, after they are bruised, they rapidly lose their aromatic properties by exposure to the air. The practice of drying the ingredients before pounding them, adopted by some workmen for the mere sake of lessering the labor, cannot be too much avoided, as the least exposure to heat tends to lessen their aromatic properties, which are very volatile. The length of time the ingredients should be digested in the spirit should never be less than 3 or 4 days. but a longer period is preferable when distillation is not employed. In either case the time allowed for digestion may be advantageously extended to 10 or 15 days, and frequent agitation should be had recourse to. In managing the still, the fire should be proportioned to the ponderosity of the oil or flavoring, and the receiver should be changed before the faints come over, as the latter are unfit to be mixed with the cerdial. The stronger spirit may be reduced to the desired strength by means of clear soft water, or the clarified syrup used for sweetening.

797. To Make Absinthe by Distillation. Put the following ingredients into a cask:—1½ pounds large absinthe, 2 pounds small absinthe, 2½ pounds long fennel, 2½ pounds star anise (breaking the star only), 21 pounds green anise seed, 6 ounces coriander seed, and 1 pound hyssop; moisten the whole with a little water, allowing it time to soften hol to about 23 gallons of proof spirit. Distill it, and it will produce nearly 15 gallons Change the receiver as soon as the spirit, as it comes from the worm, begins to assume a reddish tinge. Color the distilled product, by steeping in it for 10 or 15 days 1 pound mint leaves, 1 pound melissa leaves, 1 pound small absinthe, 2 ounces citron peel and 1 pound

bruised liquorice root. Strain and filter. 798. Absinthe by Distillation. gallons 75 per cent. spirits, 20 pounds fennel, 20 pounds green anise, 16 pounds large absin-This is colored, after distillation, by adding 4 until as hot as the hand can bear; then extinguish the fire, let it cool, settle, and filter it.

799. Superfine Curaçoa. Charge of the still: 35 pounds green orange peel, or 50 pounds 795. To Make Guignolet, or French yellow; 25 gallons 95 per cent. alcohol; add 4 Cherry Bounce. To 20 gallons cherry juice gallons water, making in all 29 gallons, at 90 add 7½ gallons 95 per cent. spirit; 7½ gallons per cent. Digest for 10 days, and stir daily. In Catalonia or Marseilles wine; gounce pow- inaking the above, the following describes dered orris root (infused in 11 gallons 95 must be carefully observed:-I. Distill very

carefully. II. When you have drawn off 20 galover again in a water-bath, adding 5 gallons water. IV. To know when the faints are coming turns milky, the faints are coming off; reserve plain syrup about 34° bauné. them for the next distillation. Reduce the 805. Malliorca d'Espagne. Charge of Curaçoa above distilled to 82 per cent. Trallé's,

Mix the above and heat in a water-bath, putting on the head. When the head begins to ously obtained, and add one drachm of ether to get hot, rake out the fire and let the whole give it age.

cool together in the bath.

month. Then distill the whole.

Note the following observations.—I. Before distilling, add 4 pounds of peach flowers. parts of sugar, and filtered. II. Keep the fire at the same degree of heat, or the Maraschino will have an oily taste. Take half an ounce of the best isin-III. When nearly finished, add 10 gallons wa-glass, and dissolve it over a gentle fire, in a ter, to draw off the faints, which will do for pint of water slightly seasoned with good distilled to 82 per cent. and you will get 45 Beat it from time to time, adding a little of gallons. If you have not that quantity, add the seasoned water. When you obtain a comspirit of the same strength to make it up. plete solution, gradually add the foaming liing, not to the distillation.

pound coriander seed (bruised), 40 gallons 95 while, and it will soon clarify the liquor. per cent. alcohol. Put the above into the water-bath with 4 gallons water, and distill. After distilling 35 gallons, add 10 gallons of of tartar), dissolved in a quart of water, is water to bring off the faints, which may be sufficient to settle 20 gallons of cordial; add distilled again. The first 5 gallons of faints and stir as directed above. may be added to the distilled spirit, which will give 40 gallons aromatized alcohol. Reduce this to 80 per cent. by adding, say 5 solved in alcohol, is sufficient to clarify 20 gallons distilled water, and then add 90 gallons of cordial; add as directed above. Ions fine white sugar syrup, 31° Baumé. This **811. Filter Bags for Cordials.** The will give 135 gallons fine anisette.

7\(\frac{2}{4}\) pounds star anise (break the stars only), 1\(\frac{1}{2}\) conical shape. In order to perform the operpounds orris root powdered, 40 gallons 95 per ation of filtering cordials thoroughly, it is cent, alcohol. Treat precisely as in the last necessary that there should be placed inside receipt. Reduce the perfumed alcohol to 82 of each bag 1 or 2 sheets of filtering paper per cent. by adding 4 gallons water, and fur- prepared as follows: Rub cach sheet of paper ther add 1½ gallons double orange flower wa- | until it becomes soft and flimsy, like a piece ter, and 90 gallons white syrup 310 Baumé Stir well and let it rest 5 to 8 days, then filter through blotting paper. This will give 135 and rub and beat it up until it becomes a soft gallous superfine anisette.

804. Marasquino di Zara. Charge of lons, add 10 gallons water, to draw off the faints, the still, water-bath: 18 pounds raspberries, which may be distilled again in the next distil- 6 pounds orange flowers, 12 pounds sour red lation. III. To make superfine Curaçoa, distill cherries (Morello). Mash the whole to a pulp with stones, macerate 24 hours with 7 gallons 95 per cent, alcohol and 7 gallons of water. off, take a little in a glass as it flows, and add Distill from off the water, 6 gallons flavored * water, as if for absinthe. When it no longer alcohol, and add 14 gallons of the whitest

the still, water-bath: 40 gallons 55 per cent. which will give 26 gallons. Add 12 gallons alcohol, 18 pounds green anise seed, 5 gallons 82 per cent. spirit, 7 gallons coloring (as given river water. Put into the water-bath only 20 below), 90 gallons syrup 31° Baumé.

800. Coloring for Curaçoa. 3½ pounds ter. When 18 gallons are distilled off, add Brazil wood; 13 pounds each Campeachy and the remaining 20 gallous of alcohol, and conyellow wood, 7 gallons 90 per cent, alcohol, tinue the distillation until 18 gallons more are obtained, which mix with the 18 gallons previ-

806. Elixir Vegetal de la Grande 801. Superfine Maraschino. Charge Chartreuse. Macerate 640 parts by weight, of the still with water-bath: Take 70 pounds each, of the fresh herb of sweet balm and peach or apricot stones, wash with tepid wa- hyssop, 320 parts of fresh root of angelica, 160 ter, and put them into a barrel, making a of cannella, and 40 each of Spanish saffron square hole 4 or 5 inches, in the head, for that and mace, in 10,000 parts of alcohol, for eight purpose. Cover them with 35 gallons 95 days. Then distill it onto a certain quantity per cent. alcohol, and let them steep for one (which varies according to the color desired) of fresh balm and hyssop; after a time these are expressed, the liquor sweetened with 1250

another distillation. Reduce the spirit above vinegar, or three tea-spoonfuls of lemon juice. Then add 90 gallons sugar syrup 32° Baumé, quid to the cordial, stirring all the while. When you have not used peach flowers in the Then stir for 15 minutes after it is all added, distillation, take 2 pounds orris root powder, and let it rest for 3 days; by that time the and steep it in 2 gallons alcohol 95 per cent. cordial will be bright and clear. The above for 15 days; then filter, and add it to the mix- quantity is sufficient to clarify 25 gallons of cordial.

802. Boitard's Anisette. Charge of the still, water-bath: 20 pounds green anise (washed in river water), 3 pounds star anise froth, add a little alcohol, and mix it gradually 808. Fining with Eggs for Cordials. (being careful to break the stars only), 1 with 20 gallons of cordial, stirring all the

809. Fining with Potash for Cordials. 2 ounces of carbonate of potash (salts

810. Fining with Alum for Cordials. 6 drachms of powdered calcinated alum, dis-

filter bags used for rendering cordials trans-803. Chauvet's Anisette. Charge of the still, water-bath: 20 pounds green anise, and other materials, according to the thickness or density of the liquor, and are generally of a or density of the liquor, and are generally of a of cloth, then tear it in small pieces and place it in a pail, pour over it a little boiling water, pulp; afterwards add more water, and continue the same as if you were beating up eggs, stirring occasionally. Then rack it off, and When the pulp assumes the appearance of a mix sufficient caramel (see No. 694) to make fine paste, fill up the pril with water and it a dark red; add 15 pounds white sugar disthrow the contents into the filter; as soon as solved in 15 gallons water; let the whole the water has run three ch, fill up the filter settle, then filter. If the bitters are required again so as to keep it full. When the liquid to be of an amber color, omit the wild cherry runs clear and limpid let it all run through, bark and the caramel coloring. and commence tiltering the cordial, being! careful to keep the filter always full. If the Take 4 ounces gentian root; 10 ounces each liquor does not run clear, add about 2 ounces calisaya bark, Canada snake-root, Virginia of granulated animal charecel (sifted and snake-root, liquorice root, yellow bark, all spice, fanned from the dust) to each filter. The dandelion root, and Angostura bark; 6 ounces charcoal should be washed with a little muriatic acid before being used.

812. The Aroma of Cordials. It requires a great deal of experience to combine different perfumes to produce any certain required aroma, a knowledge is necessary of the effect produced by perfumes in combination. The mere facts laid down in receipts will not be sufficient for a liquor manufacturer; he must know just what, and how much of it fore filtering, add 30 pounds hone; to use, to counteract what is objectionable. perfume fails to give the effect he anticipated; and yet the addition of a mere atom of some other perfume may be all that is required. Thus, the flavor of star-anise is accompanied by a slight, but objectionable odor of bedtaste which is corrected by cloves; the aftertaste of einnamon is also destroyed by cloves; vanilla has more flavor if pounded with sugar than when ground with it. Absinthe requires the zest of the lemon to take away its naturally bitter taste. These examples will show that considerable experience is needed to be able to blend perfumes with any degree of success. (See No. 767.)

813. Imitation Peach Brandy. Take ‡ gallon honey dissolved in water; 3‡ gallons alcohol; 1 gallon Jamaica rum; 1 ounce catechu, bruised to a paste; 1 ounce acetic ether. Add water to make 10 gallons, flavored with 4 ounces of bitter almonds. No coloring required.

Bitters. Bitters are considered as tonic and stomachic, and to improve the appetite when taken in moderation. The best time is early in the morning, or an hour not be taken for a longer period than a fortnight at one time, allowing a similar period to elapse before again having recourse to them.

815. To Make French Control Peruvian Take 11 pounds each red Peruvian hittor orange peel, and bark, calisaya bark, bitter orange peel, and sweet orange peel; 2 ounces calamus root; 4

816. To Make Angostura Bitters. cardamom seeds; 4 ounces each balsam of tolu, orangetis, Turkey rhubarb, and galanga; I pound orange peel; 1 pound alkanet root; 14 ounces caraway seed; 11 ounces cinnamon; 1 ounce cloves; 2 ounces each nutmegs, coriander seed, catechu, and wormwood; 1 ounce mace: 14 pounds red saunders, and 8 ounces curcuma. Pound these ingredients and steep them as in the last receipt, in 50 gallons spirit; and, be-

817. Amazon Bitters. Take 90 galand produce or increase the correct aroma. lons plain proof spirit; 31 pounds red Peru-He will frequently find that a single aromatic vian bark; 31 pounds calisaya bark; 11 pounds calamus root; 44 pounds orange peel; 3½ ounces cinnamon; 3½ ounces cloves; 3½ ounces nutmeg; 2 ounces cassia buds; 6½ pounds red saunders. First mash all the ingredients, put them in the spirit, and let them infuse 14 bugs; a very small addition of green anise days, being careful to stir the mixture well and fennel counteracts this. Ambergris, twice every day. Then rack off and color alone, gives scarcely any perfume, but musk with 11 pints brandy coloring, to get a dark brings it out. The quince has a peculiar red tint. Stir 1 hour. Dissolve 30 pounds white sugar in 30 gallons water; add, and again stir 4 hour. Let the mixture rest 4 or 5 days, and when bright, bottle. If the red saunders is not used, the color will be a bright This is the finest bitters in the amber. market. Compounded according to the above directions, the dealer will obtain 120 gallons 25 below proof.

818. Boker's Bitters. Take 11 ounces quassia; 1½ ounces calamus; 1½ ounces catechu (powdered); 1 ounce cardamom; 2 ounces dried orange peel. Macerate the above 10 days in 1 gallon strong whiskey, and then filter and add 2 gallons water, with mallow or malva flowers.

819. Stoughton Bitters. To 12 pounds dry, orange peel, 3 pounds Virginia snakeroot, 1 pound American saffron, 16 pounds gentian root, add 1 pound red saunders. Grind all the above ingredients to a coarse powder, and macerate for 10 days in 20 gallons 65 per cent. alcohol, then filter.

820. Stoughton Bitters. (Another Receipt.) 2 pounds ginsing; 2 pounds genbefore meals. An excessive use of bitters tian root; 1½ pounds dry orange peel; ½ tends to weaken the stomach. They should pound Virginia snake-root; 1 ounce quassia; pound cloves; 3 ounces red saunders wood; 3 gallons alcohol 95 per cent.; 3 gallons soft water. Grind all the ingredients to coarse powder, infuse 10 days, and filter.

821. Wild Cherry Bitters. Take of wild cherry bark, 4 pounds; squaw vine (Partridge berry), 1 pound; Juniper berries, 8 ounces. Pour boiling water over the above ounces cardamom seeds; 11 ounces each ein- and let it stand for 24 hours; strain, and pour namon, cloves, and nutmegs; 4 ounces cara- again boiling water on the ingredients; let way seed, and 3 pounds wild cherry bark. it macerate for 12 hours, then express and Pound all these ingredients to a coarse powder filter through paper, so that the whole will and steep for 15 days in 45 gallons proof, spirit (or 60 gallons spirit 25 below proof), pounds; molasses, 1½ gallons; tincture of peach kernels, 6 ounces; tincture of prickly ash berries, 3 ounces; alcohol, 2 quarts

To Make Peruvian Bitters. Take 8 ounces red Peruvian bark; 8 ounces orange peel; 1½ drachms each cinnamon, cloves, : and nutmeg; and 75 cayenne pepper seeds. Infuse them, well bruised, in 8 gallons proof spirits, for 15 to 20 days, stirring every day. Draw off and filter.

823. Brandy Bitters. Grind to coarse powder 3 pounds gentian root, 2 pounds dry orange peel, 1 pound cardamom seeds, 2 ounces cinnamon, 2 ounces cochineal. Infuse 10 days in 1 gallon brandy, 8 gallons water, and

filter.

Nonpareil Bitters. 824. Grind to coarse powder 2 ounces Peruvian bark, ½ ounce sweet orange peel, ½ ounce bitter orange peel, 25 grains cinnamon, 25 grains cloves, 25 grains nutmeg, 15 cayenne seeds. Infuse ten days in 2 gallons 65 per cent. alcohol, then filter.

825. Spanish Bitters. Grind to coarse powder 5 ounces polypody, 6 ounces calamus root, 8 ounces orris root, 2½ ounces coriander seed, 1 ounce centaurium, 3 ounces orange peel, 2 ounces German camomile flowers; then macerate with 4\frac{1}{2} gallons 95 per cent. alcohol and add 5½ gallons water and 1½ ounces of sugar. Filter and color brown.

826. Aromatic Bitters. Macerate 23 pounds ground dried small orange apples, ‡ pound ground dried orange peel, 2 ounces ground dried calamus root, 2 ounces ground dried pimpinella root, 1 ounce ground dried at 45 per cent.; press, and add 2½ pints brown sugar syrup. Filter. Color dark brown.

827. Stomach Bitters. Grind to a coarse powder ½ pound cardamom seeds, ½ pound nutmegs, ‡ pound grains of Paradise, ‡ pound cinnamon, † pound cloves, † pound ginger, † pound galanga, † pound orange peel, gallons 95 per cent. alcohol, and add a syrup made of 4½ gallons water and 12 pounds sugar; then filter.

828. Hamburg Bitters. peel; macerate with 41 gallons 95 per cent. alcohol, mixed with 52 gallons water; add 22 ounces acetic ether. Color brown.

829. Bitters made with Essences. 40 gallons proof spirit, 1 drachm oil of anise, oranges, 1 drachm oil of cinnamon, 1 drachm oil of bitter almonds, 1 gallon sugar syrup. Cut the oils in 95 per cent. alcohol, and mix. Color with brandy coloring.

830. Bitter Filter. A fine bitter filter may be made according to fig. 5, No. 17.

831. Orange Bitters. Macerate 6 pounds orange peel for 24 hours with 1 gallon water, or displace (see No. 41); then add a syrup made of 41 gallons water and 16 pounds sugar. Filter through Canton flannel.

ider. To make good cider the apples should be allowed to hang on the tree as long as the wind and frosty nights will let them. The riper they are, the better the cider. They are picked up and placed in a large heap, either in the orchard or at the eider mill, and are allowed to lie a few days to complete the ripening process, in which the starch is converted into sugar, and if any are found bruised or rotten, put them in a heap by themselves, for an inferior eider to make vinegar. They are then rasped or ground into pulp. If the weather is cool and the apples are not quite ripe, it is better to let the pulp remain in the vat a few days be-fore pressing out the place. This gives the cider a higher color, makes it sweeter, and of better flavor.

833. To Press the Apples. The process of pressing is simple, but requires some 4 boards about 6 inches wide are skill. nailed together in a square, the size it is desired to make the cheese, say from 4 to 5 feet. This is placed on the bottom of the press, and a little clean rye or wheat straw, pulled out straight into bundles, is put inside, with the ends extending about a foot all around. The pulp is then put into this rim, forming a fayer about 6 inches thick; the straw is then turned on it, and a little pulp placed on the straw to keep it down. The rim is then lifted and a stick is placed at each corner on the layer of pulp added, and the straw turned over it as before. This process cut hops, for 14 days, with 10 gallons of spirit is repeated until the cheese is as large as desired, using say from 75 to 100 bushels of apples. When they can be obtained use hair cloths instead of straw, to place between the layers of pomace. The straw, when heated, gives a disagreeable taste to the cider.

Sweet or Unfermented Cider. The eider will commence to flow at once, and pound lemon peel; then macerate with 42 it is better to let the cheese settle down somewhat before turning the screw. If pressed too much at first, the pulp may burst out at the sides. As the cider runs from the press, Grind to a let it pass through a hair-sieve into a large coarse powder 2 ounces agaric, 5 ounces cin-namon, 4 ounces cassia buds, ½ ounce grains of Paradise 2 ounces cassia buds, ½ ounce grains of Paradise 2 ounces cassia buds, ½ ounce grains of Paradise 2 ounces cassia buds, ½ ounce grains of Paradise 2 ounces cassia buds, ½ ounce grains of Paradise 2 ounces cassia buds, ½ ounce grains of paradise 2 ounces cassia buds, ½ ounces cassia buds, ¾ ounc of Paradise, 3 ounces quassia wood, 4 ounce generally allowed to remain under the press cardamom seeds, 3 ounces gentian root, 3 all night, and before leaving it in the evening, ounces orange apples dried, 1½ ounces orange the screw is turned as tight as possible. In the morning additional pressure is given, and when the cider has ceased to flow, the screw is turned back, the boards taken off, and the corners of the cheese are cut off with a hay knife and the pomace laid on the top. The pressure is again applied, and the cider will 1 drachm oil of caraway, 1 drachm oil of pressure is again applied, and the cluer win cloves, I drachm oil of lemon, 1 drachm oil of flow freely. As soon as it ceases, remove the pressure and cut off 4 or 5 inches of pomace from the sides of the cheese, place it on top, and apply the pressure again as long as any cider will flow. 8 bushels of good apples will make a barrel of cider. In a day, or sometimes less, the pomace will rise to the top, and in a short time grow very thick; when little white bubbles break through it, draw off cut the yellow part of the peel from off the liquor by a spigot placed about 3 inches white, and chop it fine; macerate with 42 from the bottom, so that the lees may be left gallons 95 per cent. alcohol for two weeks, quietly behind. The cider is usually put in barrels at once, and sold while sweet.

> 835. To Preserve Cider. Strictly speaking, we suppose the sweet juice of the

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apple is not eider, any more than the sweet bung it up tight. The most perfect plan for juice of the grape is wine. It is converted excluding all action of the air from the surinto cider by fermentation. Those who preface of the cider, and preserving it sweet, is fer sweet cider resort to various methods for the addition of a tumbler of sweet oil before arresting this process, such as putting a hand-finally closing the bung-hole. It is not an ful of powdered clay into each barrel, or 2 or easy matter to keep cider sweet and pure for 3 pounds of well burned charcoal. Others any length of time, especially if the weather add a little mustard seed, about a gill of seed is warm. If the cider is not made until just to each barrel. Sometimes a few gallons of before winter sets in, and can afterwards be cider are placed in the barrel, and then a rag kept at or near the freezing point, it will redipped in brimstone is attached to a long ta- main sweet and excellent. pering bung; this is ignited and the bung loosely inserted. After the brimstone is consumed, the barrel is rolled until the cider has sound fruit. absorbed the sulphurous acid gas. The barrel is then filled up with cider. The sulphurous acid gas acting on the albuminous matter in the eider arrests fermentation. The objection to this method is that, if too much gas is absorbed, it may prove unpleasant, if not injurious. To obviate this, sulphite of lime is now used, which has the property of checking from which to make an inferior cider for fermentation, making the eider perfectly clear, | and imparting an agreeable taste. We have tasted eider preserved in this way that was When the eider in the barrel is in a lively ferbe equal to \$\frac{1}{4}\$ or \$\frac{1}{4}\$ pound to each gallon of one or more days. The cider thus extracted cider (according as the apples are sweet or sour), let the fermentation proceed until the liquid has the taste to suit, then add \$\frac{1}{4}\$ ounce temperance cider, and may be drank, or used days, and bottle for use. The sulphite should first be dissolved in a quart or so of cider before introducing it into the barrel of cider. Agitate briskly and thoroughly for a few cloth inside the curb, with some clean straw moments, and then let the cider settle. The intermixed in thin layers with the pomace, fermentation will cease at once. When, after a few days, the cider has become clear, draw off and bottle carefully, or remove the sediment and return to the original vessel. If which should be closely watched, and as soon loosely corked, or kept in a barrel on draught, it will retain its taste as a still eider. If preserved in bottles carefully corked, which is better, it will become a sparkling cider, and may be kept indefinitely long. (See Nos. 762) be left quietly behind. fc.) Some think that cider, when treated by The vinous fermen this method, is liable to induce cramps and loss of appetite, but we have never experienced temperature of the apartment where the any such unpleasant results from its use. Another plan, which, however, we have not tried, but is strongly recommended, is to mix and proceeds rapidly, the liquor must be 1 pint of hard-wood asnes (hickory is best) racked or drawn off and put into fresh casks and 1 pint fresh slaked lime with 1 quart of in 1 or 2 days; but if this does not take place new milk; this mixture is to be stirred into at an early period, but proceeds slowly, three each open barrel of eider; after remaining quiet for about 10 hours the pomace will rise to the surface, and may be skimmed off; the least twice. If, notwithstanding, the fermenclear cider can be drawn off by means of a faucet inserted near the bottom of the barrel; it is advisable to strain it as it is drawn off, to separate any hardened pomace that may re-main in it. (See Nos. 852 and 853.) What In racking off the liquor, it is necessary to ever method be adopted, the eider must be keep it free from sediment, and the seum or drawn off into very clean, sweet casks, and yeast produced by the fermentation. When closely watched. The moment white bubbles the fermentation is completely at an end, fill are perceived rising at the bung-hole, rack it up the cask with cider in all respects like that again. When the fermentation is completely contained in it, and bung it up tight, previous at an end, fill up the eask with eider in all to which a tumbler of sweet oil may be

836. Rules for Making Good Pure Cider. Always choose perfectly ripe and Always choose perfectly ripe and

Pick the apples from the tree by hand, Apples that have been on the ground any length of time contract an earthy flavor, which will always be found in the cider.

After sweating, and before being ground, wipe them dry, and if any are found bruised or rotten, put them in a heap by themselves,

vinegar.

As fast as the apples are ground, the pomace should be placed in a previously prepared open excellent, and we have also tasted some that vat, of suitable size, and with a false bottom, was execrable; but this may have been more strainer, or clean strawaboutit. Let the pomace the fault of the material than of 'he method. remain about one day, then draw off, return the first, and continue to do so until it runs mentation, add as much white sugar as will clear. Let the juice percolate or filter for of sulphite (not sulphate) of lime to each for many purposes, as a choice and superior gallon of cider; shake well, and let it stand 3 article. In this way, about one-third of the cider will separate; the balance may then be expressed by the use of the press.

To press out the juice, use a clean strainer

and apply the power moderately.

As the eider runs from the vat or press, place it in a clean, sweet cask or open tub, as the little bubbles commence to rise at the bung-hole or top, it should be racked off by a spigot or faucet placed about 2 inches from the bottom, so that the lees or sediment may

The vinous fermentation will commence sooner or later, depending chiefly upon the cider is kept; in most cases, during the first 3 or four days may elapse before it is racked. In general, it is necessary to rack the liquor at tation continues briskly, the racking must be repeated, otherwise the vinous fermentation, by proceeding too far, may terminate in acetous respects like that already contained in it, and poured into the bung-hole, which will exclude

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the oxygen and prevent the oxidation of the crust formed of fragments of the reduced surface of the wine.

To ma' good fermented cider that will keep a year or more without turning too sour to be should be set by, uncorked, till morning, when used for anything but vinegar, is not a diffi-the corks must be driven in tightly, secured decayed fruit, but it should be quite ripe. Not a drop of water should be used in the process of manufacture. The sweeter the fuice, the stronger the cider, and the better it will keep. Put the barrel immediately in a mentation may go on slowly or rapidly, pracwine. The cask has a bung in which is fixed, air-tight, a tin tube bent at right angles, or a piece of india-rubber tube. The free end of ally remove must. the tube in either case dips into a vessel of liberated in fermentation to pass out, and the through the water shows how the fermenta-tion is progressing. When this has ceased, the eider is racked off into clean casks, which are to be full and bunged tightly. Much of the excellence of cider depends upon the temperature at which the fermentation is conmanufacturers of this liquor. Instead of the chain wears or scours off all mould or pomace fruit, being placed in a cool situation, where the temperature should not exceed 50° or 52° Fahr., it is frequently left exposed to the full heat of autumn. In this way much of the alcohol formed by the decomposition of the sugar is converted into vinegar, by the absorption of atmospheric oxygen, and thus the liquor acquires that peculiar and unwhole-some acidity known as "hardness" or hogshead of cider, 1½ gallons of good brandy "roughness." When, on the contrary, the or rum are frequently added, with 2 ounces powdered catechu (dissolved in water), 7

838. To Make Fine Cider by Another Process. After obtaining the juice 3 or 4 months, when it will usually be found as already directed (see No. 836), strain it as bright as wine. Should this not be the through a coarse hair-sieve into open vats or close casks. When the liquor has undergone finings, or a dozen eggs, and in 2 weeks more the proper fermentation in these close vessels, it will be fit for use. If the cider be preferred which may be best effected in a temperature pale, omit the catechu, and instead of the isinof from 40° to 55° Fahr., and which may be glass, fine with 1 quart of skimmed milk. If known by its appearing tolerably clear, and having a vinous sharpness upon the tongue, any further fermentation must be stopped by racking off the pure part into open vessels, exposed bottling cider it should be examined to see for a day or two in a cool situation. After whether it is clear and sparkling; if not, it this the liquor must again be put into casks should be clarified again, and left for two and kept in a cool place during winter. The weeks. The night before it is intended to be

pulp. The liquor should always be racked Sound, well made eider, that has been pro- off anew, as often as a hissing noise is heard. duced as above directed, and without any or as it extinguishes a lighted match held to foreign mixtures, is a pleasant, cooling and the bung-hole. When a favorable vinous wholesome beverage; while, on the contrary, fermentation has been obtained, nothing more the acids and drugs added to already impure is required than to fill up the vessels every liquor, retard fermentation, thus adding poison two or three weeks, to supply the waste by to poison, producing colic, and not unfrequently fermentation. By the beginning of March incurable obstructions.

837. To Make Good Fermented Cider.

Similar racking, which should be done in fair weather. When the bottles are filled, they cult matter. The first thing is to exclude all by wire or twine and melted resin, or any similar substance.

839. To Prepare Casks for Cider. Cider should never be put into new casks without previously scalding them with water containing salt, or with water in which pomace cool cellar—the cooler the better. The fer- has been boiled. Beer casks should never be used for eider, or eider casks for beer. tice differing in this respect. In the former and brandy casks will keep cider well, if the case the liquid is treated in all respects like tartar adhering to their sides is first carefully scraped off and the casks be well scalded. Burning a little sulphur in a cask will effectu-

840. Canned Cider. Cider may be pre-This arrangement allows the gases served sweet for years, by putting it up in air-tight cans after the manner of preserving end of the tube being covered with water, air fruit. The cider should be first settled and cannot pass in. The bubbling of the gas racked off from the dregs, but fermentation should not be allowed to commence before

canning.

841. To Cleanse Cider Barrels. Take lime water and a trace chain and put them in the barrel through the bung-hole, first securing a strong twine to the chain to draw it out ducted; a point utterly overlooked by the with. Then shake the barrel about until the apple juice, as soon as it is expressed from the remaining in the barrel. Then rinse well with water; after throwing out the rinsing water put in a little whiskey, turning the barrel to bring it in contact with every part, and pour

out all you can.

842. To Clarify and Improve Cider. Cider should be stored in a cool place, and pounds good moist sugar or honey, 1 ounce verted into alcohol, and this remains in the liquor, instead of undergoing the process of acetification.

pounds good involves, and 4 ounces mustard seed. These must be well stirred in, and occasionally stirred up for a fortnight, after which it must be allowed to repose for case it must be fined with a pint of isinglass wanted of a light reddish or rose tint, use 1 ounce cochineal, and omit the catechu.

843. To Bottle Cider. Preparatory to proper time for racking may always be known by the brightness of the liquor, the discharge of the cask, and left so until the next day, of the fixed air, and the appearance of a thick when it may be bottled, but not corked down many of the bottles will burst by keeping. cloves, 5 ounces; bitter almouds, 6 ounces. The best corks and champagne bottles should Boil the last 4 ingredients in 2 gallons of the be used, and it is usual to wire and cover the corks with tin-foil, after the manner of cham- tion to the other water. Burnt sugar may be pagne. A few bottles may be kept in a warm place to ripen, or a small piece of himp sugar may be put into each bottle before corking, if more body. It is generally known, we supwanted for immediate use, or for consumption pose, that bisulphite of lime may be advanduring the cooler portion of the year; but for warm weather and for long keeping this is inadmissable. The bottled stock should be stored in a cool cellar, where the quality will cider and water, 1 hogshead each; molasses, be greatly improved by age.

844. Champagne Cider. Good cider, pale, 1 hogshead; spirit, 3 gallons; honey or sugar, 20 pounds. Mix and 1 t them rest for 2 weeks, then fine with skimmed milk, ½ gallon. This will be very pale; and a similar article, when bottled in champagne often sold to the ignorant for champagne. It opens very brisk if managed properly.

3 gallons of strained honey, or 24 pounds of good white sugar. Stir well and set it aside for a week. Clarify the cider with half a galisinglass, and add 4 gallons of pure spirits. After 2 or 3 days bottle the clear cider, and it will become sparkling. In order to produce a slow fermentation, the casks containing the fermenting liquor must be bunged up tight. It is a great object to retain much of the carbonic gas in the cider, so as to develop itself after being bottled.

848. Champagne Cider. (Another receipt.) 10 gallons of cider, old and clear. Put it in a strong iron-bound cask, pitched inside (like beer-casks); add 2½ pints clarified white plain syrup; then dissolve in it 5 ounces tartaric acid; keep the bung ready in hand, then add 7½ ounces of bicarbonate of potassa; bung it as quickly and as well as possible.

847. To Imitate Champagne Cider. Cider will resemble champagne if you put a tea-spoonful carbonate of soda, 2 tea-spoonfuls fine sugar, and a table-spoonful brandy in a tumbler, and fill it up with sharp eider.

848. How to Imitate Cider. A very fair imitation cider may be produced by using the following receipt:—25 gallons soft water; 2 pounds tartarie acid; 25 pounds New Orleans sugar; 1 pint yeast. Put all the ingredients into a clean code and attach the ingredients into a clean code are attached at the ingredients into a clean code are at a second at the ingredients into a clean code are a second at the ingredients into a clean code are a second at the ingredients into a clean code are a second at the ingredients in the ingredients in the ingredients are a second at the ingredients and a second at the ingredients are a second at the in dients into a clean cask and stir them up well after standing 24 hours with the bung out. Then bung the cask up tight, add 3 gallons spirits, and let it stand 48 hours, after which time it will be ready for use.

849. To Imitate Sweet Cider. Take water, 100 gallons; honey, 5 gallons; catechu powdered, 3 ounces; alum, 5 ounces; yeast, 2 pints. Ferment for 15 days in a warm place (in the sun if possible); then add bitter almonds, 1 pound; cloves, 1 pound; burnt sugar, 2 pints; whiskey, 3 gallons. If acid liness and attention being the principal points be in excess, correct by adding honey or to be considered. It consists of five operabe in excess, correct by adding honey or sugar. If too sweet, add sulphuric acid to sugar. If too sweet, add sulphuric acid to tions, namely: mashing, boiling, cooling, fersuit the taste. We should prefer to add cider menting, and cleaning. The first process is vinegar for acidulating when necessary.

antil the day after, as, if this be done at once, 150 pounds; alum, 4 onnces; ginger, 5 ounces; water for 2 hours, strain, and add this decocadded, to color, if wished. From 3 to 4 gallons of whiskey, if mixed with it, will give tageously employed in fresh cider to stop its conversion to vinegar. (See No. 835.)

851. Cheap-made Cider. Take of good 50 pounds; alum, dissolved, 1 pound. Brimstone matches to stop fermentation, by burning,

852. To Keep Cider Sweet. Allow the cider to work until it has reached the state most desirable to the taste, then add 1½ tumblers grated horseradish to each barrel, and shake up well. This arrests further fermentabottles, and silvered and labeled, has been tion. After remaining a few weeks, rack off

ften sold to the ignorant for champagne. It pens very brisk if managed properly.

853. To Clear Cider. To clear and improve cider generally, take 2 quarts of as follows:—To 100 gallons of good cider put ground horseradish and 1 pound of thick gray filtering paper to the barrel, and either shake or stir until the paper has separated into small shreds, and let it stand for 24 lon of skimmed milk, or 4 pound of dissolved | hours, when the cider may be drawn off by means of a syphon or a stop-cock. Instead of paper, a preparation of wool may be taken, which is to be had in the market here, and which is preferable to paper, as it has simply to be washed with water, when it may be used again.

To Clean a Foul, Sour Cask, and 854. Restore the Taste of the Wood. In order to accomplish this, dissolve about 13 pounds lime in 5 gallons boiling water. Rinse the cask to be restored with this liquid, and afterwards with boiling water. If the cask is very foul, it should also be rinsed with very dilute sulphuric acid after the lime water, and afterwards with boiling water. As a general thing, however, the lime water and boiling water are sufficient. To restore the natural taste of the wood, mash up in a mortar a handful of juniper berries and put them in the tainted cask, then pour over them several gallons boiling water, roll the cask violently, and set it first on one end, and then upon the other.

855. To Make Barrels Tight. Dissolve in a water-bath 1 pound leather scraps and 1 ounce oxalic acid, in 2 pounds water, and dilute gradually with 3 pounds warm water. Apply this solution to the inside of the barrel, where, by oxidation, it will assume a brown color and become insoluble in alcohol. This coat closes all the pores of the wood, and does not crack or scale off.

rewing. The art of brewing is simply and easily understood, cleansimply to obtain an infusion of the malt. In 850. Cheap Imitation Cider. Take the second, this infusion of malt is further water, 35 gallons; sulphuric acid, enough to impregnated with the flavor of the hops in make the water pleasantly sour; brown sugar, the boiling, which is requisite for the preser-

tion or infusion is cooled down to the necessary yeast, and which fills it with carbonic gas, giving to the liquor that pungent taste for which it is esteemed. After this it is fined, or cleansed, to render it fit for drinking.

857. Brewing Utensils. These utensils in a small way (say for a hogshead, or 54 gallons of beer), will consist of a copper capable of containing about 70 gallons; and if the brick edge at the top is made sloping, and covered with lead, it will prevent any waste of the wort in the boiling. A mash tub, with a false bottom about 3 inches above the other bottom, bored full of small holes, to prevent the malt stopping up the hole of the faucet. fitted to the side of the tub, so as to cover the hole of the faucet. Any one of these contrivances is to prevent the malt or grains from flowing out with the wort, which would spoil its transparency. The tub must be suffi-ciently large to hold 10 or 12 bushels of malt, with plenty of room for mashing or stirring. mash tub. An oar, or rudder, to stir up the malt in the mash tub. Two or three coolers. coolers. These should also be raised a little at one end, that the wort may be run off at the lower end without being disturbed or down may not be again mixed with the wort. A fermenting tun. The mash-tub, when emptied of the grains, will also serve for this purpose. Casks, and cak stands for the casks and tubs to be placed on. The whole of these articles should be of a suitable size with the copper, which the cooper will always regulate, or in proportion to the quantity intended to be brewed.

858. Mashing. The purpose of mashamount of saccharine matter which it is capawhether hard or soft, the most perfect mixing of the malt with the water, and the time of When too high, or near the boiling point,

vation of the beer. In the third, this decoc- sufficient to convert the flour of the malt into sugar, or to extract the saccharine matter heat for fermentation, which is excited with from it. For pale malt the heat of the water must be higher than for brown, and so much the lower in proportion as the malt is browner. Thus, for the pale malt, the heat of the water for the first mash should be 1780 Fahr.; for the second, 182°. Pale and amber mixed, or pale malt approaching to amber, 172° for the first mash; second, 178°. All amber, the first 170°; second, 176°. For very brown, or brown malt, such as is used for porter, 154° for the first; second, 164°. When hard water is used, the heat in each case should be about 2° less. An equal portion of pale, amber, and brown, or half pale and half brown-first heat, 100°; second. In many cases, for the sake of economy, an old worn-out birch-broom is cleaned and is from an hour and a half to two hours. In fastened before the hole of the faucet; and the summer months the mash should not others again have two pieces of wood nailed stand so long by a quarter of an hour as it together, and bored full of holes, which is does in the winter. Heat the water in the copper to the required degree by Fahrenheit's thermometer. In taking the heat in the copper, if it is too hot, add cold liquor to bring it to the desired degree; but be careful to stir the hot and cold well together and mix it intimately, because the cold water, being heavier than the hot, sinks to the bottom. The An underback, to receive the wort from the heat of the water being now reduced to the proper degree in the tun, the malt must be stirred in gradually. It is best for one person These should be broad and flat, that the wort to throw it in whilst another mixes it well may cool quickly; for if the wort is too long and thoroughly by means of the oar, so that cooling, it is likely to become sour in the there may be no lumps or clots of malt left in it. The remainder of the water should be added by degrees, as the mash becomes too stiff to stir, until the whole is used. Reserve shaken, and also that the sediment which falls about 1 bushel of the malt to throw over the top when the mashing is finished. Cover the top of the tun with malt-sacks or cloths, to keep in the heat, and let it stand the required time. Turn the tap partially, to allow the wort to run out slowly, and draw eff seme in a pail or bucket. As the first running will not be clear, it must be put gently back into the tun; and if the second running is not sufficiently clear, turn the tap again, and let it remain a few minutes before drawing it off; ing is to convert as much of the flour of the then turn the tap partially as before, and malt as possible into sugar, so that the extract draw it off into the underback, which must be drawn from it may contain the greatest placed underneath to receive it. As the wort runs out more slowly, the tap must be turned ble of giving. To accomplish this perfectly more fully, until the whole is nearly run out, will depend upon many contingencies—the and the bed of the grains looks dry; then heat of the water used in mashing, its quality, | turn the tap, to prevent any more running off. While the mash is standing, the copper should be again filled with water, and heated their remaining together. High-dried malt to the required degree for the second mash; this does not produce so much saccharine matter should be ready by the time the first wort is as pale malt. On the proper temperature of drawn off; then, with a bowl or ladle, pour the liquor used will depend the goodness, over the top of the grains, as gently as possible, the liquor used will depend the goodness, over the top of the grains, as gently as possible, flavor, and clearness of the extract drawn. about half as much water as for the first; cover the mash-tun, let it remain about ten the flour of the malt will be set, form- minutes or a quarter of an hour, and draw it ing a kind of paste or starch, and the extract off as before, pouring back the first running obtained will be little better than water. The until it is fine. The wort from the first surface of the grains after the mashing process mashing is always the best and richest in is concluded will be covered with specks of saccharine or sweet matter. The proportion white meal. The same appearance also shows of wort to be obtained from each bushel of itself when unmalted corn has been mixed malt depends entirely on the proposed strength with the malt. If the temperature be too of the liquor required. To ale or beer of a low, the wort will be poor and devoid of superior kind the produce only of the first strength, because the heat of the water is not mashing should be used. For ordinary or

usual drinking ale, take the produce of the be cooler). draw it off into the fermenting first and second mashings, mix them well, tun, without disturbing the sediment at the and ascertain the gravity by a saccharometer, bottom, which gives the ale or beer a dis-This is an instrument used by brewers for as-agreeable taste. This is always observed by certaining the strength of wort; it is similar the Scotch brewers, but others consider that in principle to the hydrometer, but its scale it feeds the beer, which it certainly does, and denotes the pounds per barret m excess of the always use it; for whether it is the oleagin-weight of a barrel of water. The barrel or ous quality of the hops, or the gluten ex-36 gallons of water weighs 360 pounds; and, tracted from the malt, which is precipitated in examining a quantity of wort, if the saccharometer marks 60, it means that a barrel (36 gallons) of the wort would weigh 60 pounds service to give the full flavor of the hops. more than a barrel of water, or 420 pounds. In each case it will be thrown off in the It is a sort of specific gravity, in which 360 working. is the unit instead of 1000; from which it 861. can be seen that a saccharometer gravity of fresh yeast will be about the quantity required 420, as compared with 360, would be the same as 1166% true specific gravity as compared with brewings this will depend on the quantity 1000. Some brewers express the strength of their vort by the whole weight of a barrel, others use only the excess of weight; thus, in the example above, some would call it wort of 420 pounds, others would say 60 pounds; either way is plain; the figures showing being sufficient for a hogshead, a gallon will which plan is adopted. The usual limit for work 4 or 5 hogsheads in a body of the same ale or beer is from 50 to 60 pounds, and for gravity. First mix the yeast with a gallon a very strong ale from 90 to 120 pounds or two of the wort, and a handful or two of per barrel. That made at the first gravity will be a brisk, lively and sparkling drink; but the last will be more heavy and glutinors, and can only be imperfectly fermented.

859. Boiling. As soon as the water is taken from the copper for the table-beer, damp the fire with ashes or cinders, and put it becomes languid, or if there is sufficient in the wort. For every bushel of malt used, allow 1 pound hops, previously soaked in water taken from the first mash at 160° of beat; add half of them at first, and the other become foxed, that is, to have a rank and dishalf after the wort has boiled half an hour. 2 pounds of hops by this method are considered to be equal to 3 pounds used in the ordinary way. The water in which they are together. If, however, the fermentation has steeped is strained off and put into the tun not been fa orable, add some of the ferment; instead of the copper, which preserves the and if rather cold, wrap some sacks or old flavor of the hops. Let the wort boil as carpet round the tun, and place some more briskly as possible, for the quicker it is boiled the sooner it will break. Try it occasionally windows closed. Or take a clean cask (the in a glass, and see if it has separated into large flakes; if it has not, boil it a little brewing), and fill it full of boiling liquor; longer; when nearly ready, it will appear to be broken into fine particles. The extremes of under and over-boiling must be avoided, next morning the beer should have what is for when over-boiled it is with difficulty fined termed a cauliflower-head; remove with the again in the casks.

860. Cooling. When the wort is ready, damp the fire, and draw it off into the coolthrough a hair-sieve to take off the hops. The coolers should be as shallow as possible, that the wort may no be too long in cooling, fermented, it should be tried every two hours or it may chance to get our, and should be of until it is so, and the head may be skimmed the same depth in early, that it may cool off at the same time. When sufficiently reequally. When the first wort is drawn off, duced, cleanse it into the casks. return the hops again into the boiler, with the wort for the table-beer, and let it boil in the boiling, it will be much improved. the yeast may work and discharge itself at When the wort has been cooled down to 75 the bung-hole. A tub or pan must be placed

by the boiling, it cannot be of any injury to the wort. If it is the first, it is of essential

861. Fermentation. 3 pints good white to work a hogshead of beer; but in larger there is in a body, the gravity, and heat of the atmosphere—thus, the lower the gravity, the greater the bulk, and the warmer the weather, the less yeast must be used in proportion to work it, and vice versa. 3 pints bean or wheat flour in the fermenting tun; when the fermentation is brisk, pour over another portion, and as soon as the wort is at the proper degree of temperature run it into the tun, reserving out some of the ferment, to feed the beer as occasion may require. When yeast in, it may be left out altogether. The fermentation should be gradual at first; for it it goes on too quickly the beer is likely to agreeable taste. The next morning the beer should have a thin white creamy head; then, with a bowl or ladle, well rouse and mix it sacks over the top; also keep the door and bung it close, and put in the tun. In the evening rouse the head well in again; the skimmer any patches of dark-brown yeast, and mix it well up together again. After the yeast has risen to the top, it will form a thick ers, keeping the hops well stirred to prevently easty appearance, which should be skimmed their being burnt to the bottom; strain it off as soon as it is inclined to fall. A portion should then be taken out, tried with the saccharometer, and noted. If not sufficiently fermented, it should be tried every two hours

862. Cleansing. In cleansing ale or beer, the yeast should be skinned from the quickly for one hour and a half; and if top, and the liquor drawn off gently, so as 1 pound coarse sugar or molasses, and 1 not to disturb the bottoms. The casks ounce salt, be added to every 10 gallons wort should be plugged a little on one side, that or 80 degrees of heat by the thermometer underneath to receive the yeast as it works (this will depend on the state of the atmostover. The greatest attention should be paid phere, for when the weather is warm it should to the filling up of the casks with the wort

harsh and unpleasant, and liable to be excited in a pound of the best hops with some old ale or for table beer. beer, and scald them in it over the fire. If this mixture should be added warm, otherwise be used for this purpose by the private brewerclose; make a spile-hole near the bung, and

two or three days knock it in firmly.
863. Important Hints on Brewing. When the fermentation has commenced, the the heat of 75 degrees. It will not work so long nor so strongly as ale, and may be casked eask as directed for ale. In about two days ground ginger, or salt and any other spice, are the fermentation will have subsided, and the excellent for cleansing beer.

cask should then be bunged close. The fermentation will always show whether the mentation will always show whether the pounds will be sufficient for a coomb of malt (1 bushels). From 1 to 2 years, 4 pounds; old beer, 5 or 6 pounds. The same if the wort is very rich; or in proportion to its gravity use more hops, because beer or ale made from rich wort is always intended for long keeping. In general, 4 or 5 pounds of hops per coomb (4 bushels) is used for ales; but for porter, 5 or 6 pounds, and for bitter; ale, about 8 or 10 pounds; but in all cases care should be taken that the hops are of the best quality. The private brewer will find about 1 pound of raspings of quassia equivalent to 6 pounds of hops for preserving ale and imparting a pleasant bitter. Beer brewed for immediate use may be made from all pale malt, as it is more readily fermented than that from the browner sorts. It will not keep so well, and may be brewed almost in the hottest weather, as it need not be cooled below 76 or 75 degrees. A mixture of pale and

ing the best malt liquor, the former being amel, see No. 694.) considered the most fitted, as the beer has so 866. Hints on Fermentation.

that is left, which should be done every half does not want such watching and tending as hour at first, and as the working becomes the March beer does, in putting in and taking more slow, every 3 or 4 hours, that the yeast out the spile or peg on every change of the may continue to discharge itself, otherwise it weather. The proportion of wort to be will fall to the bottom, and render the beer obtained from every bushel of malt will depend entirely on the proposed strength of the on every change of the weather; but by attending to these precautions, this will be avoided, and the working of the beer will be should be used; but if the ordinary or usual sooner over. When the yeast has ceased to driking ale is wanted, take the produce of the discharge itself, plug the casks upright, mix first and second mashings, and use the third

864. Flavoring Beer. There are sevthe ale or beer is required to be drunk soon, eral simple and innoxious articles which can add it when cold. Mix it well into the cask namely, Spanish liquorice, liquorice root, carby means of a long stick, and bung the cask damom and caraway seeds, and dried orange peel powdered; these are very excellent when put in a spile rather loosely at first, and after used judiciously. Honey is also an excellent assistant to beer and ale; about 2 pounds to a quarter (8 bushel.) of malt being put into Small beer will require rather more yeast to the copper just before the wort is turned out, work it than strong beer or ale. A portion of or long enough to melt and incorporate with the wort at the temperature of 85 degrees the mass. The same plan should be adopted should be mixed at first with the yeast, with everything used for this purpose—that is, throwing it in when the wort is at the full rest of the wort may be run into the tun at boiling point, for then it will not fall to the bottom without mixing. When, however, Spanish liquorice is used, it will be nece sary the next day. Attend to the filling of the to tie it in a net bag and suspend it. Salt and

degrees of heat have been well taken, and the are required, namely: pale, brown, and blown extract well made. If too high, the air-blad-malt. The peculiar flavor of this liquor is ders on the head will be about as large as a given by the brown and blown malt, and no dollar piece. If too low, there will be rew or other material or ingredient whatever is reno bladders, or very small ones; but when quired different from other sorts of beer. well taken they will be in size about that of a The mixture of malt may be composed of 2 cent piece. The proportions of hops used half pale or amber, and half brown malt; or, for beer should be in accordance with the take for a hogshead, 4 bushels of pale or time it is to be kept. If for immediate use, 3 amber malt, 2 of brown, and 14 pounds of patent blown malt, and 6 pounds of the best brown hops. These proportions will make excellent porter, but the following may be used for a second-rate quality: -21 bushels of amber, 11 bushels of brown malt, and 4 pounds of hops, with sufficient burnt sugar (see No. 694) to give the desired color; or it may be brewed with all amber malt, using blown malt, or sugar coloring, instead of the brown malt. The water for mashing must be lower than for beer or ale, and be reduced to 164 or 166 degrees for the first mash, according to the instructions already laid down. All the processes are conducted the same as for beer or ale, with this exception, that blown malt is boiled with the wort in a copper, and the second malt, if boiled separate, should be boiled violently for 2 or 3 hours; and as there is generally but one quality of porter, the two kinds of wort are run together into the tun. 28 galor the real should always be used for keeping lons of cold water may be run into the two per and the wort cooled down to 60 or 70 for table porter, which should be managed in the color it is put into a state of farment as table beer. If the color is not sufficiently ta: on; hence, from Autumn to Spring, or the high it may be heightened by using a pound months of October to March, have ever been of Spanish liquorice with the wort in the decined the most favorable months in brew-brew-boiler, or by the addition of burnt sugar (Car-

many old months immediately succeeding, fermentation of beer or ale is a very import-for it to ripen and grow fine in; besides, it ant part of the process of brewing. The

quantity of extract obtained from the multifine well in the cask. After the head is used for mashing, and on the mashing process out, tried by the saccharometer, and noted; or ale, and its ultimate success in the cellar, hours until the required gravity is nearly atsufficiently fermented in the tun and casks. Fermentation increases the heat and desalt and bean-flour, and any other flavoring creases the gravity of the wort, altering ingredient may then be added, such as ground altogether its original character by a decom- ginger, cardamom, caraway seeds, &c., and position of its parts, or a conversion of its saccharine principle into alcohol, which gives to it that vinous pungency for which it is give it the necessary vinous taste, and it will be sickly and cloying, deficient of strength, and liable to become ropy. When the fermentation is carried too far in the tun, the vinous flavor is partly lost; and if still lower, the yeast becomes, as it were, fixed in it, from the ale or beer having lost its natural energy to throw it off, and it will have a flat, being deficient of body it soon becomes sour, unless speedily drunk. All beer for keeping should be fermented in the tun to about onefourth its original gravity, in a temperature of the gyle not exceeding 70 degrees. Lighter beer about one-third; but in no case should it be allowed to reach so far as onehalf. In winter, the fermentation of weak beer must not be carried quite so far as in the summer, as more unfermented matter must be left to nourish it in the cask during the cold weather, which will counteract its ripening. Some allowance should also be made for the time the ale or beer is intended to be kept. Strong wort will bear a greater proportionate fermentation than weak wort, and consequently be stronger and more sparkling. Beer of this kind, intended to be kept, should be fermented so low as to ensure transparency and softness, with a proper degree of strength, for it will have time to bring itself round. Still, care must be taken to leave a sufficient quantity of unfermented matter for the supply of the gradual decomposition, the quantity left being proportionate to the time the beer is intended to be kept. Wort of 50 or 60 degrees gravity (see No. 858) will keep well for 2 or 3 years, if reduced to two-fifths, or at least one-fourth. Ale is not fermented so much as beer, therefore a considerable portion of the saccharine matter still remains in the liquid, apparently unaltered. In conducting this process, both the thermometer and saccharometer must be the guide;—the last is indispensable. The results given by these should be carefully noted in a book kept for the purpose, with the heat of the atmosphere at the time the observations are made, which of Paradise, mixed with syrup. will serve as a guide for any future brewing. As soon as the head forms a brown, thick, yeasty appearance, and is inclined to fall, it must be immediately skimmed off. Particular attention must be paid to this point. It is at quently happens that malt liquor, especially must be immediately skimmed off. Particular all times better to skim it before it begins to drop, than allow it to pass again through the brewing, will not turn out sufficiently fine to beer, which will give it a rank, disagreeable meet the taste and eye of the consumer, in taste, termed "yeast bitten;" neither will it which case it is usually subjected to the ope-

depends greatly upon the heat of the water skimmed off, a portion should then be taken being properly conducted; but whether that and if it is not sufficiently fermented it should extract be rich or poor, the flavor of the beer be roused well up, and skimmed every two depends upon the wort being properly and tained, when it should be watched with the greatest attention, and cleansed with a little well mixed with it immediately it is reduced

to the desired point.

867. The Acetous Fermentation may esteemed. If the fermentation is not carried arise from premature fermentation, through far enough, the abundant sweet principle of the mashing heat being taken too low, when it the wort will not be sufficiently changed to may commence in the tun, underback, or coolers. If in the mash tun, the wort will ferment very rapidly, and produce a large quantity of yeast; but of course the liquor will be soured, therefore less yeast will be required to ferment it. When the first mash is affected, all the subsequent ones will share the same fate, and no extra quantity of hops or boiling that may be given to it will stale, and disagreeable taste. Fretting (see restore it to a sound condition. It may also No. 757) then ensues in the cask, and from arise from the mashing heat being taken too high. When this is the ease, the fermentation is languid, the yeast head is very low, and appears brown or fiery, accompanied with a hissing noise, and occasionally it will appear as if boiling. A larger quantity of yeast than usual is necessary to be added to wort of this description, to force the fermentation, and to discharge the yeast freely, in order that as little as possible may remain in the liquor. which would otherwise fret and become sour. The acetous fermentation may also arise from premature fermentation, either in the underback or coolers; hence, fretting ensues, and

the liquor continually generates acidity.

868. To Correct Acidity in Beer.

Acidity in beer may be neutralized by chalk, lime, alkalies, &c.; but it cannot be totally

destroyed without spoiling the liquor.

869. Bittern. This is an adulterating 869. Bittern. mixture employed by brewers to impart a false bitter and strength to their liquors. Boil 4 parts Spanish liquorice in sufficient water until dissolved, and evaporate to the consistence of cream. Then add to it 1 part extract of quassia, 1 part powdered sulphate of iron, 2 parts extract of cocculus indicus, and 8 parts molasses

870. Bitter Balls. These are used as a fraudulent substitute for hops in making beer, and are different in composition, to suit dif-

ferent kinds of malt liquor.

For ale: 2 pounds powdered gentian, and 1 pound extract of gentian, mixed with sufficient molasses to make a paste. Divide into 4 pound rolls.

For pale ale: 1 pound crude pierie acid, 34 pounds ground chamomiles, and 1/2 pound grains

For porter or stout: either of the above, with the addition of 1½ pounds Spanish liquorice softened with a little boiling water.

porter, with all the care bestowed upon it in

isinglass is put into 1 quart weak vinegar, or of each equal parts; mix. Used by brewers still better, hard beer, and when dissolved, a to make their beer keep its head. sufficient quantity of good beer may be added to make it measure I gallon. This mixture is called finings, I to 2 pints of which is the is called finings, 1 to 2 pints of which is the boiled in a gallon of the liquor, along with 7 proper quantity for a barrel. The method of pounds newly-burnt charcoal coarsely bruised, using it, is to put the finings into a bucket, and a 4 pound loaf of bread cut into slices and to gradually add some of the beer, until and toasted rather black; rouse well every the bucket is three parts full, during which time it is violently agitated with a whisk, and this is continued until a good frothy head is raised upon it, when it is thrown into the barrel of boer, and the whole well stirred up, hogshead; fermentation will ensue in a few by means of a large stick shoved in at the days, and the liquor become brisk. On the bung-hole. In a few days the beer will usually become fine.

872. To Ascertain Whether Malt Liquor may be Clarified by Fining. In some bad sorts of beer, isinglass will have no effect. This may be ascertained beforehand, by trying some in a long glass tube, or vial, with a little of the finings. These should be well shaken together, and then set aside for a short time, when it will be found that the finings will rise to the top, leaving the central portion of the beer clear, if it be in a proper induce a fresh fermentation. condition for clarifying; but if, on the contrary, they sink to the bottom, and the liquor still keeps foul, no quantity of finings, how-

ever great, will ever clarify it.

873. To Clarify Obstinate Ale. latter defect may be remedied by proceeding to fine it after the manner above described, and then adding, after the finings have been well rummaged up, either 1 spoonful oil of vitriol or gum catechu, dissolved in 1 pint warm water, again stirring well for a quarter of an hour. Or 1 or 2 ounces tincture of catechu may be used instead, mixed with a chemically on the finings, in the same way as good beer does, precipitating them along with the foulness, and thus brightening the liquor. The addition of a handful of hops, previously boiled for 5 minutes in a little of the beer, and then added to the barrel, and the whole allowed to stand for a few days, before pro- in 8 gallons water to 6 gallons of decoction ceeding to clarify it, will generally have the or extract; strain; 4 gallons of water boiled same effect.

a small lump of white sugar to each bottle of tions together; dissolve in them 1 gallon of ale or beer, and a tea-spoonful of moist sugar molasses, and, when cooled to 80° heat, $1\frac{1}{4}$ to each bottle of porter at the time of corking, will render it fit for drinking in a few days in ordinary weather. A raisin or lump of sugar fermentation is over mix with it the white of candy is often added to each bottle with a 1 egg beaten to froth; bung it, and bottle The Parisians bottle their when clear. like intention. beer one day, and sell it the next. For this purpose, in addition to the sugar as above, they add 2 or 3 drops of yeast. Such bottled liquor must, however, be drunk within a week, or else stored in a very cold place, as it will otherwise burst the bottles, or blow out

the corks. 875. To Give Beer the Appearance of Age. The addition of a very little diluted sulphuric acid to new beer will give it the appearance of being 1 or 2 years old. Copperas, alum, sliced lemons, oranges, and cucumbers, Dissolve 10 pounds loaf sugar in 10 gallons are also frequently employed by brewers for boiling water, add 4 ounces essence of spruce; the same purpose.

876. Beer Heading. Alum and green a warm place.

ration of clarifying. For this purpose 1 ounce mix. Or, alum, copperas, and common salt,

877. To Remedy Mustiness in Beer. To each hogshead add 1 pound new hops day for one week, then stir in moist sugar 3 or 4 pounds, and bung down for 2 weeks

878. To Remedy Flatness in Beer. Stir a few pounds of moist sugar into each small scale, the addition of a few grains carbonate of soda or prepared chalk to each glass will make the liquor brisk and carry a head; but it must be drunk within a few minutes, else it becomes again flat. This is an excellent method when home-brewed beer becomes sour and vapid.

879. Tα Recover Frosted Beer. Frosted beer is best recovered by the addition of a few hops boiled in a little sweet wort; or by adding a little moist sugar or molasses to

880. Foxing or Bucking Beer. Add some fresh hops, along with some bruised mustard seed, to the beer. Some persons add a little made mustard, or solution of alum or This catechu, or a little diluted sulphuric acid, and stir it well; and in a week or 10 days afterwards, further add some bean-flour, molasses. or moist sugar.

881. To Remedy Ropiness in Beer. Add a little infusion of catechu and some fresh hops to the beer, and in a fortnight stir

well, and the next day fine it down.

882. German Beer Bouquet. Accordlittle water. Either of these additions acts ing to Dr. Boettger, this liquor consists of a solution of the essential oil of lemons in light petroleum oil, and a coarse fusel oil, containing

spirit colored by turmeric.

883. Spring Beer. Boil down 3 small bunches each of sweet fern, sarsaparilla, wintergreen, sassafras, prince pine, spice wood, me effect.

874. To Ripen Beer. The addition of hops; strain; mix the two extracts or decoepound of roasted bread soaked in fresh brewers' yeast; fill up a 10-gallon keg; when

> 884. Spruce Beer. Boil 9½ gallons of water; let it cool down to 80° Fahr., and then dissolve 9 pounds of sugar in it, having previously mixed with it 1 ounce of essence of spruce; then add 1 pint of good brewers' yeast, and pour it in a 10-gallon keg until fermentation is over; then add a handful of brick powder and the white of 2 eggs beaten to a froth; mix with the beer, and let it stand

till clear, then bottle.

885. To Make White Spruce Beer. when nearly cold add 1 pint yeast. Keep in a warm place. Next day strain through copperas equal parts, both in fine powder; flannel, put into bottles and wire the corks.

886. To Make Wood's Spruce Beer. ginger root, 9 gallons water, 3 pints yeast. Boil ½ pint essence of spruce, 5 ounces each Boil the ginger half an hour in 1 gallon of bruised pimento and ginger, and 5 or 6 ounces hops in 3 gallons water for 10 minutes. Then add 3 quarts molasses and 11 gallons Add the white of an egg beaten, and ½ an warm water. When lukewarm add 1 pint ounce essence of lemon. Let it stand 4 days, yeast; ferment for 24 hours and bottle, as in then bottle, and it will keep many months. last receipt. This will also make a white beer by substituting an equivalent of loaf sugar instead of the molasses.

2 ounces each hops and chips of sassafras and 2 lemons sliced; stir the ingredients freroot, 10 gallons water; boil twenty minutes, strain, and turn on, while hot, I gallon good yeast; let it stand 24 hours; draw it off or down the corks.

bottle it.

young branches of black spruce (abies nigra). make a decoction with water (see No. 34) and evaporate to the consistence of molasses.

right pleasant drink when it is fresh.

Root Beer. (American). 2 pounds; spice wood, ½ pound; guaiaeum chips, 1 pound; birch bark, 2 pound; ginger, ½ ounce; sassafras, 4 ounces; prickly-ash bark, ½ ounce; hops, 1 ounce. Boil for ash bark, 1 ounce; hops, 1 ounce. Boil for whites of 3 eggs well beaten, 1 small tea-spoon12 hours over a moderate fire, with sufficient ful lemon oil, 1 gill yeast; boil the root for 30 water, so that the remainder shall measure 5 minutes in 1 gallon of the water, strain off, gallons, to which add tineture of ginger, 8 and put the oil in while hot; mix. Make over ounces; oil of wintergreen, I ounce; alcohol, This prevents fermentation. make root beer, take of this decoction 1 quart; molasses, 8 ounces; water, 2½ gallons; yeast, 4 ounces. This will soon ferment and produce a good drinkable beverage. The root tion of wild cherry bitters or hot drops to the above beer. (See Nos. 821 and 891.)

890. Puffer's Root Beer. Prince's pine, 2 ounces; wild cherry, 2 ounces; hemlock bark, 2 cunces; wintergreen, 4 ounces; sassafras bark, 4 ounces; birch bark, 4 ounces; spice bark, 4 ounces; Jamaica ginger, 2 ounces; white mustard seed, I ounce. Put in a percolator and cover with boiling water; let it stand till cold, then strain; add to it enough boiling water to make 4 gallons. Take 1 gallon of this, add 1 gallon of molasses, or the gallons of the strained liquor, and a browned same amount of syrup; to this add 8 gallons loaf of bread. When cool, put in 1 pint of of water and about 1 pint of yeast. 1 pint of alcohol added will much improve its flavor,

and it will keep longer.

891. Hot Drops. Take of tineture of myrrh, 1 ounce; tineture of capsicum,

ounces.

892. To Make Ottawa Root Beer. Take 1 ounce each sassafras, allspice, yellow dock, and wintergreen; ½ ounce each wild cherry bark and coriander; ½ ounce hops and 3 quarts molasses. Pour boiling water on ounces; lemon juice, 1 ounce; boiling water, the ingredients and let them stand 24 hours; filter the liquor and add ½ pint yeast, and it is ready for use in 24 hours.

893. To Make Superior Ginger Beer. ger Beer. Boil 4½ ounces of ginger with 11 Take 10 pounds of sugar, 9 ounces lemon quarts water; beat up 4 eggs to a froth, and

water; then add the rest of the water and the other ingredients, and strain it when cold.

894. To Make Ginger Beer. Put into 1 gallon boiling water, 1 pound lump sugar, 1 ounce best unbleached Jamaica 887. To Make Spruce Beer. Take ginger well bruised, a ounce cream of tartar quently in a covered vessel until lukewarm; then add 11 or 2 ounces yeast, and keep it in molasses, and add 2 table-spoonfuls each a moderately warm place so as to excite a essence of ginger and essence of spruce; 1 brisk fermentation; the next day rack and table-spoonful pounded allspice. Put into a strain through flannel; let it work for a day cask, and when cold enough add 1 quart or two, then strain it again and bottle, wiring

895. Ginger Beer Without Yeast. 888. Essence of Spruce. Take of the Boil 11/2 pounds bruised ginger in 3 gallons water half an hour; then add 20 pounds white sugar, 1 pint lemon or lime juice, 1 pound honey, and 17 gallons water; strain This is used for fabricating spruce beer-u through a cloth. When cold add the white of 1 egg, and 1 fluid ounce essence of lemon:

Take sarsaparilla after standing 3 or 4 days, bottle.

896. To Make Ginger Pop. Take 51 gallons water, 2 pound ginger root bruised. 1 ounce tartaric acid, 21 pounds white sugar, night; in the morning skim and bottle, keep-To ing out sediments.

897. To Make Ginger Pop. Take 2 ounces best white Jamaica ginger root, bruised: water, 6 quarts; boil 20 minutes, strain, and duce a good drinkable beverage. The root add 1 ounce cream tartar, 1 pound white beer should be mixed, in warm weather, the sugar; put on the fire and stir until all the evening before it is used, and can be kept for | sugar is dissolved, and put in an earthen jar; use either bottled or drawn by a common now put in 1 ounce tartaric acid, and the rind beer-pump. Most people prefer a small addi- of 1 lemon; let it stand until 70° Fahr., or until you can bear your hand in it with comfort; then add 2 table-spoonfuls of yeast, stir well, bottle for use and tie the corks.

a few days before it is wanted for use.

898. Wahoo Beer. Boil for 6 hours in 4 gallons water, 1 ounce each sarsaparilla, Solomon's seal, nettle root, and sassafras; 2 ounces each burdock root, comfrey root, and Prince's pine; 2 ounces sweet fern, ½ ounce wintergreen, and 4 raw potatoes cut up anc. Strain, and add 1 quart molasses for each 3 loaf of bread. When cool, put in 1 pint of good yeast, and let it ferment for 24 hours. It will then be ready to be put in bottles or a

899. Lemon Beer. Put into a keg 1 gallon water, 1 sliced lemon, 1 table-spoonful ginger, 1 pint good syrup, and ½ pint yeast. In 24 hours it will be ready for use. If bottled the corks must be tied down.

900. Imperial Pop. Cream of tartar, 3 ounces; ginger, 1 ounce; white sugar, 24 1½ gallons; when cool, strain, and ferment with 1 ounce of yeast, and bottle.

901. Girambing, or Limoniated Ginjuice, 1 pound honey, 11 ounces bruised add them with 9 pounds sugar to the precedthe whole into a varrel, add 3 spoonfuls of juice (but no pips), and pour over the whole yeast, bung down the barrel, and in about 12 a quart boiling water.

902. Ginger Beer Powders. Fine powder of Jamaica givger, 4 or 5 drachms; bicarbonate of soda. $3\frac{1}{2}$ ounces; refined sugar in powder, 14 ounces; essence of lemon, 30 drops; mix, and divide into 5 dozen powders. (Or 4 to 5 grains of ginger, 28 of bicarbonate of soda, 112 of sugar, and 1 drop of essence of lemon, in each powder.) In the other powder put 32 grains of tartaric acid; or 35 grain, if a more decidedly acidulated beverage is required. Or from 30 to 33 grains of citric acid.

903. Spruce Beer Powders. In each blue paper put 5 scruples of powdered sugar. 28 grains of bicarbonate of sods, and 10 grains essence of spruce. In each white paper 30

grains of tartaric acid.

904. Sherbet. Take 8 ounces carbonate of soda, 6 ounces tartaric acid, 2 pounds loaf sugar (finely powdered), 3 drachms essence of lemon. Let the powders be very dry. Mix them intimately, and keep them for use in a wide-mouthed bottle, closely corked. Put 2 good-sized tea spoonfuls into a tumbler; pour in ½ pint of cold water, stir briskly, and drink

905. Raspberry Shrub. 1 quart vinegar, 3 quarts ripe raspberries. After standing a day, strain it, adding to each pint a pound of sugar, and skim it clear, while boiling about half an hour. Put a wine-glass of brandy to spoonfuls of this, mixed with a tumbler of water, is an excellent drink in warm weather

and in fevers.

906. Aerated or Effervescing Lemonade. This may be made by putting into each bottle (soda water bottle) 1 ounce or 11 ounces syrup of lemons, and filling it up with simple aerated water from the machine. The syrup is made by dissolving 30 ounces lump sugar in 16 ounces of fresh lemon juice, by a gentle heat. It may be aromatized by adding 30 or 40 drops of essence of lemon to the sugar; or by rubbing part of the sugar on the peel of 2 lemons; or by adding to the syrup an ounce of a strong tineture of fresh lemon peel, or of the distilled spirit of the same.

907. Effervescing Lemonade, without a Machine. Put into each bottle 2 drachms of sugar, 2 drops of essence of lemon, ½ drachm bicarbonate of potash, and water to fill the bottle; then drop in 35 or 40 grains of citric or tartaric acidin crystals, and cork immediately, placing the bottles in a cool place, or preferably, in iced water.

Plain Lemonade in Powder. 1 ounce of this powder makes ½ pint of lem-

909. To Make Superior Lemonade. lemons, 1 pound loaf sugar, 1 quart boiling bonate of soda, and 3 drops oil of lemon.

ing. Take 9 lemons, peel them carefully, and the oil from them, and put it with the remainadd the rind and juice to the foregoing. Put der of the sugar into a jug; add the lemon When the sugar is days bottle it off. In 15 days it will be fit for dissolved, strain the lemonade through a piece drinking, but it improves by keeping.

dissolved, strain the lemonade through a piece of muslin, and, when cool, it will be ready of muslin, and, when cool, it will be ready for use. The lemonade will be much improved by having the white of an egg beaten up with it.

910. To Make Orangeade. Take of dilute sulphuric acid, concentrated infusion of orange peel, each 12 drachms; syrup of orange peel, 5 fluid ounces. This quantity is added to 2 imperial gallons of water. A large wine-glassful is taken for a draught, mixed with more or less water, according to taste. This refreshing drink not only assuages the thirst, but has, moreover, strong antiseptic

and anti-diarrhea properties.

911. Imitation Lemon Juice. This is an excellent substitute for lemon juice, and keeps well in a cool place. Dissolve 14 ounces citric acid, 45 grains carbonate of po-Dissolve 1‡ tassa, and $2\frac{1}{2}$ ounces white sugar in 1 pint cold water; add the yellow peel of a lemon, and, in 24 hours, strain through muslin or a hair sieve. Instead of the lemon peel, 15 or 16 drops of oil of lemon may be used to flavor.

912. Imitation Lemon Juice. or tartaric acid, 21 ounces; gum, 1 ounce; pieces of fresh lemon peel, a ounce; loaf sugar, 2 ounces; boiling water, 1 quart; macerate with occasional agitation fill cold, and

strain. Excellent.

913. Imitation Orange Juice. Dissolve 1 ounce citric acid and 1 drachm carbonate of potassa in 1 quart water, and digest in each pint of the shrub, when cool. Two the solution the peel of half an orange until sufficiently flavored; then sweeten with honey or white sugar. Instead of the orange peel, 5 or 6 drops of oil of orange peel, with 1 fluid ounce tincture of orange peel, may be used.

914. To Keep Lemon Juice. lemons when cheap and keep them in a cool place two or three days; roll them to make them squeeze easily. Squeeze the juice in a bowl, and strain it through muslin which will not permit a particle of the pulp to pass through. Have ready 1 and 1 ounce phials, perfectly dry. Fill them with the juice so near the top as only to admit 1 tea-spoonful of sweet oil in each, or a little more if for larger bottles. Cork them tight, and put them in a cool dark place. When you want the juice, open such a sized bottle as you will use in a few days. Wind some clean cotton on a skewer, and dip it in, to absorb all the oil. When the oil is removed the juice will be as fine as when first bottled.

915. Portable Lemonade. pound finely-powdered loaf sugar, 1 ounce tartaric or citric acid, and 20 drops essence of lemon. Mix, and keep very dry. 2 or 3 tea-(For ten gallons.) ½ pound tartaric acid in spoonfuls of this stirred briskly in a tumbler powder, 16 pounds sugar in powder, 1½ of water will make a very pleasant glass of drachms oil of lemons. Rub and mix well. lemonade. If effervescent lemonade be desired, 1 ounce carbonate of soda must be

added to the above.

916. Lemonade Powders. Pound and Take the rind of 2 lemons, juice of 3 large mix together ½ pound loaf sugar, 1 ounce carwater. Rub some of the sugar, in lumps, on Divide the mixture into 16 portions, wrapped two of the lemons until they have imbibed all in white paper. Then take 1 ounce of tartaric acid, and divide into 15 portions, wrap- 927. Mulled Wine with Eggs. 1 ping them in blue paper. Dissolve one of quart of wine, 1 pint of water, 1 table-spoontwo solutions together, and drink while effer- them together a few minutes; beat up 6 eggs

sugar to taste, & small tea-spoonful of carbon- they will curdle. ate of soda. Strain the juice of the lemon, and add to it the water, with sufficient white and oranges, the rinds only, 18% drachms sugar to sweeten the whole nicely. When ground cinnamon, % drachm ground cloves, well mixed, put in the soda, stir well, and 2 drachms ground vanilla. Cut, macerate for drink while in an effervescing state.

grate a little nutmeg on top.

919. Brandy Punch. Take 1 tablewhite sugar, I wine-glass water. 11 wine-glass red lead, 11 pounds.

boiling water, sugar to taste. Dissolve the a rag until they are cold. sugar well with I wine-glass of the water, then pour in the whiskey, and add the balance of the water, sweeten to taste, and put in a small piece of lemon rind, or a thin slice

of lemon.

921. Claret Punch. Take 1½ tablespoonfuls of sugar, 1 slice of lemon, 2 or 3 slices of orange. Fill the tumbler with shaved ice, and then pour in the claret, shake well, and ornament with berries in season. Place a straw in the glass.

922. Sherry Cobbler. Take 2 wine-glasses of sherry, 1 table-spoonful of sugar, 2 from large pores; if squeezed they become Take 2 wine-

berries in season.

cold water; 1 egg, 1 wine-glass Cognac brandy, milk. Fill the tumbler 1 full with shaved ice, shake the ingredients until they are thoroughly mixed together, and grate a little nutmeg on top.

924. Bottle Cocktail. To make a delicious bottle of brandy cocktail, use the following ingredients: \$\frac{2}{8}\$ brandy, \$\frac{1}{8}\$ water, 1 pony-glass of Bogart's bitters, 1 wine-glass made by using the above receipt, and substitute cord is made tight beneath the rim; the tuting those liquors instead of brandy.

925. Brandy Smash. ½ table-spoonful of white sugar, 1 table-spoonful water, 1 wine-glass of brandy. Fill & full of shaved ice, use two sprigs of mint, the same as in the receipt for mint julep. Lay two small pieces of orange on top, and ornament with berries in season.

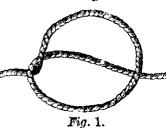
926. Santa Cruz Sour. 1 table-spoonful fine sugar, 1 wine-glass Santa Cruz rum, juice of ½ a lemon. Put the ingredients in home it will be found most advantageous to a small tumbler ¾ full of shaved ice, stir, and use the best corks, and to tie them down with slices of lime or lemon, and fruit in season.

each kind in half a tumbler of water, mix the ful of alispice, and nutmeg to taste; boil with sugar to your taste; pour the boiling 917. Lemon Soda Nectar. Juice of 1 wine on the eggs, stirring it all the time. Be lemon, 2 tumblerful of water, powdered white careful not to pour the eggs into the wine, or

928. Regent Punch. 14 each lemons 24 hours with 2 gallons pure Cognac, and 2 913. Milk Punch. Take 1 table-spoon-gallons pure Jamaica rum. Strain, press, and ful white sugar, 2 table-spoonfuls water, 1 add 12 pounds of sugar, boiled with 6 galwine-glass cognae brandy, I wine-glass Santa lons water; skim, and add to the syrup 2 Graz rum, † tumblerful shaved ice. Fill with ounces green tea; let it cool, and add the milk, shake the ingredients well together, and juice of 60 lemons and 14 oranges. Filter through Canton flannel.

929. Bottle Wax. Shellac, 2 pounds; spoonful raspberry syrup, 2 table-spoonfuls resin, 4 pounds; Venice turpentine, 1½ pounds; Fuse the shellac and brandy, a small sized lemon, 2 slices of orange, resin cautiously in a bright copper pan, over 1 piece of pineapple. Fill the tumbler with a clear charcoal fire. When melted add the shaved ice, shake well, and dress the top with turpentine, and lastly, mix in the red lead. berries in season; sip through a straw. Pour into moulds, or form sticks of the de-920. Whiskey Punch. Take 1 wine- sired size on a warm marble plate. The gloss glass whiskey (Irish or Scotch), 2 wine-glasses may be produced by polishing the sticks with

930. Corking. Little can be said with



regard to the corkingofbottles, beyond stating the fact that common, cheap corks, are afways dear; the best corks are soft, vel-

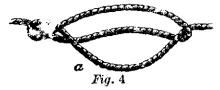
or 3 slices of orange. Fill a tumbler with more clastic and fit more closely. If good shaved ice, shake well, and ornament with corks are used, of sufficiently large size to be extracted without the corkscrew, they 923. Egg Nogg. Take 1 table-spoonful may be employed many times in succession, of fine sugar, dissolved with 1 table-spoonful especially if they are soaked in boiling water, which restores them to their original shape, wine-glass Santa Cruz rum, 1 tumblerful of and renews their elasticity. The most common mode of fastening down corks is with the

gingerbeer knot, which is thus made. First the loop is formed as in Fig. 1, then that part of the string which passes across the loop is placed Fig. 2. on the top of the cork,

of gum syrup, 1 pony-glass of Curaçoa. and the loop itself passed down around the Whiskey and gin cocktails, in bottles, may be neck of the bottle, and by pulling the ends of



ends of the string are finally brought up, and tied either in a double knot or in a bow on the top of the cork. When ginger-beer is made at strain into a claret glass, and dress with thin a bow, when both corks and strings may be made use of repeatedly. For effervescent



are more valuable, a securer knot is desirable, which may be made thus: A loop, as in Fig. 2, is first formed, and the lower end is then



Fig, 5.

on the other; on pullwhole becomes tight

carried behind the loop

as shown in Fig. 3; it

is then pulled through

the ends, which should

be quite opposite, are to be brought up over the cork, twice twisted, as in Fig. 5, and then tied in a single knot.

Distillation of Whiskey and New England Rum. The process of distillation commences with the fermentation of grain or molasses by the presence of yeast, and this is called mashing or preparing the mash. Strictly speaking, indeed, the spirits are not produced by distillation: that is done by the previous step of fermentation, and distillation merely separates the spirits from the mixture in which they already exist. The object of fermentation is to convert the starchy principle of the grain into sugar, or to saccharify it. After being agitated for 2 or 3 hours, the saccharine infusion, called wort is drawn off from the grains and cooled. To this wort is now added a certain quantity of yeast or leaven, which induces the vinous fermentation, and resolves the saccharine matter into alcohol and carbonic acid, accompanied by a rise of temperature. The alcoholic mixture which results is called the wash, and is now ready for distillation.

932. How to Prepare Yeast for Rye Whiskey or New England Rum. To prepare yeast for 80 gallons mash, take 2 pounds of wheat meal and dilute it with sufficient warm water to make a thin paste. Then boil 2 ounces of hops in a quart of water, and when cold take out the hops and throw them away. Then dilute I quart of malt in a quart of water. Mix, cold, the hop water, paste and malt well together, and add half a pound of leaven. Cover the jar containing the mixture with a piece of cloth, and keep it 3 or 4 hours in some warm place until it rises. The fermentation will be perfect after the whole has arisen and then sunk down. Then add 2 gallons of the mash, stir the whole, mix it fermentation. This receipt is the very best for rye whiskey.

To Prepare Yeast for New Eng-933.

wines, such as champagne, gooseberry, &c., | !on brewers' yeast and \frac{1}{2} pound carbonate of which require to be kept a longer time, and ammonia dissolved in a pint of water. Stir well, and begin the fermentation. Good for New England rum.

234. To Prepare Yeast for Rye Whiskey. To 80 gallons of mash, add 1 gallon yeast, 5 quarts of malt, and 1 pound of molasses. Dilute the malt with 2 quarts of water, and add the molasses. Keep the whole in a warm place until it rises, as described in No. 931. Add the yeast to the mash and stir; afterwards add the molasses and malt and stir again. Then begin the fermentation. turned upwards and for rye whiskey

935. How to Prepare Mash for New England Rum. For a still by steam or fire. To prepare 80 gallons mash, reduce the mothe loop as in Fig. 4, lasses 18 degrees by the saccharometer, add and in this state is put yeast No. 932, and stir well. Let it fer-over the neck of the ment at a temperature of 75° Fahrenheit, unbottle; the part a being til the mash is reduced to 0. But as it is very on one side, and the difficult to get such a reduction, the operator two parts of the loop may begin to distill when the mash marks 2 or 3 degrees by the saccharometer. Charge ing the two ends the three-fourths of the still, and begin distilling.

936. How to Prepare Mash for Rye round the neck, and Whiskey. For a still by steam or fire. prepare 80 gallons mash, grind the rye into coarse powder, then charge the fermenting tubs in the proportion of 110 pounds of rye to 80 gallons of water, and mix yeast No. 931 or 933. Let it ferment at a temperature of 75° or 80° Fahr., until the fermentation is completed. The fermentation will be perfect after the mash rises and sinks. When this is done, charge three-fourths of the still and begin distilling. In preparing the mash, the operator may use all rye, as directed above-this makes the best quality of whiskey-or use three-fifths rye and two-fifths corn, or threefifths corn and two-fifths rye.

937. Distillation with or without a **Heater.** Distillers usually employ a heater to hasten the process of distillation. When the heater is employed, the mash passes from the fermenting tubs into the heater. During the time occupied in distilling over the charge of the still, it is necessary to keep a heat of 125 degrees in the heater. The mash passes directly from the heater into the still by means of a pipe or gutter, according to the general arrangement of the apparatus. Distill until the spirit which runs from the worm marks 10 degrees below proof. This first run is called high wine. Ther remove the receiver that contains the high wine, and substitute another. Continue to distill until the low wine ceases to blaze when it is thrown in the Whenever this occurs, stop the operafire. tion, and keep the low wine for the next distillation. Then clean the still and charge it with fresh mash. When the operator does not employ the heater, the mash passes from the fermenting tubs immediately into the still. No uniform disposition is necessary for the fermenting tubs or heater; all depends upon the general arrangement of the apparatus. The distiller need not be informed that the apparatus must be arranged so as to save lawith 80 gallons of the mash, and begin the bor. If the mash tubs are above the still, connect them by a gutter or pipe; if on a level with the still, employ a hand pump.

938. How to Pack a Rectifying Tub. land Rum. To 80 gallons mash, add 1 gal- To rectify from 10 below proof to 50 above

proof. 30 bushels of maple charcoal are re- a steam-jacket for the purpose. A water-bath, quired for a tub seven feet high and four feet the boiling-point of which should be raised in diameter; a tub of this size will give a by the addition of about † its weight of comclear bed of 14 inches. At two inches from mon salt, comes next in point of convenience perforated with 1-inch holes, and cover this bottom with sailcloth or blanket. Then pack in the charcoal regularly and very tightly with a wooden pestle. Great attention should der to prevent the occurrence of holes or crevices in the charcoal during the process of filtration. Pack the sides of the tub thoroughly. Cover the charcoal with sailcloth, place laths over the cloth, and use heavy stones to keep the charcoal down.

eriumery. odorous essences, extracts, tinctures, eas, pomades, cosmetics. dentifrices, and other articles of the toilet, and are all derived from the latest and best authorities.

940. How to Prepare Essences and erfumed Spirits. The scented spirits of Perfumed Spirits. the perfumer are merely alcoholic solutions of the aromatic and odorous principles of the substances they represent, obtained in one or other of the following ways:—By simply adding essential oil or other odoriferous matter to the spirit, and agitating them together until solution is complete. Occasionally the resulting alcoholic solution is distilled. By macerating or digesting the ingredients (previously bruised or pulverized) in the spirit, with frequent agitation, for a few days, when the resulting tincture is either decanted and filtered (if necessary), or the whole is thrown into a still, and submitted to distillation by a gentle heat. In the former case, the spirit retained in the pores of the solid ingredients, and which, consequently, cannot be drawn off, is obtained by powerful pressure. (See Nos. 39 and 40.) By digesting the spirit, with frequent agitation on highly scented pomade or oil, in a close vessel, at a gentle heat for some hours, and the next day decanting the perfumed spirit. (See No. 40.) Distillation is only applicable to substances of which the fragrant principles are volatile, and readily pass over with the spirit during the process. Thus, flowers, flowering tops, herbs, seeds, &c., may, in general, be so treated; but not musk, ambergris, vanilla, and a few other substances, of which the odor is of a more fixed nature. (See No. 13.) In proceeding by distillation, one of the first points to be attended to is, to see that the still, condensing-worm, or refrigerator, and the receiver, be perfectly clean and sweet, and absolutely free from the odor of any previous distillation. The lute employed to secure the still-head or capital to the still must also be of a simple character, incapable of conveying any taint to the hot vapor that comes in contact with it. (Linseedmeal or equal weights of linseed-meal and whiting, made into a stiff paste or dough with water, is a good lute for the purpose. Sweet boiler, the body of the still being enclosed in bottles, by the druggists, and in fancy-stores,

the bottom of the tub place a false bottom and effect. When the still is exposed to the heat of a naked fire, or that of dry flues, a little water must be put into it along with the spirit and other ingredients, to prevent empyreuma; and the greatest care must be taken be given to this part of the operation, in or- to stop the process, and to remove the receiver, as soon as the proper quantity of distillate is obtained. If this be neglected, the odor of the whole may be vitiated. Moderately rapid distillation is favorable to the odor of the product, as is also the elevation of the boiling-point in the liquid operated on. Spirit distilled from aromatics decreases in odor with the boiling-point of the ingredients in the still. To raise the latter, the addition The receipts in this of 1 to 11 pounds of common salt per gallon department embrace a great variety of is often advantageously made. (See Nos. 5, 6 and 7.) By one or other of the above methods, or a combination of them, are, in general, prepared all the "eaux," "esprits," and "extraits," of the perfumers. As a rule, extraits and essences are preferred to eaux and esprits as the basis of good perfumery, when the color is not objectionable. Whatever process is adopted, the utmost care must be taken in the selection of the spirit used. Only spirit that is absolutely pure, flavorless, and scentless, must be employed, if we desire the product to be of fine quality. Malt-spirit or corn-spirit contaminated, even in the very slightest degree, with fusel-oil or corn-oil, or a whiskey-odor, is utterly unfit for the purpose. So also the refined methylated spirit now so commonly and fraudulently sold as spirit of wine. The extreme purity of the spirit employed by the French manufacturing perfumers —it being actually spirit of wine, and not merely so in name—is one of the reasons why their odoriferous spirits are so much superior to those of the American houses. Great care must also be taken in the selection of the essential oils intended to be employed in making perfumed spirits. These should be pure or genuine, and should be pale and recent, or of the last season's distillation. If they be old, or have been much exposed to the air, they will contain more or less resin, and their alcoholic solution will be defective in fragrance, and be liable to permanently stain delicate articles of clothing to which it may be applied. The strength of the spirit used for concentrated essences, as a rule, should not be less than 90 per cent., or of the specific gravity .8332. A few require a spirit of even greater strength than this. The first quality of extraits, particularly those prepared from pomades and oils, and many of the eaux and esprits, also require 90 per cent. spirit. The strength of the spirit for the others, and for second qualities (commonly sold as the best in the stores), must be fully 75 per cent., or of the specific gravity .8765; that of the third quality fully 70 per cent., or specific gravity .8892; and that of the fourth quality fully proof, or specific gravity .920. The last is the lowest quality, and the weakest of any almond-cake meal is still better.) The most kind made by respectable perfumers; but the convenient and manageable source of heat is double distilled lavender-water, eau de Cohigh-pressure steam supplied from an adjacent logne, and other scents, vended in little showy

are commonly even much weaker than this, which are mere artificial combinations of being often under proof. (See No. 1435.) The capacity of spirit, at this strength, of dissolving essential oil and other odorous matter is, however, very little. The solvent power of spirit decreases with its strength, but much more rapidly. (Cooley.)

tion of almost any kind, that is supposed to contain in a high degree the essential or distinctive principle or quality of some substance. from vegetable substances by distillation; concentrated infusions, decoctions, aqueous solutions, and tinetures, are all often erroneously termed essences.

In perfumery the word "essence" is applied only to a solution of an essential oil in deodorized alcohol, in the proportion, usually,

to 1 quart of rectified spirits. Sometimes an essence, using the term in its correct sense, is distilled, with the addition of a little water;

it is then called distilled aromatic spirits.

942. Essences of Flowers. The The essences of those flowers which are not separate-(respective) flowers, 3 to 5 pounds; proof then draw over, by distillation, 1 gallon of For those flowers that are not strongly fragrant, the product may be distilled a second and a third time, or even oftener, tion are always colorless; and hence flowers rich in color may, in general, be advantageously so treated. The flowers should be selected when in their state of highest fragrance: and should be picked to pieces, or crushed or many, the last is facilitated by the addition of small quantity of some other odorous essence In some cases, spirit is impregnated with a combination of essential oils and other odorous substances, so as to produce, artificially, an odor resembling or approaching that of the particular flowers after which the products are respective flowers employed in their preparation. This is particularly the case with flowers troublesome to extract, or which possess very little of it. So also of the essences of many flowers having strange or attractive names, and no true fragrance. Hence arises the almost endless variety of fragrant essences, the perfumers of the present day, numbers of dered), 10 grains avoirdupois; oil of lavender,

other perfumes. (Cooley.)

943. Essence of Almonds; Essence of Bitter Almonds; Essence of Peachkernels; Almond Flavor. Take of essential oil of almonds, I fluid ounce; and rectified spirit (90 per cent.), 19 fluid ounces 941. Essences. The term essence is mix, and agitate or shake them together until generally very loosely applied to a prepara-united.

Essence of Roses. Take of pure otto of roses 1½ drachms (Troy); and alcohol (96 per cent.) 1 pint (Imperial); mix, place Thus, the essential or volatile oils obtained the bottle in a vessel of warm water until its contents acquire the temperature of about 85° Fahr., then cork it close, and agitate it smartly until the whole is quite cold. Very fine.

945. Extra Essence of Roses. Take of petals of roses (fresh) 3 pounds avoirdu-pois; and rectified spirit (90 per cent.) 5 Imperial quarts; digest the petals (picked of 2 drachms to 2 ounces of the essential oil to pieces) in the spirit for 24 hours, then distill to dryness by the heat of a water-bath. Digest the distillate (product of distillation) on a fresh quantity of rose-petals, and re-distill, as before; and repeat the whole process of maceration and distillation a third, fourth, fifth, and sixth time, or oftener, the last time ly given in this work, may be made by one or observing to conduct the distillation rapidly, other of the following general formulæ. Take and to draw over only 1 gallon, which is the of essential oil (of the respective flowers), 1 essence. Delicately and delightfully fragrant. ounce avoirdupois, and rectified spirit 90 per It improves by age. The product of each of cent. 1 pint (Imperial); dissolve as directed the above receipts is very superior; but that for "Essence of Almonds." Or, take of the eff the last has a peculiar delicacy of flavor, which distinguishes it from those prepared spirit, 2 gallons; digest for a few days, and from the otto. Some makers add to each pint of the former 20 or 30 drops each oil of bergamot and neroli, and 15 or 20 drops essence of musk; but the product of the last formula is scarcely improved by any addition, from fresh flowers, as noticed under "Essence unless it be a very little neroli or essence of Roses." The products obtained by distilla- d'ambrette, or both, as the case may indicate. The best rose leaves to ase are those of the rosa centifolia (cabbage-rose, damask-rose), or rosa sempervirens (musk-rose), or mixtures of them.

946. Essence of Rondeletia; Extrait bruised, as their nature may indicate. With de Rondeletia. Various formulæ are current for this exquisite perfume, of which some clean sand or common salt. Or, proceed scarcely any produce an article approaching in the way described under "Essence of Tuberose." This applies to most of those lowing is an exception: Take of oil of lavent of those lowing is an exception: flowers that contrin little fragrant oil, and of der (Mitcham), 4 ounce avoirdupois; oil of which the odor is extremely delicate. A cloves (finest), 5 drachms avoirdupois: oil of bergamot, 4 drachms; ½ drachm each of the or volatile oil is commonly added to the simple essences of flowers, at will, to enrich or modify the fragrance, each manufacturer agitate them together until completely united. usually pursuing his own taste in the matter. Some persons add 1 drachm of neroli, or of oil of verbena (Indian lemon-grass), with or without 10 or 12 drops of otto of roses. Very fine.

947. Curious Essence. Take of otto of roses 2 drachms; oil of rose-geranium, 1 named; although there may be none of the drachm; essence of musk, 3 Imperial fluid drachms; essence of ambergris, 1 Imperial fluid drachm; rectified spirit (warm), 1 pint; of which the odorous principle is difficult or mix, closely cork the bottle, and agitate frequently until cold. A powerful, durable, and very agreeable perfume.

948. Essence de Frangipane; Extrait de Frangipane; Frangipanni. Take of neroli, 2 Imperial fluid drachms; esprits, and similar preparations, vended by essence royale, 3 fluid drachms; civet (pow-

oil of cloves, oil of rhodium, of each, 5 or 6 quite cold, then add 31 pints rectified spirit drops; rectified spirit, 3½ to 4½ fluid ounces; (95 per cent.), ½ fluid ounce liquor of amdigest a week, and then decant the clear pormonia (.880-.885 specific gravity), and, having tion. Powerful, durable, and pleasant.

ris-root (coarsely powdered). 1½ pounds avoirtion, in a room exposed to the sun, in sumdupois; rectified spirit, 1 Imperial quart; mer, or in an equally warm situation in winproceed by percolation or the method of dis-placement, so as to obtain I quart of essence; portion, and, if necessary, filter it. A little or by digestion for two weeks, followed by powerful pressure in a tincture-press. former is the best and most economical method. This forms the best essence of violets of the wholesale druggists. It may be,

but is rarely, distilled. (See No. 954.)
950. Essence of Cologne; Cologne-Essence: Concentrated Eau de Cologne. This is prepared from the same odorous ingredients as "Eau de Cologne," but taking 7 not be formed. Used as a condensed and convenient substitute for ordinary "Eau de the Paris houses. Cologne" by travelers, eing less bulky. It is also kept in stock by druggists and perfumers, to enable them to prepare that article strength.

951. Essence of Orange; Essence of **Orange-peel.** Oil of orange-peel is popularly so called. The alcoholic essence is made from this oil like essence of almonds. (See No. 943.)

952. Essence of Pimento; Essence of Allspice. Prepared from oil of pimento, as essence of almonds. Sometimes used in compound perfumes and cosmetics, and for

Essence of Pineapple. pineapple oil (butyric ether), as the last. Sometimes taken on sugar, by smokers; but chiefly used by confectioners, liqueur manufacturers, &c. (See No. 1060.)

Essence of Tuberose. 954. flowers are placed in alternate layers with sheep's or cotton wool impregnated with the purest oil of ben or of olives, in an earthen yessel, closely covered, and kept for 12 hours in a water bath; the flowers are then removed and fresh ones substituted, and this is repeated until the oil is sufficiently scented.

The wool or cotton is then mixed with the it to 1 fluid drachm, per pint, of liquor of ampurest spirit of wine, and distilled in a water monia, or of liquor of potassa (the first is bath; or, it is first digested in a well closed vessel for several days in a warm situation, with frequent agitation. A similar plan is fragrance of the essence. A few grains of followed for the preparation of the essences of

jasmine, violets, &c. (See No. 1349.)

955. Essence of Lemons. From oil of lemon, as essence of almonds. (See No. 943.) For this purpose the oil should have been recently expressed, and preserved from facilitate the action of the menstruum, and to the air. A dash of essence of musk improves make the most of the ingredients, it is best to it as a perfume, but not as a flavoring essence. rub down the musk, &c., with a little pow-

lemons. 956. Concentrated Essence of Musk. Take of grain-musk (Tonquin or Chinese), 1 ounce avoirdupois, boiling distilled water, Imperial pint; digest them together in a bergris, 40 grains avoirdupois; grain-musk

closely corked or stopped the vessel and 949. Essence of Violets; Essence of securely tied it over with bladder, digest the Orris; Factitious. Take of Florentine or- whole for 1 or 2 months, with frequent agitaessence of ambergris is commonly added to the filtrate, or, when this is not done, 1 to 2 drachms of ambergris are put into the vessel before closing it, and after adding the spirit. Very fine. The residuum is treated with fresh spirit for an inferior quality.

957. Fine Essence of Musk. Take 1 ounce finest grain-musk, civet and ambergris each 1 drachm, strongest essence d'ambrette. ½ pint. Instead of the ambergris, 1 to 1½ or 8 times the quantity, and using alcohol or fluid ounces of essence of ambergris may be the strongest rectified spirit, without which a added after decantation. The quantity of permanent solution of the whole of them cancivet ordered should on no account be excivet ordered should on no account be exceeded. This produces the finest quality of

958. Common Essence of Musk. Take # ounce (avoidupois) grain-musk, 1 quart (Imperial) rectified spirit (95 per cent.), extemporaneously, by simply diluting it with and 2 fluid ounces finest essence of ambergris; 8 times its bulk of spirit of the appropriate digest, &c., as before. Excellent; but greatly digest, &c., as before. Excellent; but greatly inferior to the others. Essence of musk is an agreeable and powerful perfume, and is greatly esteemed in the fashionable world. Its odor is so durable that articles scented with it will retain the fragrance for years. The product of each of the above is of very fine quality; but that of No. 957 is the very finest that is made, and such as is seldom sold, except by the high-class perfumers, who obtain for it a very high price. It is powertoothache; but chiefly as a flavoring essence. fully and deliciously fragrant.

959. Best Way to Prepare the Essence of Musk and Ambergris. The best vessel for preparing essence of musk, as well as of ambergris, is a strong tin-bottle with a nicely rounded mouth and neck. Great care should be taken to cork it perfectly close, and, after this is done, to tie it over securely with wet bladder. The bottle should not be set in the full sunshine, but only in a position warmed by it; and in no case should the digestion be of shorter duration than three greatly preferable), increases the solvent power of the spirit and vastly increases the salt of tartar (carbonate of potash) are sometimes added with the same intention; but this addition is objectionable, as it does not effect the object in view, whilst it occasions partial decomposition of the mixture. To it as a perfume, but not as a flavoring essence. rub down the musk, &c., with a little pow-Oil of lemon is popularly called essence of dered glass, sand, or lump sugar, as noticed under "Essence of Ambergris." Filtration Concentrated Essence of Musk. and exposure to the air should, if possible, be

960. Essence Royale. Take of amclose vessel, with frequent agitation, until (pure), 20 grains; civet and carbonate of

avoided.

fluid ounces; digest, with agitation, for 10 or sugar. tassa. (See last receipt.)

pure neroli in rectified spirit, 1 Imperial pint. An ounce of essence of jasmine, jonquille, or

cious perfume.

962. Essence of Storax (or Styrax); Extract of Storax. Take 1 ounce avoirdupois finest genuine liquid storax and 1 Impe- particularly for personal use. rial pint rectified spirit; digest, with agitation, for a week, and then decant the clear portion.

963. Essence of Ambergris; or Concentrated Tincture of Ambergris. Take 10 drachms avoirdupois 95 per cent. ambergris and 1 Imperial pint rectified spirit, put them into a strong bottle or tin can, secure the mouth perfectly and very firmly, and keep the vessel in a room exposed to the heat of the sun, or equally warm, for a month or two, observing to briskly agitate it daily during the whole time. Lastly, after repose, decant the clear portion, and, if necessary, filter it rapidly through soft blotting paper. Very fine. It forms the strongest and finest simple essence of ambergris of the Paris houses. (See No. 959.) The common practice in making the essence is to cut the ambergris up small before digesting it; but a much better plan is to rub down both the ambergris and musk with a little powdered glass, clean silicious sand, or dry lump-sugar, observing afterwards to rinse the mortar out well two or three times, with portions of the spirit, so that nothing may be lost. A second quality may be made by employing half the quantity of ambergris to the same amount of spirit.

964. Essence of Ambergris. Ambergris 10 drachms avoirdupois; grain musk (Tonquin or Chinese pure), 3 drachms; rectified used alone. spirit, 1 quart. Proceed as in the last receipt. The products of the above two receipts form any one of them added to cau de Cologne, lavender-water, tooth-powder, hair-powder, pomades, wash-balls, &c., communicates a sweet-scented spirits, liqueurs, wines, &c., improve their flavor and aroma. 1 or 1½ fluid drachms added to a hogshead of claret, imparts a flavor and bouquet to the wine which is re-

garded by many as delicious.

965. Fine Essence of Vanilla. Take pound avoirdupois finest vanilla, and rectified spirit, 1 Imperial quart; proceed as for essence of musk. (See No. 959.) Lastly, press and decant or filter. Very superior. It forms the best quality vended by the wholesale druggists, and is sold at exorbitant prices.

potassa, of each 10 grains; oil of cinnamon, 6 it, the vanilla, &c., should be cut small with drops; oil of rhodium and otto of roses, of a sharp knife; or what is better, rubbed down each 4 drops; rectified spirit, 4 Imperial with a little powdered glass, sand, or lump-

12 days, or longer. Very fragrant. The 966. Essence of Patchouli; Essence above is a celebrated receipt, but we think it de Patchoulie; or Essence de Pouchawould be improved by substituting 12 drops pat. Take 3 pounds avoirdupois Indian patchliquor of ammonia for the carbonate of po- ouli (leaves or foliaceous tops), and rectified spirit 9 Imperial pints; digest for a week in Essence of Neroli; Essence of a close vessel, add & ounce oil of lavender Orange Blossoms; or Essence de Fleurs (Mitcham) and promote solution by agitation. d'Oranges. Dissolve ½ ounce avoirdupois Next throw the whole into a still, and further add 1 gallon water and 2 or 3 pounds common salt. Agitate the whole briskly together. violets, is often added. A delicate and deli- lute on the still-head, and distill over (rapidly) 1 gallon. To the distillate add 1 fluid ounce finest essence of musk; and after 10 days' repose, bottle it. A very fashionable perfume,

967. Common Essence of Patchouli. 11 ounces otto of patchouli, 1 ounce otto of

rose, and 1 gallon rectified spirit.

968. Essence d'Ambrette; or Essence of Musk-seed. Take 11 pounds avoirdupois finest musk-seed; grind it in a clean peppermill, and digest it for 3 or 4 weeks in 3 pints Imperial rectified spirit; the vessel being closely stopped or corked, and kept in a warm room all the time. Lastly decant, press and filter.

969. Essence of Bergamot. The popular name of oil of bergamot. A spirituous essence may be made in a similar way to that

of almonds. (See No. 943.)

970. Essence of Cassia. From oil of cassia, as essence of almonds. (See No. 943.) Uses, &c., the same.

971. Essence of Cinnamon. From oil of cinnamon, as essence of almonds. (See No. 943.) Essence of cassia is commonly and fraudulently sold for it.

972. Essence of Civet. Take 1 ounce (avoirdupois) civet cut very small, and 1 pint (Imperial) rectified spirit; proceed as for essence of ambergris or musk. Its odor is only agreeable when faint and combined with that of other substances, which it sustains and increases. It is hence seldom or never

973. Essence of Lavender. Take 1 ounce avoirdupois oil of lavender (Mitcham) a delightful perfume highly esteemed in the and & Imperial pint strongest rectified spirit; fashionable world. A very small quantity of mix with agitation; a few drops of the essences of musk and ambergris being added at

will. Very fine.
974. To Extract the Essence from delicions fragrance. A few drops added to any Flower. Take any flowers you choose; place a layer in a clean earthen pot, and over them a layer of fine salt. Repeat the process until the pot is filled, cover closely, and place in the cellar. Forty days afterwards, strain the essence from the whole through a crape by pressure. Put the essence thus expressed in a clear bottle, and expose for six weeks in the rays of the sun and evening dew to purify. One drop of this essence will communicate its odor to a pint of water.

975. To Make Attar, or Otto of Roses. Gather the flowers of the hundred-This, as well as the preceding, is chiefly used leaved rose (rosa centifolia), put them in a for flavoring, and as an ingredient in com- large jar or cask, with just sufficient water to pound perfumes and cosmetics. Essence of cover them, then put the vessel to stand in vanilla is a favorite and useful addition to the sun, and in about a week afterwards the tooth-cosmetics, pomades, &c. In preparing attar—a butyraceous oil—will form a seum on

the surface, which should be removed by the of rosemary, I ounce essence of lavender, 14 aid of a piece of cotton.

Cologne Water and Per-fumed Spirits. In preparing eau de Cologne, it is essential that the spirit be of the purest description, both tasteless and scentless, and that the oils be not only genuine, but recently distilled; as old oils, especially if they have been exposed to the air, are less odorous, and contain a considerable quantity of resin and camphor, which would prove injurious. French spirit of 90 per cent. should be used in the manufacture of eau de Cologne, and when a weaker spirit is employed, the essential oils must be dissolved in a small quantity of 90 or 95 per cent. spirit. Should the mix-ture afterwards prove turbid, filter it through paper with a little carbonate of magnesia. (See Nos. 1080 and 1081.) To produce an article of the finest quality, distillation should be had recourse to; but a very excellent eau de Cologne may be produced by simple solution or maceration of the ingredients in the spirit, provided all the essences be new, palecolored, and pure.

America, some of which possesses the most delicate fragrance, and is nearly equal to the best imported, is made without distillation.

Cologne. Mix with agitation 3 ounces attar of neroli pétale; 1 ounce attar of neroli bigarade; 2 ounces attar of rosemary; 5 ounces zest; and 2 ounces attar of bergamot, with 6 gallons 95 per cent. grape spirit. Let it stand perfectly quiet for a few days. Although merely mixing the ingredients, it is better first to mix all the citrine attars with spirit, adopted by the most popular house in Cologne.

978. Eau de Cologne. To 3 pints alco-hol of 95° add 12½ drachms oil of lemon, 1½ drachms oil of orange, 2½ drachms oil of cedrat, 1½ drachms oil of vervain, 2½ drachms oil of bergamot, 2½ drachms oil of mint, 5 drachms oil of lavender, 1¼ drachms oil of white thyme, 2 drachms oil of Portugal, 1¼ drachms oil of rosemary, 8 ounces tincture of of musk, 1 gallon deodorized alcohol, and 2 ambretta, and 1 pound eau de melisse; (eau pints rose-water. The mixture should stand des carmes); mix well in a bottle, and after a long time before filtering for use. standing six hours add 2½ drachms tincture of 984. Parrish's Common Col ambergris; then filter until clear. This is ter. improved by distilling.

979. Eau de Cologne—Extra.—Put 1 part 9 per cent. alcohol into a bottle; add to it druchms oil of cedrat, 2 drachms oil of thyme, 6 drachms each oil of bergamot and

Durockereau's Cologne Water. To 7 quarts French tasteless alcohol, add 11 drachms essence of Portugal, 13 drachms essence of the oils of neroli, neroli petit-grain, sence of bergamot, 1 ounce essence of lemon, and lemon; 204 ounces each of the oils of

drachms rose water, 13 drachms jasmin water, 15 drachms orange-flower water. Mix the whole together, let it stand 24 hours, and distill over a water-bath.

981. Gouffe's Eau de Cologne. Take 1 ounce each essences of lemon, bergamot, and eitron; 4 ounce essence of rosemary; 4 ounce essence of neroli. Infuse for 8 days in 1 quart 95 per cent. alcohol. Filter, and bottle for use.

982. Farina's Eau de Cologne. of angelica-root, 10 grains; camphor, 15 grains; cassia-lignea, cloves, mace, nutmegs, wormwood tops, of each 20 grains; calamus aromaticus, sage, thyme, of each ½ drachm (Troy); orange flowers, 1 drachm (Troy); lavender flowers, 11 drachms (Troy); rose petals, violets of each, 3 drachms (Troy); balmmint and spear-mint of each 1 ounce (Troy); 2 sliced lemons; 2 sliced oranges, and 5 gallons rectified Cologne spirits. Bruise or slice the solids, and digest them in the spirit, with frequent agitation, for 2 or 3 days, then distill off 3 gallons. To this add, of oil of bergamot, essential oil of jasmin, 1 fluid ounce each; oil of balm-mint, oil of cedrat, oil of lavender, lored, and pure.

The mass of the eau de Cologne prepared in and oil of anthos-seed, of each 20 drops. Agitate until solution is complete, and the next day, if necessary, filter. This formula, many years since, was confidentially given 977. Piesse's Best Quality Eau de by the celebrated original Jean Maria Farina. who lived opposite the Jülichs Platz, in Cologne, to a professional gentleman, now deceased, with a solemn assurance that it was attar of orange zest; 5 ounces attar of citron the one used by the former in his laboratory. After keeping the secret some years, this gentleman disclosed it. It seems unnecessarily stand perfectly quiet for a few days. Although complicated. Some of the articles, as the very fine eau de Cologne is often made by herbs wormwood and mint, are either useless or better omitted. The version given above differs from the original simply in being inthen distill the mixture, and afterwards add tended for only 5 gallons instead of twelve the rosemary and nerolies. This method is times the quantity. Dr. Cooley says he personally tried it, and found the quality of the product splendid.

983. Parrish's Best Cologne Water. Mix together 2 fluid ounces oil of bergamot, 2 fluid drachms oil of neroli, ½ fluid ounce oil of jasmin, 2 fluid drachms oil of garden lavender, 1 minim oil of cinnamon, 3 fluid ounces benzoated tineture, 1 fluid ounce oil

984. Parrish's Common Cologne Wa-A much cheaper preparation than the foregoing can be made by mixing 14 fluid ounces oil of lavender, & fluid ounce oil of rosemary, 1 fluid ounce oil of lemon, and 20 drops oil of cinnamon, with 1 gallon alco-

oil of lemon, 4 drachms on or robugar, and drachms each oil of neroli, oil of vervain and oil of rosemary, 2½ drachms oil of mint, 2 the Farinas in the journal of the North Gerpints eau de melisse and 24 drops tincture of man Apothecaries' Association. Dissolve 2 ounces by weight purified benzoin, 4 ounces by weight purified benzoin, 4 ounces oil of rosemary, in 9 gallons 95 per cent. fine Cologne spirits. To this solution add successively, 103 ounces 10 drachms essence of neroli, 1 ounce essence | sweet orange peel, limes, and bergamot; to-

gether with tincture of rose-geranium flowers, | spirit, 5 fluid ounces; mix. Very agreeable sufficient to suit the taste. Macerate for and durable some weeks, then fill into flasks.

perfectly quiet before bottling.
987. Cologne Water, Second Quality.

Pure 95 per cent. alcohol, 6 gallons; oil of

the same way as the last.

988. Eau des Carmes; Eau de Meand nutmeg (bruised). of each 2 ounces; before distillation is wrong, as the aromatic coriander seed (bruised), 1 ounce; dried an principle of the root does not pass over with gelica root, 1 ounce; rectified spirit, 1 gallon. the vapor of alcohol. Macerate for 4 days, and distill in a water- 997. Common bath.

of each ½ ounce; rectified spirit (90 per cent., mary is now commonly sold for it by the scentless), ½ gallon; mix by agitation. Very druggists. fine without distillation; but better for it, in

Take 1 ounce (avoirdupois) oil of lavender (Mitcham); essence of ambergris, $\frac{1}{2}$ ounce; sence de petit grain, of each $1\frac{1}{2}$ to 2 fluid eau de Cologne (finest), $\frac{1}{2}$ Imperial pint; recidrachms; essential oils (ordinary), $\frac{1}{2}$ fluid tified spirit, $\frac{1}{2}$ pint; mix by agitation. Very ounce; concentrated essences, 2 to $2\frac{1}{2}$ fluid fragrant, and much esteemed. The ordinary ounces. The spirit of wine employed for lavender water is usually made with spirit at them should in no case be weaker than 73 proof, or even much weaker: hence its in- per cent., and for spirit of roses (esprit de ferior quality to that of the higher class of rose), it should be, at the least, 90, or else perfumers. 1 ounce of true English oil of little of the attar will be dissolved. These lavender is all that will perfectly combine proportions may be adopted for all the simple with 1 gallon of proof spirit (or 1 drachm to the pint); any excess rendering it milky or cloudy.

(90 per cent.), 1 gallon. Dissolve. Cordial.

and fragrant.

of rosemary, essence of violets, and orange-nature; and, with certain flowers, the pro-flower water, of each 1 Imperial fluid ounce; cess must be repeated with fresh flowers, as oil of bergamot and oil of jasmin, of each 1 often as necessary. To mature and bring out fluid drachm; oil of lavender and oil of ver- the full fragrance of distilled spirits, they bena, of each $\frac{1}{2}$ fluid drachm; eau de rose, $\frac{1}{2}$ should be kept for some time in a cellar, or pint; rectified spirit, $1\frac{1}{2}$ pints; mix. A deother cool situation, previously to being used lightful perfume. Various other similar or offered for sale. The same applies, though formulæ are employed.

993. Eau de Maréchale. Take of es- by the other methods. sence of violets, 1 Imperial fluid ounce; oil of

and favorite perfume.

drachm; eau d'Ambrette and eau de fleurs used; for a third quality. 3 to 4 pints at d'oranges, of each 2½ fluid cunces; rectified proof.

ome weeks, then fill into flasks.

986. Fine Cologne Water. Take of d'Ambrette. Take 1 pound (avoirdupois) pure 95 per cent. Cologne spirits, 6 gallons; oil grains d'Ambrette (musk-mallow seed, bruisof neroli, 4 ounces; oil of rosemary, 2 ounces; ed); rectified spirit, 1 Imperial quart; water, 4 oil of orange, 5 ounces; oil of citron, 5 ounces; pint; digest for 7 or 8 days, and distill off 1 oil of bergamot, 2 ounces; mix with agita- quart. Very fine. Commonly sold as "Estion; then allow it to stand for a few days sence d'Ambrette." When used alone, a very few drops of essence of ambergris and esprit de rose improve it.

996. Fine Hungary Water. Take 2 neroli, 2½ ounces; oil of rosemary, 2 ounces; pounds (avoirdupois) rosemary-tops (in blosoil of orange peel, 4 ounces; oil of lemon, 4 som); ‡ pound sage (fresh); rectified spirit, 3 ounces; oil of bergamot, 4 ounces. Treat in Imperial quarts; water, 1 quart; digest for 10 Imperial quarts; water, 1 quart; digest for 10 days, throw the whole into a still, add 13 pounds common salt, and draw over 6 pints. lisse; Compound Spirit of Balm. Fresh To the distillate add I ounce bruised Jamaica flowering balm, 24 ounces; yellow rind of ginger, digest a few days, and either decant lemon, cut fine, 4 ounces; cinnamon, cloves, or filter. The old plan of adding the ginger

Common Hungary Take 1½ to 2 Imperial fluid drachms pure 989. Fine Lavender Water; or Eau de oil of rosemary; oil of lavender (English), ½ Lavande. Take 2 ounces (avoirdupois) finest fluid drachm; orange-flower water ½ pint; oil of lavender (Mitcham), essence of musk rectified spirits, 1½ pints; mix. No. 996 is (finest), 1 Imperial fluid ounce; essence of the genuine formula. This is the perfume ambergris (finest), and oil of bergamot (recent), usually sold by the perfumers. Spirit of rose-

998. Simple Perfumed Spirits-Eswhich case the essences should be added to the prits. The simple perfumed spirits (esprits) distillate. Delightfully and powerfully fragrant. (Cooley.)

990. Smith's Lavender Water.

pries. The simple perfumed spirits (esprits) and odoriferous tinctures are principally used in making compound eaux, esprits, &c. Their common strength. per pint. is of—

Lavender Water. common strength, per pint, is, of-

Attar of roses, 1 fluid drachm; neroli, esspirits of the perfumer for which separate formulæ are not given in this work, and even in place of those so given, at the convenience 991. Common Lavender Water. En- of the operator, when intended for the use glish oil of lavender, 3 ounces; rectified spirit just mentioned. When flowers, leaves, seeds, &c., are employed, the proportions may be 13 to 3, or even 5 pounds to the gallon of the 992. Eau de Bouquet. Take of spirit distillate or product, according to their in a less degree, to perfumed spirits prepared

999. Esprit de Bergamotte. Take 5 bergamot and oil of cloves, of each ½ ounce Imperial fluid drachms oil of bergamot (finest, (avoirdupois); orange-flower water, ½ pint; recent); oil of rose-geranium and oil of verrectified spirit, 1 pint; mix. An agreeable bena, each & fluid drachm; essence of ambergris, 2 fluid drachms; essence of musk, & 994. Eau d'Ambre Royale; Eau fluid drachm; rectified spirit, 1 pint; mix. Royale. Take of essence of ambergris and Very fine. For a second quality (usually essence of musk, of each 1 Imperial fluid called best), 1 quart of spirit (70 per cent.) is

1001. Esprit de Rose. The compound gallor perfume sold under this name is commonly made as follows: Take 1 Imperial pint finest simple esprit de rose (see No. 998); essence 12 pounds avoirdupois; water, 36 pounds; of ambergris and oil of rose-geranium, each 1 distill 24 pounds for double orange-flower

fluid drachm; mix. Delicately fragrant.

1002. Esprit & Bouquet. Take 4 imperial fluid drachms oil of lavender; oil of should not be put into the still till the water bergamot and oil of cloves, each 1½ fluid nearly boils. drachms; essence of musk and oil of verbena, each ½ fluid drachin; attar of roses, 5 to 6 drops; and rectified spirit, 1 pint; mix, and powerful and agreeable scent.

1003. Eau d'Héliotrope. Take essence of ambergris, coarsely powdered, 1 Imperial mot, 3 ounces; oil of cinnamon, 4 drachms; fluid drachm; vanilla, ½ ounce avoirdupois; orange-flower water, ½ pint; rectified spirit, 1 quart; digest for a week, and then decant or filter. 5 or 6 drops each of oil of bitter alfilter. 5 or 6 drops each of oil of bitter almonds and cassia are sometimes added. Used drachms each of the oils of lavender, berga-

both as a cosmetic and perfume.

1004. Esprit de Jasmin Odorant.
Take extrait de jasmin, and rectified spirit, each ½ Imperial pint; essence of ambergris, ½ fluid drachm; neroli (finest), 8 or 10 drops; mix. A delicate and favorite foreign scent.

1005. Millefleur Water. Very pure rectified spirit, 9 pints; balsam of Peru (gen-mace)

uine) and essence of cloves, each 1 ounce; essences of bergamot and musk, each 2 ounces; essences of neroli and thyme, each 1 ounce; eau de fleurs d'oranges, 1 quart; mix well. Very fine.

1006. Honey Water (Eau de Miel). Rectified spirit, 8 pints (Imperial); oil of cloves, oil of lavender, oil of bergamot, of each 1 ounce avoirdupois; musk, 15 grains; yellow-sanders shavings, 4 ounces; digest for 8 days, and add 2 pints each of orange-flower and rose waters.

1007. Honey Water. (With Honey.) seed, 8 ounces; fresh lemon-peel, 1 ounce; cieros, 3 ounce; nutmeg, benzoin, styrax caiamita, of each 1 ounce; rose and orangeflower water, of 4 ounces; rectified then distilled as before. spirit, 3 Imperial pinta; digest for a few days, and filter. Some receipts add 3 drachms of vanilla, and direct only i ounce of nutmeg, storax, and benzoin

1008. Rose Water. The ordinary best article, is generally made as follows: - Dissolve attar of roses, 6 drachms avoirdupois, in strongest rectified spirit (hot), 1 Imperial pint; throw the solution into a 12-gallon carboy, and add 10 gallons pure distilled water, at 180° to 185° Fahr.; at once cork the carboy (at first loosely), and agitate the whole briskly (at first cautiously), until quite cold. The product is really superior to much of the trash carelessly distilled from a scanty quantity of rose-leaves, and sold as rose water. (See Nos. 1071 and alcohol, and filter. 1079)

1009. Orange-Flower Water. genuine imported article is one of the most in alcohol of 95°; press through a cloth and delightfully fragrant of all the odoriferous dis- filter.

1000. Eau de Lavande de Millefleurs. | follows:-Take of orange-flowers, 7 pounds Take 1 quart can de lavande; oil of cloves, avoirdupois; fresh thin yellow-peel of bitter 14 fluid drachms; oil of cassia and essence of ambergris, each 4 fluid drachm; mix. oran ges, 6 to 8 ounces; water, 2 Imperial gallons: macerate 24 hours, and then distill 1

1010 Orange-Flower Water. other method is as follows .- Orange-flowers, water; this, with an equal quantity of distilled water, forms the single. The flowers

1011. Florida Water. Dissolve in 1 gallon 90 per cent. alcohol, 1 ounce each oil of lavender, oil of bergamot, and oil of lemon; agitate frequently for a day or two. A very and of oil of cloves and cinnamon 1 drachm

each; add 1 gallon water, and filter.

tincture of benzoin, 2 ounces; 75 per cent. alcohol, 1 gallon. Mix and filter. (See No.

976.

mot, and lemon 1 drachm each of tineture of turmeric and 1 of neroli; 30 drops oil of balm and 10 drops oil of rose; mix the above with 2 pints deodorized alcohol. (See No.

1014. Tincture of Coriander. Powder coarsely 4 ounces coriander seed, and macerate for 15 days in 1 pint 95° alcohol;

strain and filter.

1015. Tincture of Nutmegs. Bruise well 6 ounces nutmegs in 1½ pints 95° alcohol; let it remain for a couple of weeks, stirring occasionally; then press through a coarse cloth, and filter. Tincture of ginger, mace, and other spices are prepared by the same method.

1016. Tincture of Storax. Macerate 5 ounces storax in 3 pints 95° alcohol, until

dissolved, then filter.

1017. Alcoholate of Roses. Macerate 2 pounds fresh roses in 2 quarts alcohol of 95° White honey, 8 ounces avoirdupois; coriander and 1 pint water for 12 hours; then distill by means of a water-bath. If a superior article is required, the alcoholate thus prepared may be used to macerate 2 pounds more roses, and

1018. Tincture of Vanilla. Steep 2 ounces vanilla, cut into small pieces, in 1 pint alcohol, for about a month; stir frequently,

and filter.

Tincture of Benzoin. In 2½ 1019. rose-water of the stores, particularly of the quarts alcohol of 95°, macerate 8 ounces wholesale druggists who deal largely in the powdered benzoin until dissolved, then filter it and bottle; cork closely.

1020. Tincture of Balgam of Peru. Macerate 8 cunces liquid balsam of Peru in 3 pints 95° alcohol; when dissolved, filter.

1021. Tincture of Grain of Paradise. Macerate 4 ounces cearsely powdered grain of paradise for 15 days in 1 pint alcohol of 95°, then press through a cloth and filter.

Tincture of Balsam of Tolu. 1022. Dissolve 5 ounces balsam of Tolu in 3 pints

1023. Tincture of Cardamoms. Bruise The 4 ounces cardamoms, and macerate 2 weeks

tilled waters. An imitation may be made as | 1024. Tincture of Ambergris. Pow-

der thoroughly 1 ounce ambergris and ½ ounce sugar in a warm mortar; then dissolve dounce carbonate of potash in 14 ounces alcoholate of roses, and add to it 3½ ounces tineture of musk (see No. 1025); macerate the

whole for about 1 month, and filter.

Tincture of Musk. ounce musk in a warm mortar with a little sugar; macerate for a month in 7 ounces alcohol containing 1 ounce each tineture of ambergris and tincture of vanilla. Filter thoroughly and then add a few drops of attar of roses.

1026. Economical Perfumes. cheap perfumes which are offered for sale in small fancy bottles, are of the simplest kind, and from the nature of the case, made of the the leading mixtures, which are sold under the names deemed the most likely to prove attractive:

Mix 1 ounce essence of bergamot, or attar

of santal, with 1 pint spirits of wine.

Mix ½ ounce each of the attars of lavender and bergamot, and 1 drachm attar of cloves, with 1 pint spirit of wine.

Mix 1 ounce attar of lemon grass, and 1 ounce essence of lemons, with 1 pint spirit of

Mix $\frac{1}{4}$ cunce attar of petit-grain, and $\frac{1}{4}$ ounce attar of orange peel, with 1 pint spirits of

These mixtures are filtered through blotting paper with the addition of a little magnesia to make them bright. It would be well if all the cheap perfumes put up in attractive bottles were as good as these mixtures. A large proportion of them are far inferior, and frequently little more than weak perfumed wa-

1027. To Make Imitation Bay Rum. The genuine bay rum is made by digesting the leaves of the Bay plant (an aromatic plant which grows in the West Indies), in rum, and subsequent distillation. The imita-Bay (or a ounce oil of Bay, and a ounce of either oil of pimento, allspice, or cloves), with 4 gallons 95 per cent. alcohol; then add gradually 4 gallons of water, shaking the drachms oil of nutmegs with 1 ounce powmixture constantly. If the mixture should become milky, the addition of a little alcohol will make it clear. Probably the best imitation is as follows: 10 fluid drachms oil of ounces acetic ether, 3 gallons alcohol, and 21 gallons water. Mix, and after 2 weeks' repose, filter.

2 pounds of leaves of the myrtus acris, 1 pound cardamoms, 2 ounces cassia, 1½ ounces cloves, and 9 quarts rum. Distill 12 gallons. and omitting the syrup Bay rum may be colored with tincture of saffron, or with a mixture of equal parts caramel (see No. 694) and tineture of turmeric.

1029. Cheap Bay Rum. Saturate a pound block of carbonate of magnesia with the desired quantity is obtained, then add aland quality of the Bay rum.

o Prepare Flavoring Extracts. The following excellent receipts, taken from the "American Journal of Pharmacy," are by Prof. W. Procter, Jr.

Lemon Extract. ounces of the exterior rind of lentons in the air until partially dry; then bruise in a wedgewood mortar; add to it 2 quarts dedorized alcohol of 950, and agitate until the color is extracted; then add 6 ounces recent oil of lemon. If it does not become clear immediately, let it stand for a day or two, agitating occasionally. Then filter.

1032. Orange Extract. Follow the same method as for lemon extract, using 4 ounces exterior rind of oranges, 1 quart of least expensive materials. The following are deodorized alcohol of 95°, and 2 ounces recent

oil of orange.

1033. Extract of Bitter Almonds. Mix together 4 ounces oil of bitter almonds, 1 ounce tineture of turmeric, and 1 quart 950

alcohol.

To Neutralize the Poison in Extract of Bitter Almonds. As this extract is poisonous in a quantity, it is better to deprive it of its hydrocyanic acid as follows:-Dissolve 2 ounces sulphase of iron in a pint of water; in another pi. t of water slake 1 ounce lime recently bur ed; mix them together, and shake the mix are with 4 ounces oil of bitter almonds. Distill in a glass retort until the whole of the oil has passed over; and after allowing the oil time to separate from the water, remove it for use.

1035. Extract of Rose. Bruise 2 ounces of hundred-leaved rose-leaves; make an extract from them by macerating in 1 quart deodorized alcohol; press the quart of alcohol out, and add to it 1 drachm oil of rose, and filter through paper. If there are no red rose leaves, a little fincture of cochineal will

give a pale rose tint.

1036. Extract of Cinnamon. Dissolve 2 drachms oil of cinnamon in 1 pint deodortion is prepared from the essential oil obtained | ized alcohol; add gradually 1 pint of water, from the Bay plant. Mix 1 ounce of oil of and then stir in by degrees 4 ounces powdered Ceylon cinnamon; agitate several hours, and

filter through paper.
1037. Extract of Nutmegs. Mix 2 dered mace; macerate for 12 hours in 1 quart

deodorized alcohol, and filter.

1038. Extract of Ginger. Pack 4 ounces powdered ginger in a percolator, Bay, 1 fluid drachm oil of pimento, 2 fluid moisten it with a little alcohol, then pour on alcohol until 1½ pints of tincture have passed through. Mix this with 8 ounces syrup.

1039. Extract of Black Pepper. This 1028. West India Bay Rum. Take is prepared from powdered pepper in the same manner as the extract of ginger, pouring on alcohol until a quart has passed through,

> 1040. Extract of Capsicum. Prepared from powdered capsicum, in the same manner

as black pepper.

1041. Extract of Coriander. Mix 4 ounces powdered coriander with 1 drachm oil cil of Bay; pulverize the magnesia, place it of coriander; add the mixture to 11 pints alin a filter, and pour water through it until cohol of 95°, and ½ pint water; macerate for 24 hours, decant the liquid; put the matter cohol. The quantity of water and of alcohol that has settled into a percolator, and pour on employed depends on the desired strength it the decanted liquid, adding alcohol until a quart has run through.

1042. Extract of Vanilla. Cut 1 ounce glycerine, mix 2 parts chloroform, 2 parts aldevanilla into small pieces, and triturate with 2 hyde, 5 parts acetate of ethyl, 1 part each of ounces sugar to a coarse powder; put it into formiate, butyrate and benzoate of ethyl, 1

1043. Extract of Celery. Bruise 2 1045.) ounces celery seeds, and put into a percolater; pour on 1 pint deodorized alcohol, then pour on water till a pint of extract has passed

of magnesia, and filter.

1044. Extract of Soup-herbs. into a percolator 1 ounce each of thyme, of extract.

Artificial Fruit Essences. These are composed chiefly of compound ethers, which possess the odor and of the same of succinic and benzoic acids. flavor of certain fruits. In some of the following receipts, where tartaric, oxalic, succinic or benzoic acid enters into the composi-tion of an essence, it must be understood that aldehyde, 5 parts acetate of ethyl, and 1 part cinic or benzoic acid enters into the composistate, but in the form of saturated solutions thylate of ethyl, 1 part sebacic ether, 1 part (see No. 27) in cold alcohol. Glycerine will be found as an ingredient in nearly all these butyrate of amyl, 5 parts tartaric and 1 part monize the different odors.

1046. Peach Essence. This is a mixture of 5 parts glycerine, 2 parts aldehyde, 5 parts glycerine and 1 part nitric ether add 5 parts acetate of ethyl, 5 parts formiate of parts acetate, 1 part formiate and 5 parts butyture of 5 parts glycerine, 2 parts aldehyde, 5 ethyl, 5 parts butyrate of ethyl, 5 parts valerianate of ethyl, 5 parts cenanthylate of ethyl, 3 parts acetate and 2 parts butyrate of amyl. 1 part sebacic ether, and 2 parts salicylate of

methyl.

glycerine add 1 part chloroform, 10 parts ethyl, and 10 parts sebacic ether. butyrate of ethyl, 5 parts valerianate of ethyl, 1060. Pineapple Essence. of methyl, 1 part butyrate of amyl, and 1 aldehyde, 5 parts butyrate of ethyl and 10 part saturated solution of oxalic acid in alco- parts butyrate of amyl. hol. (See No. 1045.)

1048. Plum Essence. To 8 parts glycerine, add 5 parts of aldehyde, 5 parts acetate of ethyl, 1 part formiate of ethyl, 2 parts butyrate of ethyl, and 4 parts cenanthylate of

benzoate of ethyl, 1 part cenanthylate of ethyl, odorous principles of plants and other suband 1 part saturated solution (see No. 1045) of benzoic acid in alcohol.

1050. Black Cherry Essence. Mix 10 parts acetate of ethyl with 5 parts benzoate term, however, are often classed many perof ethyl, 2 parts conanthylate of ethyl, 1 part fumes prepared with rectified spirit by the saturated solution of oxalic acid, and 2 parts latter methods, and which are highly charged solution of benzoic acid. (See No. 1045.)

1051. Lemon Essence. To 5 parts glycerine, 1 part chloroform and 1 part nitrie ether, add 2 parts aldehyde, 10 parts acetate ether, add 2 parts aldehyde, 10 parts acetate necessary being that the spirit be absolutely of ethyi, 10 parts valerianate of amyl, 10 scentless and of sufficient strength, and that parts solution of tartaric acid, and 1 part sat- the oils and other materials be recent and urated solution of succinic acid. (See No. 1045

1052. Pear Essence. To 10 parts glycerine add 5 parts acetate of ethyl and 10 am); oil of cloves, 5 drachms; oil of bergaparts acetate of amyl.

a percolator, pour on it diluted alcohol until part salicylate of methyl, 10 parts acetate of 1 pint has run through—then mix with 1 pint amyl, 10 parts essence of orange, and 1 part saturated solution of tartaric acid. (See No.

1054. Apple Essence. To 4 parts glycerine, 1 part chloroform, and 1 part of nitric pour on water till a pint of extract has passed ether, add 2 parts aldehyde, 1 part acetate of through; triturate with 1 drachm carbonate ethyl, 10 parts valerianate of amyl, and 1 part saturated solution of oxalic acid. (See

Put | No. 1045.)

1055. Grape Essence. To 10 parts glysweet marjoram, sweet basil, and summer cerine and 2 parts chloroform, add 2 parts savory, and 1 drachm celery seeds. Pour on aldehyde, 2 parts formiate and 10 parts cenanthem sufficient diluted alcohol to make 1 pint thylate of ethyl, 1 part salicylate of methyl. and 5 parts tartarie and 3 parts succinic acids in saturated solution. (See No. 1045.)

1056. Gooseberry Essence. To 1 part aldehyde add 5 parts acetate, 1 part benzoate and 1 part cenanthylate of ethyl, and 5 parts saturated solution of tartaric, and 1 part each

(See No. 1045.)

1057. Raspberry Essence. To 4 parts these acids are not to be used in their pure each of formiate, butyrate, benzoate and conanartificial essences; it seems to blend and har- succinic acid in saturated solution. (See No. 1045.)

> Strawberry Essence. rate of ethyl, 1 part salicylate of methyl, and

1059. Melon Essence. Take 3 parts glycerine, 2 parts aldehyde, 1 part formiate, 4 Apricot Essence. To 4 parts parts butyrate and 5 parts valerianate of

1060. Pineapple Essence. To 3 parts 1 part cenanthylate of ethyl, 2 parts salicylate glycerine and 1 part chloroform add 1 part

Extracts: Extracts. In French perfumery these are, appro-1049. Cherry Essence. Take 3 parts priately, strong spirituous solutions, either glycerine, 5 parts acetate of ethyl, 5 parts simple or compound, of the essential oils and stances, obtained by infusion or digestion, as distinguished from those that are obtained by distillation and direct solution. Under the with the fragrant matter, or matters, which they represent. The preparation of most of the extraits is simple enough, the chief care

perfectly pure.

1062. Extrait de Rondeletia. Take 12 drachms avoirdupois oil of lavender (Mitchmot, 4 drachms; oil of verbena (or neroli), 1 1053. Orange Essence. With 10 parts drachm; essence of ambergris and essence

of musk, of each ½ Imperial fluid drachm; of pure water, but only 1 gallon drawn over.

rich and highly esteemed perfume.

Take 4 1063. Extrait de Millefleurs. grains finest grain musk; finest ambergris, 6 der (English), and oil of cloves, each 4 drachms; liquid storax (genuine), 1 drachm; with frequent agitation, for 2 or 3 weeks. Very fine. The omission of the storax renders it paler, and thus preferable to some per-

1064. Jockey Club Bouquet. Mix 1 pint extract of rose, 1 pint extract of tuberose,

the mixture.

1065. Bouquet de Millefleurs. 1 pint extract of rose; 1 pint each of the extracts of tuberose, jasmin, orange-flower, cassia, and violet; 4 ounces essence of cedar, 2 ounces each of the tinctures of vanilla, ambergris, and musk; ½ pint essence of rose, 1 of the attars of almonds, neroli, and cloves.

1066. Bouquet de Rondeletia. Mix cloves, 1 ounce attar of bergamot, 3 drachms attar of roses, 4 ounces each of the tinctures of musk, vanilla, and ambergris, with 1 gallon deodorized alcohol. After a month's repose,

1067. Imitation Lily of the Valley. This much admired perfume is made by mixorange-flower, 3 ounces extract of vanilla, ‡ pint extract of cassia, 1 pint extract of rose, and 3 drops attar of almonds. Keep this mixture for a month and then use.

1068. Imitation Essence of Myrtle. Mix together and allow to stand for 2 weeks, pint extract of vanilla, 1 pint extract of reses, 1 pint extract of orange-flower, 1 pint

1069. Extract of Patchouli. Mix 11 ounces attar of patchouli, and 1 ounce attar of rose, with 1 gallon rectified spirits.

Aromatic, Odoriferous, or Perfumed Waters, &c.
These are strictly pure water charged by distillation with the volatile, aromatic, and odor, or lessen their keeping qualities. odorous principles of plants; or they are solutions of these principles, chiefly the essenand of pharmacy belong to either class, according to the mode of their preparation.

1071. Submitted to Distillation for Making The common plan is to reject the first 2 or 3 Perfumed Waters. The vegetable matter fluid ounces that pass over, and to collect the (bruised, if necessary), in the quantity ordered, remainder of the runnings until the proper

rectified spirit (90 per cent.), 1 pint; mix. A In this way the finest fragrant distilled waters may be produced from all flowers, and other aromatic vegetable substances. The points requisite to be attended to are, that the flowers grains; oil of lemon, 6 drachms; oil of laven- be fresh, gathered after the sun has risen and the dew exhaled, and that sufficient water be used to prevent the flowers being burned, but oil of verbena, oil of pimento and neroli, of not much more than is sufficient for this pureach 12 drops (minims); rectified spirit, 1 pose. The quantities usually directed are: pose. The quantities usually directed are: Imperial pint; macerate in a warm room, Roses, 8 pounds (avoirdupois); water, 2 gallons (Imperial); distill 1 gallon for single, and the same water with 8 pounds of fresh roses for double rose water. The usual quantities of aromatic material required in proportion to the amount of distilled water to be obtained, are given in classified form in the Journal de pint extract of cassia, 4 ounces extract of Pharmacie as follows: Fresh aromatic plants, jasmin, and 3 ounces tineture of civet. Filter such as wormwood, black-cherry, scurvygrass, hyssop, cherry-laurel, lavender, balm, mint, peach-leaves, roses, and sage, require 1 part of the plant for each part distilled product desired. Fresh and dry aromatics, as bitter almonds, orange-flowers, melilot, horseradish, elder, and tansy, require 1 part of the plant to 2 parts of distilled product. Dry and ounce attar of bergamot, and 10 drops each very aromatic plants, as angelica, green anise, juniper berries, camomile, canella, cascarilla, Let the mixture stand for a week, and then fennel, sassafras, linden-flowers, and valerian, require 1 part of the plant to each 4 parts of These proportions will be some distillate. 2 ounces attar of lavender, 1 ounce attar of guide both in respect of the distilled waters referred to, and others not included in the list. In general, druggists draw over 2 gallons of water from the respective quantities of flowers, herbs, bark, or seeds, ordered in the pharmacopecias, quantity rather than quality being their object. Manufacturing perfumers, on the contrary, either use an excess of flowers ing together 1 pint extract of tuberose, 1 for their finer odoriferous waters, or they preounce extract of jasmin, 2 ounces extract of serve only the first and stronger portion of the water that distills over; the remainder being separately collected and used for a second distillation with fresh flowers. some cases, where a very superior quality is desired, they re-distill the water of the first distillation and preserve only the first 2, or

even only the first half, that passes over. 1072. Elder-flower Water, Acaciaextract of tuberose, and 2 ounces extract of flower Water, and Bean-flower Water, are prepared in the same manner as rose water.

(See Nos. 1071 and 1079.)

1073. Directions for Distilling Perfumed Waters. The following directions are, in the main, those given by the thoroughly practical chemist, Mr. Arnold J. Cooley. In the distillation of odoriferous waters, manufacturing perfumers employ their utmost care, in order to produce a highly fragrant article, free from any contamination that can vitiate the purity of their still may be of copper, but the head and worm should be formed of solid tin. It should be tial oils, in distilled water. The simple fra- furnished with a high and narrow neck to grant waters of the perfumers are of the prevent the liquor in it spirting over into the former kind; those of the wholesale druggists neck and condensing-worm. A still furnished with a steam-jacket is the most convenient for the purpose, as the heat of steam, or of a Proportions of Aromatics salt-water bath, can alone be safely employed. is to be put into the still along with 2 gallons quantity be obtained. The whole product is

even months, in order that it may lose its No. 1076.)

1075. To Prevent Distilled Waters

1075. To Prevent Distilled Waters tillation, but Mr. Haselden, of England, rewith the water and the whole transferred to the stock vessel, where the oil will separate; of stoneware, furnished with a tap about 2 can be drawn out clear, the oil either rising water a few days afterwards. to the top or sinking to the bottom, according to its specific gravity. As soon as it has acking Distilled Waters. There are certain quired its full odor, or reached maturity, it is carefully decanted into bottles, which are then well corked or stopped, and stored in a moderately cool place. Some of the leading manueach of their more delicate distilled waters, difficult to remove any odor or taint that adheres to the still, still-head, and worm. Even blowing steam through them for some hours of distilled waters by contact with copper, dissolve these metals. In almost all cases, salted or pickled flowers, herbs, &c., are greatly superior to the fresh vegetables for the preparation of fragrant distilled waters. When the former are employed the product has little or none of the herbaceous and raw odor which is always present when the latter are used, besides which they keep better, and 1349.) Carefully prepared distilled waters keep well, and are not liable to any change, but when the reverse is the case, particularly when the liquor in the still has spirted over the neck of the still-head into the condensing worm, they are apt to acetify, and even to become ropy and viscid. A common, but very objectionable plan, in such cases, is to agitate them with a little carbonate of magnesia, and to filter them through paper. The only safe remedy is to re-distill them on the first indication of such change, for magnesia weakens them. Indeed, all their essential oil and fragrance may be removed by increasing the in diameter, is surmounted by an expanded quantity of it. If magnesia, in any form, be head or capital, B, which is furnished with an used for filtering distilled waters, it should be inner ledge, forming a kind of gutter, to rethe carbonate; but a little of even that will ceive the liquid condensed on the inner surface

1074. of Freshly Distilled Waters. The burnt | c, pierced with small holes. A steam pipe, d, smell of waters, frequently arising from care- having a stop-cock, a, is introduced in the less stilling, is usually lost, or greatly lessened, cylinder in the manner shown, terminating in by freezing, or by exposure to a temperature an expansion, b, perforated like the rose of a approaching the freezing point; but if the watering-pot, and located a little below the water be highly charged with essential oil, diaphragm.

then agitated together, and stored, loosely part of the latter will separate, and thus the

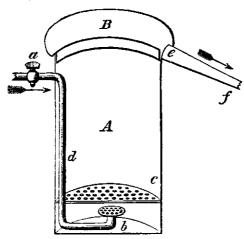
stillage. It is a common practice to separate from Souring. To prevent carelessly preany volatile oil floating on waters after dis pared distilled waters acetifying or turning sour, and to recover those which have begun commends the excess of oil to be well shaken to spoil, a common plan is to shake them up with a little calcined magnesia, or to dissolve in each pint of them 1 grain each of powdered it keeps better thus treated, and full strength borax and alum. This, however, is not to be is ensured. He prefers the stock vessel to be recommended, as it unfits the waters for use as vehicles. Whenever it is unavoidably had inches from the bottom, whereby the water recourse to, the best plan is to re-distill the

general rules or points to be adhered to in distilling perfumed waters: Dry, hard, or fibrous substances should be mechanically divided, and macerated in water before undergoing disfacturing perfumers keep a separate still for tillation. Too great a quantity of materials should not be introduced at one time into the and thoroughly clean them out and dry them body of the still; if this precaution be neafter each distillation, as it is extremely glected, there is a risk of the liquid boiling over or spirting into the receiver. Ebullition should be attained as quickly as possible, and be continuous. Sufficient water should be will not always sufficiently purify them for left undistilled to cover the matter in the still, this species of distillation. In the preparation to guard against its coming in contact with of distilled waters for medicinal purposes, a the sides of the vessel. In this case the matclean, sweet still, still-head, and worm, must 'ter would be decomposed by the heat, and also be employed. The two last should be of yield empyreumatic products; besides, if the tin or glazed stoneware; and the receivers distillation is carried too far, a slimy formashould be of glass or stoneware. The utmost tion is apt to adhere to the sides of the still, care should be taken to prevent contamination which would also be decomposed by the heat, of distilled waters by contact with copper, and have a similar effect on the product. lead or zinc, since they slowly oxidize and These risks may be greatly lessened, if not entirely avoided, by applying heat by means of an oil-bath, regulated by a thermometer; and still better by a bath containing a solution of chloride of calcium (muriate of lime). Any degree of heat between 212° and 285° Fahr. may be obtained and sustained by regulating the strength of the solution. (See No. 7.) Another convenient method is by steam. (See reach maturity, or the full development of No. 1077.) Waters distilled from plants are their odor, in a much shorter time. (See No. apt to have a smoky odor at first, even when the greatest care and precaution have been observed in their distillation; exposure for a short time to the air will remove this, after which they should be kept in closely-stoppered bottles, and preferably in bottles containing only sufficient for probable use at one time; they should be entirely filled and closed air-tight.

1077. Soubeiran's Steam Apparatus for Distilled Waters. The illustration given is a vertical section of Soubeiran's apparatus used in France for obtaining distilled waters. A cylindrical tinned-copper or iron boiler, A, of convenient size, say 31 feet high and 2 feet be dissolved if the water be ever so slightly of the capital, and opening into the exit tube, acidulous.

e. About 6 inches from the bottom of the To Remove the Burnt Smell cylinder is placed a false bottom or diaphragm,

preparation, is placed upon the diaphragm, the capital, B, is applied and luted with dextrine paste; steam is passed through the tube,



and issuing from b, passes through the material, becomes loaded with the volatile matter, rises into the capital, condenses, and passes through f, into a worm or other suitable condenser.

Vanilla Water. Macerate 1 1078. pound vanilla in coarse powder, and 5 pounds salt in 2½ gallons water for 24 hours. Then

distill over rapidly 1 gallon.

Rose Water. Take 48 Troy ounces pale rose, and 16 pints water. Mix them and distill 8 pints. When it is desirable to keep the rose for some time before distilling, it may be preserved by being well mixed

salt).

U. S. Ph. (Se No. 1008.)
O. To Prepare Aromatic Waters 1080. from Essential Oils. The United States Pharmacopæia, although not discarding altoof magnesia, and subsequently filtered. This | fine, and highly esteemed. is the most simple and easy process. The water is obtained pure and transparent, the magnesia being separated by the filtration. The drachm; oil of cedrat, and lavender (Mitchobject of the magnesia is simply to enable the am, of each 40 grains; oil of bergamot and oil to be brought to a minute state of subdivision, and thus present the largest possible surface to the water; but its use is open to the before. objection that it is slightly soluble in water, and is apt to produce, under certain circumstances, a slightly flocculent precipitate. It has been recommended to use porcelain clay, finely powdered glass, or pumice stone, instead of magnesia, as these substances are wholly insoluble. (See No. 1073 and 1081.)

1081. Aromatic or Perfumed Waters. with constant trituration, 8 pints distilled water. After brisk agitation for some time, filter

The material to be distilled, after proper lex (quartz) is unobtainable. Magnesia and sugar were each formerly used for the purpose, but are objectionable. (See No. 1080

1082. Aromatic or Perfumed Waters. Instead of preparing the waters directly from the essential oils, an essence may be made by dissolving 1 Imperial fluid ounce of the essential oil in 9 fluid ounces rectified spirit; 2 Imperial fluid drachms of the essence agitated briskly for some time with 1 Imperial pint distilled water, and filtered through wet filtering paper, will make a good perfumed water. Cooley says this is an excellent formula for extemporaneous waters; but the U.S. Dis. pronounces them feeble for medicated purposes, in the properties of their respective essential oils. (See No. 1008.)

Aromatic Vinegar—Vinai-gre Aromatique. This is a compound of strong acetic acid with cer-tain powerful essential oils. To produce the finer qualities of aromatic vinegar, glacial acetic acid must alone be employed. Aromatic vinegar is used as a pungent and refreshing nasal stimulant in languor, faintness, nervous headaches, dimness of sight, &c. For this purpose it is generally dropped on a small piece of sponge placed in a stoppered bottle, or a vinaigrette, which is only smelt at. It forms a useful caustic for warts and corns. As it is highly corrosive, it should be kept from contact with the skin and clothes. (Cooley.)

1084. Fine Aromatic Vinegar. Take with 1 its weight of chloride of sodium (table of glacial acetic acid, I pound avoirdupois; rectified spirit, 2 Imperial fluid ounces; camphor (pure, crushed small), 2½ ounces; oil of cloves (finest), 11 drachms; oil of rosemary, 1 drachm; oil of bergamot, oil of cinnamon, gether the process of distillation in the preparation of aromatic water, directs, in preference, that water should be impregnated with (in a stoppered bottle), and agitate until the the volatile oil by trituration with carbonate whole of the camphor is dissolved. Very

> 1085. Aromatic Vinegar. Take of camphor, 1 ounce avoirdupois; oil of cloves, 1 thyme, of each 20 grains; oil of cinnamon, 10 grains; glacial acetic acid, 1 pound; mix as

Very fine.

1086. Henry's Aromatic Vinegar. This resembles the preceding, except in being strongly scented with the oils of cloves, lavender, rosemary, and calamus aromaticus only

1087. Vinaigre Aromatique. Take of camphor, 1 ounce avoirdupois; oil of cloves, 15 grains; oil of cinnamon, 10 grains; oil of Take 2 fluid drachms of the essential oil of lavender (English), 5 or 6 grains; glacial the plant, triturate with 2 drachms levigated acetic acid, ½ pint. As the last. It is impowdered silex; then add very gradually, proved by doubling the quantities of the essential oils.

1088. Acetic Perfumes. The stronger the solution through filtering paper wetted aromatic or perfumed vinegars fall under this with pure water. This is a convenient method class of preparations; as do also various for the extemporaneous preparation of per-esprits and eaux (alcooliques) to which a fumed waters, but, without great care in ma-nipulating, the products are inferior instrength to those obtained by distillation. Finely pow-latter may be conveniently prepared by dered or levigated glass may be used when si-simply adding 1 to 1; fluid ounces of glacial

acetic acid to each ½ pint of scented spirit. beaten, washed and dried; pour into the bot-For acetic eau de Cologne and other like perfumes, 11 to 2 ounces of acid, per pint, is generally sufficient.

melling Salts. Sesquicarbonate of ammonia commonly passes under this name, and, with the addition of a few drops of essential oil, is frequently employed to fill smelling bottles. Its pungency, howof the true or neutral carbonate of ammonia. The latter salt continues unchanged in composition, and preserves its pungency as long portion only which flies off suffers decomposition as it volatilizes, separating into gaseous ammonia and carbonic acid. The pungency of the sesquicarbonate, on the other hand, dethe solid state, into carbonate of ammonia, which flies off under exposure to the air; and which remains behind; the weight of the latter being far greater than one-half the weight of the original salt. Carbonate of ammonia, be alone used in filling smelling bottles, if a strong, agreeable, and durable pungency be desired. It is employed, either directly or indirectly, by the makers of all the more esteemed smelling salts of the day; and their predecessors did the same, even long before the chemistry of the two salts, and the rationale of the properties which cause a preference for the one, were known. (Cooley.)

1090. Fine Smelling Salts. Take of carbonate of ammonia (crushed small), 1 pound avoirdupois; oil of lavender (Mitcham), oil of bergamot, of each 1 Imperial fluid ounce; oil of cloves, 2 fluid drachms; oil of cassia, 1 fluid drachm. Rub them thoroughly together, sublime at a very gentle heat into a well-cooled receiver, and at once put the product into a well-stoppered bottle, or bottles. The sublimation may be omitted, but the quality of the product suffers. This is varied in some samples, by substituting 1 ounce of oil of lemon, or a little of the oils of rosemary and sweet flag (calamus aromaticus), for the oils of cloves and cassia; or by adding (after sublimation) a dash (2 or 3 drops per bottle) of essence of musk or essence royale.

1091. Smelling Salts. As before, but taking as perfume, oil of bergamot, 2 fluid ounces; oil of verbena, ‡ fluid ounce; attar of roses, 1 to 2 drachms. It is varied as in the last.

1092. Smelling Salts. Same as No. 1090, but using oil of bergamot and lemon, of each, 4 fluid ounce; essence de petit-grain, 3 fluid drachms; oil of cloves and cassia, of each, 1 fluid drachm; varied, as before, at will.

1093. Inexhaustible Smelling Salts. Take 1 pint liquid ammonia, 1 drachm attar of rosemary, I drachm attar of lavender, ½ drachm attar of bergamot, and 1 drachm attar of cloves. Mix together by agitation in a very strong, well-stoppered bottle. To prepare a smelling-bottle of this mixture, fill a stopper-

tle as much of the mixture as the sponge will absorb, but not sufficient for a drop to escape if the bottle be inverted.

1094. Aromatic Spirit of Ammonia. Take of carbonate of ammonia, 8 ounces avoirdupois; strong liquor of ammonia (.882) 4 Imperial fluid ounces; volatile oil of nutmeg, 4 fluid drachms; oil of lemon, 6 fluid drachms; rectified spirit, 6 pints; water, 3 pints; mix, and distill 7 pints. Specific gravity .870. This is now the only authorized formever, is neither so great nor so durable as that | ula. The product is excellent, and very agreeable in use. (Br. Ph.)

1095. Ammoniated Perfumes. These are prepared by either adding strong liquor of as a particle of it remains unvolatilized. The ammonia to the liquid perfumes (eaux, esprits, &c.,) in sufficient quantity to impart to them a pungent ammoniacal odor, or by adding to the articles, before distillation, the ingredients that, by their mutual reaction, produce ampends solely on its gradual decomposition, in monia. In the former case, ½ to 1½ fluid ounces of liquor of ammonia (.880-.882), per pint, will be required, according to the nature of into bicarbonate of ammonia, which is much the preparation and the degree of pungency less volatile and only slightly pungent, and desired; and in general, when much essential oil is present, a spirit of higher strength than usual should be employed for the esprit, to compensate for its subsequent dilution by the and not the sesquicarbonate, should, therefore, ammonia. In the other case, 4 to 5 drachms of sal ammoniae, and 7 to 8 drachms of earbonate of potash for each pint of the product intended to be drawn over, are mixed with the cold ingredients just before distillation. For this use the liquor of ammonia must be perfectly free from tarry or empyreumatic matter, and have a purely ammoniacal odor.

1096. Ammoniated Eau de Cologne; Ammoniacal Cologne Water, As a per-Take of fume, this is best prepared by either of the methods noticed under ammoniated perfumes. It is now very extensively employed as a substitute for spirit of sal volatile. When intended for use in this way, a more agreeable and effective article may be produced by adding 1 ounce of carbonate (sesquicarbonate) of ammonia, and 1 fluid ounce of the strong liquor of ammonia to each pint of the product, or intended product, which will then have about the strength of the officinal spirit of sai volatile (spiritus ammoniæ aromaticus) of the British Ph. That of the stores has usually

only little more than half this strength.

1097. Eau de Lavande Ammoniacale. To cach Imperial pint of eau de lavande (see No. 989), add of liquor of ammonia (.880-.882), $\frac{1}{2}$ to 1 fluid ounce.

1098. Ammoniacal Lavender Water. Take of oil of lavender (English) 1 fluid ounce; spirit of ammonia (caustic) 1½ pints; mix. The product is the officinal preparation of the French. Used as a stimulating pungent scent, in fainting, headaches, &c.

Derfumed Powders and Rouges. Powders for the hair and skin have almost gone out of use. The basis of perfumed powders is either orris, or fine pearl starch. The perfume of the finest kinds is imparted by alternating layers of starch and fresh f wers, the latter being afterwards separated bottle with pieces of sponge, previously well by sifting. The simple perfumed powders thus obtained, by judicious admixture, form com- | tion of gum tragacanth. For lighter shades, pound or bouquet powders. The tediousness and expense of this process prevent its general employment. The common mode is to seent by the direct addition of extracts or essential oils, or else to mix in powdered fragrant material with the orris or starch.

1100. Violet Powder. Wheat starch, 12 pounds; powdered orris, 2 pounds. Mix together, and add attar of lemon, ½ ounce; attars of bergamot and cloves, each 2 drachms.

root, 12 pounds; powdered bergamot peel, and acacia flowers, each 8 ounces; powdered from the sediment, and bottled. cloves, ½ ounce. Mix and sift. 1114. Azure Paste. Ta

1102. Prepared Bran for the Hair. Powdered wheat bran, 1 pound; powdered

orris, 2 ounces. Mix and sift.

1103. Poudre Noir for the Hair. Starch and orris in fine powder, each 8 powder, each 1 ounce. Mix and sift.

1104. Poudre Blonde for the Hair. Finely powdered starch and orris, 8 ounces each; as in the preceding, but with yellow

ochre for the coloring matter.

1105. Poudre à la Vanille Brune for the Skin or for Sachets. Powdered vanilla, rose-leaves, lump storax, benzoin, rhodium, pallisandre and ebony woods, each 1 pound; starch: sift, and add a few drops of extracts of tuberose and jasmin.

1106. Poudre à l'Œillet Composéefor the Skin or Sachets. Powdered rose leaves and orris root, each 3 pounds; powdered bergamot peel, 1 pound; powdered cloves and cinnamon, each 6 ounces; powdered acacia and orange flowers, each 8

ounces; starch, 3 pounds.

1107. Paints or Rouges for the Skin. Paints or rouges are the means by which the natural color of the skin may be heightened very little beyond the theatres, where they are employed to produce stage effect.

1108. French White. This is the mineral tale, or French chalk, finely powdered and bolted. It forms the basis of the most harmless rouges. Perfume is added as may be

desired.

1109. Pearl White. subnitrate of bismuth in powder. This pigment darkens in atmospheres containing sulwhite for theatrical use.

Pearl Powder. chalk finely bolted and perfumed. The French add oxides of zine and bismuth, each

1 ounce to the pound of chalk.

1111. Caution against Bismuth as a Cosmetic. The continued use of bismuthwhite injures the skin, and ultimately produces paralysis of its minute vessels, renderattempt to conceal by its freer and more frequent application.

1112. Carmine Rouge. Finely bolted 1119. Glycerine Amandine. As the tale, 4 ounces; carmine, 2 drachms. Mix preceding, but adding, with the shaving

the proportion of carmine must be diminished. For commoner pastes, rose-pink replaces the carmine as coloring matter. It may be made

into a pomade.

1113. Bloom of Roses. Powdered earmine of the best quality, 2 drachms, digested with strong ammonia, 4 ounces, in a tightly stoppered bottle for 2 days, at the ordinary temperature of the atmosphere. Then add rose water, 1 pint; and essence of 1101. Poudre d'Iris. Powdered orris rose, 4 ounces. After standing for a week to settle, the clear liquid may be poured off

1114. Azure Paste. Tale and ultramarine, finely bolted, equal parts, triturated with a solution of gum tragacanth into a stiff

paste

1115. Enamel Powder. Take equal parts finely scraped tale or French chalk, and ounces; charcoal and ivory black, in fine pearl-white; sufficient rouge or carmine to slightly tinge it; mix. Used to conceal discolorations; and, without the coloring, to whiten the skin.

osmetics for the Skin and Complexion. parations under this head are designed to powdered cloves, 2 ounces; powdered musk, soften the skin and beautify the complexion. 2 drachms. Mix together with 3 pounds of We annex receipts for the more important. The heating medium in the manufacture of them must be either a water or steam bath.

1117. To Make Amandine. Put into a large marble mortar 2 ounces gum arabic, and 6 ounces white honey; triturate, and when the mixture has been rubbed into a thick paste, add 3 ounces perfectly neutral almond shaving cream. (Sec No. 602.) Then continue the trituration until the mixture has become homogeneous. 2 pounds of fresh cold-pressed sweet almond oil are next allowed to flow from a can above into the mortar, but or changed. They are, however, objectionable only as rapidly as it can be incorporated with preparations, and the use of them extends the mass; otherwise, if it enters in too large quantities, the blending is imperfect, and the amandine becomes oily instead of jellylike and transparent, as it should be when the manipulation has been skillful. In summer temperatures it will be difficult to effect a combination of all the oil; and, therefore, the flow should be stopped as soon as the mixture Pure oxide or becomes bright and assumes a crystalline lustre. The perfume should be mixed with the almond oil, and consists of 1 drachm attar of phide of hydrogen. 1 ounce triturated with bitter almonds to every pound of paste. A 4 ounces of orange-flower water makes liquid little attar of rose and bergamot may also be added-about 1 drachm of each. As soon as Precipitated finished it must be put in close pots.

1118. To Use Amandine. To produce amandine of fine quality is a matter of some difficulty and labor, and requires experience and considerable manipular skill. The details essential to success are noticed under "Emulsions." (See No. 43.) A small quantity, say a lump of filbert size, gives with ing it yellow and leather-like—an effect which, warm water a rich lather, which, when rubbed unfortunately, those who employ it generally over the face and hands, imparts softness, and prevents chapping. It should be wiped off while still in lather, with a dry towel.

together with a little warm and dilute solu- cream, & to 1 ounce of Price's glycerine for

every pound of oil intended to be subsequently | No. 1125), with glycerine substituted for roseadded

1120. Colored Amandine. Amandine may be colored green with spinach-leaves, and yellow and orange with palm oil or annotto, by digesting or dissolving the substances in the oil before adding the scents. A beautiful searlet or crimson may be given to in place of rose. it by adding a little liquid rouge or carmine (ammoniacal), just before removing it from the maceti, ½ ounce; oil of sweet almonds, 2 mortar. Olivine is a similar preparation to ounces; white wax, 1 ounce; glycerine, 4 amandine, but made with olive-oil. It is ounces: mix the spermaceti, white wax and often colored green.

1121. Cosmetic Balsam of Honey. Take finest pale honey, 4 ounces (avoirdupois); glycerine (Price's), 1 ounce; unite by a gentle heat; when cold, add rectified spirit, I fluid spermaceti, 2 ounces white wax, and 12 ounce (Imperial); essence of ambergris, 6 ounces fresh oil of monds, in a water-bath; drops; and at once bottle it. Used to soften pour it into a marble mortar, and stir briskly and whiten the skin, prevent chaps, &c.

of honey prepared as directed in the last receipt, add pure citric acid, 3 drachms. Used to prevent and remove freekles and discolorations.

almonds to a very smooth paste by patiently pounding them in a marble mortar, adding gradually, toward the end, a little rose-water, or orange-flower water, with a few drops of attar of roses or neroli, or a little eau de Cothe paste into covered porcelain pots or jars.

1124. Bitter Almond Paste. equal parts bitter almonds and sweet almonds; and rose-water, a sufficient quantity; and proceed as before. No scent need be added. Both the preceding are occasionally diversified by the addition of either powdered spermaceti in weight equal to about & part of that of the amonds, or of ½ this weight of white soap. Sometimes the white of an egg is added.

1125. Cold Cream. Take 1 ounce avoirdupois each pure white wax and spermaceti, and 1 Imperial pint oil of almonds; melt, pour the mixture into a marble or wedgwood-ware mortar (or a porcelain basin), which has been heated by being immersed for some time in boiling water; add, very gradually, of rose-water, 4 fluid ounces; and assiduously stir the mixture until an emulsion is formed, and afterwards until the whole is very nearly cold, Lastly, put it into porcelain or earthenware pots for use or sale.

1126. Hudson's Cold Cream. This is the addition of 1 fluid ounce grange-flower water.

1127. Sultana Cold Cream. white wax; almond-oil, and butter of cacao, Peru, 2 drachms. After repose, pour off the pomade. clear portion, add orange-flower water, 2 Imperial fluid drachms, and stir it briskly until it White wax and spermaceti, each 1 ounce; oil

each 2 drachms; then add oil of sweet almonds, 4 ounces, and Mecca balsam, 3 drachms; next perfume with rose-water, 6 water, 8 ounces; and tincture of benzoin, 2 drachms; stir antil cold.

water. Melt together spermaceti, 6 ounces; and white wax, I ounce, in I pound of sweet almond oil. Then remove from the fire, and stir in Price's glycerine, 4 ounces; and when congealing, perfume with attar of rose, 20 drops. Other attars may be used as desired.

1130. Rose Glycerine Cream. Speroil of almonds together first; then add the glycerine and stir the mixture until cool.

Perfume with attar of rose.

1131. Snow Cream. Melt 3 ounces pour it into a marble mortar, and stir briskly to prevent granulation; when of the consist-1122. Freckle Balsam. To the balsam ence of butter, triturate until the mixture has a white, creamy appearance; then, during continued trituration, add by degrees a mixture of 1 ounce double water of roses and 1 ounce odorless glycerine; incorporate for 20 minutes. 1123. Almond Paste. Reduce blanched and add 10 drops essence of roses; beat for about half an hour, put into pots or jars, and close air-tight.

1132. Fine Camphor Ice. Melt together over a water-bath, white wax and spermaceti, each 1 ounce; camphor, 2 ounces; logne, or other perfume, at will. Lastly, put in sweet almond oil, 1 pound. Next, triturate in the manner directed for amandine, and Take allow 1 pound of rose-water to flow in slowly during the operation. Then perfume with attar of rosemary, 1 drachm. An inferior and cheaper quantity may be made as follows:-

1133. Camphor Ice. Oil of sweet almonds, 2 ounces; spermaceti, 4 ounces; white wax, 2 ounces; camphor, ½ ounce; melt them over a water-bath, run in moulds of proper size and form.

1134. Pate d'Amande au Miel. Rub together 1 pound honey and the yolks of 8 eggs; then gradually add sweet almond oil, 1 pound, during constant trituration, and work in bitter almonds—blanched and ground to meal, 8 ounces; finally perfume with attars of bergamot and cloves, each 2 drachms.

1135. Pomade Rosat. Melt together white wax, 2 ounces; oil of sweet almonds. 4 ounces; alkanet, 3 drachms. Digest for several hours, strain, and add 12 drops attar of rose; used for the lips.

1136. Cacao Pomade. Take of cacao prepared in the same way as the above, with butter, oil of almonds, white wax (pure), equal parts; melt them together, and stir until nearly cold. Used as an emollient skincosmetic, particularly for chapped lips, hands, ounce avoirdupois each, pure spermaceti and &c. It is sometimes colored with a little palm-oil. Scent may be added at will. It is each 2 pound; melt, and stir in of balsam of highly esteemed by some persons as a hair

1137. Crême de Psyché—for the Lips. concretes. Used like cold cream, lip-salve, &c. of sweet almonds, 5 ounces. Melt together, 1128. Crême de Cathay. Melt together and pour in Mecca balsam, 1 drachm; and over a water bath, white wax and spermaceti, stir until the mass congeals, then add 10 grains powdered acetate of lead.

1138. Lait Virginal. Orange-flower drachms. The former is added very slowly to 1129. Glycerine Cream. This superior the latter during constant trituration, so as cosmetic is the well-known cold-cream, (see to produce an opalescent milky fluid.

make as directed for the preceding milks.

bottle it. This is a highly esteemed cosmetic for the skin and complexion. Milk of cucumbers may be made in the same manner as milk of roses, by substituting juice of cucumbers for rose-water.

1141. Lotion for Freckles. pure hydrochloric acid, specific gravity 1.13, 1 Imperial fluid drachm; distilled water, 1 pint; mix, and add rectified spirit and eau de ounce.

1142. Lotion to Remove Freckles. Dissolve 3 grains borax in 5 drachms each rose-water, and orange-flower water; a very simple and harmless remedy is equal parts of pure glycerine and rose-water, applied every

night, and allowed to dry. 1143. Iodine Lotion for Eruptions of the Skin. Take iodide of potassium, 30 grains avoirdupeis; iodine, 15 grains; distilled or soft water, 1 Imperial pint; add only a couple of table-spoonfuls of the water at first, and when by agitation the solids are dissolved, add the remainder. This is the common and best form of ioduretted lotion or wash for ordinary purposes. It is often serviceable in enlarged and indurated glands, itch, &c. Or: take iodide of potassium, 1 to 2 drachms, and distilled water, 1 pint; dissolve.

1144. Glycerinated Lotion of Iodide of Potassium. To the last add 1 ounce Price's glycerine. Both are excellent skincosmetics, employed like Gowland's lotion particularly for persons with a scrofulous or from it. It is also excellent as a hair-wash. The product of the last formula may be advantageously used instead of hair-oil.

1139. Crême de Pistache. Pistachio sal-ammoniac) or 5 or 6 drops (not more) nuts, 3 ounces; green oil, palm soap, wax, hydrochloric acid, increases the solvent action and spermaceti, each 1 ounce; orange-flower of the water, and renders the preparation less water, 31 pints; essence of neroli, 12 ounces; liable to suffer change, but is not otherwise advantageous. When absolutely pure dis-1140. Milk of Roses. Place over a tilled water is not used, this addition of acid water-bath, oil soap, I ounce; and melt it in should be made to prevent decomposition. 5 or 6 ounces rese-water; then add white Some persons dissolve the sublimate in 2 or 3 wax and spermaceti, 1 ounce, and continue fluid drachms rectified spirit before adding the heat until they have melted. Next take the water, to facilitate the process; but this 1 pound blanched almonds, beat them to a also, though convenient, is unnecessary. meal in a clean marble mortar, with 3½ pints Apart from its value as a cosmetic, the above rose-water, admitted portionwise, during the lotion is an excellent application in a variety trituration. (See No. 43.) The emulsion of obstinate eruptions, and in obstinate sores almonds, thus made, is to be strained without and glandular swellings and indurations of a pressure through washed white muslin, and minor character; the first of which it seldom run very slowly into the previously formed fails to relieve, provided the bowels and diet soap-mixture; the whole being blended at be carefully attended to, and sufficient exerthe same time by energetic trituration. To-cise be taken daily. Ordinary mild cases of wards the end of this operation, 2 drachms itch rapidly disappear under its use. The attar of rose, dissolved in 3 ounces inodorous addition of about 1 ounce pure glycerine conalcohol, are to be let into the mixture very verts it into a lotion admirably adapted to gradually, and in a thin stream, during con-stant rubbing of the mass. This cautious as into one of the best cosmetic washes known. manipulation is indispensable to the smooth- For the latter purpose, a little pure rose water ness and perfection of the milk. (See No. or orange-flower water may be added, at will, 43.) The last operation is to strain; and, to give it fragrance; a like quantity of distillafter the liquid has had a day's repose, to ed water, in the case of any of the above additions, being omitted.

1146. Eau de Beauté. Biehloride of mercury (corrosive sublimate), 8 grains; camphor, 10 grains; sulphate of zine, and solution of lead (liquor of acetate of lead), Take each 2 scruples; rose water 5½ ounces; and bichloride of mercury, 6 grains avoirdupois; the yolk of a small egg. This mixture is regularly in use by Creole ladies for beautify-

ing their skin.

1147. Glycerine Lotion. Take Price's rose, each 2 fluid ounces; Price's glycerine, 1 glycerine, 1 ounce, and distilled or pure soft water, 19 ounces; mix. A good strength for daily use as a cosmetic wash, or as a vehicle for other ingredients, for which purpose it is greatly preferable to milk of almonds; also as a lotion to allay itching and irritation of the skin, prevent chaps, exceriations, the effects of weather, climate, &c. It is likewise applied to the hair instead of oil.

1148. Glycerine Lotion No. 2. Take of Price's glycerine, 1 ounce, and distilled water, 17 ounces; mix. A proper strength when more marked effects are desired; as in chapped hands, lips, and nipples, obstinate excoriations, abrasions, chafings, sunburns, persistent roughness or hardness of the skin, &c.

1149. Glycerine Lotion No. 3. of Price's glycerine, 3 ounces; water, 17 ounces; mix. This is adapted for use in obstinate eases, or when still more rapid effects are desired; also as an application to

burns and scalds.

1150. Fragrant Glycerine Lotions. Any of the foregoing glycerine lotions may be rendered fragrant and more agreeable by emscorbutic taint, or who are troubled with ploying rose water or elder-flower water, ineruptions, swellings, or indurations arising stead of water, or by the addition of a little eau de Cologne, lavender water, or other scent, at will. The addition of a few drops of essence of musk or of ambergris, per pint, or 1145. Lotion of Bichloride of Mer- of a couple of ounces of eau de rose or eau cury. Take corrosive sublimate (in coarse de fleurs d'oranges, in lieu of an equal bulk of powder), 10 grains avoirdupois; distilled wa- water, imparts a delicate odor which is always ter, 1 Imperial pint; agitate them together highly esteemed. In like manner they may until solution be complete. The addition of be medicated or increased in efficacy, in 5 or 6 grains hydrochlorate of ammonia (pure various ways, for toilet and personal use.

Thus, the addition of a little borax (2 or 3 to the most tender surfaces without producdrachms per pint), renders them more effecting injury, and as it does not dry up, virtually ive in chaps, excoriations, &c.; a little salt of maintains the parts in a constantly moist contartar, or of lemon juice, vinegar, or rectified dition, excluding the air and promoting the spirit, increases their power of allaying itching healing process. and morbid irritability in skin-diseases, as well as converts No. 1 (more particularly) into an excellent wash for freckles and like disdrachin or so of iodide of potassium, or of compound tineture of iodine, we have a healthful cosmetic wash particularly serviceable to persons with a scrofulous taint. Strongly scent it with the oils of origanum and rosemary, or impregnate it with a certain proportion of cantharides, or some other appropriate stimulant and rubefacient, and we have respectively the most cleanly, convenient, the cosmetic and allied treatment of the person, would alone fill many pages.

1151. To Test the Purity of Glycer-Glycerine weighed at the temperature of 60° Fahrenheit should have no less than 29° B.; if it contains lime or alkalies, one degree should be deducted, as these substances

make it heavier.

Rubbed on the hand, it should be perfectly inodorous. Impure glycerine, under this test, has a disagreeable smell. The impurity causing this odor is mostly butyric acid, as by contact with the glycerine it forms a very volatile glycerole. Such an article will always grow worse by age.

The presence of chlorine, sometimes used for bleaching glycerine, is detected by tinging the sample blue with sulphate of indigo, and then adding a little sulphuric acid; if free chlorine, or chloride of calcium, be present,

the blue color will disappear.

If a few drops of a solution of nitrate of silver be added to glycerine, the presence of chlorine is marked by the formation of a white precipitate.

Oxalate of ammonia will precipitate lime, if present. Lead will be detected in the same way by hydrosulphate of ammonia; and sulphuric acid by a soluble salt of baryta.

Cane sugar may be traced by increased sweetness of taste; also by dissolving the glycerine in chloroform, in which it is completely soluble if pure, sugar being insoluble

1152. Caution About Glycerine. The property which has caused most annoyance In the use of glycerine is its strong affinity for water. Although glycerine has a pleasant, sweetish taste, yet the first sensation that is felt when it is applied to the tongue is one of pain and burning. This is caused by the fact that the glycerine absorbs all the moisture from the surface that it touches, and thus dries it up and parches the nerves. Ignorant grant and much more agreeable and effective. of this fact, nurses and mothers have applied Itsdaily use as a cosmetic wash renders the skin pure glycerine to the chafed skin of infants, beautifully soft and white, and prevents and and produced great pain. The glycerine removes chaps, sunburns, &c. ought to have been first mixed with an equal 1158. Cazenave's Lotic

1153. Fine Glycerine Lotion. cerine, 3 fluid ounces; quince-seed mucilage, (see next receipt), 10 fluid drachms; pulverized colorations. 8 or 10 grains of bichloride of cochineal, 5 grains; hot water, 1½ fluid ounces; mercury, per pint, converts it into the ad-inodorous alcohol, 2½ fluid ounces; oil of rose, mirable lotion of that substance. (See No. 8 drops; pulverized gum-arabic; ½ drachm; 1145.) In like manner, by the addition of a water, 8 fluid ounces. Rub the powdered cochineal first with the hot water gradually added, and then add the alcohol. triturate the oil of rose well with the powdered gum-arabie, and gradually add the water as in making emulsion. (See No. 43.) With this mix well the solution first formed, and filter, and to the filtered liquid add the glycerine and mucilage of quince seeds, and shake well. The mucilage of quince seeds and useful hair cosmetics. Indeed, merely to should always be freshly made. If the alcoenumerate all the uses it may be placed to in hol is sweet and free from foreign odor, and the glycerine perfectly inodorous, a less quantity of oil of rose may suffice. If care is taken in its manufacture, this will form a beautiful and elegant preparation, with a rich rosy fragrance. When applied to the skin it imparts an agreeably soft, smooth, and velvety feel. It is an excellent application for the face after shaving, or for allaying the irritation caused by exposure to the wind.

1154. Quince Mucilage. The mucilage of quince seeds may be made by boiling for 10 minutes 1 drachin quince seeds in ½ pint water, and straining. This is sometimes used as a bandoline, but it soon decomposes, and, therefore for that purpose, only very small

quantities should be prepared.

1155. Gowland's Lotion. The formula sanctioned by the medical profession is to take of Jordan almonds (blanched), 1 ounce; bitter almonds, 2 to 3 drachms; distilled water, pint; form them into an emulsion. To the strained emulsion, with agitation, gradually add of bichloride of mercury (in coarse powder), 15 grains previously dissolved in distilled water, 1 pint. After which further add enough water to make the whole measure exactly 1 pint. Then put it in bottles. This is used as a cosmetic by wetting the skin with it, and gently wiping off with a dry cloth. It is also employed as a wash for obstinate eruptions and minor glandular swellings and indurations

1156. Lotion of Borax, for Sore Gums and Nipples. Take 5 drachms powdered borax; distilled water, 2 pint; mix. An effective wash for sore gums, sore nipples, exceriations, &c., applied twice or thrice daily,

or oftener.

1157. Glycerinated Lotion of Borax for Chaps and Sunburns. Take 6 drachms avoirdupois powdered borax; Price's glycerine, 2 ounce; rose-water or elder-flower water, 12 ounces; mix. Resembles the last, but is fra-

1158. Cazenave's Lotion of Cyanide bulk of water, or at least with so much as of Potassium. Take cyanide of potassium, would remove its burning action on the sense 5 grains avoirdupois; emulsion of bitterof taste. This being done, it may be applied almonds, 3 Imperial fluid cunces; dissolve,

Used like the last, to allay itching and irrita- eau de rose; and put it into covered pots. tion, particularly after shaving; also for freckles and pustules. (See No. 43.) The above is Cazenave's formula. The next receipt is, however, preferable,

of Potassium. Take cyanide of potassium, 6 grains avoirdupois; glycerine, 1 ounce; strongest camphor-water, 2½ ounces; mix.

(See No. 1160.)

1160. Caution Against Cyanide of **Potassium.** Cyanide of potassium is highly lotions are pleasant-tasted, they should not a stoppered phial, for 24 hours; and, if necesbe left out of the dressing-case; nor should a sary, decant the clear portion. larger quantity than that above given be kept in use at once; nor, under ordinary circumstances, should they be applied to a large surface at a time. If not kept under lock and key, it is safest to label them Poison. Kept with care, and properly employed, they

are safe and useful lotions.

1161. Cherry-Laurel Lotion, or Shaving Wash. Take genuine distilled cherry-laurel, 2 Imperial fluid ounces; rectified spirit, 1 fluid ounce; glycerine, ½ ounce; distilled water, 7½ fluid ounces; mix. Used to allay irritation of the skin, particularly after shaving, the part being moistened with it by means of the tips of the fingers; also used as a wash for freckles and pustules, and to remove excessive moistness or greasiness of the Milk of bitter-almonds is often substituted for the glycerine and spirit, but not for the hair.

1162. for the Complexion. Mix ½ ounce powdered borax, and I ounce pure glycerine, with 1

water.

1163. Pomade de Ninon de l'Enclos. Take of oil of almonds, 4 ounces avoirdupois; hor's lard, 3 ounces; spermaceti, 1 ounce; melt, add of expressed juice of house-leek, 3 Imperial fluid ounces, and stir until the mixture solidifies by cooling. A few drops of ored, it forms white rose lip salve. esprit de rose, or of eau de Cologne, or lavande, may be added to scent it at will. Used as a general skin-cosmetic; also for wrinkles and freckles. It is said to be very softening,

cooling, and refreshing.

1164. Pomade de Beauté: Pomade de Vénus. Take of oil of almonds, 1 pound; spermaceti (pure), 2 ounces; white wax (pure), 1½ ounces; glycerine (Price's), 1 ounce; balsam of Peru, 2 ounce; mix by a gentle heat, and stir the mass until it begins to solidify. It is sold either white, or tinted of a delicate rose or green color. Used both as a hair and skin cosmetic. It forms an elegant alkanet to color. substitute for ordinary cold-cream, lip-salve. &c., and is much recommended by the makers for improving the quality and promoting the growth of the hair.

Shaving Paste; Pate pour Faire la Barbe. Take of Naples-soap (genuine), 4 ounces; curd-soap (air-dried and powderea), 2 ounces; honey (finest), 1 ounce; essence of ambergris (or essence royale), oil of cassia, oil of nutmeg, of each 10 drops; the alkanet, may answer the purpose.

(See Nos. 602, &c., and 607.)

1166. Shaving Paste. Take of white soft-soap (see No. 600), 4 ounces; honey-soap (finest, sliced), 2 ounces; olive-oil, 1 ounce; 1159. Glycerinated Lotion of Cyanide water, 1 or 2 table-spoonfuls; carbonate of Potassium. Take cyanide of potassium, soda, 2 drachms; melt them together, and form a paste, as before, adding a little proof spirit and scent, at will. Some persons melt with the scap about 1 drachm of spermaceti.

1167. Colored Collodion for the Skin. 1 ounce collodion, 3 grains each pure annotto poisonous when swallowed, and as the above and dragon's blood; digest, with agitation, in

1168. Flesh Colored Collodion. ounces collodion; 1 drachm palm oil; alkanet, 15 grains; digest, &c., as in the last receipt. This dries of a good skin color; but it is not so strong as the product of the preceding formula.

1169. Glycerinized Collodion may be obtained by substituting 2 drachms of glycerine for the palm oil in the preceding receipt. This is exceedingly supple, does not crack or scale off from the skin, and accommodates

itself to the motions of the part.

1170. Peruvian, or Red Lip Salve. Take of spermaceti ointment, ½ pound; alkanet root, 3 or 4 drachms; digest, at a gentle heat, until the first has acquired a rich deep red color, then pass it through a coarse strain-When the liquid fat has cooled a little, stir in thoroughly 3 drachms balsam of Peru. In a few minutes pour off the clear portion Glycerine and Borax Lotion from the dregs (if any), and add 20 to 30 drops oil of cloves. Lastly, before it cools, pour it into the pots or boxes. The product forms the quart camphor-water. Wet the face morning finest and most esteemed lip salve. 2 or 3 and evening with this lotion, allowing it to drops of essence of ambergris, or of essence dry partially, and then rinse off with soft royale, improve and vary it.

1171. Rose Lip Salve. As the above, but using only 1½ drachms balsam of Peru, and replacing the oil of cloves with a few drops of attar of roses, or sufficient to give the mixture a marked odor of roses. Some makers omit the balsam altogether. If uncol-(See No.

1172. White Lip Salve. Take 1 pound spermaceti ointment, liquify it by the heat of warm water, and stir in ½ drachm neroli or

essence de petit-grain as before.

Glycerine Lip Salve. prepared by adding \$\frac{1}{6}\$ to \$\frac{1}{6}\$ part of glycerine to any one of the above whilst in the melted state, and stirring the mixture assiduously until it begins to cool.

1174. French Lip Salve. Mix together 16 ounces lard, 2 ounces white wax, nitre and alum in fine powder, of each, \(\frac{1}{2}\) ounce;

1175. German Lip Salve. Butter of cacao, ½ ounce; oil of almonds, ½ ounce; melt together with a gentle heat, and add 6

drops essence of lemon.

1176. Gants Cosmétiques. These are white kid gloves, which have been turned inside out, and brushed over with a melted compound of wax, oil, lard, balsam, &c. The Peruvian lip calve (see No. 1170) without beat them to a smooth paste with water or excellent method for softening the hands.

or Baldness. Liliments or washes to make the hair grow, can always be employed, with greater or less success, so long as there is any vitality left in the hair follicles or roots. If, however, these are entirely dead or destroyed, there is no possibility of inducing a fresh growth of hair. This will be evident from the shining or glistening appearance the scalp assumes when the hair roots are destroved. The loosening of the hair, which frequently occurs to young persons, or those of the middle period of life, will generally, if neglected, become real baldness. Such a state is common in women, and generally terminates. in its mildest form, in excessive loosening of the hair. The case, however, is not the hopeless one which is generally imagined; and if proper treatment be pursued, the hair will grow afresh, and assume its pristine strength. A useful practice in men, and those of the opposite sex whose hair is short, is to immerse the head in cold water morning and night, dry the hair thoroughly, and then brush the scalp, until a warm glow is produced. For women with long hair, this plan is objectionable; and a better one is to brush the scalp until redness and a warm glow are produced, then dab among the roots of the hair one or other of the hair lotions. If the lotion produce smarting or tenderness, the brush may be laid aside, but if no sensation is occasioned, the brushing should be resumed, and a second application of the lotion made. This treatment should be practiced once or twice a day, or at intervals of a few days, according to the state of the scaip; namely, if tender, less; if insensible, When the baldness happens more frequently. in patches, the skin should be well brushed with a soft tooth brush, dipped in distilled vinegar morning and evening, or dipped in one of the washes given below. If either of these lotions should be found too irritating to the skin, use them in smaller quantity, or diluted, and less frequently. If they have the effect of making the hair harsh and dry, this inconvenience may be removed by the use of oil or pomatum after each application of the lotion. Pomatums for the growth of the hair are very inferior to the lotions in efficacy. The basis of most heir invigorators and restorers is either the tincture or the vinegar of cantharides; the method of preparing the latter ingredient is given in the next receipt.

1178. To Prepare Vinegar of Cantharides. This preparation is not always obtainable in the drug stores, and is made by macerating, with agitation for 8 days, 2 ounces powdered cantharides in 1 pint acetic acid; then press and strain.

Wash for Restoring Hair. Mix 1 ounce vinegar of cantharides with 1 ounce eau de Cologne and 1 ounce rose water. Or, a ounce tineture of cantharides, 2 ounces eau de Cologne, ½ drachm oil of nutmeg, and 10 lrops oil of lavender.

1180. Morfit's Hair Tonic. Scald black tea, 2 ounces, with 1 gallon boiling water; bers for this purpose. Dissolve 1 ounce salts strain, and add 3 ounces glycerine; tincture of tartar in 1 quart soft water; sprinkle freely cantharides, \(\frac{1}{2}\) ounce; and bay rum 1 quart. on the head and rub well till a lather is formed; Mix well by shaking and then perfume.

1181. Regenerative Glycerine Hair be used if desired.

Wash. Take I ounce, avoirdupois, glycerine 1189. Shampoo Liquor. Salts of tar-

ashes for Failing Hair (Price's); strongest can de Cologne, 1 Imperial pint; liquor of ammonia (specific gravity 880-882), 1 fluid drachm; oil of origanum and oil of rosemary, each, & fluid drachm; tineture of cantharides, 1 fluid ounce; briskly agitate them together for 8 or 10 minutes, then add & pint strongest camphor water, and again well agitate. A few drops of essence of musk are often added. An excellent hair lotion, and one that supersedes the necessity of using oil or pomade.

1182. Erasmus Wilson's Hair Wash. Take 8 Imperial fluid ounces strongest eau de Cologne; tincture of cantharides, 1 fluid ounce; English oil of lavender, and oil of rosemary, each. 1 fluid drachm; mix. It is improved by the addition of ½ fluid drachm oil of origanum, or by its substitution for the oil of lavender; but the omission of the latter

renders it less odorous.

1183. Parisian Wash to Gradually Darken the Hair. Take of green sulphate of iron, 15 to 20 grains; distilled verdigris, 5 or 6 grains; good white wine, 1 Imperial pint; perfume with eau de Cologne to suit; mix. A favorite among the fashionable Parisians. The above will iron-mould linen if permitted to come in contact with it.

Wash to Gradually Darken the 1184. Hair. Take of sulphate of iron (green, crushed), 2 drachms avoirdupois; rectified spirit, 1 Imperial fluid ounce; oil of rosemary, 10 or 12 drops; pure soft water, ½ pint; agitate them together until solution and mixture are complete. Many persons substitute the strongest old ale for the water ordered above.

(See No. 1183.)

1185. Wash to Darken the Hair. Take of rust of iron, 2 drachms avoirdupois; old ale (strongest), 1 Imperial pint; oil of rosemary, 12 to 15 drops; put them into a bottle, very loosely cork it, agitate it daily for 10 or 12 days, and then, after repose, decant the clear portion for use. (Sec No. 1183.)

1186. Wash for Dry, Stubborn Hair. The best and most effective of these consists of 11 ounces avoirdupois glycerinedissolved in 1 Imperial pint of any fragrant distilled water, as that of roses, or orange or elder flowers; 15 to 20 grains salt of tartar (carbonate of potassa) per pint, is sometimes added.

1187. Wash to Cleanse the Hair and

1187. Wash to Cleanse the Hair and Scalp. 1 tea-spoonful powdered borax; 1 table-spoonful spirits of hartshorn; 1 quart soft water. Mix all together and apply to the head with a soft sponge; then rub the head well with a dry towel. Use once a week.

Another excellent method of cleansing the hair, is to take the yolk of an egg, and rub it in thoroughly a little at a time. It will pro-duce a slight soapy lather, which should be rinsed out with soft water. This leaves the scalp perfectly clean, and the hair soft and

silky

Barbers' Shampoo Mixture. 1188. Shampooing is a term used for cleansing the head and hair. Salts of tartar (carbonate of potassa) is the principal article used by barwash off with clean water. Bay rum can then

excellent wash for the hair is made by dissolving $\frac{1}{2}$ ounce carbonate of ammonia and $\frac{1}{2}$ ounce borax in 1 quart water thereto 2 ounces glycerine, 3 quarts New England rum, and I quart bay rum. The hair, having been moistened with this liquor, is clean, and the hair moist and glossy.

1191. Hair Curling Liquid. soon as the ingredients are dissolved add 3 are only occasionally met with in the stores, table-spoonfuls strong spirits of camphor. On 1199. Walnut Hair Dye. The simplest

Lastly, add enough water to make the whole cool place. measure 1 pint, with a little esprit de rose, it with the fingers. Shake before using.

1193. Wild Rose Curling Fluid. Take 2 drachms avoirdupois dry salt of tartar (carbonate of potassa); powdered cochineal. This is composed of 2 different liquids. drachm; liquor of ammonia and esprit de 6 drachms avoirdupois good recent sulphuret rose, each 1 fluid drachm; glycerine, 1 ounce; of potassium; distilled water, 2 Imperial fluid rectified spirit, 11 Imperial fluid ounces; diskair is moistened with it, and then loosely adjusted. The effect occurs as it dries

1194 Take of essential oil of almonds. Lax Hair. 1 Imperial fluid drachm; oil of cassia, ½ fluid drachm; essence of musk, ½ fluid drachm; recounces distilled water in which has been dis-solved 1 ounce finest gum-arabic. The hair and scalp are slightly moistened with the liquid, and the hair at once arranged without | The strongest, intended to dye the hair black,

gum tragacanth for 30 hours in 1 gallon rosewater, stirring frequently; strain through a of the nitrate to the fluid ounce. This cloth, and let it stand for a few days; then tion stains the skin as well as the hair. strain again and work into it 4 drachms oil of roses. (See No. 1152.)

jasmin, and 5 drops aniline, with 4 pounds names, for which a most extravagant price is pure glycerine.

1197. How to Dry a Lady's Hair. The lady should recline on a lounge or a sofa, with her long hair hanging over the end. A pregnated with benzoic acid combined with 7 fluid drachms; distilled water, 1 ounce; mix. carbonic acid, rapidly absorbs the moisture in the method of using these liquids is given the hair, which should be previously well in the following receipt:

tar, 4 ounces; pulverized borax, 4 ounces; wiped with towels, so as to be as free from wet

Hair Dyes. The numerous pre-parations vended, under different to be shampooed with the hands until a slight names, as hair dyes, have generally a basis of lather is formed; and the latter being then lead or silver, and possess a sameness of comwashed out with clear water, leaves the head position which scarcely occurs, to an equal extent, in any other class of cosmetics. A Take few, it is true, contain bismuth, crude pyroborax, 2 ounces; gum-arabic, 1 drachm; add gallic acid, and certain astringent vegetable hot water (not boiling), 1 quart; stir, and as juices, as their active ingredients; but these

retiring to rest wet the hair with the above liquid, and roll it in twists of paper as usual. of green walnuts. This is the venerable hair 1192. Curling Fluid for the Hair. dye of Paulus Ægineta. To preserve this Take I ounce avoirdupois finest white gum- juice, a little rectified spirit is commonly added arabic; good moist sugar, ½ ounce; pure hot to it, with a few bruised cloves, and the whole water, ‡ Imperial pint; dissolve. To the digested together, with occasional agitation, water, 4 Imperial pint; dissolve. To the digested together, with occasional agitation, solution, when cold. add 2 fluid ounces rectifor a week or fortnight, when the clear porfied spirit; corrosive sublimate and powdered tion is decanted, and, if necessary, filtered. sal-ammoniae, each 6 grains; the last two Sometimes a little common salt is added with being dissolved in the spirit before admixture. the same intention. It should be kept in a

1200. Pyrogallic Hair Dye. Take of ean de Cologne, or ean de lavande, to scent it. pyrogallic acid, i ounce; dissolve it in hot The hair is moistened with the fluid before distilled water, 12 ounces; and, when the putting it in papers or papillotes, or twisting solution has cooled, gradually add of rectified spirit, & fluid ounce. It may be made a little

stronger or weaker at will.

Beautiful Black Hair Dye. 1201. ounces; liquor of potassa, 12 drachm; agitate tilled water, 18 ounces; digest, with agitation, them together, after repose decant the clear for a week, and then decant or filter. The solution into a stoppered phial, and label the hair is moistened with it, and then loosely bottle either Solution No. 1, or The Mordant. (See No. 93.) This solution does not stain Drying Washes for Moist, the skin, and is an effective and easily prepared mordant. In some of the mordants sold in the shops, the liquor of potassa is omitted. drachm; essence of musk, ½ fluid drachm; rectified spirit, 2½ fluid ounces; mix, and add graday avoirdupois crystals of nitrate of silver; disually, with brisk agitation, 16 avoirdupois tilled water, 2 Imperial fluid ounces; dissolve in a stoppered phial, and mark it either Solu-tion No. 2, or The Dye. This is the average strength of the best silver-dyes of the stores. wiping, whilst still moist. Shake before using in a few cases are made with 2 drachms of 1195. Rose Bandoline. Steep 6 ounces the nitrate to 1 fluid ounce of distilled water; weaker ones, for brown, with only 1 drachm of the nitrate to the fluid ounce. This solusolutions are usually put up in flat stoppered phials, and one of each, handsomely labeled, 1196. Hair Gloss. Mix 1 pint spirit of sold together in a case under various fanciful generally charged. They form the most convenient, effective, and expeditious hair dye known, and the one now chiefly sold and used by the large perfumers and hair-dressers. pan containing 2 or 3 bits of ignited charcoal Other nearly similar mordants are recom-is then placed under it, and a little powdered mended by different good authorities. A good benzoin sprinkled upon the lighted fuel. The formula is:—Take of liquor of potassa, 3 thick smoke which rises and is strongly im fluid drachms; hydrosulphuret of ammonia,

1202. Method of Using the Hair! care being taken not to make the man, too wee, as that would interfere with the next operational bulk of water.

1206. Blonde or Flaxen Hair Dye. dye, or Solution No. 2, by means of a small-potassium and distilled water. toothed comb, or what is more convenient, a with the dye, are now removed by rubbing potassium solution as in last receipt.

them with a piece of rag or sponge, or the cor 1208. Golden Yellow Hair Dye. ner of a napkin wetted with a little of the the lapse of a few minutes, the skin is sponged clean with a little warm water, and wiped dry, and the hair arranged with the comb. in the usual manner. It is better to avoid rubbing or washing the hair for a few hours. Sometimes the two operations are reversed, produced is more permanent, but stains on the skin are less easily removed. The whole process, if expertly managed, may be completed in from 10 to 15 minutes.

Hydrosulphate or Hydrosulphuret of Ammonia (also called sulphuret or sulphide of ammonia), used as a mordant in dyeing the hair with either silver 2 parts; boil in water sufficient to dissolve the sulphur; filter, and to the filtered liquid add for every 8 parts of sulphur used, 33 parts of sulphate of ammonia. After agitation and repose, the clear supernatant liquid must be decanted, and preserved in bottles. duct contains traces of lime, which do not, however, unfit it for use in the cosmetic art. hair, the neutral hydrosulphuret of ammonia more sulphur than is necessary to neutralize on very light hair. the ammonia, and it be used in excess, the The neutral hydrosulphuret is prepared by second portion of liquor of ammonia equal to that first used. (See No. 1201.)

1204. Red Hair Dye. An acidulated potassio-tartrate of antimony or tartar-emetic weak mordant of neutral hydrosulphuret of ammonia (see No. 1203), or the bisulphuret (carefully avoiding excess) gives a red turning Brown hair may have a golden tone imparted on the orange, which tones well on light-brown to it by the judicious application of any of hair. A solution of sulphantimoniate of polithe yellow dyes already noticed. Light hair

1205. Red Hair Dye. A strong infu-Dye. The hair (perfectly clean) is first sion of safflowers, or a solution of pure rouge, thoroughly wetted to the roots with Solution in a weak solution of crystallized carbonate of No. 1, previously diluted with 4 or 5 times its soda, gives a bright red like henna, or a redbulk of pure water, or of the highest strength dish yellow, according to its strength, if folthat can be used without irritating the skin, lowed, when dry, by a mordant of lemon juice care being taken not to make the hair too wet, or vinegar diluted with one half to an equal

the purpose, and the action and absorption of Mix in 10 ounces distilled water, 1 ounce acethe mordant is promoted by the free applicatate of iron, 1 ounce nitrate of silver, and 2 tion of the former for a short time. After ounces nitrate of bismuth; moisten the hair the lapse of 2 to 5 minutes, the hair is with this mixture, and, after an hour, touch it thoroughly but lightly moistened with the with a mixture of equal parts of sulphide of

1207. Blonde Hair Dye. half-worn tooth brush, care being taken to method is by moistening the hair with a mixtouch the skin as little as possible. Any ture of 2 ounces protochloride of tin and 3 stains left on the skin by accidental contact ounces hydrated lime. An hour after, use the

solution of bichloride of tin, sufficiently diluted, mordant previously diluted with water. After followed by a mordant of hydrosulphuret of ammonia (see No. 1203), gives a rich golden yellow tint to very light hair, and a golden brown to darker hair, owing to the formation of bisulphuret of tin.

1209. Rich Yellow Hair Dye. A solution of acetate or nitrate of lead, followed and the dye applied first. The color thus by a mordant of yellow chromate of potash, gives a brilliant rich golden yellow. If wanted warmer or deeper toned, a few drops of solution of diacetate of lead (Goulard's extract) should be added to the acetate solution.

A solution of pure annotto obtained by boiling it in water slightly alkalized with carbonate of soda, or with salt of tartar, gives a golden yellow or flame yellow, according to or lead, may be prepared as follows:-Take its strength, to very pale hair, and correspondof sulphur, 1 part; fresh dry hydrate of lime, ling tones to darker hair. A previous mordant of alum-water deepens it, and a subsequent washing with water soured with lemon juice or vinegar reddens it or turns it on the orange.

1210. Brilliant Yellow Hair Dye. A solution of a neutral salt of iron (sulphate, acetate, or chloride), followed by a weak solution of carbonate of soda, or salt of tartar, or When a salt of antimony is used to dye the lime water, gives a warm yellow or nankeen color, which, when deep, turns on the red. In should be employed, as, if the liquid contain the latter case it is apt to assume a sandy shade

1211. Brown Hair Dye. A ready way color at first produced is dissolved out and to color the hair brown is by a solution of washed away. But if this excess be avoided, permanganate of potassa in the proportion of 1 the bisulphuret gives the brightest color. troy ounce to 1 quart of water. The hair must be first cleansed by a dilute solution of saturating strong liquor of ammonia with ammonia, when it is dried by means of a tow-sulphuretted hydrogen, and then adding a el, and the solution of the permanganate applied to the hair, but not to the skin, as this would also be colored. It dyes the hair immediately, and the desired shade may be obsolution of a salt of antimony (a solution of tained by applying more or less of the solution. Should the hands become stained with 1 to 16, acidulated with a little tartaric, citric, it, they can be cleaned with a little dilute hyor acetic acid, may be used), followed by a drochloric acid. This dye is not permanent,

tassa (Schlippe's salt) with a mordant of may be previously dyed of a warm light water slightly acidulated with sulphuric acid, brown before applying the latter. A so-gives a bright orange-red or golden-red color. lution of sulphate of copper (blue vitriol),

followed by a solution of ferrocyanide of po- phur, 3 drachms; aqua ammonia, 12 ounces; tassium, gives an extremely rich golden brown | glycerine, 6 ounces; water sufficient to fill a or bronze brown to light hair, when the pro-

cess is expertly managed.

shades, requires more consideration and experience than that of the black dyes. The complexion, and the natural color of the hair of beforehand, and allowed for. Unless all these points be attended to, the party may, on looking in the mirror, suddenly find himself er, and shake before using. strangely altered in appearance, and probably for the worse. Hair dyes of all kinds will only act effectively and satisfactority on perfeetly clean hair. The presence or the slightest contamination of oily or greasy matter will arrest or greatly lessen their action, and render it unequal in different parts. Hence the hair, in all cases, should be first thoroughly washed with warm soap and water, then rinsed with tepid water, and lastly, wiped dry previous to their application. few grains of soda or of salt of tartar (carbonate of potassa) added to the first water, will powdered starch. It should be applied imfacilitate its detergent action

1214. To Bleach Hair. It has been found in the case of bleaching hairthat gaseous chlorine is the most effectual. The hair should be cleaned for this purpose by a warm solution light coating of sulphuretted sulphide of calof soda, and washed afterwards with water. While moist it is put into a jar and chlorine gas introduced, until the air in the jar looks greenish. Allow it to stand for 21 hours, and if necessary repeat the operation. The employment of binoxide of hydrogen has been often recommended for this purpose, it being in every way superior to the other agents, but than 2 to 4 minutes. it has the drawback of being difficult to pre-

the Hair. A number of lotions are extensively advertised, and sold under the name of the last receipt. "Hair Restorers," "Hair Rejuvenators,"
"Life for the Hair," &c., which purport to restore the color and improve the growth of the hair. The active agent in all these preparations is lead, combined with sulphur, and this, by frequent application, darkens the hair. In the majority of cases, probably, a moderate use of such a lotion would be unattended tain it, in order to render the paste more with mischief; but it is worth remembering manageable. Sometimes soap-lye is used, inthat palsy has been known to be produced by the long continued use of cosmetics containing lead. The following receipts show how these restorers are made:

lead, 2 scruples; glycerine, 2 ounces; distilled water, 6 ounces; mix, and perfume to fancy. Or, lac sulphur and sugar of lead, each 1 drachm; sulphate of iron (copperas), 10 grains; glycerine, 2 ounces; water, 6 ounces; mix and perfume. Shake well before using, and apply with a sponge every other day until a change of color is obtained, after which one application each week will be sufficient. The hair must be cleansed of all greasy matter before using the above. (See No. 1213.)

pint bottle; mix, and perfume to suit the fancy. Or, take of lac sulphur and sugar of 1213. Cautions about Applying Hair lead, each 1 drachm; tinctures of capsicum, Dyes. The application of the above dyes, so as to produce appropriate and agreeable ounces; water, 5 ounces. Apply as above. Do not employ any greasy oils in perfuming these preparations. (See No. 1213.)

1218. Hair Restorative. Take 1 drachm the person operated on, with other attendant milk of sulphur, 1 drachm acetate of lead, 2 circumstances, must be carefully considered drachms muriate of soda, 2 fluid ounces glycerine, 8 fluid ounces bay rum, 4 fluid ounces Jamaica rum, and 1 pint water. Mix togeth-

epilatories. Preparations for removing superfluous hair from the skin. The constituents of most of these are lime, and the tersulphuret of arsenie (orpiment), but the use of orpiment is dangerous, especially in case of any abrasion of the skin. The safest depilatory is a strong solution of sulphuret of barium made into a paste with mediately after it is mixed, and allowed to remain there for 5 or 10 minutes. (See Nos. 1223 to 1225.)

1220. Martin's Depilatory. Apply a cium to the part from which the hair is to be removed; after 10 minutes it may be washed

off, and the skin will be clean.

1221. Boudet's Depilatory. parts hydro-sulphuret of sodium (crystallized), 10 parts finely powdered quicklime, and 11 parts starch. It should not be applied longer Very effective and safe.

Chinese Depilatory. 1215. Lotions to Change the Color of ounces quicklime, 1 ounce dry pearlash, and 1 ounce sulphuret of potassium; apply as in

1223. To Apply a Depilatory as a Paste. In use, the chemical depilatories (see Nos. 1219 to 1222) which are in the state of powder, are made into a paste with warm water, and immediately applied to the part, previously shaved close, a little starch being generally added to those which do not constead of water, to form the paste. A wooden or bone knife should be used in preparing this paste.

1224. Te Apply a Depilatory as a 1216. Hair Coloring which is not a Plaster. Another mode of application is to Dye. Take 1 drachm lae sulphur; sugar of make the paste rather thick, spread it on a piece of strong paper, and apply it like a plaster. In from 5 to 10 or 15 minutes, or sooner if much smarting occurs, the paste should be washed off with warm water, and a little cold cream or any simple ointment applied to the part. The liquid depilatories are usually thickened with a little starch powder, before application. (See Nos. 1219 to 1222.)

1225. 1225. Cautions About Applying Depilatories. Both classes (see Nos. 1223 and 1224) require caution in their use. They 1217. Magic Hair Colorer and Restor- should be applied to only a small surface at a Take of sugar of lead, 1 ounce; lac sul-time, and great care should be taken to pre-

vent them extending to the adjacent parts. | flowers) until the next day, or (for other sub-They lose their properties unless kept entirely stances) for 5 to 7 days, to settle, when the excluded from the air; and no liquid must be clear portion is carefully decanted into a clean added to the dry ones until just before their bottle, or bottles. With ambergris, civet, application, and then no more should be musk, and vanilla, the digestion, with fremixed than is required for immediate use.

cented Oils; Perfumed The fixed oil that usually forms the basis of the simple scented oils of the perfumer, is that of almonds, ben, or olives; but other bland vegetable oils are qualities. In France, three different modes are adopted for imparting fragrance to these oils.

1227. Perfumed Oils by the Addition of Essential Oils, or Alcoholic Essences. By the simple addition of a sufficient quantity of the essential oil of the plant, or of the concentrated alcoholic essence of the substance, if it does not furnish an oil, followed by agitation; the whole being then allowed to repose for a few days, and, if any sediment falls (which should not be the case decanted or poured off into another bottle. In the case of alcoholic essences, it is better that the fixed oil should be gently warmed for the purpose,) for a short time in a waterbath, before adding them, and then, after tightly and firmly securing with a cork, to agitate it until cold or nearly so. In general, 1 to 1½ drachms of a pure essential oil, or 3 to 4 fluid drachms of a concentrated essence, is sufficient to render 1 pint of fixed oil agreeabest quality, an additional ½ drachm, or more, of the one, and 1 to 2 fluid drachms of the other, will be required. 1 drachm pure attar of roses, owing to the very powerful character. of ambergris, bergamot, cassia, cinnamon, cloves, lavender, lemons, millefleurs, musk, all other similar scented oils, may be thus made. The above are chiefly employed as hair cosmetics, with, in most cases, trifling additions of other essential oils or essences, to modify and improve their odor. Some of them are also colored. (Cooley.)

1228. Perfumed Oils by Infusion. "Dry substances, after being reduced to coarse powder (but free from dust), or sliced very small; flowers or petals, after being carefully scentless portions, and pulled to pieces; and soft, unctuous, and resinous matters, as siliceous sand or powdered glass, to facilitate adopted in this country for "Oil of Roses, for an hour or two, in a covered vessel, at hair. (Cooley.) a gentle heat obtained by means of a water-

quent agitation, is usually continued for at least 3 weeks; and exposure of the vessel in the sun, or in some equally warm situation, is generally substituted for the heat of a waterbath. When flowers are employed, the free oil is allowed to drain off, and the remainder is obtained by the action of a press. The two portions being mixed, fresh flowers are added to the oil, and the whole process is repeated; occasionally used, particularly for inferior and this again, with fresh flowers, 5 or 6 times, or oftener, until the oil is sufficiently fragrant." (Cooley.) For the extraction of perfume from rose leaves, from scented woods, from bark, from gums, there appears to be nothing better than glycerine, and this use of it is constantly on the increase, as the most delicate odors are perfectly preserved in it.

1229. Perfumed Oils by Enfleurage. A series of shallow iron frames, adapted for piling on each other, and fitting close together, being provided, a piece of white, spongy cotton-cloth is stretched upon each, and is then if the ingredients are pure), the clear portion freely moistened with oil of almonds, olives, or ben. On the cloth is next laid a thin layer of the fresh-plucked flowers, and each frame, as thus covered, is placed on the preceding by placing the bottle or vessel (a well-tinned one, until a compact pile of them is raised. bottle or can with a suitable mouth and neck In 24 to 30 hours the flowers are replaced by for corking, is the best and most convenient fresh ones; and this is repeated every day, or every other day, until 7 or 8 different lots of flowers have been consumed, or the oil has become sufficiently charged with their odor. The cotton-cloths are then carefully collected and submitted to powerful pressure, and the expressed oil which flows from them is placed aside in corked bottles or jars, to settle. After bly fragrant; but in some cases, and for the some time it becomes perfectly clear, and is then ready to be decanted into other bottles for store or sale. Sometimes trays with perforated bottoms, on which are laid thin layers of cotton-wool slightly moistened with the of its odor, is sufficient for the purpose. Oils oil, are substituted for the frames and cottoncloth above referred to. Sometimes, also, sheep's wool or cotton wool impregnated with neroli, nutmeg, orange-flowers, roses, and oil, is stratified with flowers in a large earthen vessel, and this, after being closely covered up, is kept for 10 or 12 hours gently heated by means of a water-bath. The next day the old flowers are replaced by fresh ones, and the whole process repeated again and again, as often as necessary. The oil is finally obtained by pressure from the wool, as before. When only a moderate degree of aroma is required in the oil, the flowers may be crushed in a mortar or a mill, with one-half their weight selected, picked from the stems and other of blanched sweet almonds, and the next day, or the second day after, according to the weather, the mass, after being slightly warmed, ambergris, musk, civet, resins, and balsams, may be submitted to the press. After about after being rubbed to a paste with a little of a week's repose, the upper portion, which is the oil (either with or without the addition of the perfumed oil, may be decanted, and, if about twice or thrice their weight of clean necessary, filtered. This plan is occasionally the reduction), are digested in the fixed oil, and a few other flowers, intended for the

1230. To Perfume Hair Oils. The bath, frequent stirring or agitation being em-ployed all the time. The vessel is then substances, used in the preparation of the removed from the bath, and set aside (for perfumed spirits, will furnish examples which

may be followed in scenting hair oils and po-Nos. 1243 and 1261.)

fixed oil, and new and colorless, or nearly uum with 1 pint of fresh oil. colorless, essential oils and essences only are

employed.

oils derive their hues from the fixed oil of them together until perfectly mixed, and for which they are prepared being tinged before a short time afterwards; then set the bottle the scent is added. In each case the colored aside, and in a few days decant the clear poroil should be allowed to clarify itself by re-tion. Oil of nutmeg, 20 or 30 drops, is compose in a closed vessel and a warm situation monly added to increase its action. Used to (60 to 70° Fahr.) before being decanted for scent other oils and fats; also, by itself, to further treatment. It is also better to pass it improve and restore the hair, for which it is through a piece of coarse muslin, to remove in high repute among many persons. floating particles; and, in some cases, it may be necessary to filter it, to render it quite benzoin, 1 ounce avoirdupois, and oil of albrilliant-a quality which it should always monds, I Imperial pint; and proceed by infupossess.

1233. Crimson. A red and crimson tinge may be given by steeping, for 2 or 3 days, a little

reduced to 1 or 2 hours

by adding a little bright palm oil to it whilst warm.

1235. To Color Hair Oils Green. green tinge may be given by steeping a little green parsley, or spinach-leaves, or lavender, in the oil for a few days, in the cold; or by dissolving 2 or 3 drachms of gum-guaiacum in each pint of it, by the aid of heat.

1236. Oil of Musk; or Huile Musquée. Take 2 avoirdupois drachms grainmusk; ambergris, 1 drachm; oil (almond, olive, or ben), 1 Imperial pint; proceed by infusion. (See No. 1228.) Some makers add about 20 or 30 drops oil of layender (English), 10 drops oil of cloves, and 5 or 6 drops oil of cassia, with the musk. A second quality is 1242. made by working over the same ingredients with # pint of fresh oil.

1237. Oil of Ambergris and Musk: or Huile Royale. Take 4 drachms ambergris; grain-musk, 1 drachm; oil of lavender (English), 20 drops; oil of cassia, oil of cloves, fine. The ingredients may be worked over a

second time, as with oil of musk.

1238. Oil of Storax. Take 10 to 12 drachms pure liquid storax; oil of nutmeg, (almond, olive, or ben), I Imperial pint; by infusion. (See No. 1228.) Highly fragrant. Used in the same way as oil of balsam of Peru.

1239. Oil of Vanilla; or Huile à la vanilla in powder; oil of bergamot, 1 Imperial fluid drachm; attar of roses, 15 drops; ambergris, 3 grains; oil (almond or olive), 14 pints; by infusion. (See No. 1228.) Very fragrant. ambergris, are omitted.

1240. Oil of Ambergris; Huile d'Ammades, and from these can be framed other bergris, or Huile à l'Ambre. Take of finest combinations as the fancy may suggest. (See ambergris, 4 to 6 drachus avoirdupois; and oil (almond, olive, or ben), I Imperial pint; 1231. Colorless Hair Oils. In prepar- and proceed by infusion. (See No. 1228.) A ing colorless or white hair oils, blanched second quality is made by working the resid-

1241. Oil of Balsam of Peru. Take 5 avoirdupois ounce pure balsam of Peru, and 1232. Colored Hair Oils. The colored hot oil of almonds, 4 Imperial pint; agitate

> sion. (See No. 1228.) Used to convey the To Color Hair Oil Red or scent of benzoin to other oils; and also to

prevent rancidity

1243. Mixed Essential Oils, or Mixed alkanet-root (say 2 or 3 drachms) in each pint Scents. The following are used as extemof the oil. By warming the oil, the time re-poraneous scent for smelling bottles, hair oil, quired for obtaining the desired tinge may be pomades, esprits, &c.; for which purpose one or other of them is commonly kept at hand 1234. To Color Hair Oil Yellow or by the druggists. 1 ounce of any one of Orange. A yellow and orange tinge may be them, added to a pint of rectified spirit, progiven by rubbing up a little annotto with a duces an agreeable esprit or perfume for perportion of the oil whilst hot, and then adding sonal use. Oil of bergamot and lemon, of it to the rest at a gentle heat; or, more simply, each 1 ounce; oil of lavender (English) and pimento, of each ½ ounce; mix. Or: To the last add of oil of orange peel, 2 drachms; oil of cloves, 1 drachm; mix. Or: Take oil of bergamot, lemon and orange peel, of each 3 drachms; essence de petit-grain, 2 drachms; oil of cloves, 1½ drachms; oil of cassia, 1 drachm; mix.

1244. French Huiles or Hair Oils. The huile antique au jasmin, aux fleurs d'oranges, à la rose, à la tuberose, à la violette, &c., &c., of the French perfumers, are simply one or other of the bland fixed oils, (almonds, olives, or ben), strongly scented with the oils (huiles) of the respective flowers, or some other preparation of them. (See Nos. 1236 to

1245. Marrow Oil. Take clarified beefmarrow, 12 ounces avoirdupois; oil of almonds, 4 Imperial pint; melt them together, and scent the mixture at will. Held in high repute as a hair oil, by many. That of the small stores has seldom any marrow in it, but oil of nutmeg, and neroli, each 10 drops; and lard instead. The appropriate scents are the proceed by infusion. (See No. 1228.) Very same as for bear's grease. It is generally tinged slightly yellow by means of a little palm-oil or annotto.

1246. Tonquin Pomade or Oil. Macerate for from 12 to 24 hours, ½ pound tonquin 12 to 15 drops; ambergris, 5 or 6 grains; oil beans in 4 pounds melted fat or warm oil, and strain through fine muslin; when cold the grease will be found to have acquired a fine

odor of the beans.

1247. Vanilla Pomade or Oil. This Vanille. Take 2½ ounces avoirdupois finest is prepared in the same way as for tonquin beans, by substituting 1 pound of vanilla beans

1248. Macassar Oil. Oil of ben, 1 gallon, oil of noisette, & gallon; strong alco-For the simple oil, the bergamot, attar, and hol, I quart; attar of rose, 2 drachms; attar of bergamot, 3 ounces; attar of Portugal, 2 and bottle.

bergamot. A few drops of neroli, or oil of rose geranium, or a little huile au jasmin, As the roller, or muller, revolves over the fat, huile royale, are occasionally added to improve and slightly modify the odor.

1250. Tricopherous. Castor oil, † pint; 95 per cent. alcohol. \$ pint; tincture cantharides, \$\frac{1}{2}\$ ounce; oil of bergamot, 2 drachms. Color a pale pink with alkanet root. (See No.

Oil for Incipient Baldness. 1251. The commonest, and perhaps the most convenient and easily prepared cosmetic of the kind, is a mixture of equal parts of tincture of cantharides and olive oil or almond oil, simply agitated together, and shaken before use. A more effective and cleanly liquid preparation may be made by substituting proof spirit (or good rum) for the oil, and adding 1 to 1½ drachms of glycerine (Price's) to each ounce of the mixture, a corresponding increase being made in the proportion of the tincture, This prepato compensate for this addition. ration imparts as much moisture and gloss to the hair as the former one, and is much more genial in its action on the scalp. Distilled water, or rosemary water, is often substituted for proof spirit. A still more active prepara-tion is made of tincture of cantharides and glycerine only.

omatums or Pomades. Any scented greasy matter of appropriate consistence, or any mixture of fats, used, or intended to be used, in dressing the hair, now commonly passes under the name of pomatum or pomade. The usual basis of ordinary pomatum or pomade for use in this climate, is either a mixture of 2 parts of hog's lard and 1 part of beef suet; or of 5 parts of lard and 2 parts of mutton suet; the fats being both previously carefully rendered or prepared, and then melted together by a gentle heat. The latter mixture is chiefly used for white pomatum or pomade. Essential oil, and to the fat more fully liquefied, aiding their other volatile matter used to scent this fat, should be added to it and stirred up with it, after it has somewhat cooled, but before it begins to solidify, in order to prevent loss. The it is often necessary to allow the mixture to unscented mixed fats form the plain pomade or repose for a short time, and to pour it off pomatum of the perfumers. (Cooley.)

1253. To Purify Suet or Lard for Making Pomades. Suet or lard form the body of pomades; and that their quality may be unexceptionable, the rendered suct must be ishing off pomades two methods are adopted, subjected to a purifying process, in order to fit according to the appearance it is desired they it for use in perfumery. This is done by melt should have. Those which it is intended ing the rendered fat by the heat of a saline should be opaque and white, should be stirred or steam bath in an enameled iron vessel, or beaten assiduously with a knife or spatula and adding to it, gradually, 1 ounce powdered until the fat begins to concrete, or has acquiralum and 2 ounces chloride of sodium (pure ed considerable consistence, before potting it; table salt) to every fifty pounds of fat under but when it is desired that they should be trans-

ounces; and tineture of musk, 3 ounces; mix 212° Fahr., until scum ceases to rise to the together, digest with alkanet root (for color), surface, which contains all the organic and in a stoppered bottle for a week, then strain other impurities, and must be skimmed off as fast as it is formed. The fat is then strained 1249. Cheap Hair Oils. These are through bolting cloth into clean stone jars, and made of fixed oils (usually almond or olive left to cool. It is next to be spread upon a through bolting cloth into clean stone jars, and oil), gradually receding in quality, scented circular stone slab, the top surface of which is with less attar, the deficiency being made up slanting from the centre, (that is, slightly coniby a mixture of oil of rhodium, rosemary, and cal in form), and provided with a stone roller which is made to revolve by suitable gearing. with or without 2 or 3 drops oil of musk or cold water is allowed to trickle upon it, and this dissolves the saline impurities remaining in the fat. After this the fat is heated until all water is expelled by evaporation. When cold. the fat will be found to be very white and pure, and in a condition to preserve its sweetness, and suitable for use with the most delicate odors.

1254. Method of Purifying Fat. Take 1 cwt. of perfectly fresh grease, either of lard or beef suet; cut the grease into small pieces, and pound it well in a mortar; when it is well crushed, wash it with water repeatedly, until, in fact, the water is as clear after withdrawing the grease as before it was put in. The grease has now to be melted over a slow fire, adding thereto about 3 ounces crystallized alum in powder, and a handful of common salt; now let the grease boil, but allow it to bubble for a few seconds only; then strain the grease through fine linen into a deep pan, and allow it to stand, to clear itself from all impurities, for about 2 hours. The clear grease is then again to be put into the pan, over a bright fire, adding thereto about 3 or 4 quarts rose water, and about 5 ounces powdered gum benzoin; it is allowed to boil gently, and all scum that rises is to be removed. until it ceases to be produced; finally the grease is put into deep pans, and when cold taken carefully off the sedimentary water; it is then fit for use, and may be kept for an indefinite period, without change or turning rancid. It will be observed that the principal feature in this process is the use of benzoin.

1255. To Perfume Melted Fat. adding aromatics or perfumes to the melted fat, its temperature must be adapted to their relative degree of volatility. Essential oils and alcoholic essences, particularly the more delicate ones, are added at the lowest possible temperature compatible with their perfect union with the fat; whilst substances like the aromatic resins and balsams are better added solution and union by stirring the mass with a wooden, bone, or porcelain knife or spatula. With the latter, after the union is complete. from the dregs before adding the essential oils and essences, and concluding the work. (See No. 1261.)

1256. To Finish off Pomades. In fin-Those which it is intended treatment. The heat is to be continued above parent or crystalline, the clear liquid mass is mutton suet is employed; for others, in general, beef suct. In those which are artificially colored, either may be used; but beef suct is preferable when either clearness or a crystalline appearance is desired. (Cooley.)

1257. Coloring Matters for Fat. It is often desirable, as a matter of taste, to tinge process given below is applicable to all fats, fleurage) is adopted. (See No. 1263.) imparted by the addition of pigments in powfat before scenting it. (Sec No. 1232.)

mixture; 1 ounce of it will be sufficient to color 1 pound of white fat, by simply melting them together.

1259. To Color Fat Yellow. A yellow coloring fat may be prepared as in the last receipt, by using, instead of the alkanet, 1 ounce of annotto to the pound of fat.

1260. To Color Fat Green. The same process followed in No. 1258, with fresh walnut leaves, will give a green coloring fat.

1261. Essences for Scenting Pomatums. Millefleur-oil of lemon, 3 ounces; essence of ambergris, 4 ounces; oil of cloves. 2 ounces, oil of lavender, 2 ounces. Cowslipof cloves, each 2 ounces; oil of orange-peel, 1½ ounces. (See Nos. 1243 and 1255.)

are prepared by digesting the odorous substances in the simple pomade (see No. 1265). already noticed under "Oils" (see No. 1228); observing to stir the mixture frequently, and to keep the vessel covered as much as possible during the whole time. 1 part of flowers, carefully picked and pulled to pieces, to 3 or 4 parts of pomade, are the usual proportions. time, is thrown into a strong canvas bag, which is then securely tied, and at once submitted to the action of a powerful press. spirit may be strained off, and will be a per(This should have been previously made fumed extract of the flowers employed. The moderately warm. This is effected either by following flowers are best adapted for this means of a steam-jacket, or by filling it with process: Rose, jasmin, orange, violet, jon-

poured into the pots or bottles, previously hot water. In the latter case, care should be slightly warmed, and the whole is allowed to taken to perfectly free it from water before cool very slowly, without being disturbed, in a use.) The whole operation is then repeated, situation free from draughts of cold air. For several times, with fresh flowers, or other the ordinary pomades a mixture of lard and bulky odorous substance, until the pomade be suct is generally employed; for the harder ones, sufficiently fragrant. This will require 3 to suct chiefly reholly; or a little pure white 6 times its weight in flowers. Lastly, in the wax or beeswax (according to the intended case of flowers, the pomade is liquefied in a color of the product) is melted with the fat to covered vessel, at a gentle heat, as before; increase its solidity. For white pomades, and after sufficient repose to allow it to deposit adhering moisture, is poured off for stock, or is at once potted. To obtain essences the fat is treated with spirit, which combines with the essential oil, leaving the fat with still a strong odor of the flower. This latter forms the French pomade. The delicate perfume of some flowers is impaired the prepared fat used for perfumery. The by heat, and the process of absorption (cnwhether solid or fluid. Color may also be mode of proceeding with the aromatic barks, seeds, resins, balsams, &c., the duration of der, but these are objectionable for pomade, the infusion, and the proportions taken, are, hair oil, and creams. The coloring matter for the most part, similar to those of the corshould be dissolved or steeped in the melting responding builes or oils; but here the first two substances, and others of a like nature, 1258. To Color Fat Pink. Bruise 4 are only bruised, ground, or sliced very small, ounces alkanet root for every pound of fat and not reduced to actual powder before used; melt the fat over a water-bath, add the digestion, as pomades, unlike oils, cannot be bruised alkanet, and digest for several hours. freed from fine powder or dust by filtration Strain the mixture through bolting cloth, and through fine media, or by repose in the cold. allow the clear fluid fat to cool. This fat, In this way are prepared the pomades of now colored deep pink, is used as a coloring balsam of Peru, benzoin, cassia, cinnamon, lavender (green), orange-blossoms, orris-root (violet), roses (colored), storax, vanilla, and several others, kept by the French perfumers, and known and spoken of in this country by their French names, as "Pomade aux Fleurs d'Oranges," "à la Rose," "à la Vanille," &c. (Cooley.) Piesse proposes a simple method by which any person can perfume pomade in small quantities; and, if desired, prepare perfumed extracts of favorite flowers. Procure an ordinary, perfectly clean, double glue-pot, the inner vessel capable of holding a pound of fat. When the flowers are in bloom, put a pound of fine lard into the inner vessel of the essence of bergamot, 16 ounces; essence of glue-pot; pour sufficient boiling water into lemon, 8 ounces; oil of cloves, 4 ounces; oil the outer pot, and place the whole on a stove of orange-peel, 2 ounces; oil of jasmin, 2 until the lard is melted; strain it through a drachms; eau de bouquet, 2 ounces; oil of close hair-sieve into a vessel containing cold bitter almonds. 16 drops. For general use—spring water. In order to obtain a perfectly essence of bergamot, 16 ounces; essence of inodorous grease, this process may be repeated lemon. 8 ounces; true oil of origanum and oil 3 or 4 times, using each time fresh water, containing a pinch each of salt and alum. Lastly melt the purified fat and let it cool, to free it 1262. Pomades by Infusion. These from water. Next put the fat in a vessel in a place just warm enough to keep it constantly liquid; throw into it as many of the flowers at a very gentle heat, for 2 or 3, to 8 or 10 as it will receive; every 24 hours for a week, hours, according to their nature, in the way strain the fat from the flowers, and add fresh ones. This repetition of fresh flowers will produce a highly perfumed pomade. In this manner either one kind of flowers, or a mixture of 2 or more kinds may be employed. The perfumed extract may be obtained from the pomade by introducing the cold perfumed fat, finely chopped, into a wide-necked bottle, The next day the mixture is again greatly fat, finely chopped, into a wide-necked bottle, heated, and, after being stirred for a short and covering it with the strongest spirits of wine that can be obtained; and, after closing the bottle, let it stand for a week, when the

heliotrope, but probably without sufficient grease and 2 ounces spermaceti; triturate in

grounds.

a layer of simple pomade is spread, with a adding to it ½ drachm of alkanet, and strainbone palette-knife, on panes of glass, to about ing it before incorporation. the thickness of a finger, and the surface is even 3 months, or until the pomade has be- drachms. come sufficiently fragrant to render it of the quality intended by the manufacturer. It is store-pots, and is ready for use or sale. blossom, myrtle-blossom, narcissus, orangeflower, tuberose, and violet pomade; as well as the pomades of several other delicate flowers that readily impart their odor to fat au Jasmin." "Pomade aux Fleurs d'Oranges." "Pomade à la Violette," &c. The stronger pomades of these last two classes are chiefly employed in the preparation of extraits and essences, and are added to other pomades, to The others are also used as hair cosmetics.

1264. **Pomades.** These are prepared either by the admixture of the different fragrant pomades already noticed, or by the addition of judicious almost exclusively adopted by our perfumers. The usual fatty basis of the preceding pomades is one or other of the following:

1265. Plain Pomatum or Pomade. Take 2 parts carefully rendered hog's lard, and 1 part beef-suct (see No. 1253, &c.), and melt them together by a very gentle heat. The grant. product is of the proper consistence for temperate climates. mutton-suet, 2 parts. (See No. 1253.) Or: Lard and suet equal parts.

1266. Common Pomatum. Take of plain pomade (or fat), 1 pound, melt it at the lowest degree of heat that will effect the object, add of oil of bergamet and lemon, of the following way: Fatty oil of almonds, 21 each 1 drachm; stir the mixture until it be pounds; spermaceti, ½ pound; oil of lemon, 3 gins to concrete, and then pour it into the ounces. The spermaceti is melted in a water-This forms the ordinary pots or bottles. pomatum.

quil, tuberose, and cassia. Piesse proposes and mix in a water-bath 1 pound prepared a mortar until it becomes white and smooth, 1263. Pomades by Enfleurage. These perfumed pomades are prepared by a similar process to that adopted for the correspondant drachm oil of geranium. A rose-color ing oils. (See No. 1229.) On the large scale, is obtained by heating the oil of almonds and

1268. Pomade Millefleur. This much closely stuck all over with the newly-gathered esteemed pomade is strongly scented with flowers. The panes are then placed in shall several perfumes of the kind noticed below, low frames of wood, and these are closely so proportioned to each other that none prepiled one upon another, in stacks, in a moder-dominate. The following are common examately cool situation. In some of the great ples; but the scents, within certain limits, perfumeries of France, many thousands of may be varied at will .- Take of plain pomade, these frames are employed at once. On the 1½ pounds avoirdupois; oil of lemon, 1½ Impesmall scale, porcelain or pewter plates are rial fluid drachms; oil of lavender (English), generally used instead of panes of glass, and balsam of Peru, and essence royale, of each are inverted over each other, in pairs, so as to 1 fluid drachm; oil of cassia, oil of cloves, fit close at the edges. In each case the and essence de petit-grain, of each ½ fluid flowers are renewed daily, and the fat stirred drachm. Or, plain pomade, 1 pound, and esup and re-spread occasionally, for 1, 2, or sence or extrait de millefleurs, 4 to 5 fluid

1269. Peruvian Pomade. ounce each good washed lard, and clarified now scraped off the panes or plates, into the beef suit; balsam of Peru, 4 ounce; mix as In before, add ½ fluid drachm oil of nutmeg, and this way are prepared the finest qualities of pour it into pots or dumpy, wide-mouthed cowslip, honeysuckle, jasmin, jonquil, may-phials. Dr. Copland adds a little oil of lavender. In high repute as a hair-restorer.

1270. Philocome. This compound is made without heat. Equal parts of purified beef-marrow, oils of noisettes and sweet alby simple proximity or contact. The imported monds are thoroughly mixed in a marble pomades of this class, like those of the last mortar, and the whole is then perfumed by one, are always distinguished among the per-tumers, by their French names; as "Pomade ture of extracts of rose, acacia, jasmin, orange-flower and tuberose.

1271. Vanilla Pomatum. plain pomade 1 pound avoirdupois; melt and add 4 or 5 Imperial fluid drachms finest essence of vanilla; attar of roses, 8 or 10 drops, impart the fragrance of the respective flowers, as before. Very fine. The plain pomade may be previously slightly tinged with annotto.

1272. East India Pomatum; Pomade Mixed Pomades; Compound des Indes; or Pomade d'Orient. Take beef-suet, } pound avoirdupois; lard, ½ pound; pure bright beeswax, 2 ounces; finest annotto, already noticed, or by the addition of judicious 1 drachm; gum-benzoin in coarse powder, a combinations of the more esteemed essential ounce; and grain-musk, 6 to 8 grains; digest oils, essences, and other odorous substances, in a covered vessel set in a water-bath, with to simple pomade, whilst in the liquid or frequent agitation, for 2 or 3 hours. After resemi-liquid state. The latter is the method pose, decant the clear portion, add of oil of pose, decant the clear portion, add of oil of lemon, 1 Imperial fluid drachm; oil of lavender (English), & fluid drachm; oils of cassia, cloves and verbena, each 10 or 12 drops; and stir the mass until it has somewhat cooled. Lastly, pour it into pots or bottles, and let it cool very slowly, and undisturbed. Very fra-

1273. Transparent Pomade. Take of Or: Lard, 5 parts, and best transparent soap, 1½ drachms; 95 per arts. (See No. 1253.) Or: cent. alcohol, 2½ ounces. Dissolve the soap in the alcohol by heat, and add it suddenly to a quart of hot castor oil; have perfume ready to put in at once, and pour in warm bottles. Another very superior article is prepared in bath, the oils are then added, and the heat kept up until a uniform mass is obtained, in 1267. Rose Pomade. Melt together which no floating particles of spermaceti can

be distinguished. The pomade is then poured rated, decant the clear portion, and again stir into glasses; if it is desired to obtain this polluntil the mass concretes. It is cheaper and made crystallized, the glasses must be heated more convenient to omit the powdered cinbeforehand, and cooled down very slowly.

pint; ‡ pound spermaceti (best, pure); melt the oils of origanum and bergamot; and them together by a gentle heat, add scent at others employ the oils of nutmeg and lavenwill, and whilst sufficiently warm to be clear, der for the purpose. Recommended in weak pour it into warm glass bottles, and allow it hair and remediable baldness. It is ordered to cool very slowly, and without disturbance. to be used night and morning; the head being Some persons add 1 drachm camphor. It is usually preferred uncolored. If tinged at all, it must be only very faintly so, and with sub-

stances that will not cause opacity.

1275. Pomade Divine. Take of refined beef-marrow, 1 pound avoirdupois; cypresswood (rasped). orris root (in coarse powder), liquid styrax, of each 1 ounce; cinnamon (powdered, but not dusty), 1 ounce; cloves (well bruised), nutmegs (grated), of each 1 esteemed for the hair, and also as an occasional skin cosmetic.

1276. Castor Oil Pomade; Palma-Christi Pomatum. Take of castor oil, 1 pound avoirdupois; pure white wax, 4 ounces; melt them together, and then add of oil of bergamot, 2½ drachms; oil of lavender (English). ½ drachm; essence royale, 10 or 12 drops;

stir the mixture whilst cooling.

1277. Bear's Grease. The fat of the bear has long been highly esteemed for promoting the growth of human hair, but without sufficient reason, since experience shows smell of genuine bear's grease as an indication mula:-

1278. Imitation Bear's Grease. Take of washed hog's lard (dry), 11 pounds avoirdupois; melt it by the heat of a water-bath, add of balsam of Peru, 2 drachms; flowers of benzoin and palm oil (bright), of each 1 dracher; stir vigorously for a few minutes, to promote solution. Then remove the pan from the bath, and, after repose for a short time, pour off the clear portion from the sediment, and stir the liquid mass until it begins to

cool.

1279. Pomade for Incipient Baldness. Melt over a water-bath, 12 ounces pure veal grease, 5 ounces nerval balsam, 5 ounces nutmeg butter, and 6½ ounces oil of almonds; triturate in a mortar until thoroughly mixed; then add 10 drops eroton oil, and incorporate. Next dissolve 3½ ounces subcarbonate of soda in 1 ounce each of alcohol and distilled water; incorporate this with the pomade and perfume to taste.

1280. Cazenave's Pomade. Prepared

namon, and to strongly scent it with oil of 1274. Crystallized Pomade or Poma-cinnamon (or of cassia), after the removal of tum. Take of oil of almonds or olives, 1 the vessel from the bath. Some scent it with washed with soap and water, and afterwards with salt and water, and wiped dry, each time

before applying it, or at least once a day.

1281. Tar Pomade. Dr. Dauvergne extolled in unmeasured terms the virtue of vegetable tar in failing hair and baldness. His formula is as follows:—6½ troy ounces lard; 5 drachms Norwegian tar; 3½ drachms each butter of nutmegs and gum-benzoin; 5 drachms fiovarenti balm; 5 drachms baume ounce; digest, by the heat of a water-bath, in de commander; 1 ounce essence of patchouli; a covered vessel, for 5 or 6 hours, and then and 3 grains musk; mix. This formula apstrain through flannel. Very fine, and much pears unnecessarily and absurdly complicated. We have no hesitation in stating that the substitution of 3 to 5 drachms English oil of lavender, and 2 drachms essence of musk or essence royale, for the last four articles, would disguise the smell of the tar quite as well, without impairing the efficacy of the preparation

1282. Dupuytren's Pomade. Take 12 avoirdupois ounces prepared beef-marrow; melt by a gentle heat, add baume nerval, 4 ounces; 3 ounces each balsam of Peru and oil of almonds; and mix thoroughly. Then add alcoholic extract of cantharides, 36 grains, that it possesses no superiority over the fats dissolved in 3 Imperial fluid drachms rectiordinarily employed by the perfumers. In- fied spirit; stir the mass until it concretes. deed, if we may regard the somewhat rank This is the original formula for this celebrated pomade: but, in serious cases, Dupuytren of its quality, it must be inferior to them as was in the habit of doubling, or even tripling a hair cosmetic; besides which, it is much the proportion of the extract of cantharides more costly. The greater portion of the so-without altering that of the other ingredients, called bear's grease now sold is a factitious. The product is a genial stimulant and rubefaarticle, and is prepared by the following for- cient, and, not undeservedly, has long been held in high esteem as a hair-cosmetic, acting by medicating the scalp.

1283. Soubeiran's Pomade. Take of oil of almonds, ½ ounce; disulphate of quinine, 1 drachm; triturate them together in a warm wedgwood ware mortar until thoroughly united; then add of prepared beef-marrow 14 ounces; and continue the trituration until the mass is cold. Scent may be added. Recommended for strengthening and restoring

the hair.

1284. Pomade Contre l'Alopécie, to Cure Baldness. Fresh lemon juice, 1 drachm; extract of bark (by cold water), 2 drachms; marrow, 2 ounces; tincture of cantharides, 1 drachm; oil of lemon, 20 drops; oil of bergamot, 10 drops; mix. First wash the head with soap and water, with a little eau de Cologne, then rub it dry. Next morning rub in a small lump of pomade, and repeat it daily. In 4 or 5 weeks the cure of baldness is effected.

New French Remedy for 1285. beef-marrow, 4 ounces (avoirdupois); tincture Baldness. Croton oil, one of the last French of cantharides, ½ fluid ounce (Imperial); and remedies for baldness, is employed by simply cinnamon coarsely powdered, ½ ounce; melt adding it to oil or pomade, and stirring or them together by the heat of a water-bath; agitating the two together until admixture stir until the spirit in the tincture has evapo- or solution be complete. The formula adopt-

ed by the eminent French physician who in- Nos. 25, 31, and 14.) To ensure the perfect troduced this remedy, and who speaks, in the mixture of the ingredients, they should be most confident and enthusiastic way, of the stirred together until they form an apparently oil, 12 drops (minims); oil of almonds, 4 rubbed on the scalp twice a day. Soft down, we are assured, appears in three weeks. Mr. Cooley says: "I have tried a number of exto bear testimony to its efficacy in several apparently hopeless cases, in which even cantharidine had failed. Soft hair, resembling down, did begin to appear in from 3 to 4 weeks, and continued to grow and increase in strength for some time. It was, however, only in about one-third of these cases that this quantity so as to well cover the part, and to deserve the name of hair, in the popular sense of the word." (See No. 1286.)

1286. Caution about Strong Hair Cosmetics. Although the stronger hair cosmetics are, as a rule, perfectly safe when applied according to the directions given, and the chief inconvenience that may arise, even from their too free or injudicious use, will be impalpable powder, 4 ounces; mix thoroughly only temporary irritation, perhaps accompanied or followed by slight desquamation of the cuticle, or by a few unimportant pustules which will pass off in two or three days, yet there are cases in which their application would be unwise, and liable to produce more serious consequences. Thus, persons of a nervous temperament, with a highly irritable skin, and bad habit of body, persons liable to attacks of erysipelas, or to swellen glands behind the ears, or to swellings or tumors in the upper part of the neck behind, or to eruptive or other attacks of the scalp, and the like, should not have recourse to them. In other cases, and, indeed, in all cases, it is wise way, and be able to judge from experience the strength that can be employed, without inconvenience, to produce the desired effect. (See Nos. 1177, &c., 1279, &c., and 1285.)

Hungarian Pomade for the 1287. **Moustache.** Melt by a gentle heat $\frac{1}{2}$ pound gum-arabic, and 1 pound of oil soap, in 1 pint rose water, then add 1 pound white wax, constantly stirring; when of a uniform consistency, add 1 ounce attar of bergamot, and 1 drachm attar of thyme, for perfume. If required to be brown, color it with tube-burnt amber; or for black, use tube ivory-black.

Tooth Powders; Dentifrices; Poudres pour les Dents; &c. These preparations should be compounded of materials which, and tonic in their action upon the gums. tooth powder, known also as Lardner's Pre-Cooley says: "Great care should be taken to pared Charcoal. finely pulverize all the dry ingredients, and to

success attending its use, is-take of croton homogeneous powder, which should then be passed or rubbed through a fine gauze-sieve. Troy drachins; mix. A little is to be well Those which contain volatile or perishable substances, or which, like chargoal, are affected by contact with the air, should be put up in Cooley says: "I have tried a number of experiments with croton oil, thus used, in partial loss of hair and baldness, and am compelled compound powders. The only simple powder in common use as a dentifrice is powdered Powdered bicarbonate of soda, charcoal. cream of tartar, &c., are also employed, though less frequently." The following list includes some of the best tooth-powders in common use, as well as several advertised nostrums and named powders of the stores. down subsequently increased in stiffness and By omitting the honey and spirit, the formulæ given for tooth pastes furnish others for tooth powders; and vice versa. Thus, the example given under each will increase the number of the other; and both will suggest to the reader other formulæ.

1289. Poudre Détersive Dentifrice. Willow charcoal and white sugar in impalpable powder, each 8 ounces; calasava bark in in a mortar, sift through the finest bolting cloth, and perfume with a mixture of attar of mint, 2 drachms; attar of cinnamon, 1 ounce;

and tincture of amber, $\frac{1}{2}$ ounce.

1290. Camphorated Chalk. Precipitated carbonate of lime (chalk), 1 pound; powdered orris root, 3½ pounds; powdered camphor, 2 pound; reduce the camphor to fine powder by triturating it in a mortar with a little alcohol; then add the other ingredients, and when the mixture is complete, sift through

the finest bolting cloth. (See No. 28.) 1291. Precipitated Chalk. prepared by adding a solution of carbonate of soda to a solution of chloride of calcium (both to use them very sparingly, or in a diluted cold), as long as a precipitate forms. This state at first, and thus, as it were, feel our last is well washed with pure water, and dried out of the dust, as the last. The refuse sulphate of lime of the soda-water makers, which is poisonous in quantity, is often sold for it by the druggists. Pure chalk is wholly soluble in vinegar, and in dilute acetic, hydrochloric, and nitric acid, with effervescence. Sulphate of lime is insoluble in these fluids.

To make Prepared Chalk. Rub 1 pound chalk with sufficient water, added gradually, to make it a smooth cream; then stir this into a large quantity of water, after the coarser particles have settled decant the milky fluid into another vessel, and allow the chalk to settle; decant the clear water,

and dry the sediment.

1293. To Purify Hartshorn. Burn pieces of harts' horns until perfectly white; then grind them, and purify in the same

manner as chalk. (See No. 1292.)

1294. Lardner's Tooth Powder. Take of powdered charcoal (recent), I cance; prewhile cleaning the teeth without injury to the pared chalk (see No. 1292), 3 ounces; mix, enamel, will also be anti-acid, anti-scorbutic, and keep it from the air. A simple, but good

1295. Miahle's Rational Dentifrice. reduce the harder and gritty ones to the state Take of sugar of milk, 3 ounces; tannin (tanof impalpable powder, either by patient levi- nic acid), 3 drachms; red lake, 1 drachm; gation or trituration, or by elutriation. (See oil of mint and oil of aniseed, of each 7 or 8 drops; neroli, 4 or 5 drops; mix. Very teeth and gums. serviceable in foul, lax, or bleeding gums, commonly substituted for the coral, and a little loose or rotten teeth, &c. As a tooth powder red bole added to color it. it is improved by the addition of 1 ounce each of burnt hartshorn and cuttle-fish bone.

1296. Deschamp's Dentifrice for Removing the Yellow Color from Teeth. Take of dry hypochlorite of lime, ½ drachm; red coral, 2 drachms; triturate well and mix thoroughly. This powder is employed in the following manner: a new brush is slightly moistened, then dipped in the powder and applied to the teeth. According to Deschamp, a few days' use of this powder will produce a marked alteration in the appearance of the the teeth, which will acquire a white color.

1297. An Excellent Dentifrice. Precipitated chalk (see No. 1291), 1 pound; powdered borax, ½ pound; powdered myrrh, 4 ounces; powdered orris, 4 ounces. Mix, and sift through finest bolting cloth. (See No. 28.)

1298. Morfit's Dentifrice. Powdered willow charcoal, 4 ounces; chinchona bark and sugar of milk, in powders, each 1 pound; old transparent soap, in powder, 4 ounces; mix in a merble mortar, sift through the finest attar of orange-flower, 1 ounce.

Grosvenor's Tooth Powder. 1299. Take of red coral, 6 ounces; prepared oystershells, 5 ounces; orris root, 1 ounce; oil of rhodium, 4 or 5 drops; mix. This is the original formula. Equal parts of prepared shells, rose-pink, and cuttle-fish bone, are now gently make timed for the cord. This place is erally substituted for the coral. It is also sold as coral dentifrice and coral tooth powder. They are all favorites in the fashionable world.

1300. Violet Tooth Powder. Take of precipitated chalk, 6 ounces; cuttle-fish bone, 3 ounces; rose-pink (bright), 2½ ounces; orrisroot, 1½ ounces; essence of violets (orris), ½ fluid drachm; indigo (pure, to strike a violet dentifrice among ladies.

1301. Areca Nut Tooth Powder. Take of areca nut charcoal, 5 ounces; cuttlefish bone, 2 ounces; areca nuts (raw), 1 ounce; mix. About ½ drachm each of cloves and cassia are usually added, but it is better without any such addition. Areca nut charcoal, in fine powder, is often sold under this name. This powder cannot be excelled. (Sec No. 1302.

that sold by the druggists is spurious. The genuine powder is heavier and harder than common charcoal, and has a peculiar appearance and feel, when pressed with the fingers, which is readily distinguishable.

1303. Pearl Dentifrice; Pearl Tooth or heavy carbonate of magnesia is commonly substituted for the marble-dust, but the quality of the product suffers in all but color.

will; mix. Recommended as a tonic for the ed, and improve it.

Prepared oyster-shell is

rooth Pastes; Tooth Electuaries; Pates pour les

Dents. These may consist of any of the substances ordinarily used as dentifrices, reduced to the state of inpalpable powder, and beaten up with sufficient honey (liquefied by a gentle heat), syrup, or capillaire, to give them the form of a smooth and moderately stiff paste or electuary, a sufficient quantity of aromatics being usually added, as it were. to "embalm and perfume the mouth." Honey of roses is often, and conserve of roses sometimes, used for those in which their odor and color are suitable. A little rectified spirit is a useful addition, as tending to preserve them, and promote their action. A little eau de Cologne or lavender water is often employed, with the same intention. They are usually bolting cloth (see No. 28), and perfume with put up in porcelain or ornamental glazed earthenware pots, furnished with closely fitting covers, to preserve their contents from the air. The mixed powders should be passed through a very fine gauze-sieve, before adding the honey, and the paste should not be potted until the day following that on which it is made. (See No. 1288.)

1306. Ward's Tooth Paste. Take of prepared chalk (see No. 1292), 2 ounces: myrrh, rhatany root, and cuttle-fish bone, each, 1 ounce; orris root, 1 ounce; honey, 3 ounces. A very useful dentifrice in foul. spongy, and scorbutic gums, loose and rotten teeth, &c. This is also known as Zeiter's Anti-scorbutic Dentifrice.

1307. Areca Nut Charcoal Tooth tint), a sufficient quantity; mix. A favorite Paste. Areca nut charcoal (recent, in fine powder), beaten up with pure honey or capilfaire. Aromatics, though commonly added. do not improve its efficacy. (See No. 1302.)

1308. Areca Nut Tooth Paste. Take of recently burnt areca-nut charcoal, in fine powder (see No. 1302), 5 parts: raw or unburnt areca nuts, 1 part; honey, liquefied by a gentle heat, and allowed to cool, sufficient to make them into a stiff paste, adding gradually, for each ounce of the mixture, about 1 1302. Areca Nut Charcoal is prepared fluid drachm rectified spirit, holding in soluand kept by only a few houses; four-fifths of tion oil of cassia and oil of cloves, of each 10 or 12 drops. The next day beat up the mass again, adding, if necessary, a few drops of proof spirit, or of eau de rose or orangeflower water, to give it a proper consistence. and at once put it into pots. A very excellent preparation.

Powder. Take of white marble-dust, 4 1309. Vanilla Tooth Paste. Take of ounces; cuttle-fish bone, 1 ounce; smalts the finest vanilla, 1 drachm; cloves, ½ drachm; Vanilla Tooth Paste. Take of (finest), I drachm; essence de petit-grain, 10 lump sugar and cuttle-fish bone, of each 1 to 12 drops; mix. A favorite with ladies who ounce; white marble-dust, I ounce; mix, trithave white, healthy teeth. Precipitated chalk urate them to an inpalpable powder, and then beat them to a paste with about 2 ounces syrup of saffron. The product is much esteemed for rapidly whitening the teeth and 1304. Pelletier's Quinine Dentifrice. deodorizing the breath. 5 or 6 drops of es-Take of red coral, 3 ounces; myrrh, 1 drachm; sence of ambergris or musk, dissolved in 1 disulphate of quinine, 15 grains; scent at fluid drachm of rectified spirit, are often addThis paste is made by adding 1½ or 2 drachms of Peruvian bark, in very fine powder, to the last receipt. It is a useful tonic in sponginess, foulness, and scurvy of the gums. (See No.

1311. Soap Tooth Paste. Take of Castile soap (air-dried, in fine powder), and cuttlefish bone, of each 2 ounces; honey, 4 or 5 ounces; aromatics or perfume at will, with or without the addition of a little rectified spirit. A very excellent preparation, superior to all the other pastes for cleaning the teeth and removing tartar and animalculæ from them, but inferior in blanching and preservative qualities to areca nut charcoal paste. A pink or rose color may be given it by adding 1 drachm of finely powdered cochineal, or a fluid drachm or two of the tincture. It is commonly ordered in books to be made with honey of roses, but the alkali of the soap spoils the color of this article. The above preparation is also known under the names of Spanish Dentifrice, and Castilian Tooth Cream.

Violet Tooth Paste. Take of 1312. prepared chalk, 3 ounces; cuttle-fish bone and white sugar (powdered), of each, 2 ounces; orris root (powdered), 1 ounce; smalts, 2 to 3 drachms; mix with sufficient syrup of violets to make a paste. A fashionable tooth-paste, highly esteemed for its power of cleaning the teeth, and its delicate color and odor.

Odontine. There are dentifrices advertised under this name, two or three of which have acquired a very large sale in the fashionable world. That of an eminent perfumery house appears to have the following composition: -Cuttle-fish bone, Castile soap and red coral, equal parts; color with tincture of cochineal and mix with honey

Magic Tooth Paste. Take of 1315. white marble-dust, 2 ounces; pumice-stone in impalpable powder, $1\frac{1}{2}$ ounces; rose-pink, $\frac{1}{2}$ ounce; attar of roses, 7 or 8 drops; mix as before with sufficient honey to make a paste. A favorite nostrum for rapidly cleaning and whitening the teeth, but one not adapted for free or frequent use.

Charcoal Tooth Paste. Take of 1316. chlorate of potassa in very fine powder, 1 drachm; finely powdered charcoal, 2 ounces; honey (best raw, cold), 11 ounces; sufficient mint water to flavor; form a paste as before. A rather unchemical mixture, esteemed, particularly by smokers, for deodorising the teeth and breath.

1317. To Prepare Charcoal as a Dentifrice. To prepare charcoal of the highest quality, as a dentifrice, requires considerable skill and care. The substance, whether wood or nut, should not be in larger than one inch pieces; the carbonization should be effected in covered crucibles, at a low red heat-in no case exceeding a dull cherry red,-and the whole should be cooled out of contact with the Take of white Castile soap, 2 cunces; honey, air. On opening the crucible, only those pieces 4 ounces; water, 12 ounces; alcohol, 4 ounces;

1310. Peruvian Bark Tooth Paste. burnt, and have a uniform dark color and a dull surface. If the heat employed be much higher than that named, the charcoal acquires a brilliant surface, and is greatly deteriorated in quality. The pieces selected should be kept in close vessels for further use or operation; any exposure to the air weakens its power of absorption.

1318. Peruvian Tooth Paste. This is formed by adding about 11 to 2 drachms of Peruvian bark, in very fine powder, to every ounce of the dry ingredients of any simple tooth paste, before beating them up with honey or syrup. A useful tonic for tender, spongy, foul, or scorbutic gums, and said to fix loose teeth. A little powdered myrrh is sometimes added.

1319. Quinine Tooth Paste. Take red coral, 3 ounces; cuttle-fish bone, 1 ounce; disulphate of quinine, ½ drachm; mix, triturate to very fine powder, add honey (white), 4 ounces; and a few drops attar of roses, or neroli, dissolved in rectified spirit, 3 fluid drachms; and beat the whole to a paste. A little powdered myrrh (1 to 3 drachms) is sometimes added. A very fashionable and popular article. Use, &c., the same as Peruvian paste.

1320. Opiate Tooth Paste. powdered orris, and precipitated chalk (see No. 1291), each ½ pound; rose pink, 2 drachms. Rub into paste with simple syrup, and perfume with oils of cloves, nutmeg, and rose, each & ounce

1321. Patey's Orris Tooth Paste. Take 1 pound Paris white, ½ pound rose pink, 3 ounces orris root; alum, ½ ounce; oil cloves and nutmegs, each 1 drachm. Use honey enough to form a paste.

1322. Dr. King's Tooth Paste. Prepared chalk (see No. 1292), 1 part; powdered sufficient to make a paste, and essential acromatize, a sufficient quantity of each.

1314. Pellitier's Odontine is said to consist of pulverized sepia-bone (cuttle-fish tinctures of rhatany and myrrh; oil of checkerberry to flavor. This paste is a fine pre-

ooth and Mouth Wash-

These are used to rinse the mouth, and particularly the teeth and gums, a few drops, more or less, of them being added to about a wine-glassful of water for the purpose. In some cases their action is promoted by the use of the tooth-brush.

1324. Eau Botot. Tincture of cedar wood, 1 pint; tineture of myrrh and rhatany, each 4 ounces; oil of peppermint and rose, each 10 drops. Mix.

1325. Violet Mouth Wash. Tineture of orris, essence of rose, and alcohol, each 1 pint; oil of almonds, 5 drops. Mix.

Mexican Tooth Wash. 1326. pulverized orris root, 1 ounce; tonqua beans, 1 ounce; Peruvian bark, 1 ounce; oak bark, 1 ounce; alcohol, 1 pint; water, 1 pint; let the above stand for 12 days, and filter; color with

alkanet root. An elegant tooth wash.

1327. Balm of Thousand Flowers. should be selected for use which are properly melt the Castile soap and honey in the alcohol and water with a gentle heat. Flavor with oil of rose and wintergreen. Used as a denti-

1328. Wash to Harden the Gums. Take 1 pint of Jamaica spirits, 1 tea-spoonful each powdered alum and saltpetre pulverized, and I ounce of pulverized myrrh. Mix.

1329. Cologne Tooth Wash. Eau de Cologne, 1 quart; tineture of myrrh, 4 ounces.

1330. Sozodont. Take of salts of tartar (carbonate of potassa), ½ ounce; honey, 4 ounces; alcohol, 2 ounces; water, 10 ounces; oil wintergreen and oil rose, sufficient to flavor. An elegant dentifrice.

1331. Cleveland's Tooth Wash. Tinetures of myrrh, Peruvian bark, and gentian wintergreen, or any flavor to suit; mix. This

is a fine wash for the mouth, gums, and teeth.

1332. Myrrh Tooth Wash; Kirk-land's Tooth Lotion. Take of tineture of myrrh, 1 ounce; water, 2 cunces; mucilage, a ounce: agitate them well together, and again each time before use. As a wash in rotten and loose teeth, foul, spongy, and ulcerated gums, fetid breath, &c., it is often very serviceable where there is a scorbutic taint.

1333. Myrrh and Borax Mouth Wash. Rub well tegether in a mortar, 1 ounce each of borax and honey; then gradually add 1 quart spirit of wine (not above proof), and add I ounce each of gum myrrh and red saunders wood. Macerate for 14 days, and filter. This is an excellent wash for the gums and mouth.

1334. To Cleanse the Spaces Between the Teeth. Some dentists recommend silk floss for cleaning the spaces between teeth, but we know from experience, that No. 8 gum rings are superior. They are much

more convenient in every respect.

1335. Wash to Beautify the Teeth. Dissolve 2 ounces borax in 3 pounds boiling spirits of camphor, and bottle for use. A table-spoonful of this mixture, mixed with an daily with a soft brush, preserves and beautifies the teeth, extirpates all tartarous adhesion, arrests decay, induces a healthy action in the gums, and makes the teeth pearly white.

1336. Cachou Aromatise. These popular pastilles for perfuming the breath are liquorice in 4 ounces water, by the heat of a attars of thyme, caraway, rose, lavender, ounce; and Bengal catechu in powder, 1 ounce. Evaporate to the consistence of an extract, and then mix in thoroughly, powdered mastic, charcoal, cascarilla, and orris Make into pastils, and dry. root, each & drachm. When the mass has 1341. Basis for Fren been reduced to the proper consistence, it is to be removed from the fire, treated with attar of peppermint, 30 drops; tinetures of ambergris and musk, 5 drops; and then poured out following French pastils, as well as many upon an oiled slab, and rolled to a very thin others:sheet. After cooling, blotting paper is pressed

Tumigating Pastils; Incense Pastilles. These are small masses essentially composed of powdered charcoal and aromatic substances that emit fragrant fumes during combustion, with the addition of sufficient nitre or saltpetre to cause them to slowly consume away, without flame, when kindled. Their common form is that of a small cone with a triangular or triped base, of about # to 1 inch in height, and about inch diameter at the larger part. This form is most simply and conveniently given them by pressing the mass, whilst soft, into a mould of lead or porcelain. The dry ingredients should be first reduced to fine powder, and the balsams and essential oils (if any) being added, the whole should be root, each I fluid ounce; aqua ammonia, I (if any) being added, the whole should be drachm; pure water, I pint; tincture of which the mixture should be heaten to the which the mixture should be beaten to the consistence of a stiff ductile mass or dough with the liquid ordered for the purpose. When powdered gum is one of the ingredients, the mass should be beaten up with water; but otherwise mucilage must be employed. Gum-tragacanth, owing to its greater thickening and binding powers, is here generally pre-ferred to gum-arabic. The charcoal of the light woods, as the linden, willow, and alder, make the best pastils; that of the first being most esteemed for this purpose in France. The following receipts are among the best that can be made, and will serve as examples of these articles, from which the operator will be able to devise others:

1338. Dr. Paris's Fumigating Pastils. Pulverize 1 pound benzoin, 1 pound cascarilla, $1\frac{1}{4}$ ounces myrrh, and $1\frac{1}{2}$ pounds charcoal; mix them through a sieve; then add # ounce each of attars of nutmegs and of cloves; dissolve 2 ounces of nitre in sufficient mucilage of tragacanth to make the whole into a stiff paste; beat well in a mortar, make into pas-

tils, and dry.

1339. Perfumers' Fumigating Paswater, and before it is cold add 1 tea-spoonful tils. Take of gum benzoin, 2 ounces (avoirdupois); olibanum (in tears), 1½ ounces; storax (in tears), 1 ounce; cascarilla and gumequal quantity of tepid water, and applied tragacanth, of each & ounce; nitre, 2 ounces; charcoal, 11 pounds; mix, and beat them up

with water or rose water.

1340. Piesse's Fumigating Pastils. Dissolve 4 ounce nitre in 1 pint rose water; mix this with 1 pound willow charcoal, and dry it thoroughly in a warm place. When the nitrated charcoal is perfectly dry, pour thus made: Dissolve 3½ ounces extract of upon it a mixture of ½ drachm each of the water bath, and add pulverized gum-arabic, ½ cloves, and santal; then stir in 6 ounces ounce; and Bengal catechu in powder, 1 benzoic acid (flowers of benzoin); mix thor-Evaporate to the consistence of an oughly through a sieve, then beat in a mortar with sufficient mucilage to bind together.

> 1341. Basis for French Pastils. Take of charcoal, 1½ pounds avoirdupois; nitre, 2 ounces; gum-tragacanth, 1 ounce; mix in the dry state. It is used as a basis for the

1342. Pastilles aux Fleurs d'Oranges. upon it to absorb any adhering oil, and the To each pound of Nos. 1341 or 1339, add of surfaces are moistened with water, and orange powder (genuine), 2½ ounces avoirducovered with silver leaf. When dry it is to pois; neroli, 1 Imperial fluid drachm; and be divided into small bits of the size of a lentil. beat up the mass with eau de fleurs d'oranges. pound of Nos. 1341 or 1342, add of pale rose products keep better, and are quite free from powder. 3 ounces avoirdupois; essence of the peculiar rawness found in those from roses, 2 Imperial fluid drachms; and beat up fresh herbs and flowers, and which nothing the mass with cau de rose.

1344. Pastilles à la Vanille. To each pound of Nos. 1339 or 1341 (usually the first), add of vanilla (in fine powder), 2 ounces avoirdupois; cloves (in fine powder), 1 ounce; either in very fine shreds or recently powderessence of vanilla, 1/2 Imperial fluid ounce; ed; or by a like addition of any of the suboil of cloves, oil of cassia, of each 1 fluid drachm; and beat up the mass with cinnamon water.

1345. Pastils of Every Variety products of the preceding formulæ are of excellent quality. They may be varied, to please some of their aromatic ingredients, or by the may be done up with the bundle of leaves articles are made by simply increasing the proportion of the charcoal and saltpetre. Good burning qualities depend greatly on the benzoin. completeness of the mixture, and the moderate compactness of the mass. If they burn too slowly, a little more saltpetre may be added; if too fast, the quantity of saltpetre should be slightly lessened. Musk and civet, though often ordered in books as ingredients in pastils, should be avoided, as they give out a disagreeable odor during combustion. Ambergris is also unsuited for an ingredient in them.

1346. Incense. Storax, 2½ ounces; benzoin, 12 ounces; musk 15 grains; burnt sugar, 1 ounce; frankincense, 21 ounces; gum-tragacanth, 1½ ounces; rose-water sufficient to form a mass; to be divided into small tablets.

1347. Incense. Powdered cascarilla, 2 ounces; myrrh, storax, benzoin, burgundy

pitch, each 1 ounce; mix. Or:

1348. Fine Incense. Take of olibanum (true), 7 parts; gum benzoin, 2 parts; mix. Or: To the last, add of cascarilla 1 part. The preceding, placed on a hot iron plate, or burned in a censer, were formerly used to perfume apar a s. The incense used in the rites of molic Church, and in the tema, consists wholly or chiefly of o ibanum.

1349. Freserved Flowers and Herbs. Flowers, herbs, and other like vegetable substances, are now generally preserved, for distillation, by means of common salt. The process simply consists in intimately mixing the flowers, &c., with about \tau their weight of good dry salt, and ramming down the mixture as tightly as possible, in strong casks or jars. The casks or jars are then placed in the cellar, or other cold place, and covered with boards, on which heavy weights are put, to keep the mass tight and close. In this state they may be preserved from season to season, or even for two or three years. The flowers, &c., should be recently gathered, and free from dew or moisture; and the salt should be quite dry, to ensure which it may be exposed for 2 or 3 hours in an oven. The above is the method now generally followed, by our manufacturing perfumers and wholesale druggists, for preserving fresh aromatic vegetable sub- its odor for years; is much used for perfuming stances for subsequent distillation. It is found that the odor of distilled waters, oils, &c., obtained from flowers, &c., thus pre- drawer or desk containing the paper, will served, is superior to that of those from either impart to it a fine and durable perfume.

1343. Pastilles à la Rose. To each the recent or dried vegetables; whilst the but age, or redistillation, will remove.

1350. To Scent Tobacco. Fragrance may be imparted to tobacco, by mixing with it, while slightly damp, a little cascarilla, stances noticed under fumigating pastils (see No. 1339) of which the odor is appropriate to the purpose. Cigars may be perfumed by The moistening them externally with concentrated tincture of cascarilla, or tineture of benzoin or storax, or a mixture of them; or a minute the fancy of the maker, by the omission of portion of the powders, shred roots, or woods, addition or substitution of others. Cheaper that form the centre of the cigar. The socalled anti-choleraic and disinfecting cigars are scented with camphor, cascarilla, and

1351. Scented or Aromatic Candles. These are prepared by introducing a very small quantity of any appropriate aromatic into the material (fat, wax, or wick) of which they are made, whilst it is in the liquid state. Camphor, gum benzoin, balsam of Peru, cascarilla, essential oils, &c., are generally the substances selected. Care must be taken not to overdo it, as then the candles will burn smoky and give little light.

1352. To Make Snuff Scents. Of the substances used, singly and combined, to scent snuff, the following may be mentioned as the principal:—tonqua beans, and their oil or essence; ambergris, musk, civet, and their

essences.

1353. To Scent Snuff. A sufficient quantity of the powder, essence, or oil, having been well mixed with a little snuff, the perfumed mixture is added to the whole quantity of snuff to be scented, and the mass well stirred up and turned over. It is lastly passed or rubbed through a sieve, to ensure the perfect diffusion of the scent through the whole mass.

1354. To Restore the Odor of Musk. Genuine musk frequently becomes nearly inodorous by keeping, but its perfume is restored by exposing it to the fumes of ammonia, or by moistening it with ammonia water.

1355. Peau d'Espagne, or Spanish Skin, is merely highly-perfumed leather. Take of oil of rose, neroli, and santal, each ½ ounce; oil of lavender, verbena, bergamot, each & ounce; oil of cloves and cinnamon, each 2 drachms; in this dissolve 2 ounces gum benzoin. In this steep good pieces of waste leather for a day or two, and dry it over a line. Prepare a paste by rubbing in a mortar, 1 drachin of civet with 1 drachin of grain musk, and enough gum-tragacanth mueilage to give a proper consistence. The leather is cut up into pieces about 4 inches square; two of these are pasted together with the above paste, placed between 2 pieces of paper, weighted or pressed until dry. It may then be inclosed in silk or satin. It gives off paper, envelopes, &c.; for which purpose 1 or 2 pieces of the perfumed leather, kept in the

Cyrups. sugar more or less strong according to the object for which they are used. In the preparation of syrups, if care be taken to employ the best refined sugar, and either distilled water or filtered rain water, they will be rendered much less liable to spontaneous decomposition, and will be perfectly transparent, without the trouble of clarification.

Clarification of Sugar for 1357. When inferior sugar is employed, Syrups. clarification is always necessary. best done by dissolving the sugar in the water or fruit juices cold, and then beating up a little of the cold syrup with some white of egg, and 1 or 2 ounces of cold water, until the mixture froths well; this must be added to the syrup in the boiler, and the whole whisked up to a good froth; heat should now be applied, and the seum which forms removed from time to time with a clean skimmer. As soon as the syrup begins to slightly simmer it must be removed from the fire, and allowed to stand until it has cooled a little, when it should be again skimmed, if necessary, and then passed through a clean flannel. When vegetable infusions or solutions enter into the composition of syrups, they should be rendered perfectly transparent, by filtration or clarification, before being added to the sugar.

1358. Filters for Syrups. Syrups are usually filtered, on the large scale, by passing them through creased bag filters; on the small scale, conical flannel bags are usually adopted. Thick syrups filter with difficulty, hence it is a good plan to dilute them before filtering, and afterwards evaporate them to the required consistency. For small quantities clarification involves less trouble than filtra-(See No. 1357.)

1359. To make a Conical Filter. Take a square piece of flannel or Canton flannel, fold it diagonally, and sew two of the corresponding edges together with an over-lap seam, leaving the other two edges open; then fold the open edge over, sufficiently to make the opening level. (See Fig. 1.) This fold gives a considerable degree of stiffness to the open

end, preventing the filter in some measure from collapsing. Professor Parrish, in his book on Practical Pharmacy,

recommends the use of a conical wire frame (see Fig. 2) to support the filter. The frame is made to fit into the top of a suitable tin bucket, being supported by a rim or flange around the top of the frame, projecting sufficiently to rest on the edge

Fig. 2.

Fig.~1.

of the bucket. The filter must fit the frame.

1360. Quantity of Sugar Used in Making Syrups. The proper quantity of sugar for syrups will, in general, be found to be 2 pounds avoirdupois to every pint of wa- sp. grav. 1.317; that of the British Ph. is 1.330.

Syrups are solutions of ter or thin aqueous fluid. These proportions allow for the water that is lost by evaporation during the process, and are those best calculated to produce a syrup of the proper consistence, and possessing good keeping qualities. They closely correspond to those recommended by Guibourt for the production of a perfect syrup, which, he says, consists of 30 parts sugar to 16 parts water. To make highly transparent syrups the sugar should be in a single lump, and by preference taken from the bottom or broad end of the loaf; as, when taken from the smaller end, or if it be powdered or bruised, the syrup will be more or less cloudy.

1361. Amount of Heat to be Employed in Making Syrups. In the preparation of syrups it is of great importance to employ as little heat as possible, as a solution of sugar, even when kept at the temperature of boiling water, undergoes slow decomposi-The best plan is to pour the water (cold) over the sugar, and to allow the two to lie together for a few hours, in a covered vessel, occasionally stirring, and then to apply a gentle heat, preferably that of steam or a water-bath, to finish the solution. Some persons (falsely) deem a syrup ill prepared unless it has been allowed to boil well; but if this method be adopted, the ebullition should be only of the gentlest kind (simmering), and should be checked after the lapse of one or two minutes. When it is necessary to thicken a syrup by boiling, a few fragments of glass should be introduced, in order to lower the boiling point. In boiling syrups, if they appear likely to boil over, a little oil, or rubbing the edge of the pan with soap, will prevent it. Syrups are judged by the manufacturer to be sufficiently boiled, when some taken up in a spoon pours out like oil; or, a drop cooled on the thumb nail gives a proper thread when touched. (See No. 1368.) When a thin skin appears on blowing upon the syrup, it is judged to be completely saturated. These rude tests often lead to errors, which might be easily prevented by employing the proper proportions, or determining the specific gravity.

Table of Specific Gravities of 1362. The degrees of Baumé here given are those

of his heavy saccharometer.

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Specific Degrees in 100 parts. Baum é. Gravity. 00 1.000 1.020 $\mathbf{3}$ 10 1.0406 15 1.0628 20 1.081 11 25 1.104 13.5 30 1.12816.3 35 1.15219 40 21.6 1.177 45 24.5 1.2041.23050 55 1.25729.51.284 60 321.321

The latter density is about the syrupus of the pharmacopæias; that of the U.S. Ph. has a

Syrup. A fluid ounce of saturated syrup ter, is not dissolved off, but turns hard and weighs $577\frac{1}{2}$ grains; a gallon weighs $13\frac{1}{3}$ snaps. pounds avoirdupois; its specific gravity is 1.319 to 1.321, or 35° Baumé; its boiling point mel sugar, and is proved by dipping a stick is 221° Fah., and its density at the tempera- into the sugar and then into cold water, when, ture of 212° is 1.260 to 1.261, or 30° Baumé. on the moment it touches the water, it will The syrups prepared with the juices of fruits snap like glass. It has now arrived at a full mark about 2° or 3° more on Baumé's scale candy height. than the other syrups. (Cooley.) According to Ure, the decimal part of the number denoting the specific gravity of a syrup, multiplied The best safeguard against this is the use of by 26, gives the number of pounds of sugar it

contains per gallon, very nearly.

1364. To Preserve Syrups. The presolutions, is best promoted by keeping them complete. in a moderately cool, but not a very cold place.

Let syrups be kept in vessels well closed, and in a situation where the temperature never 1 pint of water to every 2 pounds of sugar fermenting or losing their transparency.

1365. To Prevent Syrup from Candy- in with the rest. ag. The candying or crystallization of 1370. Plair syrun, unless it be over-saturated with sugar, clean copper, 100 pounds loaf sugar and 3 may be prevented by the addition of a little gallons water; take the white of 12 good acetic or citric acid (2 or 3 drachms per gal-leggs, whisk them up to a froth in a pan, and lon); confectioners add a little cream of tartar put them into a copper before the fire is lightto the sugar, to prevent granulation.

is also good.

1367. To Bleach Syrup. Syrups may be decolored by agitation with, or filtration through, animal charcoal.

Degrees of Boiling Sugar. In preparing sugar for candies, &c., the confectioner requires different degrees of boiling in order to bring the sugar to the proper state for the various articles he prepares. This is called a weak candy height.

called bloom sugar.

sugar will fly off like feathers.

1363. To Determine the Density of dipped into it, and put_directly into cold wa-

The last stage of boiling reduces it to cara-

Throughout the boiling, the fire must not be too fierce, as it will discolor the syrup. steam heat. Color may be given to the candy by adding the coloring matter to the syrup before boiling it. Flavoring essences servation of syrups, as well as of all saccharine must be added when the process is nearly

rises above 55° Fah. They are better kept in used; this proportion will make a fine syrup, small than in large bottles, as the longer a about 32° Baune, but the manufacturer often bottle lasts, the more frequently it will be requires weaker syrups when preparing infe-opened, and, consequently, the sore it will rior cordials, and the easiest method of ascerbe exposed to the air. By bot ling syrups taining the proper point of concentration is whilst boiling hot, and immediately corking by the use of that variety of Baume's hydown and tying the bottles over with bladdrometer. called a saccharometer. Beat up der, perfectly air-tight, they may be preserved. the whites of 2 eggs (if you are clarifying even at a summer heat, for years, without about 10 pounds of sugar, or mix in this proportion), until it is very frothy, and then mix

1370. Plain Syrup. Put into a very ed; stir them well in the sugar, make a good 1366. To Prevent Syrup from Fer- fire, and let the mixture be still. As it comes The fermentation of syrups may toward boiling, the seum will rise; be parbe effectually prevented by the addition of a ticular not to let it bubble or boil, but simmer; little sulphite of potassa or of lime. A cele- as soon as the scum is seen to break through brated French chemist recommends the addi- the edge of the copper, damp the fire, and tion of about 3 to 4 per cent. sugar of milk, take off the first seum; then stir it up and with the same intention. Fermenting syrups let it simmer; keep skimming it until it bemay be immediately restored by exposing the comes clear and bright, and the scum as white vessel containing them to the temperature of as milk; then draw your fire, and take it out boiling water. The addition of a little spirit of the copper, and it will be fit for use. The quantity thus made will be 10 gallons.

1371. Gum Syrup. Dissolve 20 pounds best clear white gum-arabic in 4 gallons water nearly boiling hot; take 60 pounds sugar, melt and clarify it with 1 gallon water, add the gum solution, and boil for 2 minutes.

1372. Raspberry Syrup. This syrup is sometimes used to give a vinous body and flavor to brandy. It is made of 2 pints filtered Well clarified and perfectly transparent syrup raspberry juice, and 4½ pounds sugar. Select the fruit, either white or red. Having picked is boiled until a skimmer dipped into it, and a the fruit, either white or red. Having picked portion touched between the forefinger and them over, mash them in a pan, which put in thumb, on opening them, is drawn into a a warm place until fermentation has comsmall thread which crystallizes and breaks. menced. Let it stand for about 3 days. All mucilaginous fruits require this, or else they If boiled again, it will draw into a larger would jelly when bottled. Now filter the string, and if bladders may be blown with the juice through a close flamel bag, or blottingmouth through the drippings from the ladle, paper, and add sugar in the proportion menit has acquired the second degree, and is tioned above; this had better be powdered. After still further boiling, it arrives at the skim it carefully, but do not let it boil; or state called feathered sugar. To determine mix it in a glass vessel or carthenware jar, this, dip the skimmer and shake it over the and place in a pan of water on the fire. pan, then give it a sudden flirt or jerk, and the (This is simply a water-bath.) When the gar will fly off like feathers.

Syrup is dissolved, so that when you dip your fore-finger in it and apply it to the ball which state the sugar that hangs to a stick of your thumb, and then separate the thumb and finger, the fine thread of syrup reaches mix them with the infusion; keep back a from each without breaking, take it off; strain quart of the liquid; then dissolve and boil in through a cloth; bottle when cold; cover with tissue paper dipped in brandy, and tie down with a bladder until wanted for use.

1373. Imitation Raspberry Syrup. Dissolve 50 pounds white sugar in 10 gallons water; then make an infusion of 1 pound powdered orris root in 1 gallon boiling water, in a covered vessel, stirring occasionally as it cools, and when cold, filter through flannel; stir this infusion into the syrup; then stir in ½ pound tartaric acid previously dissolved in 1 quart water. Color the mixture with 1 to 1 gallon cherry juice, using more or less, as required to produce the desired color. This produces a splendid imitation of raspberry syrup at a comparatively trifling cost.

1374. Parrish's Strawberry Syrup. Take 4 quarts fresh fruit; express the juice, by the aid of heat; raise it to the boiling point, and strain. If it is to be kept till the following season, it should be poured, while hot, into dry bottles, filled to the neck, and if necessary. securely corked. This furnishes a key for the treatment of the whole family of fruit juices.

1375. Lemon Syrup. Take 5 gallons the juice, and boil for 2 minutes; skim, then strain.

1376. Orgeat Syrup. Take 10 pounds sweet almonds, 4 pounds bitter almonds; Take 10 pounds cover them with boiling hot water; let them stand till nearly cold, and peel them by pressing through your fingers; beat them in a stone or brass mortar to a very fine paste with some sugar, adding water slowly; press through a linen cloth, so as to get 5 gallons of a liquid resembling rich milk; dissolve in this liquid 80 pounds sugar; boil up once, and add 1 pint orange-flower water; then strain.

1377. Arrack Punch Syrup. Take 53½ pounds sugar; 3½ gallons water. Beil up well, then add 1½ gallons lemon juice, and stir till the liquid is clear; pour it into a clean tub, and, when nearly cool, add 5 gallons Batavia arrack, then filter.

1378. Syrup of Coffee. Take 10 pounds best Java coffee, fresh roasted and ground, and 6 gallons boiling water. Let it stand, well covered, till cool; strain and press; next dissolve in this infusion 80 pounds sugar; boil and skim for 2 minutes, and then strain.

1379. Cinnamon Syrup. Take 1 ounce oil of Ceylon cinnamon, rubbed and dried up with carbonate of magnesia in a mortar, so as to make it a powder; put it in a filter bag, and pour 5 gallons water on it; pour the water over and over till it runs clear; get in this way 5 gallors clear high-flavored water; dissolve 80 pounds of sugar in the flavored 1387. Lemon Syrup. Add to simple strain.

1380. Sirop Capillaire. Maidenhair Syrup. Take 1 pound maidenhair herb, and 51 gallons boiling water. Macerate till cold; take the whites of 3 eggs beaten to froth, and water.

the above 80 pounds sugar by a good heat; when the scum rises, put in a little from the quart of cold liquid, and this will make the scum settle; let it raise and settle 3 times; then skim, and when perfectly clear add 1 pint orange-flower water; then boil once up again and strain.

1381. Cherry Syrup. Take 5 gallons cherry juice; let it ferment a few days; dissolve and boil 80 pounds of sugar; when clear, skim and strain.

1382. Syrup of Orange Peel. Reduce 2 ounces dried orange peel to coarse powder, put it in a small glass percolator, and pour deodorized alcohol slowly on it till 6 fluid ounces of tineture have passed; evaporate this spontaneously to 2 fluid ounces; triturate this with 1 ounce carbonate of magand strain; add water until it measures 4 nesia, 1 ounce sugar and 1 a pint water pints. Dissolve 8 pounds raw sugar in this gradually added; pour this on a filter, and when it ceases to pass, add water till a pint of filtrate is obtained; to this add 2½ pounds sugar; dissolve with a gentle heat, and strain

1383. Punch Syrup. Digest 8 ounces fresh lemon peel cut in small pieces and bruised, in 12 ounces Jamaica rum for 3 days, lemon juice, I ounce best oil of lemons dis- and strain. Mix 28 ounces strained lemon solved in ½ pint of alcohol; or the rinds of 16 juice with 18 ounces rum; allow it to settle, lemons rubbed with sugar to extract the escential oil; dissolve 80 pounds of sugar in powdered white sugar in 42 ounces rum at a gentle heat, and when cool, mix all the liquids together. This is in no way inferior to the most celebrated European punch syrups.

> Syrups for Soda or Min-eral Waters. The following is a collection of well approved receipts for flavoring mineral waters, selected principally from the "Druggist's Circular and Chemical Gazette." Most of the syrups not made from fruits may have a little gum-arabic added, in order to produce a rich froth when the soda water is added.

> 1385. Simple Syrup. To 8 pounds finest white sugar, add 2 quarts water and the whites of 2 eggs; stir until all the sugar is dissolved; simmer for 2 or 3 minutes; skim well, and strain through a fine flannel bag. The following syrups for soda water may be produced by employing the above syrup as a basis. A variety of other syrups may be made in the same way by using the artificial fruit essences. (See No. 1045, also last receipt.)

> 1386. Simple Syrup. White sugar, 10 pounds; water, 1 gallon; isinglass (best), 2 ounce (or, the white of an egg). Dissolve the isinglass in hot water, and add it to the

dissolve 80 pounds of sugar in the flavored water, and boil for 2 minutes; then skim and syrup, when cold, 20 drops fresh oil of lemon and bounce citric acid (previously dissolved in 3 ounces water) to each gallon. Mix by shaking well in a bottle, then add 4 ounces gum solution, made by dissolving 2 ounces strain without pressing, so as to get 5 gallons; fine white gum-arabic in 2 ounces warm

press the lemon juice, add 1 pint water to mix each pint of juice and 3½ pounds granulated sugar, including that rubbed up with the rind; warm until the sugar is dissolved, and strain.

1389. Sarsaparilla Syrup. To 1 gallon simple syrup add 10 drops oil of anise, 20 drops oil of wintergreen, 20 drops oil of sassafras, and 6 ounces caramel, or coloring. Before the oils are added to the syrup, they should be cut by grinding them in a mortar, with as 1/2 tea-spoonful of cream of tartar. Strain. much sugar as they will moisten, or mixed

drops; oil of sassafras, 10 drops; fluid extract of sarsaparilla, 2 ounces; simple syrup, 5 pints; powdered extract of liquorice, a ounce;

1391. Parrish's Syrup of Sarsaparilla for Mineral Waters. Take simple syrup, 4 pints; compound syrup of sarsaparilla, 4 fluid ounces; caramel, 11 ounces; oil of wintergreen, 6 drops; oil of sassafras, 6 drops; mix.

pounds, and strain through a fine flannel bag. Ginger syrup may also be made by adding 2 ounces extract of ginger to 1 gallon simple

1394. Vanilla Syrup. Vanilla, 6 drachms; boiling water, 41 pints; sugar, 4 pounds avoirdupois. Reduce the vanilla to fine powder by trituration with a portion of the sugar; boil this with water for 2 hours in a covered vessel, then strain.

1395. Vanilla Syrup. Fluid extract of vanilla, 1 ounce; citric acid, ½ ounce; simple syrup, 1 gallon; rub the acid with some of the syrup, add the extract of vania,

and mix.

1396. Wild Cherry Syrup. Steep 4 ounces wild cherry bark, well bruised, in 1 pint cold water, for 36 hours; press out the

1397. Wild Cherry Syrup. Moisten 5 ounces wild cherry bark, in coarse powder, with water, and let it stand for 24 hours in a for pineapple syrup, or use the essence of pear, close vessel. Then pack it firmly in a percolator, and pour water upon it until 1 pint of fluid is obtained. To this add 28 ounces sugar. tartaric acid.

1398. Strawberry Syrup. Take fresh strawberries and inclose them in a coarse bag; press out the juice, and to each quart add 1 pint water and 6 pounds white sugar; dissolve by raising it to the boiling point, and strain; bottle and cork hot, and keep in a cool place.

1399. Strawberry Syrup. Take fresh

strawberries, 5 quarts; white sugar, 12 pounds; water, 1 pint. Sprinkle some of the sugar over the fruit in layers, and allow the whole to stand for several hours; express the juice and saur strain, washing out the pulp with water; Mix add the remainder of sugar and water, bring the fluid to the point of boiling, and then sweet almonds and 1 ounce bitter almonds; strain. This will keep for a long time.

Lemon Syrup. Grate off the 1400. Strawberry Syrup. Strawberry yellow rind of lemons, and beat it up with a juice. 1 pint; simple syrup, 3 pints; solution sufficient quantity of granulated sugar. Ex of citric acid (see Fruit Acid), 2 drachms;

> 1401. Fruit Acid (used in some of the syrups). Citric acid, 4 ounces; water, 8

ounces.

1402. Strawberry Syrup Without the Fruit. Add to 1 gallon simple syrup, 2 tea-spoonfuls essence of strawberry, and 1 ounce tartarie acid. Color with coloring made as follows: Boil 1 ounce eachineal with

Raspberry Syrup. Make as with a small quantity of strong alcohol.

1390. Sarsaparilla Syrup. Take oil fruit or the essence. The flavor of this syrup of wintergreen, 10 drops; oil of anise, 10 is improved by using 1 pint currants to 5 of

raspberries.

1404. Blackberry Syrup. Make as directed for strawberry, and add to each quart

1 ounce of the best French brandy

1405. Pineapple Syrup. Take a convenient number of pineapples, pare and mash them in a marble or porcelain mortar, with a small quantity of sugar; express the juice, and for each quart take 11 pints water and 6 1392. Ginger Syrup. Bruised Jamaica pounds fine sugar; boil the sugar and water, ginger, 2 ounces; boiling water, 1 pint; then add the juice; remove from the fire, and macerate for 4 hours; add fine white sugar, 2 skim and strain. Or make it with the essence, as directed for strawberry. (See No. 1402.

1406. Pineapple Syrup. Oil of pineapple, 1 drachm; tartaric acid, 1 drachm; 1393. Ginger Syrup. Tincture of simple syrup, 6 pints; mix. Or: Take 1 gallon expressed pineapple juice; sugar, 15 mix.

Wintergreen Syrup. 1407. wintergreen, 25 drops; simple syrup, 5 pints; sufficient burnt sugar to color (see No. 694);

1408. Maple Syrup. Take maple

sugar, 4 pounds; water, 2 pints.

1409. Chocolate Syrup. Mix 8 ounces chocolate in 2 pints water, and stir thoroughly over a slow fire. Strain, and add 4 pounds white suga.

1410. Orange Syrup. Take a convenient number of fresh and ripe oranges, grate off the outside yellow peel; cut the oranges infusion; let it stand till clear; decant, and and express the juice; and to each quart add add 1½ pounds fine white sugar; mix and 1 pint water and 6 pounds sugar, previously strain.

well mixed with the grated peel. Dissolve by gentle heat, then strain.

1411. Pear Syrup. Make as directed by adding to each gallon of simple syrup 2 tea-spoonfuls essence of pear and 1 ounce of

1412. Apple Syrup. Make as directed for pineapple syrup; or with the appropriate fruit essence and acid, as above.

1413. Banana Syrup. Make as directed for pineapple syrup; or with the appropriate fruit essence, as before directed. (See No. 1402.) Or: Take oil of banana, 2 drachms; tartaric acid, 1 drachm; simple syrup, 6 pints; mix.

1414. Grape Syrup. Brandy, 1 pint; spirits of lemon, 1 ounce; tineture of red saunders, 2 ounces; simple syrup, 1 gallon.

1415. Orgeat Syrup. Take 3 ounces gum-arabie in powder, 1 ounce; sugar in powder, 3 ounces. Rub together in a mortar, adding water from time to time, until the unskimmed milk, 1 pint; sugar, 2 pounds, mixture measures 1 quart. Strain through a cloth, and mix with 1 gallon of simple syrup.

1416. Imitation Orgeat Syrup. Cream syrup, 1 pint; vanilla syrup, 1 pint; oil of bitter almonds, 4 drops. Or: About 2 drachms imitation cream syrup (see No. 1430) are to be mixed with 2 ounces simple syrup and flavored with bitter almond and orange-flower

1417. Orange-Flower Syrup. Add to 1 gallon simple syrup 2 ounce extract of or-

ange flowers

1418. Coffee Syrup. Coffee, roasted, ½ pound; boiling water, I gallon. Enough is filtered to make ½ gallon of the infusion, to which add granulated sugar, 7 pounds.

1419. Nectar Syrup. Strawberry syrup, ½ pint; Madeira wine, 1 ounce; orgeat syrup,

₫ pint. Mix.

1420. Nectar Syrup. Vanilla syrup, 5 pints; pineapple syrup, 1 pint; strawberry, raspberry, or lemon syrup, 2 pints. Mix.

1421. Sherbet Syrup. Vanilla syrup,

pints; pineapple syrup, 1 pint; lemon

syrup, 1 pint. Mix.

1422. Ambrosia Syrup. Raspberry syrup, 2 pints; vanilla syrup, 2 pints; Hock wine, 4 ounces. Mix.

1423. Hock and Claret Syrup. Hock or claret wine, 1 pint; simple syrup, 2 pints. Mix

Solferino Syrup. 1424. Brandy, 1

pint; simple syrup, 2 pints. Mix.

1425. Cream Syrups. These are prepared by mixing highly flavored syrups with fresh cream. As this latter does not keep well, it is a more economical plan to make a simple cream syrup in suitable quantities, and to add a portion of it to the flavored syrup as required. This prevents the loss of different flavored syrups by spoiling, and allows of the cream being used for any flavored syrup

1426. Simple Cream Syrup. Mix together thoroughly 1 pound powdered sugar with 1 pint fresh cream. Keep it in pint bot-

tles for use.

1427. Taylor's Cream Syrup. Fresh cream, ½ pint; fresh milk, ½ pint; powdered sugar, 1 pound. Mix by shaking, and keep in a cool place. The addition of a few grains of bicarbonate of soda will for some time re-

1428. Hubbell's Cream Syrup. This is prepared with 13 pounds sugar to I pint of

cream.

1429. Cream Syrup. Take of fresh cream, 1 pint; fresh milk, 1 pint; fine powdered sugar, 3 pounds; beat the sugar with the milk and the whites of 2 eggs, then mix with the cream. Flavor with vanilla, lemon, or strawberry. Keep in a cool place, well bottled.

1430. Imitation Cream Syrup. Make an emulsion with 3 fluid ounces fresh oil of sweet almonds, 2 ounces powdered gum-arabic, and 9 ounces water; then dissolve 1 pound white sugar by a gentle heat, strain, and when cool, add the whites of 2 eggs. It should be put up in small bottles, well corked, in a cool place. This is not only an excellent (See Nos. 53, &c.) imitation and substitute for cream syrup, but will keep well for a considerable time.

1431. Cream Syrup. Take of fresh Troy. Dissolve by snaking in a bottle, add 1 of this to \$ of any of the fruit syrups; or, for vanilla cream, add about a table-spoonful of fluid extract of vanilla to 1 pint.

1432. Vanilla Cream Syrup. Fluid extract of vanilla, 1 ounce; simple syrup, 3 pints; cream (or condensed milk), 1 pint. May be colored with carmine.

1433. Coffee Cream Syrup. Coffee

syrup, 2 pints; Cream, 1 pint.

1434. Nectar Cream Syrup. This is a mixture of 3 parts vanilla syrup, 1 part pineapple syrup, 1 part lemon syrup, and 1 part simple cream syrup.

lcohol. Alcohol is a light, transparent, colorless, volatile, inflammable fluid; mixes in all proportions with water, with evolution of heat and condensation of the mixture, but some hours elapse before the union is complete. It dissolves resins, essential oils (see No. 940), camphor, bitumen, soaps, sugar, the alkaloids, wax. spermaceti, and various other substances. Boils at 172° and in a vacuum at 56° Fahr.; curdles milk; coagulates albumen, and separates both starch and gum from their mucilages; uncongcalable by cold; powerfully antiseptic to animal or vegetable substances immersed in it; with acids it forms ethers. Its evaporation, like that of ether, produces intense cold. By undergoing the acetic fermentation it is converted into vinegar. Dilute alcohol may be procured by the ordinary process of distillation, from all fermented liquors; when drawn from wine, as in France, it is called brandy; when from rice, as in the East Indies, it is called arrack or toddy; when from grain or malt, as in the United States or Great Britain, it is called whiskey, and when from molasses or the juice of the sugar-eane, as in the West Indies, it is called rum.

Whiskey is the spirit from which alcohol is

usually obtained in this country.

By distilling a hundred gallons of whiskey, between 50 and 60 gallons of alcohol are received in the condenser of a specific gravity of 0.835. By a second distillation, taking care to collect only the first portions, and cautiously managing the heat so as not to allow it to rise to the temperature of boiling water, alcohol may be obtained of a specific gravity of 0.825, which is the lightest spirit that can be received by ordinary distillation. At this stage it contains 11 per cent. of water and some small portions of fusel oil.

The best alcohol is that manufactured under Attwood's patent process, in which manganic acid is used to destroy the fusel oil and other foreign substances. This alcohol withstands the tests of nitrate of silver and sulphuric acid remarkably well. (See No. 1444.)

The high wine, or rectified spirit, distilled and rectified in the United States, and often sold as French pure spirit, is free from all deleterious substances, and nearly scentless. Its strength is usually from 84 to 95 per cent.

1436. Proof Spirit contains 521 per cent. by volume of pure alcohol; has a specific

gravity of .920 at 60° Fahr.; and is no more than a mixture of 49 parts by weight pare furnished with a ground-glass stopper. alcohol with 51 parts water. This is the B, Loop of cord to hang up the appropriate the state of the state strength of the proof spirit usually employed by perfumers, and for medicinal purposes; but by law (see No. 58), proof spirit is equal parts by volume of absolute alcohol and dis-

cent. by weight, or 46.33 per cent. by volume, of pure or absolute alcohol, and has a specific hydrometer.

cent. by volume, of pure alcohol; its specific ration repeated a second time. gravity is .835, or 38.45° Baumé.

and a specific gravity of .817, or about 420 Baumé.

1440. Amylic Alcohol. A peculiar oily, nearly colorless acrid liquid, known also as Fusel oil, obtained by distilling fermented after the ordinary spirit has ceased to come

be done on both sides. After it is again inflated and dried, smear over the outer surface twice, and the inner surface four times. with a solution of isinglass. Then nearly fill it with the spirit to be concentrated, leaving only a small space vacant; it is then to be securely fastened, and suspended in a warm situation, at a temperature of about 122° Fahr., over a sand bath, or in the neighborhood of an oven or fire. In six to twelve hours, if the heat be properly conducted, the spirit will be concentrated, and in a little

time longer may be rendered nearly free from water (anhydrous) or of the strength of 97 or 98 per cent.

This alcohol will be sufficiently pure for all the common purposes of the manufacturers, and is an excellent spirit for making varnishes, &c.

The same bladder will serve more than one hundred times; and in fact a common bladder, thoroughly cleansed from fat, and washed and dried, may be used without any further preparation. The bladder should be kept very nearly full, or else a portion of the spirit will escape through the empty part. To prevent this accident, a bottle

with a double neck, of the shape represented in the engraving, may be employed. By this means the bladder may be kept always full.

A, A bottle with two necks, the upper

B, Loop of cord to hang up the apparatus. Bladder containing spirit, filled by means of the bottle, A.

D, Neck of bladder accurately secured to the lower neck of the bottle, A.

tilled water, having a specific gravity of .933. After the first or second time of using the 1437. Dilute Alcohol. Alcohol dilutum bladder, it gives alcohol sufficiently pure for (U. S. Ph.) consists of equal measures of offi-most experimental purposes. Before hanging cinal alcohol and water; it contains 39 per the apparatus up, it is better to enclose and suspend it in a coarse netting, which will prevent any accident arising from the strain on gravity of .941, equal to 190 of Baume's light | the neck of the bladder. Should weaker spirit than that directed in the preceding formula 1438. Alcohol. Officinal alcohol (U. S.) be used, to procure alcohol by either method, it Ph.) contains 85 per cent. by weight, or 89 per must be previously concentrated, or the ope-

Absolute alcohol is used to dissolve resins 1439. Stronger Alcohol. Alcohol fortius (U. S. Ph.) has 92 per cent. by weight, or 94.65 per cent. by volume, of pure alcohol; photographer; and by the pharmaceutist to prepare tinetures and for many other purposes.

1442. Chemical Method of Procuring Absolute Alcohol. Take 1 gallon of the alcohol of commerce; throw 1 pound freshly grain or potatoes, by continuing the process made chloride of calcium into the alcohol, and, as soon as it is dissolved, distill off 7 pints and over. Its specific gravity is .818, and its boiling point 268° to 272° Fahr. (U. S. Ph.)

1441. Absolute Alcohol. To procure absolute or anhydrous alcohol, take the bladder a retort properly connected, and expose the of an ox or calf, soak it for some time in mixture to a gentle heat until the lime begins water, then inflate it and carefully free it to slake; then withdraw the heat until the from the attached fat and vessels; this must slaking is finished. Now raise the heat gently and distill off 17 fluid ounces. Alcohol thus obtained will have a density, when the operation is carefully managed, of 0.796.

1443. To Increase the Strength of Common Alcohol. Take a pint of common spirits, and put it into a bottle which it will only fill about \(\frac{3}{2} \) full. Add to it \(\frac{1}{2} \) ounce pearlash or salt of tartar, powdered as much as it can be without occasioning any great loss of its heat. Shake the mixture frequently for about half an hour, before which time a considerable sediment, like phlegm, will be separated from the spirits, and will appear along with the undissolved pearlash or salt at the bottom of the bottle. Then pour the spirit off into another bottle, being careful to bring none of the sediment or salt along with it. For this purpose an instrument called a separating funnel is well adapted. To the quantity just poured off add \(\frac{1}{2}\) ounce pearlash, powdered and heated as before, and repeat the same treatment. Continue to do this as often as necessary, till little or no sediment forms; when this is the case, 1 ounce of alum. powdered and made hot, but not burned, must be put into the spirits, and suffered to remain some hours, the bottle being frequently shaken during the time; after which the spirit, when poured off, will be found free from all impurities, and equal to the best rectified spirits of wine.

To Test the Purity of Alcohol. 1444. The presence of water may be detected by its specific gravity. Fusel oil may be detected by adding a little of a solution of nitrate of silver to the alcohol. Dissolve 10 grains nitrate of silver in 1 ounce of pure dis-Killed water. Then take half a tumblerful of

is not always immediate, for it is sometimes necessary to wait from 1 to 30 hours when testing a sample of alcohol which has been powder can be perceived floating on the contain, and will yield to the manufacturer, liquid, and even then it is necessary to expose much information of a very useful character. the glass to a strong light before the powder can be discovered.

For detecting fuscl oil in alcohol, Mr. E. N. Half fill a test tube with the spirit to be water or ether; tastes and smells vinous.

of sand, wood-charcoal, boiled wheat, and or 21 cents per gallon. broken oyster shells; this removes all other 1451. To Ascertain How Much Wabroken oyster shells; this removes all other impurities as well. The fusel oil can be extracted from small quantities of alcohol, by adding a few drops of olive oil to the spirit, agitating thoroughly in a bottle, and, after settling, decanting. The olive oil dissolves and retains the fusel oil.

1446. To Deodorise Whiskey or Albarrel of liquor add about a gallon (or more) of water saturated with chlorine; stir up water, and distill.

1447. To Filter Alcohol. The following method of filtering alcohol, or its solutions, is said to be very satisfactory, and is used extensively in North Germany, where it constitutes one of the secrets of the trade. Clean, unsized paper (Swedish filtering paper is the strained through a flannel bag, when the re-sulting liquid will be found to possess the reduce it to 50° Tralles', or proof. utmost clearness and limpidity. A filter may also be made by spreading thin paper pulp evenly upon stretched flannel or woolen cloth. When dry, the cloth so coated will be found to give better results than the felts, etc., commonly employed as filters. (See Nos. 714 and 811.)

1448. To Test the Strength of Alcotube into which a measured quantity of for example: a barrel of brandy containing 32 chloroform is poured, and to this is added a gallons, 60° strong at 60° Fah., contains 19½ given quantity of the liquid to be tested; gallons pure alcohol. Rule.—Multiply the

the suspected liquor and drop into it 25 these are well mixed together and then left to drops of the above solution; and if the subside; the chloreform takes up the alcohol liquid should contain any grain oil, it will and leaves the water, which, being lighter assume the form of a black powder and than the chloroform, will float on the top; float on the surface. The action of this test and the quantity of water that has been mixed with the spirit will be at once seen.

Arithmetical Rules for the 1449. Treatment of Alcohol. The following well rectified, before any evidence of the oil or excellent rules, derived from various sources,

1450. To Ascertain the Cost of any Quantity of Alcohol at any Degree or Percentage of Strength Above or Be-Kent finds pure sulphuric acid the best test. low Proof. Alcohol is always bought and sold at so much above or below proof. To tested, then fill up slowly with pure concen-trated sulphuric acid. Pure spirit remains add the percentage over proof, or deduct the colorless; impure spirit becomes colored in percentage under proof, and multiply by the proportion to the amount of fusel oil present.

I per cent. of wood spirit (wood naphtha) in of alcohol, will cause it to turn yellow or brown cents proof? We first find 25 per cent. of 40, alcohol, will cause it to turn yellow or brown cents proof? We first find 25 per cent. of 40, alcohol, will cause it to turn yellow or brown cents proof? We first find 25 per cent. of 40, alcohol, will cause it to turn yellow or brown cents proof. with the addition of caustic potassa. Pure which is 10; we then add that number to 40, alcohol is neutral to test paper; should be the number of gallons, and we get 50; we colorless; will evaporate entirely by heat; then multiply 50 by 28, the price per gallon retains its transparency when combined with proof, and get \$14.00, or 35 cents per gallon. Again, what will 40 gallons alcohol, 25 per 1445. To Free Alcohol from Fusel cent under proof, cost, at 28 cents per gallon Oil. This may be effected by digesting the proof? Again, we find that 25 per cent. of 40 alcohol with charcoal. By Schaeffer's method is 10; we then deduct 10 from 40, this leaves the alcohol is filtered through alternate layers us 30; by multiplying 30 by 28 we get \$8.40,

ter Should be Added to Spirits, to Reduce it from a Given Degree of Strength to a Lower Degree or Percentage of Strength. The manufacturer may some-times find it necessary to reduce or increase the strength of spirit, according as circumstances may require. To accomplish this, cohol and free it from Fusel Oil. To the we give the following rules, which will be found useful to the dealer: multiply the number of gallons by the actual degree of strength thoroughly, and let it rest for 12 hours. Then of the spirit, and divide the amount by the saturate with chalk; add another gallon of degree of strength sought to be obtained, and from the answer subtract 100; the amount thus obtained will show the quantity of water to be added to the spirit in order to reduce it to the degree sought. For example: suppose you have 100 gallons of spirit at 80° by Tralles' hydrometer, and wish to reduce it to 50° or proof. Multiply 100 by 80, and divide best), is torn into shreds and stirred into the the amount by 50, then from the answer subliquid to be clarified. The whole is then tract 100; this will show that 60 gallons of water must be added to the spirit in order to

> 100 gallons Thus, Maltiplied by

50)8000(160 Divided by Deduct 100

1452. To Ascertain the Quantity of Aicohol dissolves chloroform, so that Pure or Absolute Alcohol in any Given when a mixture of alcohol and water is shaken up with chloroform, the alcohol and chloroform unite, leaving the water separate. On this fact Basile Rakowitsch, of the Imperial Russian Navy, has founded his invention. The instrument he uses is a graduated glass quantity of liquor, by the ascertained strength;

number of gallons by the ascertained degrees reduced. Divide the product thus ascertained of strength, and divide by 100. Thus:

32 gallons, 60° Tralles' at 60° Fahr.

19.20, or $19\frac{1}{5}$ gallons pure alcohol. To Ascertain the Number of Gallons at any Required Number Below Proof, in any Given Number of Proof Gallons. Multiply the given number of proof gallons by 100, and then divide the product thus obtained by a number found by deducting the required number of degrees below proof from 100. The quotient will be the answer. For example: How many gallons, 25 below proof, are there in 35 gallons lons spirit at 30 above proof to 10 above proof?

35 gallons proof,

25 в. р. 100

)3500(46% gallons 25 below proof. 75 We thus see by the above example that 35 gallons proof spirit is equal to 462 gallons 25

1454. To Increase the Strength of a Spirit from any Degree to a Higher given Degree, or Percentage. To increase the degree of strength of a spirit, multiply the number of gallons by the actual degree of strength of the spirit, and divide by the degree of strength sought to be obtained. Suppose you want to reduce a cask of 40 For example: suppose you have 100 gallons of spirit at proof, or 50° by Tralles' hydrometer, and wish to increase its strength to 80°. Multiply 100 gallons by 50 and divide by 80; the answer will give you the number of gallous of spirit, 622, to be added to the 100 gallons in spirit in order to increase its volume to 80° by Tralles' hydrometer.

Thus.

100 80)5000

62.4, or $62\frac{1}{2}$.

1455. To Reduce Spirit a Given Number Above Proof to a Required Number Below Proof, by the Addition of Water. Multiply the number of gallons of spirit by the sum of the given degree above proof and the required degree below proof, and divide the product by a number to be found by subtracting the required proof from 100. The quotient will give the number of gallons of water to be added.

Suppose you want to reduce 40 gallons spirit 20 above proof to 10 below proof, how much water must be added to accom-

plish the result?

40 gallons. 30

Required proof,

 $90)1,200(13\frac{1}{3})$ gals. water. It will thus be seen that, to reduce 40 gallons spirit 20 above proof to 10 below proof, it

will be necessary to add 131 gallons of water,

making 531 gallons in all.
1456. To Reduce High Proof Spirit to a Required Lower Proof, by the Addition of Water. First multiply the number of gallons by a number expressing the difference in degrees of strength between the 4 gallons have to be taken from the spirit given proof of the spirit to be reduced and the and the same quantity of water added, to rerequired degree, or proof, to which it is to be duce it to proof.

by a number to be found by adding the required proof to 100.

Suppose you desire to reduce 72 gallons spirit at 30 above proof to 10 above proof,

how much water must you add?

30, given strength.

10, required strength.

20, difference.

Required strength, 10 72, No. of gals. 100 20, difference.

110)1,440($13\frac{1}{11}$ gals. Thus it will be seen that, to reduce 72 galproof, it is necessary to add 1311 gallons of

water, making about 85 gallons in all.

1457. To Reduce Spirit of a Given Number Above Proof to a Required Number Below Froof, by the Substitution of Water for Spirit. Deduct the number below proof from 100, and multiply the number of gallons by the remainder. Then add the number which the given liquor is above proof to 100, and divide the above product hy the number thus obtained. The duct by the number thus obtained. quotient, deducted from the original number of high proof gallons, will give the answer

gallons spirit at 20 above proof to 10 below

proof.

Multiply 90 40

To 100 add 20=120)3,600(30 Original number of gallons, 40 Deduct quotient,

Answer, 10 gallons.

Thus it will be seen that 10 gallons should be removed, and their place supplied with water, in order to make the mixture equal to

10 degrees below proof.

1458. To Reduce Spirit of a Given Number Above Proof to Proof Spirit, by the Substitution of Water for Spirit. Multiply the number of gallons by 100, then add the number which the spirit is above proof to 100, and divide the above product by the number thus obtained; subtract the quotient from the number expressing the original quantity of spirit, and the answer will give the number of gallons to be removed from the spirit and replaced with water, in order to reduce the high proof spirit down to proof.

Suppose you want to reduce a cask of 24 gallons of spirit 20 above proof to proof spirit.

Above proof, 20 100 100

120)2,400(20

Original quantity 24

It will be seen by the above example that

1459. To Raise Spirit of a Given Number Under Proof to a Required Strength Above Proof, by the Substitution of High Proof Spirit. Multiply the number of gallons by the number expressing the difference in degrees of strength between the high proof spirit to be added and the required degree to which it is to be raised. Divide the product thus found by a number Subtract 15 to be obtained by adding the given number below proof to the number the high spirit is above proof; then subtract the quotient from above proof; then subtract the quotient from the original number of gallons, and the remainder will show the quantity of law spirit mainder will show the quantity of low spirit of Water. First multiply the number of to be removed and its place supplied by the addition of the same quantity of high proof

Suppose you desire to raise a cask of 40 gallons at 10 below proof to 15 above proof, by means of spirit 40 above proof:

40 A. P. 40 40 number of gals. 15 10 в. в. 25 multiplied by diff.

Diff. 25 50

40 gals, original quantity to be raised. 20 deduct quotient.

20 answer.

The above example shows that 20 gallons should be taken from the low proof spirit, and the same quantity of spirit added at 40 above proof, to raise it to 15 above proof.

1460. To Raise Spirit of a Given Number Below Proof to Proof Spirit, by the Substitution of High Proof Spirit. Multiply the number of gallons by the number which the high proof spirit is above proof, divide the product by a number to be found by adding the given number the spirit is below proof to the number the high spirit is above proof; subtract the quotient from the original number of gallons, and the remainder will show the quantity of low proof spirit to be removed, and its place to be supplied by the addition of high proof spirit.

Suppose you desire to raise a cask of 40 gallons at 5 below proof, to proof, by means of spirit 35 degrees above proof.

35 A. P. 40 number of gallons.

5 B. P. 35 above proof.

40

)1400(35 quotient. 40 gallons, 35 quotient,

5 answer. It will thus be seen that 5 gallons should be taken from the low proof spirit, and the same quantity of spirit added at 35 above proof, in order to raise it to proof strength.

1461. To Raise Spirit of a Given Number Above Proof to a Still Higher Degree of Strength, by the Addition of High Proof Spirit. First multiply the number of gallons by a number expressing the difference in degrees of strength between the given proof of the spirit to be raised, and the required degree to which it is to be raised. Divide the product thus ascertained, by a number to be found by subtracting the difference in degrees between the spirit to be raised

Suppose you desire to raise a cask of 35 gallons spirit 15 above proof to 20 above proof, by the addition of spirit 30 above proof.

20 required proof. 15 given proof,

5 difference.

From 35 number of gallons. 5 multiplied by difference.

15)175(113 answer.

gallons by the difference in degrees of strength between the given proof of the spirit to be reduced, and the required proof to which it is to be reduced. Divide the product by a number ascertained by subtracting the given proof from 100, and the quotient will give the numer of gallons of water to be added.

Suppose you want to reduce 40 gallons spirit 10 below proof, to 15 below proof.

Required proof 15 Given proof

Difference

40 gallons 10 given proof 5 difference

90)200(23 gals. water

1463. To Raise a Low Proof Spirit to a Higher Required Proof by the Addition of High Proof Spirit. Multiply the number of gallons by a number expressing the difference in degrees of strength between the given proof of the spirit to be raised, and the required proof to which it is to be raised. Divide the product thus ascertained by the sum of the given proof, and the high proof spirit to be added, and the quotient will give the answer.

Suppose you desire to raise 40 gallons spirit 15 below proof to 10 below proof with spirit 10 above proof.

Given proof

Required proof 10

Difference

Given proof 15 40 gallons High proof 10 5 difference

)200(8 gals. answer.

'ssential Oils: Volatile Oils. The essential or volatile oils are an extensive and important class of bodies derived from the vegetable kingdom, and found in almost every part of the larger number of the plants which produce them, except the cotyledons of the seeds, which, in general, form the exclusive repository of the fixed oils. It is the volatile oils which confer upon flowers, leaves, fruit, seeds, roots, barks, and woods, their peculiar and characteristic odors; but among these they are not equally distributed in the same individual, and are often altogether absent from some of them. To and the high proof spirit employed to raise them we are indebted for our most delightful it. The quotient will show the number of perfumes, and our choicest aromatics and gallons of a higher proof which must be added. | spices. All of them, when perfectly pure, are

the whole of them have a pale yellow tint, and some of them are brown, blue, or green. They mix in all proportions with the fixed oils, dissolve freely in both alcohol and ether, and are sparingly soluble in water, forming perfumed or medicated waters. (See Nos. 1080, &c.) Their boiling point usually ranges between 310° and 325° Fahr., and is always considerably higher than water. They resist saponification and (excepting oil of cloves) siderably higher than water. do not combine with the salifiable bases. Their density fluctuates a little on either side tery portion as it comes over, and keep for of water. The lightest oil is that of citrons use. (See No. 46.) The same receiver may of water. The lightest oil is that of citrons (specific gravity 0.847), and the heaviest, that of sassafras (specific gravity 1.096). When reversing the arrangement; but a glass sepacooled sufficiently they all soldify. The common temperature of the atmosphere is sufficient for this with some of them, as the oils of roses and aniseed; whilst others require to be cooled below the freezing point of water before they assume the solid form. By exposure to the air they rapidly absorb oxygen, and become partially converted into resin. This is the cause of the deposit that usually forms in them (especially in the expressed oil of orange) when kept in an imperfectly stopped bottle.

лые. (*Cooley*. **1485. Т**-To Obtain Essential Oils. All essential oils which are more or less volatile can be obtained from substances by distilling the articles along with an equal weight (some use a larger proportion) of water; but some substances that give out their oil with difficulty, are first soaked for 24 hours in twice their weight of water, to each gallon of which 1 pound of common salt has been added, by which its boiling point is raised, and consequently the oil comes over more easily. In such cases a quick fire is used, and when one half the water has come over, it is returned into the still, and this is repeated until the distilled water ceases to come over mixed The heat of steam or a salt water bath should be preferably employed; but if a naked fire be used, the still should be deep and narrow, by which means the bottom will be more perfectly covered when the quantity of water becomes small, and burning prevented. When the distilled water is to be repeatedly poured back on the ingredients, a very convenient plan is to so arrange the apparatus that, after the water has separated from the

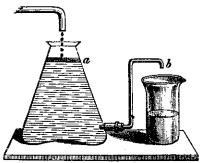


Fig. 1.

oil, it shall flow back again into the still, by which much time and trouble will be saved. The separation of the oil and water is effected by allowing the mixed liquids to drop into ing Essential Oils. Substances yielding a Florentine receiver (see Fig. 1), when the volatile oils are generally distilled with water, oil is lighter than water, by which means the the proportion of which varies with each

colorless; though, before rectification, nearly latter accumulates at a, and the water flows over by the spout, b. The essential oil is obtained in this manner from the following: Anise, caraway, wormseed, cubebs, fennel, pennyroyal, juniper, lavender, lemon, cinnamon, peppermint, spearmint, horsemint, origanum, pimento, rosemary, savine, sassafras, valerian, &c. The empyreumatic oil of tobacco is obtained by introducing the dry leaves in coarse powder into a green glass retort, heating it in a sand-bath to a dull red heat. Separate the oily liquid from the wabe employed for oils heavier than water, by rator (see Fig. 2) will be found more con-

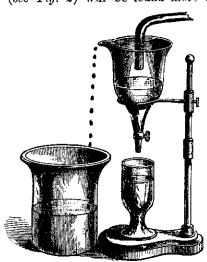


Fig. 2.

venient. In this case the oil accumulates at the bottom of the vessel, and may be drawn off by the cock. The oil of cloves and other heavy essential oils are obtained by macerating 5 pounds coarsely powdered material for 48 hours in 10 pounds water containing 1 pound salt; and distilling until the product is no longer milky. After the oil has deposited, the remaining water is again distilled, and this repeated until all the oil has been extracted from the water. After 10 days, the oil is cleaned and clarified by filtering. The essential oil of cloves, cinnamon, rhodium-wood, sandal, calamus, aloes, &c., are thus obtained. That of bitter almonds and of mustard are obtained by making a thin paste of the material with water; and, after 24 hours' maceration, distilling by steam-bath. The essential oils of lemons, oranges, and some other fruits, are chiefly obtained by submitting the yellow rind to powerful pressure; but in this way they are not so white, nor do they keep so well as when distilled. Volatile oils should be kept in well-closed and nearly full bottles, in the dark, and opened as seldom as possible, as by age and frequent exposure they become resinous. The process of distillation should be done as rapidly as possible, and the light oils collected soon after its separation from the water.

1466. Special Directions for Distill-

sufficient to prevent the substance from burning before the whole of the oil has passed 1467. Millon's Method of Obtaining whole of the oil will not be distilled. Dried plants require more water than the fresh and succulent.

The form of the alembic has an influence system. over the quantity of water distilled, which dethe amount of liquid; by employing a high and narrow vessel the disadvantage of an ex-

cess of water is much obviated.

regulated so as not to exceed the required devolatile than others, an appropriate temperature must be obtained and sustained; the use of a higher temperature than is necessary besteadily applied by the use of a bath, either of a compound of potato oil and conanthic ether. water or of some solution (weaker or stronger as required) of which the boiling point is known. (See No. 7.)

The more volatile oils pass freely with the with a large and low head, having a rim or gutter inside, in which the oi, may be received of the condensing tube (see No. 1077), which is better straight than coiled, for convenience in cleaning, as the alembic and all its appurtenances must be perfectly clean before distilling each kind of essential oil.

Certain flowers, such as orange flowers and is dissolved in from 6 to 8 parts of water. roses, yield little or no oil when dry, and must be preserved fresh, either with salt, or made from the heavy fusel oil which comes by means of glycerine, to keep them in condi- over last in distillation. To purify the fusel tion for distilling their oils. (See No. 1349.)

The most of the aromatic herbs are usually distilled while fresh, although it is thought by some that they yield a larger product when moderately dried. Dried substances require. previous to distillation, to be thoroughly macerated with water; and to facilitate this end, should be prepared by slicing, rasping, bruising, or other appropriate means. Sometimes the proportion of oil in the substance employed is so small that it is wholly dis-solved in the water distilled, even though the substance, until more oil passes over than the chloride of zinc bath; it is then filtered,

article, but under all circumstances must be water will dissolve. This process is called

over. To prevent the risk of burning, it has Essential Oils. The flowers are placed in been recommended to suspend the substance a percolating apparatus (see No. 41) and then to be distilled in a basket, or a bag of wire- ether or sulphide of carbon is poured over work, in the water, so as not to touch the bot-them. After leaving the flowers in contact tom or sides of the alembic; or to place the for 15 minutes the liquid is drawn off and substance on a perforated shelf in the upper a fresh supply added and drawn off in a part of the alembic above the surface of the similar manner. This completely dissolves water. Some substances, such as mustard, all the essential oil of the flowers, leaving bitter almonds, &c., which are mixed to a them quite scentless. The liquid is next abpaste with water, are distilled by the action tilled, and the ether or sulphide of carbon, 1 cof a current of steam heated to the necessary ing volatile at a much lower temperature than degree and admitted into the bottom of the fragrant principle, is drawn over alone, alembic. An excess above what is necessary and leaves a residue containing all the peracts injuriously by holding some of the oil in fume of the flower. This residue, more or solution after the mixed vapors are condensed; less solid, is exposed to the heat of the sun on the other hand, if too small a quantity be until it loses the unpleasant smell of the employed, besides the danger of burning, the solvent used. No degree of natural heat is capable of altering the perfume or turning it rancid. The product has a much finer odor than essential oil prepared by any other

1468. Cognac Oil. Oil of eognac is pends more upon the extent of surface than prepared by dissolving the fusel oil of brandy mare in strong rectified spirit, and then adding a sufficient quantity of concentrated sulphuric acid to form a sulphate; alcohol and excess of water is much obviated.

The temperature should be equable, and of acid are removed by washing the newly gulated so as not to exceed the required deformed compound with water. To 100 pounds gree of heat; and, as some oils are more mare add 1 pound sulphuric acid; the oil is generally formed towards the end of the distillation, and is found floating in blackish drops on the surface of the distillate. According ing injurious. Any degree of heat can be to a distinguished French chemist, this oil is

1469. Oil of Apple. Mix cautiously 1 part fusel oil, 3 parts sulphuric acid, and 2 parts water. Dissolve 2½ parts bichromate of potash in 4½ parts water, introduce this into steam into the neck of the receiver, but some alarge tubulated retort, and gradually add the that are less volatile are apt to condense in former liquid, so that the boiling continues very the head, and return into the body of the slowly. The distillate, which is principally still; for these a still should be employed valerianic acid, is saturated with carbonate of soda, and evaporated to dryness. Take of the valerianate of soda, thus formed, 1½ parts; as it condenses, and thence led into the neck fusel oil, 1 part; sulphuric acid, 1 part; mix cautiously, heat by a water-bath, and mix with water; the impure valerianate of amyloxide will separate. It is washed several times with water, then with a solution of carbonate of soda, and finally with water.

> oil, wash it with soda and water, and distill between 254° and 284° Fahr. Of this take 1 pound; glacial acetic acid, 1 pound; sulphuric acid, 1 pound. Digest for some hours at 254°. The ether separates upon the addition of water, and is purified by washing with soda and water. Mixed with $\frac{1}{30}$ part acetic ether, and 7 parts of deodorized alcohol, it gives the essence of pears.

Oil of Quince-Pelargonic 1471. Ether—is made from oil of rue by treating it with double its volume of dilute nitric acid, smallest necessary quantity of water has heating the mixture until it begins to boil. been employed in the alembic. In this case After some time two layers are seen. The the distilled solution must be redistilled lower one is separated with a pipette, and several times with fresh quantities of the freed from nitric acid by evaporation in a oil of wine, which gives the bouquet. It is terated with one of these substances, a greasy

sometimes sold as oil of cognac.

1472. To Restore the Fragrance of Oil of Lemon. There are several oils that, by absorption of oxygen from the air, will become camphorated, grow turbid, deposit a residue, generally called stearopten, and lose more or less of their flavor, instead of which they acquire the odor of turpentine. Those oils that are free from oxygen are chiefly subject to these changes, and it is therefore necessary to keep them in full bottles, well improved, but can never be restored to their original quality. Many means have been proposed for this purpose, but the one now generally employed in France is to shake the oil with warm water several times, letting it settle, and drawing it off by means of a syphon; it may lastly be filtered either through paper or linen.

1473. To Keep Oil of Lemon Fragrant. To every pound of oil, I ounce alcohol is to be added and well mixed; then I ounce water is put with it, which again withdraws the alcohol from the oil, and collects at the bottom of the bottle as dilute alcohol, where it should be permitted to remain until the oil has been used, with, perhaps, an occaopened. Oil of lemon treated in this manner has been kept fresh and fragrant for over a year. Oil of orange may be treated in the

same manner with excellent effect.

1474. To Purify Essential Oils that have Deteriorated from Age. The method most commonly pursued is by redistillation, mixing them first with water, and sometimes with alkali. There are, however, other processes that have been recommended, which are believed to be equally as efficacious, and at the same time more simple. M. Curieux proposes to submit them to the action of a and towards the end of the evaporation will solution of borax with animal black. The solution of borax is mixed with the animal charcoal to form a thin consistency; the oil is then added and agitated for a quarter of an hour. At the end of that time the borax mixture is found adhering to the sides of the had restored or purified in this manner. Mr. example, are usually compounds of 1 ounce Charles Bullock, of Philadelphia, has found of the genuine oil with 9 ounces of oil of that permanganate of potash is admirably turpentine. Even American and English oil adapted to the purpose of the restoration of resinified essential oils. A large can of oil of tified spirit, besides a considerable quantity of lemon having become unsalcable, he agitated a solution of the potash with the oil for a length of time, then decanted, mixed with fresh water, and warmed gently, till the oil floated perfectly clear on the surface. The may be detected by agitating the suspected solution of the permanganate was in the proportion of 1 ounce of the salt to 8 ounces of water. This quantity was enough for 4 pounds of the oil.

To Detect the Presence of 1475.

mixed with deodorized alcohol, and digested paper, and exposing it for a short time to at a gentle heat until the fruity odor is noticed. heat. If the oil under examination be pure, the ether seems identical with the ethereal it will entirely evaporate; but if it be adulor translucent spot will be left on the paper. These substances also remain undissolved when the oil is agitated with three or four times its volume of strong rectified spirit,

1476. To Detect the Presence of Alcohol in Essential Oils. The presence of alcohol or rectified spirit may be detected by agitation with the oil a few small fragments of dried chloride of calcium. These will remain unaltered if the oil be pure, but will dissolve in one containing alcohol, and the resteppered, and in a cool place. When they have sulting solution will form a distinct stratum deteriorated in the way indicated, they may be at the bottom of the vessel. The milkiness and loss of volume, when such an oil is agitated with a little water, is another test of the presence of spirit. A more delicate test of the presence of alcohol in an essential oil than the preceding, is effected by potassium. Place 12 drops of the oil on a perfectly dry watch-glass, and put a piece of potassium, the size of an ordinary pin's head, in the middle of it. If the potassium remains unchanged for 12 or 15 minutes, no alcohol is present; bnt if it disappears after 5 minutes, the oil contains at least 4 per cent. of alcohol; if it disappears in less than 1 minute, it proves the presence of not less than 25 per cent. of alcohol. This species of adulteration is very common. It is a very general practice of the sional shake-up when the bottle has been druggists to add strong rectified spirit to their essential oils, to render them transparent, especially in cold weather. Oil of cassia and oil of cinnamon are nearly always so treated by them.

1477. To Detect the Admixture of one Essential Oil with Another. admixture of an inferior seential oil with another more costly, is readily detected by a connoisseur or expert, by placing a drop or two on a piece of clean blotting-paper, shaking it in the air, and smelling it occasionally. The difference of the odor at the beginning show the adulteration, especially if the adulterant be oil of turpentine. This last may also be detected by remaining undissolved when the oil is agitated with about thrice its volume of strong rectified spirit. Highly rectified oil of turpentine is very largely used to adulterbottle, while the oil flows limpid. The oil of ate the stronger scented essential oils. Forlayender, neroli, and peppermint, M. Curieux eign oil of layender and oil of peppermint, for of peppermint are adulterated with 1 part recoil of spearmint, and often turpentine.

1478. To Detect the Adulteration of a Heavy Oil with a Light One. The adulteration of a heavy oil with a light one sample with water, when, in general, the two will separate and form distinct layers

1479. To Test the Purity of Essential Oil of Almonds. Essential oil of almonds is very generally adulterated with Fatty Oil and Resins in Essential Oils. cheaper oils, particularly nitrobenzole (artifice presence of fatty oil, resin, or spermaceti, ficial oil of bitter almonds), and in nearly may be readily detected by placing a single every case with alcohol or rectified spirit. drop of the suspected oil on a piece of white The pure oil, when mixed with oil of vitriol,

solution of potassa, crystals are eliminated: iodine dissolves only partially and slowly in it, without further visible results:-chromate of potassa does not affect it:-nitric acid of gravity 1.5 produces the same effects in a gravity of the pure oil, when recent, is never less than 1.052; and when old, never greater than 1.081; that of trade averages gravity 1.209, and its boiling point is 415° Fahr., or fully 100° higher than that of essential oil of almonds.

Bergamot. Oil of bergamot is very frequently adulterated with rectified spirit, or previously noticed. (See No. 1476, &c.) The resence of the foreign oils, particularly the list, lessens its solubility in rectified spirit.

gravity is .875 to .885.

Cinnamon. highly rectified spirit and oil of cassia. When oil, but hitherto mostly in vain. pure, its specific gravity is 1.035. Oil of cassia, of which the specific gravity is 1.071 increases it; but before trying it, it must be tested for spirit, which has a contrary effect.

lightest is esteemed the best. Santaline is insoluble, or very nearly so, in the pure oil, but is freely soluble in that adulterated with alcohol. The presence of oil of turpentine, and other inferior oils, may be detected by the blotting-paper test, noticed above. No. 1475.

To Test the Purity of Oil of Neroli. This is the oil of orange flowers, with the oil of orange leaf (essence de petitgrain), and generally with both. The presence of the first is easily determined (see No. 1476); that of the second only by comparing the odor of a drop of the suspected oil, placed on a piece of paper, with a drop of pure neroli

similarly treated.

1484. To Test the Purity of Otto of Roses. Cooley says: "The common adulterants are the oils of rhodium, sandal wood, and geranium, with camphor, and occasionally with spermaceti, to give the spurious article the usual crystalline appearance. otto has a bland, sweet taste; if it be bitter, be taken as types of the rest. The fixed oils it contains oil of rhodium or sandal wood; if are chiefly found in the fruit and seeds of it be pungent or bite the palate, it contains plants, and in thin membranous cells in either oil of geranium or camphor, and most various parts of the bodies of animals. Some probably both; if it imparts an unctuous of these oils are solid at ordinary temperatures; sensation to the palate, or if it leaves a greasy as palm oil, cocoanut oil, &c.; but the majori-

turns of a clear crimson-red color, without stain on paper, it contains spermaceti. A single visible decomposition:—mixed with alcoholic drop of pure otto of roses exposed for some hours under a bell-glass, in the cold, to the vapor of a few grains of iodine, remains white, and continues so on subsequent exposure to the air. A sample adulterated with foreign the specific gravity 1.42 causes no immediate oil, on the contrary, becomes yellow or yellowreaction, but crystals of benzoic acid begin to ish-brown, and continues subsequently to darkform in 3 or 4 days; if only 7 or 8 per cent. en, until it becomes of a deep brown color, or of alcohol be present, violent effervescence even perfectly black, according to the extent speedily commences, and colored nitrous of the adulteration. A single drop of pure fumes are evolved. Nitric acid of specific otto placed on a watch glass with one drop of concentrated sulphuric acid (oil of vitriol), marked degree, even when the smallest quan- and stirred with a glass rod, retains the purity tity only of alcohol is present. The specific of its color and odor; but a sample adulterated with other oil becomes more or less brown, and evolves peculiar odors—that from oil of geranium being strong and disagreeable; that about 1.075. Nitrobenzole has the specific from oil of rhodium being increased and rendered unctuous and cubeb-like; that from camphor, characteristic and combined with ntial oil of almonds.

1480. To Test the Purity of Oil of clearly perceptible." Dr. R. Baur, of Constantinople, has had the opportunity of preparing a standard otto of rose on the spot, and was with the oil of lemon, orange peel, and tur-also in a position such as scarcely any other pentine. These may be detected in the way chemist ever was for investigating the whole subject. He says that pure otto gives, with iodine and with iodide of potassium and starch, the same reactions as when it is mixed The pure oil is freely soluble in liquor of with geranium oil, and even those with pure potassa, forming a clear solution. Its specific geranium oil are hardly different. He further says that many attempts have been made to 1481. To Test the Purity of Oil of discover some chemical reaction which would The common adulterants are reveal the falsification of otto with geranium

1485. To Test the Purity of Oil of Cloves. Oil of cloves is frequently adulterto 1.073, and when old, even 1.078 to 1.090, ated with inferior essential oils, but when pure it exhibits the following results: When sted for spirit, which has a contrary effect. shaken with pure liquor of ammonia, it coag-1482. To Test the Purity of Oil of plates, and crystallizes after fusion by a gentle Lavender. Alcohol is here also the common heat: Treated with an alcoholic solution of adulterant. The finest quality—that from the potassa, it congeals into a crystalline mass, flowers, has specific gravity .877 to .905. The with total loss of its odor: A solution of with total loss of its odor: A solution of chromate of potassa converts it into brown flakes, whilst the salt loses its yellow color.

1486. To Test the Purity of Oil of Rue. This oil is nearly always adulterated. When pure, it forms a clear solution with rectified spirit; Iodine dissolves in it slowly, without apparent reaction beyond a darkening and a slight increase in viscidity: It is unaffected by a solution of chromate of potassa; and is commonly adulterated with alcohol, or Nitric acid very slowly changes it into a greenish yellow liquid balsam.

> rixed Oils and Fats. These are compounds of carbon, hydrogen, and oxygen (hydrocarbons), obtained from the organic kingdom, and chiefly distinguished by their insipidity, unctuosity, insolubility in water, and being lighter than that fluid. Olive oil, obtained from the vegetable, and Pure spermaceti oil, from the animal kingdom, may

when they separate into two portions: the 2 per cent. of gum-benzoin (in fine powder), one solid, consisting mostly of stearine, and or about one per cent. benzoic acid, in the the other liquid, consisting chiefly of oleine. Nearly all the fixed oils, when freely exposed to the air, absorb oxygen, and either gradually peculiarly soothing to an irritable or highly harden, or become rancid. The former are termed drying oils, and are used by painters; the latter are used in cookery, for machinery, lamps, &c. The fixed oils, except where otherwise directed, are obtained from the should be somewhat increased. bruised or ground fruit or seed, by means of powerful pressure, in screw or hydraulic presses, and are either allowed to clarify themselves by subsidence, or are filtered. Another method is by boiling the bruised seed in water, and skimming off the oil as it rises to the surface. This is the plan adopted for castor Rancidity in Oils, &c. Nitric ether, or its oil in the West Indies. The specific gravities of the fixed oils range between 0.865 and

0.970. (Cooley.)

1488. Davidson's Process of Deodorizing Putrid Whale Oil. This cheap method of purification consists in the employment of chloride of lime, the quantity depending on the degree of putrefaction of the whale oil. In general 1 pound is sufficient for 112 pounds oil; but if it is in a state of great putrefaction, there may be 11 or 2 pounds required. With 1 pound chloride of lime about 12 times the quantity of water must be employed. The chloride is bruised in a mortar, soft and liquid paste, and afterwards by the addition of the remainder of the water it takes the consistency of cream. This is to be mixed with the oil and often carefully stirred. After some hours 1 pound sulphuric acid, diluted with 20 or 30 times its bulk of water, is poured on the mixture, and the whole brought to a boil over a moderate fire, and stirred continually until drops of oil run off at the end of the stirring pole. It is then left for some hours for the oil to precipitate, and the acidulated water is drawn off. A common cast-iron the powder to one pound of fat. boiler, with sheets of lead at the bottom, is the best for the purpose, or a copper or iron vessel may be used when the quantity of acid is not too great. The chloride of lime must not be bruised in a copper or iron mortar.

To Restore Rancid Oil and 1489. Fat. Rancid oil and fat may be recovered by agitating them, at a gentle heat, with freshburnt and coarsely-powdered charcoal (which has been thoroughly freed from dust by sift-ing and fanning), followed by filtration

according to the common method.

1490. To Restore Rancid Fat or Oil. Another method is to thoroughly wash them with hot water, frequently renewed, or to blow steam through them, until the desired effect be produced. Air freely employed for some time, instead of steam, succeeds admirably with many oils, and its use has the fat, for 15 to 30 minutes, with a little water the bottom, enough has been added. and calcined magnesia.

1491. To Prevent Oils and Fats from Becoming Rancid. The tendency of oils is then filtered. (See No. 1551.) Another and fats to become rancid may be prevented, plan of purifying oils is to agitate them with or greatly retarded, by artificial means. One a strong solution of common salt.

ty are fluid, except when considerably cooled, of the simplest methods is to dissolve about oil or fat, by the aid of a gentle heat. addition renders oils, pomades, ointments, &c., sensitive skin. It should be done before the addition of the scents. When the preparations are intended for exportation to hot climates, the percentage of the gum or acid This is the plan generally adopted by the manufacturing perfumers and druggists. In the wholesale trade, carefully rendered lard, suet, &c.; simple pomades and oils, so prepared, are now common articles of stock and sale.

alcoholic solution (sweet spirits of nitre), is highly recommended as a most effective preventive of rancidity. It is said that a few drops of the ether will effect this object, and will even remove the disagreeable odor of rancidity when present. Oil so treated, after being heated to remove the alcohol, when the solution has been used, is quite bright, clear, and scentless, if it were originally so. Poplar-buds, crushed and digested at a gentle heat, in oil or fat, will also remove, or greatly retard, its tendency to become rancid. Fatty bodies in a globular state may be kept a long time without becoming rancid. This pecuand the water added by degrees till it forms a liar state can be imparted to fatty matters by melting them at 130° Fahr. and adding a small quantity of yolk of egg, or bile, or albuminous substances, or best, a solution of alkali (composed of 5 to 10 parts for every 100 of oil), at the same temperature. The whole is then agitated for some time to bring the fatty matter into a globular condition.

1493. To Prevent Fats and Oils from Becoming Rancid. Heat the oil or melted fat for a few minutes with powdered slipperyelm bark, in the proportion of 1 drachm of The bark shrinks and gradually subsides, after which the fat is poured off. It communicates an odor like that of the hickory-nut. Butter thus treated has been kept unchanged for a

1494. To Purify Vegetable Oil for se in Lamps. To 100 pounds oil add 25 Use in Lamps. ounces alum, dissolved in 9 pounds of boiling water. After stirring it about half an hour, add 15 ounces nitric acid, still continuing to Let it stand 48 hours, when the fine through flannel; or by simple filtration oil will swim on the surface, and then draw it through charcoal in bags of Canton flannel, off. Such oil is used all over Continental Europe, and an equal quantity yields double the light of whale and fish-oil, without its offensive odor

1495. Bancroft's Process for Refining Lubricating Oils. Mr. Bancroft's process for refining common olive oil, lard oil, &c., for lubricating purposes, is to agitate them with from 3½ to 8 per cent. caustic soda lye, advantage of not introducing moisture into of 1.2 specific gravity. If, on trial of a small the article. Another method is to boil oil or quantity, the lye be found to settle clear at oil is allowed to rest for 24 hours, for the soapy matter to subside; the supernatant oil

1496. Calvert's Tests for the Purity of Oils. In the use of the following tests, the result of a series of experiments by Mr. F. G. Calvert, he recommends especial care in the preparation of the reagents used for testing, not only as regards their exact strength and purity, but also in following strictly the prescribed method of using them, carefully noting the time required for their action and effects to become apparent.

1497. Calvert's Caustic Soda Test A solution of caustic soda, specific gravity 1.340, is useful to distinguish fish from other animal and vegetable oils, owing to the distinct red color which the fish oil assumes; the presence of 1 per cent. of fish oil will be detected by the test. Add one volume of the test to 5 volumes of the oil, well mixed, and heated to the boiling point. Hempseen equires a brown-yellow color, and become, so thick as to entirely lose its fluidity. Linseed oil assumes a much brighter yellow color, and remains fluid. India nut oil, gallipoli oil, and pale rape oils, become a solid white mass in 5 minutes, while the other oils remain fluid.

1498. Calvert's Sulphuric Acid Tests hempseed and linseed oils to the amount of 10 per cent. Fish oil may be detected to the amount of 1 per cent. by the red color it aswhen the fish oil is allowed to separate by standing. To apply the test agitate 1 volume with 5 volumes of the oil, and allow the mixture to stand for fifteen minutes.

II. For the detection of hemp, linseed, of sulphuric acid of specific gravity 1.530, agitated with 5 volumes of oil, and the mixture allowed to stand for 5 minutes. this test the above mentioned oils alone assume a decided coloration.

III. Sulphuric acid of specific gravity 1.635, used similar to the preceding, and the effects noted after standing 2 minutes, affords a test under which the colorations are distinct and well marked, and will detect 10 per cent. of rapeseed oil in olive oil, of lard oil in poppy oil, of French nut oil in olive oil, and

of fish oil in neat's foot oil.

A stronger acid than this carbonizes the oils

and destroys the coloration.

1499. Calvert's Nitric Acid Tests for Oils. The successive application of nitric acid of specific gravity 1.330, and of a solution of caustic soda of specific gravity 1.340, can be successfully applied to detect the following very frequent cases of adulteration:

I. Gallipoli oil with fish oils; the former gives with soda a mass of fibrous consistency, while fish oils are colored red, and become

mucilaginous with the alkali.

II. Castor oil with poppy oil; the former, if adulterated, acquires a reddish tinge, and the mass with the alkali loses much of its

fibrous appearance.

III. Rapeseed oil with French nut oil; under the nitric acid test the former, if adulintense, which alkali increases, and renders portion of the day, or at all events to the the semi-saponified mass more fibrous.

portion of the day, or at all events to the south-east and south. 14 to 21 days' exposure

1500. To Test the Purity of Olive Oil. Cooley says: When pure olive oil is shaken in a phial only half filled, the bead or bubbles formed very rapidly disappear, but with the adulterated oil they remain much longer before they burst. If olive oil contains 1 part of poppy oil, part of it remains liquid at 36° Fahr., its proper freezing temperature; and if it contains of poppy oil, it does not solidify at all, unless cooled much below the freezing point of water. Pure olive oil well agitated for some time with 1/2 of its volume of nitric solution of mercury, becomes quite solid in 3 or 4 hours, without any separation of liquid oil. (The mercurial solution is made by dissolving ì ounce mercury in 2 fluid ounces 11 drachms nitric acid specific gravity 1.500.) According to M. Boudet, 1 grain of hyponitrous acid (hyponitric?) mixed with 3 grains of nitric acid, will cause the perfect solidification of 200 grains of pure olive oil in 75 to 78 minutes

1501. To Test the Purity of Castor Oil. Castor oil is frequently adulterated with rape oil; but this may be detected by its not dissolving in strong alcohol, and also by its less density. Pure easter oil is soluble for Oils. I. Sulphuric acid of specific grav- by its less density. Pure castor oil is soluble ity 1.475 will detect oils adulterated with in an equal weight of alcohol specific gravity 0.820.

1502. To Refine Olive Oil. Olive oil intended for huiles antiques (see No. 1244) sumes, this being noticed more particularly and other like uses, is commonly refined by violently agitating it in glass or stoneware, with about 1½ to 2 per cent. of its weight of concentrated sulphuric acid. This renders it opaque, and causes it to assume a greenish color. After about 2 weeks' repose, it deposfish, gallipoli, and French nut oils, I volume its much coloring matter, and is then found to have acquired greater fluidity, to have become much paler, to be more emollient and glossy as a lubricator, and to burn with greater brilliancy. The clear portion is now decanted, well washed with steam or hot water, and, after sufficient repose in a close vessel, at a temperature about 60° Fahr., again decanted, and, if necessary, filtered through Canton flannel or bibulous paper. This plan is also applied to other fixed oils, and answers well for most of the recently expressed vegetable oils.

1503. To Purify and Sweeten Castor Oil. The American Journal of Pharmacy gives the following receipt for this purpose: Take 1000 parts of the oil, 25 parts purified bone-black, 10 parts calcined magnesia. Mix them carefully in a convenient vessel of glass or tinned iron, and let it stand during 3 days, with occasional agitation, and filter through

paper or felt. (See No. 1504). 1504. To Bleach the Vegetable Oils. assumes no distinct color with the acid, and According to Cooley, almond, ben, castor, colza, linseed, nut, olive, poppy, rape, teel, and other like vegetable oils, are readily bleached by exposure, in glass bottles, to the light. For this purpose, 2-quart to 4-quart pale green glass or blue glass bottles filled with the oil, and covered with white gallipots inverted over them, are suitably placed, a small distance apart, on the roofs of houses or sheds, or in any other suitable position, terated, assumes a reddish tinge, more or less fully exposed to the sun during the greater is usually sufficient to decolor easter oil and acid (diluted with about twice its bulk of almond oil; but 4, 5, or even 6 weeks, is com- | water), if added towards the end of the agimonly required to render linseed oil very pale. This is the common plan adopted by the colza, linseed, nut, and rape oil, instead of wholesale druggists to whiten their castor oil, by some of the perfumers for their almond oil and olive oil, and by the oilmen for their pale agitation, the oil must be allowed to repose at linseed oil for artists. A better plan, however, when this method is adopted, is to cork the has settled, the clear portion should be debottles loosely air-tight, but not firmly down, when the sun has been on them two or three hours, and whilst they are still heated with it. In this way the oil suffers less from the exposure than by the loose gallipot system in common use. Almond, clive, and the other sweet oils, thus treated, are apt to less some minutes, 300 parts of the oil with 40 parts of their blandness, and to acquire a slight sulphurous smell, and smoky flavor, whilst easter oil loses its original blandness, and assumes the strong, nauseous flavor characteristic of the white castor oil of the stores. These little fresh animal charcoal, dry freshly prepared alumina. or calcined magnesia, and subsequent filtration; or, what is even better, though more troublesome, by well washing the oil with hot water, and subsequent repose out of contact with the air, and subsequent decantation. (See No. 1503.)

To Bleach Végetable Cils. Another method pursued for bleaching oils is as follows: The oil is placed in a porcelain, stoneware, or well-tinned vessel, along with some dry filtering powder, 1 to 2 pounds to each gallon of the oil, or some dry and recently prepared hydrated alumina (4 to 4 and let it stand all night, sustaining the tempound per gallon of oil; but much less is perature. Next day pour it off into a clean often sufficient if the article be of proper vessel and lct it cool down to about 100°. quality); and the heat of steam or boiling water being applied, is vigorously stirred, with a clean wooden or stoneware spatula, for about an hour. It is then thrown into a Canton flannel oil-bag, and filtered, in the the pair oil, stirring quickly, and in about 5 usual manner, observing to return the runnings until they become quite white and clear. This is the way perfumers and wholesale fies and becomes quite limpid. It should druggists usually prepare their white almond become quite white after washing it with oil, white olive oil, and white oil of ben. Formerly fresh burnt animal charcoal was chiefly used for the purpose, and is still so employed by some houses; but the other substances answer better and are more convenient. (Cooley.)

1506. To Bleach Vegetable Oils. The oils referred to in No. 1504, as well as all other oils and fats, may be rendered perfectly colorless by agitating them with a little chromic acid; or, what is cheaper and more convenient, with a mixed solution of bichromate of potassa and sufficient sulphuric acid to seize on the alkali of the bichromate and to liberate light, add more of the solution to bring it to its chromic acid. 1 to 2 drachms of the bichromate, mixed with 3 times its weight of oil of vitriol (previously diluted with about twice oils. The process of M. Keyer, which is its volume of water, and allowed to cool), is applicable to all oils, has given excellent reordinarily sufficient, when skillfully used, to violent agitation, and this should be kept up ter, and agitate the barrel well until the alkali for some considerable time after the last portion is added. The mixture must be made in minutes. The barrel is then sealed hermetia vessel of glass, porcelain, stoneware, or cally, and, after 3 days' repose, the oil is

to the sun, in clear weather, during summer, In some cases a few drops of strong nitric tation, will facilitate the process; or, with the diluted nitric acid, a few drops of hydrochloric acid without dilution. After the final a temperature of about 60° Fahr. When it canted, thoroughly washed with hot water, again allowed to repose for some time, and then finally decanted for use. If necessary, it may lastly be filtered. (Cooley.)

1507. Berlandt's Method of Bleaching Fixed Oils. Shake strongly for some water containing 1 part permanganate of potassa; allow the mixture to stand in a warm place for some hours, and then filter. This renders the oil colorless.

1508. Dieterich's Method of Bleachqualities may be removed by agitation with a ing Fixed Oils. Dissolve 24 pounds (avoirdupois) permanganate of potassa in 311 quarts water, in a wooden tub having a faucet in its bottom. Stir into the mixture 52½ quarts of the oil to be bleached, and keep all well stirred for 2 days. Then add 21 quarts boiling water and 11 pounds commercial hydrochloric acid, and keep the whole stirred for 2 days longer. Draw off the acid water, and wash the oil repeatedly with boiling water until all acid is removed from it.

1509. Engelhardt's Method of Bleaching Palm Oil. Heat 1000 parts by weight palm oil in an iron vessel to about 143° Fahr., perature. Next day pour it off into a clean vessel and lct it cool down to about 100°. Meanwhile, dissolve 15 parts bichromate of potash in 45 parts boiling water; when the solution has cooled a little, pour into it 60 parts hydrochloric acid. Add this mixture to minutes it will assume a sombre green color; by continued stirring the oil gradually clariwarm water; but if not entirely colorless, the operation must be repeated, using 1 part bichromate of potash, and 1 part hydrochloric acid. This is a quick method, and Engelhardt claims that it produces better results than the means usually employed. (See No. 537.)

1510. To Bleach Cotton Seed Oil. Use 1 gallon English caustic soda, in a solution of about 40° Baumé, to about 20 gallons crude oil. The oil, previous to being mixed with the solution, must be heated to about 90° Fahr. Stir constantly while adding the cold solution. If the oil is not now sufficiently a light yellow or straw color.

1511. Keyer's Process for Purifying perfectly bleach 2 or 3 pints of oil. It should 1000 parts by weight of oil, put a mixture of be added gradually to the oil, with continued 6 parts solution of ammonia and 6 parts wawood, and nothing metallic must touch it. decanted and filtered. The residue is used inous impurities are destroyed or precipitated.

1512. Liebig's Method of Obtaining Non-poisonous Oil of Almonds. Agitate cury in slight excess; and, after a few days' contact, rectify the oil from a little fresh binmercury.

1513. Neat's-foot or Trotter Oil. Obtained by boiling neat's-foot, tripe, etc., in water. It is a coarse animal oil, very emollient, and much used to soften leather.

To Refine Neat's-foot Oil. a quart of the oil with 1 pound bright lead it will be found congealed; place it into a strained. through.

Hirzel's Method of Preserving Animal Fats. Mix 14 pounds of recent y alum in fine powder; heat until a scum is formed on the surface; remove the scum, and in water, frequently changing the water, so as to remove all the sait; then evaporate the water at a heat insufficient to injure the fat.

zoating all kinds of animal fats will be water-bath, and then strain.

found the most effectual for preserving them 1522. To Bleach Lard. Lard may be strain and mix with equal parts of fresh castor oil. Of this mixture add 4 ounces to each gallon of fat or ointment while warm. The proportion of the solution of benzoin may be increased for pomades, as it forms, by its aromatic odor, an excellent basis for perfumes. The benzoatic fat should not be kept in tin, but in well-covered jars. Steam-rendered lard, or that treated with salt and alum, should be carefully re-melted in a water-bath, to allow all the water to settle so as to pour off the pure fat. In preparing ointment and pomades it is important that the wax should be first melted, and the oil or fat warmed before adding to the wax. This precaution, which will save much time and trouble, is maceti.

for the manufacture of soap. Oil thus worked acidulated water to remove the excess of contains no trace of acid, and the mucilag- lime, a hard fat results, suitable for making candles.

1518. Hog's Lard. This is obtained, like the rest of the animal fats, from the raw the crude distilled oil with binoxide of mer- lard, by chopping it fine, or rather rolling it out, to break the cells in which the fat is lodged, and then melting the fat in a wateroxide of mercury. The product is quite pure, bath, or other gentle heat, and straining it if properly managed, as the hydrocyanic acid while warm. Some boil them in water; but (the poisonous principle) of the oil, unites the fats thus obtained are apt to grow rank with the binoxide to form a bicyanide of much sooner than when melted by themselves. (See No. 525.)

1519. To Try out Lard. This should be done in the open air. Set a large kettle over a fire, in some sheltered place, on a still It will cook much quicker in large quantities. Put into the kettle while the lard is cold, a little saleratus, say 1 table-spoonful to every 20 pounds; stir almost constantly shavings, and 1 pound quicklime pounded, to every 20 pounds; stir almost constantly into a glass bottle, let it stand in the sun and when nearly done till the scraps are brown light for 2 or 3 weeks, then put the oil and and crisp, or until the steam ceases to rise; lime into a saucepan with ½ pound washing then there is no danger of its moulding; soda, boil gently 15 minutes, then set in the strain out into pans, and the first will be coldest place possible till the next day, when ready to empty into crocks when the last is

filter of white blotting paper, place a clean glass bottle under the filter, and you will get The presence of water is very easily detected the finest oil, suitable for the most delicate by merely melting the lard, when the water machinery. Any one requiring a little nice collects at the bottom of the vessel as a disoil would do well to try this in preference to buying it ready done. It must be kept per-fectly cold while filtering, or the soda will go of water with it; and purchasers of a pound of lard will frequently find that they have paid the price of the lard for as much as 4 ounces of water. Lard is also adulterated melted fat with 5 drachms salt and 15 grains with from 2 to 5 per cent. of milk of lime (slacked lime mixed to a milky consistence with water); this gives the lard a beautifully when the clear fat is cool, wash and knead it white appearance, and also allows of 25 per cent. of water being stirred into it while cooling.

1521. Benzoated Lard. Take benzoin 1516. To Preserve Animal Fats for in coarse powder, 1 ounce; fresh lard, 1 a Long Time. The following mode of ben- pound. Heat together for 2 or 3 hours in a

for a long time. Make a saturated solu-bleached by applying a mixture of bichromate tion of gum benzoin in alcohol by simple of potassa and muriatic acid, in minute proheat, allow the liquid to settle clear, then portions, to the fat. (See Nos. 1509 and 1523, also No. 537.)

1523. To Bleach and Harden Tallow. In a copper boiler, put ½ gallon water, and 100 pounds rendered tallow; melt over a slow fire, and add, while stirring, 1 pound of oil of vitriol, previously diluted with 12 of water; afterwards, 1 pound bichromate of potassa, in powder; and lastly, 13 pints water, after which the fire is suffered to go down, when the tallow will collect on the surface of the dark green liquid, from which it is separated. It is then of a fine white, slightly greenish color, and possesses a considerable degree of (See No. 1509.) hardness.

1524. Factitious or Imitation Sper-White spermaceti, 10 parts; sonoroften neglected by young beginners. (See ous cake stearine, 20 parts; potato starch, Nos. 1253 and 1254.)

5 parts; mucilage, 1 part. Melt the first *hree 1517. Boillet's Process for Purify- and unite well, then let the mass cool to the ing Fats. Melt 24 pounds avoirdupois of consistence of dough; turn it out on an oiled the fat with 2 quarts lime-water; stir act- marble or lead slab, and roll it into a cake; ively over the fire for 2 or 3 hours, and cool. next sprinkle a little mucilage on it, double Then press in fiannel and allow it to stand a it, and roll again; repeat the process as often day or two to harden. By melting it with as required; lastly allow it to cool. If it has

been properly managed, it will flake when it is next heated by means of a coil of steam broken up, and resemble spermaceti.

1525. Extraction of Fat from Bones. A process has been adopted abroad for extracting oil and fat from bones and other animal refuse, by digesting it in a closed and heated vessel with benzole or similar hydrocarbon. After a few hours the liquid is drawn off, the hydrocarbon separated by distillation, and the oil is left ready for use. The bones may then be used for the manufacture of gelatine. This is very similar to a method lately proposed of obtaining oil from oleaginous seeds, but in this latter case, as would probably be preferable in the former, bisulphide of carbon is the menstruum employed.

Detroleum, or Crude Coal A Oil. The name of petroleum is now applied to all the native liquid substances which have a bituminous character. It consists, therefore, of an inflammable and more or less volatile oily substance, ranging in color and appearance from a yellowish white, transparent fluid, to a brown or almost black, opaque viscid mass. The former used to be called naphtha, but this name is now given to any oil of this description, whether native, or distilled from a darker grade of petroleum. The latter is the form in which the bulk of the petroleum is found in America; and this, when exposed to the air, gradually passes into

asphaltum, or solid bitumen. 1527. To Purify Petroleum. Tankshaped stills of a capacity of 500 to 2500 barrels are filled with crude oil, and heat applied by furnaces beneath them, causing vapors to arise, which are carried forward through pipes immersed in water, and condensed into a liquid, which runs out at the end of the pipe. The first product is gasoline, a very light hydrocarbon, marking as high as 83° and as low as 75° of Baumé's coal oil hydrometer. The heat is then somewhat increased, and the next product obtained is called naphtha, benzine (not benzele), which marks from 75° to 63° Baumé; and, when combined, will average about 67°. The heat being allowed to increase further, produces distillate, or crude burning oil. This passes over until about 8 or 10 per cent. of the original quantity contained in the still remains, which is called residuum or tar, and may be redistilled for the purpose of obtaining paraffine and lubricating oil. Paraffine is a fatty material, resembling sperm in appearance. The distillate or crude burning oil is converted into ordinary kerosene by a process of purification. For this purpose it is placed in a tank, where it is violently agitated by forcing air through it, and while thus agitated, 11 to 2 per cent. sulphuric acid is added, after which the agitathen allowed to settle, when the acid and impurities are drawn from the bottom. The oil is then washed, first with water and then with caustic soda, by which means the remaining impurities are removed, and any acid remaining in the oil is neutralized. It is then These are so much used that a few hints on taken to shallow bleaching tanks, where it is their management will no doubt be accepta-

pipe running through it, to expel all gaseous vapors which will ignite at a temperature below 110° Fahr. The oil is now called a fire test oil, and is ready to be barreled and sent to market.

1528. To Clarify Coal Oil. Place in a close vessel 100 pounds crude coal oil, 25 quarts water, 1 pound chloride of lime, 1 pound soda, and ½ pound oxide of manganese. mixture is violently agitated, and allowed to rest for 24 hours, when the clear oil is decanted and distilled. The 100 pounds coal oil are to be mixed with 25 pounds resin oil; this is one of the principal points in the manipulation; it removes the gummy parts from the oil, and renders them inodorous. The distillation spoken of may terminate the process, or the oils may be distilled before they are defecated and precipitated.

1529. To Decolorize Kerosene Oil. Kerosene oil is decolorized by stirring it up with 1 or 2 per cent. of oil of vitriol, which will carbonize the coloring matter, then with some milk of lime or some other caustic alkali, settling, and redistilling. The latter appears to be indispensable.

Why Kerosene or Coal Oils
No oil is explosive in and of 1530. Explode. itself; it is only when the vapor arising therefrom becomes mixed in the proper proportions with air, that it will explode. There should be no inflammable vapor from any oil used for burning in lamps at ordinary temperature. A volatile oil is unfit for the purpose of illumination.

1531. To Test Kerosene or Coal Oil. Burning oil is often adulterated with heavy oil, or with benzine. The adulteration with the former is shown by dimness of the flame after having burned for some time, accompanied by a charring of the wick. The latter may be readily detected by means of a thermometer, a little warm water, and a tablespoonful of the oil. Fill the cup with warm water, the temperature of which is to be brought to 110° Fahr. Pour the oil on the water; apply flame to the floating oil by match or otherwise. If the oil is unsafe it will take fire, and its use in the lamp is dangerous, for it is liable to explode. But if the oil is safe and good it will not take fire. All persons who sell kerosene that will not stand the fire test at 110° are liable to prosecution.

1532. To Extinguish the Flame of Petroleum or Benzine. Water, unless in overwhelming quantity, will not extinguish the flame of petroleum or benzine. It may, however, be speedily smothered by a woolen cloth or carpet, or a wet muslin or linen cloth, or earth or sand being thrown over it. These act by excluding the air, without which combustion cannot be maintained.

To Deodorize Benzine. Shake 1533. tion is continued 15 to 30 minutes. The oil is repeatedly with plumbate of soda (oxide of lead dissolved in caustic soda), and rectify. The following plan is said to be better: Shake repeatedly with fresh portions of metallic quicksilver; let stand for 2 days, and rectify.

1534. To Manage Kerosene Lamps. exposed to light and air, and allowed to settle; ble. There are very few common illumina-

management. here given, the greatest amount of light will be with a rag dipped in the same substance. obtained, combined with economy in the consumption of the oil. The wick, oil, lamp, and all its appurtenances, must be perfectly clean. and bright. The wick must be trimmed exactly square, across the wick-tube, and not over the curved top of the cupola used to spread the flame; after trimming, raise the wick, and cut off the extreme corners or points. A wick cannot be trimmed well with dull scissors; the sharper the scissors, the bet- leave no trace of soap; let it drain till dry. ter the shape of the flame. These hints, simple as they appear, are greatly disregarded, and the consequence is a flame dull, yellow, and apt to smoke. The burners made with an immovable eupola, and straight, cylindrical chimneys, require especial care in trimming; the wick has to be raised above the cupola, and has therefore no support when being trimmed. A kerosene lamp, with the wick night. A wick made of felt is greatly supe-

rior in every way to the common cotton wicks.

1535. To Keep Kerosene Lamps time, frequently gets oily, from the condensa-tion of the vapor of the oil. This will be greatly, if not entirely prevented, by taking a piece of felt and cutting a hole in it so as to cally. fit exactly around the socket into which the

felt ring on the socket.

1536. To Cement the Socket on a Kerosene Lamp. The socket of a kerosene lamp, into which the burner is screwed, frequently becomes loose or comes off. To fasten this, take the socket off, pick out the old cement, and wash it with hot soap and waslightly, and screw it into the socket (the bottom of the socket; this will leave a circular trench to receive the cement. Take the best plaster of Paris, mix it quickly as thick as it will flow, fill the trench in the socket, reverse the lamp, and press the lip of the glass firmly into the socket until the edge of the plication to this purpose. (See No. 1495.) socket fits closely to the glass. This operation must be done quickly, before the plaster has had time to set. Let the whole remain about 12 hours in a warm place before using.

1540. Sperm Oil as a Lubricator for Heavy Machinery. The superiority of winter sperm oil has been fully established by experiments made during 14 months, on

tain Kerosene. Wash the vessel with thin from 100 to 400 per cent. more of these oils milk of lime, which forms an emulsion with to keep the temperature of the journals below the petroleum, and removes every trace of it, 100° Fahr. than when winter sperm oil was and by washing a second time with milk of employed; and in no instance could the preslime and a very small quantity of chloride of sure on the car-shaft be raised to 8,000 pounds lime, and allowing the fiquid to remain in it with any other oil. It was also established

ting substancss that produce a light as bril- about an hour, and then using it with cold liant and steady as kerosene oil, but its full water, even the smell may be so completely brilliancy is rarely attained, through want of removed as to render the vessel thus cleansed attention to certain requisite points in its fit for keeping beer in. At the same time the management. By following the directions external surface of the vessel is to be washed the milk of lime be used warm, instead of cold, the operation is rendered much shorter. If particles of thickened petroleum adhere to The chimney must be not only clean, but clear the glass after the first washing, these can be removed by washing with fine sand, or by other mechanical means.

1538. To Clean Kerosene Lamps. Wash the lamp inside and out thoroughly with hot soap and water, and a little washing soda. When clean, rinse repeatedly so as to

ubricators. Compounds to lessen the friction in machinery, and to prevent the bearings from rusting. Lubricators must possess a certain amount of cohesive and adhesive attraction. But they turned down, so as to make a small flame, must also have the power to retain their should not be placed in a sleeping room at cohesion and fluidity under the action of moderate heat, heavy pressure, and contact with metals and air. The oxygen of the air attacks many kinds of oils, rendering some from Getting Greasy. The upper part of acid and others resinous; and moreover some a kerosene oil lamp, after standing for a short oils of mineral extraction are contaminated with acids, used in their rectification, which attack metallic surfaces, the oxides of the metals thus produced increasing friction mechani-The oxides of metals have the power of saponifying vegetable and animal oils, and burner is screwed; trim the felt off so as to no doubt this combination often takes place leave a rim about ½ inch wide, and place this when oils of this kind are used on rusty bearings. The soaps formed by the union of the saponifiable parts of oils with metallic oxides are hard and insoluble, and are, therefore, much less perfect lubricators than the oils themselves. Some oils, more particularly those extracted from petroleum, are volatile, and evaporate as soon as journals become ter, with a little soda, to remove all trace of slightly heated. Oils possessing these degrease. Empty the lamp, and wash it in the feets are unfit for purposes of general lubricasame manner, especially the lip or neck which tion. Probably nothing else has ever been fits into the socket. Next take a cork which discovered that possesses in so high a degree fits (not too tight) into the socket; grease it all the properties desirable in a lubricator as good, pure sperm oil. There have been, howsame way the burner is screwed in), until ever, some close approximations to it in oils the end of the cork is nearly level with the extracted from petroleum. Many of the latter are, nevertheless, very inferior. Some excellent lubricating oils are also obtained from various seeds. The olive and the castor bean furnish oils very good for lubrication. oil is, however, too expensive for general ap-

Then unscrew the cork and scrape off any the car and locomotive axles of a leading line adhering plaster. (See No. 2260.)

1537. To Clean Vessels Used to Conusing mineral, animal or fish oils, it required that under various velocities, the amount of posit, and the oil has become quite limpid and this oil consumed in lubrication decreased in almost the same ratio as the velocity; and as the velocity and the requisite amount of the finest porpoise oil to the lowest natural oil was diminished, the pressure could be increased without any increased consumption of oil.

1541. Booth's Axle Grease. This popn'ar axle grease is made as follows: Dissolve k pound common soda in 1 gallon water, add 3 pounds tallow and six pounds palm oil (or 10 pounds of palm oil only). Heat them together to 200° or 210° Fahr.; mix, and keep the mixture constantly stirred till the composition is cooled down to 60° or 70°.

1542. Thin Axle Grease. A thinner composition than the last is made with & pound soda, 1 gallon water, 1 gallon rape oil, and 1 pound tallow, or palm oil.

1543. French Liard for Lubrication. The French compound, called liard, is thus made: Into 50 parts of finest rape oil put 1 part of caoutchouc, cut small. Apply heat

until it is nearly all dissolved. 1544. Bavarian Anti-Friction Composition. This composition has been enployed in Munich with success and economy ism. Refined oil for fine mechanism can be 101 parts pure hog's lard melted with 2 parts finely pulverized and sifted plumbago. lard is first to be melted over a moderate fire. then the plumbago is thoroughly mixed in, a handful at a time, with a wooden spoon, and stirred until the mixture is of a uniform composition. This is applied in its cold state with a brush to the pivots, the cogs of the wheels, &c., and seldom more than once in 24 hours. It was found that this composition replaced satisfactorily the oil, tallow and tar used in certain iron-works, and saved about four-fifths of the cost of those articles.

1545. Lubricator for Wagon Axles. Tallow, 8 pounds; palm oil, 10 pounds; and plumbago, 1 pound, make a good lubricator for wagon axles. A mixture of glycerine and plumbago makes a fine liquid lubricator.

Mankettrick's Lubricating Compound. 4 pounds caoutchouc dissolved in spirits of turpentine, 10 pounds common soda, 1 pound give dissolved in 10 gallons water, 10 gallons of oil thoroughly incorporated by assiduous stirring, adding the caoutchouc

1547. Anti-Attrition Grease. rusting. It was once a patent article. Camphor is sometimes added, 7 pounds to the

1548. Anti-Friction Grease. well. The above is for summer. For winter, 1½ cwt. tallow to 1½ cwt. palm oil. and autumn, 1½ tallow, 1½ palm oil. Spring

white glass bottle filled with olive oil, and ex- of a duck. posing it to the sun's rays at a window for some time, till a curdy matter ceases to de- Dissolve 1 pound alum in two quarts boiling

colorless. Used for fine work; does not get thick by age. (See No. 1551.) Or:—expose temperature attainable. It will separate into two portions, a thick, solid mass at the bottom, and a thin, oily supernatant liquid. This is to be poured off while at the low temperature named, and is then fit for use. Delicate clocks and watches are now lubricated with glycerine.

1550. To Prepare Oleine for Watchmakers' Use. Oleine is the liquid portion of oil and fat; by saponification it yields oleic acid. Almond or olive oil is agitated in a stout bottle with 7 or 8 times its weight of strong alcohol specific gravity .798, at nearly the boiling point, until the whole is dissolved; the solution is allowed to cool, after which the clear fluid is decanted from the stearine which has been deposited, and after filtration, the spirit is removed by distillation at a gentle heat. By exposure at a very low temperature it deposits any remaining stearine, and then

to diminish friction in machinery. It consists of prepared by putting zine and lead shavings, in equal parts, into good Florence olive oil, and placing in a cool place till the oil becomes colorless. (See No. 1495.)

> Taterproofing. Numerous plans have been invented for rendering cloth and felting waterproof; the best methods adopted are given in the following receipts:

1553. Waterproof Porous Cloth. A porous waterproof cloth is the best for outer garments during wet weather, for those whose duties or labor causes them to perspire freely. The best way for preparing such cloth is by the process adopted for the tunics of the French soldiers during the Crimean war. It is as follows: Take 2½ pounds alum and dissolve in 10 gallons boiling water; then in a separate vessel dissolve the same quantity sugar of lead in 10 gallons of water, and mix the two solutions. The cloth is now well handled in this liquid, until every part of it is penetrated; then it is squeezed and dried in Grind the air, or in a warm apartment, then washed together blacklead with four times its weight in cold water and dried again, when it is fit for of lard or tallow. This is used to lessen use. If necessary, the cloth may be dippedin friction in machinery, and to prevent iron the liquid and dried twice before being wash-The liquor appears curdled when the alum and lead solutions are mixed together. This is the result of double decomposition, Boil the sulphate of lead, which is an insolutogether 12 cwt. tallow with 11 cwt. palm ble salt, being formed. The sulphate of cil. When boiling point is reached, allow it lead is taken up in the pores of the cool to blood-heat, stirring it meanwhile, cloth, and it is unaffected by rains or then strain through a sieve into a solution that the cool to blood-heat, stirring it meanwhile, cloth is allow rates and yet it does not render the cool to blood a sieve into a solution bloth six tight. of ½ cwt. soda in 3 gallons water, mixing it cloth air-tight. Such cloth is also partially A solution of alum itself non-inflammable. will render cloth, prepared as described, partially waterproof, but it is not so good as the Watchmakers' Oil. Prepared sulphate of lead. Such cloth—cotton or woolby placing a strip of clean lead in a small en-sheds rain like the feathers on the back

To Waterproof Tweed Cloaks. 1554.

it remain 24 hours. the solution into another vessel containing 2 gallons of cold spring water. press it, and immerse it in the second vessel. gines, hydraulic pumps, &c.
Let it remain 6 hours, gently wring it, and 1558. To Render Articles Water-Let it remain 6 hours, gently wring it, and hang it in the shade to dry. This receipt has been tried, and found to answer admirably. quantity of sugar of lead is used, and the cloth is immersed in the solutions separately.

1555. Cooley's Method of Making perfectly successful method of rendering cloth waterproof without being, at the same Spread the cloth on any time, airproof. a lump of bees' wax (perfectly pure and free from grease), until the surface presents a ance. If this be done carefully and thor-saturated solution. oughly, a lighted candle may be blown out

French Waterproof Felting. 1556. This composition, heretofore regarded as a secret in France, has been adopted for use in the French navy. The information regarding this material was furnished by Mr. Parent to the "Journal of Applied Chemistry." The inoxidizable compound for waterproof is made thus: 106½ parts, by weight, India rubber, 175 parts finely sifted sawdust, 10 parts powdered sulphur, 25 parts slacked lime, 125 parts sulphate of alumina, 125 parts sulphate of iron, 10 parts hemp tow. To mix the above, use heated cylinders, so as to obtain a very homogeneous paste, which is made into thin cakes, and afterward divide into small pieces to be dissolved. To disselve this substance, take 4½ pounds spirits of turpentine, benzine, (common is preferable), petroleum, or sulphuret of carbon, to 2½ pounds of the mixture. It must be stirred 5 or 6 times during 24 hours, at the end of which time the mass will be thoroughly dissolved. The solution is then spread on the fabrics or articles to be preserved, by means of rollers, knives, or spatulas, adapted to the purpose. Apply as many coats as may be necessary, and then let it dry. As soon as the fabric is dry, it is passed under pasteboard laminating rollers, in order to give a lustre to the surface. The fabric is then rolled up on a hollow iron pipe, which is covered with cloth to prevent it sticking to pipe, with a perforated lid or cover; steam is then introduced at a pressure of 4 atmo-spheres, which pressure is maintained for 1 hour, at the end of which time the operation is ended. If it be desired to give these impermeable covers a black color, a solution of sulphate of iron, nut-gall and logwood is applied with a brush.

water, and pour the solution into a vessel about the same materials as the above by obcontaining 2 gallons cold spring water, serving the following proportions: Dissolve Immerse the garment in this vessel, and let 211 parts, by weight, of India rubber, in suf-Dissolve 1 pound sugar ficient benzine; then mix with it 15 parts of lead in 2 quarts of boiling water, and pour sawdust, 2 parts sulphur, 3 parts red lead, and 5 parts each of alum, slacked lime, and hemp Take the gar- tow, adding benzine to make the whole into ment from the first vessel, gently wring or a paste. For closing the joints on steam en-

proof. A patent has recently been taken out in Paris for a method of rendering paper, It is very similar to the last, but only half the cloth, cork, sponge, and other porous substances waterproof, as well as articles manufactured from these materials, including banknotes, envelopes, gloves, clothing, paper col-Cloth Waterproof. This is a simple, but lars, umbrellas, labels, &c. The process consists in dissolving paraffine, cut up in small slices, in pure naphtha or benzine, entirely free from fat or oil. The solution is to be made smooth surface, and rub the wrong side with in a vessel with a glass stopper, and is to be shaken repeatedly until the result is accomplished. An excess of paraffine should be slight, but uniform, white or grayish appear- used, so as to make sure of having a perfectly The articles to be treated are immersed in this for a time, according through the cloth, if coarse; and yet a piece to the thickness or porosity of the tissue, and of the same, placed across an inverted hat, arranged to secure either a complete saturamay have several glassfulls of water poured into the hollow formed by it, without any of the liquid to any required depth. After removal, the liquid passing through; pressure or frietion will alone make it do so. evaporates, leaving the paper or other substance saturated with paraffine impermeable to water, and capable of resisting the action of acids. Articles of dress, such as paper collars and wristbands, should be subjected to the action of a flat-iron or heated cylinder, in order to give them a high degree of polish. The applications of this process are manifold. and new ones are constantly suggesting them-

> 1559. Balard's Waterproofing for Clothing. Balard recommends the application of acetate of alumina for the purpose of rendering clothing impervious to water. cloth is to be immersed in a mixture of solutions of acetate of lead and sulphate of alumina; by mutual decomposition of the salts, acetate of alumina is produced on the cloth, and when the goods are dried, basic acetate of alumina adheres to the fibre, and thus proteets it from the action of moisture. process is particularly recommended for military goods.

1560. Berlin Waterproof Cloth. firm in Berlin has for some years furnished a completely waterproof cloth, the process for making which has been kept a secret. It is now stated, however, that the method consists, in all probability, in saturating the cloth at first with a solution of sulphate of alumina and of copper, and then immersing it in the iron, and the whole placed in a copper a bath of water-glass and a solution of resin soap. The object of the copper seems to be to prevent the cloth from rotting or stiffening more perfectly than can be done by the alumina alone. (See No. 1561.)

1561. To Waterproof Linen, Canvas, &c. Three baths are prepared as follows: The first, by dissolving 1 part neutral sul-&c. phate of alumina (concentrated alum cake) 1557. To Make Waterproof Joint in 10 parts cold water. For the second, boil Closers. Caps or joint closers can be made of 1 part light resin, 1 part soda crystals and 10

parts water, till the soda is dissolved; add \ dered galls, heated to boiling, and then mixed parts water. bath; and lastly, rinse in the water. (See No. | 1560.

1562. Metallic Soap. Metallic soap in linseed oil is highly recommended for coating canvas for wagon covers, tents, &c., as remaining pliable for a long time without breaking. It can be made with little expense, as follows: Soft soap is to be dissolved in hot of iron) added. The sulphuric acid combines with the potash of the soap, and the oxide of iron is precipitated with the fatty acid as insoluble iron soap. This is washed and dried, and mixed with linseed oil. The addition of dissolved India rubber to the oil greatly improves the paint.

1563. To Render Canvas Fire and Waterproof. Tents, awnings, canvas, &c., may be made fireproof as well as waterproof, boiling water to 25° Baumé. Before thorof alumina (alum cake) and sulphate of copper (blue vitriol), 1 part of each to 10 parts of water; then dry the fabric slowly in the air.

1564. Fireproofing Fabrics. A solution of 3 parts borax and 2½ parts sulphate of magnesia in 20 parts water is recommended. Or a mixture of sulphate of ammonia and sulphate of lime. Soluble glass is applicable to rendering wood and theatrical decorations less inflammable.

oney. The sweet substance extracted by the bee from the juices of cells of wax forming the honey-comb. Pure honey consists of a syrup of uncrystallizable sugar and crystalline saccharine grains, resembling grape sugar. Virgin honey is that which flows spontaneously from the comb; ordinary honey, that obtained by heat and pressure.

1566. To Purify Honey. Take of honey, 8 pounds; water, 16 pounds; heat in a tin vessel to 212° Fahr. (not to boiling) for 1 hour; then set aside over night. Mix with fresh coarsely powdered charcoal, 2 ounces Troy, and strain through flannel, then evaporate in a steam bath, at about 175° Fahr., to the proper consistence.

Hoffmann dilutes the honey with water, adds solution of tannin as long as precipitation takes place, heats to 212°, strains and evaporates as before.

Mohr and Rebling have an unfavorable opinion of charcoal, and recommend tannin or powdered galls.

Strauss, of St. Petersburg, likewise removes

an excess of tannin by means of gelatin.

1567. Rebling's Method of Purifying Honey. One half ounce of honey and

part common salt, to separate the water and with sufficient lime-water to neutralize the collect the soap; dissolve this soap with an acid. For the best honey it takes 2 drachms. equal amount of good palm-oil soap in 30! This is merely a preliminary test to determine This soap bath must be used the necessary quantity of lime-water. A floc-The third bath consists of water only, culent precipitate takes place, which readily Soak the fabric thoroughly in the first, or separates, leaving the honey perfectly clear alum bath; next pass it through the soap and of a very pale yellow color, like that of an old Rhine wine; the strained liquor must be perfectly neutral. From the quantity of lime-water necessary, the quantity of the whole lot of honey is calculated, and is then treated as follows: 1 pound avoirdupois each being not only impermeable to moisture, but of honey and water are heated, 4 grains powdered galls are added; the whole well stirred, heated to boiling, and the whole quantity of lime-water added at once. The fire is immewater, and a solution of copperas (sulphate diately slackened and after a few minutes the honey, when sufficiently clear, is strained; if still acid, reheating and an addition of more lime-water will be necessary. It is to be evaporated as above.

Vogel's Method of Purifying 1568. Vogel's method is to beat 5 pounds Honey. honey with the white of 1 egg till it froths, and then add water to make it of the consistence of syrup; it is next boiled until the white of egg can be skimmed off. Pour it by immersion in soluble glass diluted with into an upright vessel into which a faucet has been inserted near the bottom, and let it setoughly dry, immerse in a solution of sulphate the for some weeks-when the pure honey may be drawn off through the faucet

1569. To Clarify Honey. Melt the honey in a water-bath, remove the scum, and pour off the clear. Less agreeable than raw

honey, but not so apt to ferment and gripe.

1570. Siller's Method of Clarifying Honey. Any quantity of honey is dissolved in an equal part, by weight, of water. The liquid is allowed to boil up 4 or 6 times without skimming; it is then removed from the fire, and after being cooled, brought on several strong linen strainers, stretched horizontally, and covered with a layer of clean and wellwashed sand an inch in depth. When the solution has passed through the strainers, it the nectaries of flowers, and deposited in the is found to be of the color of clear white wine; the sand being allowed to remain on the strainers, is rinsed with cold water, and the whole of the liquor is finally evaporated to the thickness of syrup.

1571. To Clarify Honey. the honey in water, add 1½ pounds animal charcoal to every 28 pounds of honey, gently simmer for 15 minutes, add a little chalk to saturate excess of acid, if required; strain or clarify, and evaporate. Observe.—Honey acquires a darker color if heated in copper or iron vessels; the above processes should therefore be conducted in earthen or welltinned copper pans.

1572. Shute's Artificial Honey. Soft water, 6 pounds; pure best honey, 3 pounds; white moist sugar, 20 pounds; cream of tartar, 80 grains; essence of roses, 24 drops. Mix the above in a brass kettle, boil over a charcoal fire 5 minutes, take it off, add the whites of 2 eggs well beaten; when almost cold, add 2 pounds more honey. A decoction of slippery elm will improve the honey if it be added while cooling, but it will ferment in warm weather and rise to the surface.

1573. Cuba Honey. Good brown sugar, hounce water are mixed with h grain pow- 11 pounds; water, 1 quart; old bee honey in Have ready, strained, 1 quart water in which physiological effect upon the system, a table-spoonful of pulverized slippery elm bark 1578. To Bleach Wax. Pu and rise to the surface.)

stand until cold, when it will be ready for

1575. Excellent Honey. Take 5 pounds good common sugar, 2 pounds water, gradupeppermint. If you desire a better article bleached. use white sugar and \frac{1}{2} pound less water and \frac{1}{2}

pound more honey.

1576. To Test the Purity of Honey. Honey is frequently adulterated with molasses, potato-sugar syrup, starch, wheat flower, and water. The molasses may be detected by the color and odor; the potato-sugar syrup, by boiling a sample of the honey for a short time in water containing 2 or 3 per cent. of caustic potessa; if the liquid remains colorless it is pure; but if it turns brown, more or less, it is adulterated according to the quantity of syrup present. The starch, by the honey not forming a nearly clear solution with cold water, and striking a blue color with iodine. When it contains wheat flour and is heated, it at first liquefies, but on cooling it becomes solid and tough. Water is added to honey to increase its bulk. Its presence may be suspected from the greater thinness of the liquid.

Bees' Wax. The substance which forms the cells of bees; obtained by melting the comb in water after the honey has been removed, straining the liquid mass, remelting the defecated portion, and casting into cakes. Bees' wax, when pure, has neither taste nor smell; it melts at about 157° Fahr. and is of a specific gravity of .966. It burns melt them anew, and having repeated the without smoke or disagreeable odor. It is in-soluble in water, but soluble in all proportions in the fixed and volatile oils, bisulphide of car-melted, and cast into discs of 1 to 2 ounces bon, and benzine. Its complete solution in weight, and forms the cera alba of the Pharthese substances demonstrates its freedom macopæia. from fecula, sulphur, sawdust, or bone dust, which have been found in the wax of com- Bees' Wax. The yellow wax is first melted merce, sometimes amounting to 60 per cent. in a kettle, and then is dipped out into a long

the comb, 2 pounds; cream of tartar, 50 price of paraffine have made this substance grains; gum-arabic, I ounce; oil of pepper- one of the principal articles used in the falsifimint, 5 drops; oil of rose, 2 drops. Mix and cation of wax, and perhaps of all others it is boil 2 or 3 minutes and remove from the fire. the least objectionable, being without marked

1578. To Bleach Wax. Pure white has stood sufficiently long to make it ropy and wax is obtained from the ordinary bees' wax thick like honey. Mix this into the kettle by exposure to the influence of the sun and with egg well beat up. Skim well in a few weather. The wax is sliced into thin flakes, minutes, and when a little cool add 2 pounds; and laid on sacking or coarse cloth, stretched nice strained bees' honey, and then strain the on frames, resting on posts to raise them from whole, and you will have not only an article the ground. The wax is turned over frewhich looks and tastes like honey, but which quently, and occasionally sprinkled with soft possesses all its medical properties. (The water, if there be not dew and rain sufficient slippery elm will ferment in warm weather to moisten it. The wax should be bleached in about 4 weeks. If, on breaking the flakes, 1574. Artificial Honey. Take 10 the wax still appears yellow inside, it is nepounds Havana sugar, 4 pounds water, 40 cessary to melt it again, and flake and expose grains cream of tartar, 10 drops essence of it a second time, or even oftener, before it bepeppermint, and 3 pounds honey; first dissolve comes thoroughly bleached. The time rethe sugar in the water over a slow fire, and quired being mainly dependent on the state of take off the scum. Then dissolve the cream the weather. There is a preliminary process, of tartar in a little warm water, and add, with by which, it is claimed, much time is saved in some stirring; then add the honey, heated to the subsequent bleaching; this consists in a boiling point; then add the essence of pep-permint; stir for a few moments, and let it pipes, so as to expose the wax as much as possible to the action of the steam; thence into a pan heated by a steam bath, where it is sarred thoroughly with water and then allowed to settle. The whole operation is really bring to a boil, skimming well; when peated a second and third time, and the wax cool, add I pound bees' honey and 4 drops of is then in a condition to be more readily

> 1579, To Bleach Wax. Wax cannot be bleached with chemicals; if any other agent but sunshine is employed, part of its properties will be destroyed, and it is genuine wax no longer. Chlorine will whiten, but at the same time greatly injure it. The chlorine is retained, and forms, on combustion, muriatic acid.

> 1580. French Method of Bleaching Bees' Wax. The wax is melted in copper vessels, and, after complete liquefaction, is agitated with 8 ounces of pulverized cream of tartar for each 100 pounds. After some minutes' agitation it is allowed to deposit its impurities, and is drawn into a wooden vessel and allowed to deposit a further amount of foreign substance—dirt, sand, bees, etc.—and, while still liquid, is drawn upon a little roller partly immersed in water, to which a regular rotation is given-thus producing thin sheets or ribbons of wax, which may be detached from the roller, being now ready for the po-cess of bleaching. This is accomplished by the exposure of the yellow scales and ribbons, upon cloths, to the direct rays of the sun and the dew, for several days, during which time the wax completely loses its color. It is, however, in practice impossible to bleach the wax at a single operation, as the effect takes place only on the surface, and, as the ribbons have a certain thickness, it is necessary to

of the whole weight. The abundance and low it in vessel that will hold 2 or 3 gallons, and

which has a row of small holes, about the streaky, or of different shades of color. diameter of a knitting-needle, in the bottom. This vessel is fixed over a cylinder of wood 2 feet in length and 15 inches in diameter, which is made to revolve like a grindstone, in one end of a trough of water 21 feet in width, 10 to 15 feet in length, and 1 foot in depth. As the melted wax falls in small streams on this wet revolving cylinder, it flattens out into a thin ribbon and floats off toward the other end of the trough of water. It is then dipped out with a skimmer (that may be them in such quantity as to render them inmade of osier twigs), spread on a table (with a top made of small willow rods, covered with a clean white cloth), and then exposed in this way to the sun until bleached.

1582. To Detect Spermaceti in Wax. The presence of spermaceti in what is sold as virgin wax, is shown by its reduced melting point, its bending before it breaks, and by its

flavor when chewed.

1583. To Detect Japanese Wax in Bees' Wax. According to Hager, this is determined by their different behavior in a concentrated solution of borax, at the boiling point. Bees' wax is totally insoluble in such which renders it, no matter how pure, object a solution, while Japanese wax dissolves, and tionable to the retail purchaser. Such wax on cooling forms a milky white, gelatinous undergoes the operation of coloring. This is mass. From a mixture of the two the latter done as follows:-A small quantity of the is dissolved out, carrying with it a portion of the former, while another portion rises and more or less, to 1 cwt. wax, depending on the

congeals on the surface.

1584. To Refine Bees' Wax. Crude wax, especially that imported, is generally loaded with dirt, bees, and other foreign matter. To free it from these substances, it un-This is dergoes the operation of refining. done by melting the wax along with about 3 per cent. of water in a bright copper boiler, preferably heated by steam, and after the and is added in quantity as required to the few minutes, withdrawing the heat, and sprinkling over its surface a little oil of vitriol, in the proportion of about 3 or 4 fluid ounces and to cool a little now and then to ascertain to every 100 pounds of wax. This operation should be conducted with great care and circumspection; as, if done carelessly, the melted wax will froth up, and boil over the sides of the pan. The acid should also be well scattered over the whole surface. The melted wax is next covered over, and left for some hours to settle, or till it becomes sufficiently cool to the purpose being often so large as to injure be drawn off into the moulds. It is then very gently skimmed with a hot ladle, and bailed color produced is inferior, and less transparent or decanted into basins, where it is left to cool. Great care must be taken not to disturb the sediment. When no more clear wax cap be drawn off, the remainder in the melting ton sact or stearine, 8 pounds; palm oil, 21 pan is allowed to cool, and the cake or foot, as it is called, is taken out, and the impurities (mostly bees) scraped from its under surface. The remaining portion is usually reserved for a second operation, but, if required, may be at once melted, and strained through canvas into a mould. The great art in the above low resin, 70 pounds; boil with constant agiprocess is to produce a wax which shall at tation till perfectly mixed and of a proper once be bright or semi-translucent in thin color, and as soon as it begins to thicken, pieces, and good colored. The former is best pour it out into basins to cool. When cold insured by allowing the melted mass to settle well, and by carefully skimming and decanting the clear portion without disturbing the sediment. It should also not be poured into Artificial Wax. the moulds too warm, as, in that case, it is tallow is liquefied by oil of turpentine, and apt to separate, and the resulting cakes to be poured into small round boxes lined with felt

should also be allowed to cool very slowly. When cooled rapidly, especially if a current of air fall upon its surface, it is apt to crack and form cakes full of fissures. Some persons who are very nice about their wax, have the cakes polished with a stiff brush when quite cold and hard. It is necessary to have the cans, ladles, and skimmers used in the above process kept quite hot, as without this precaution the wax cools, and accumulates upon convenient, and often quite useless, without being constantly scraped out.

1585. To Refine Wax. Another method of refining crude wax, and which produces a very bright article, is to melt it with about 1 per cent. of concentrated nitric acid, in a farge earthen or stoneware vessel, heated by steam or a salt-water bath, and to continue the boiling till nitrous fumes cease to be evolved, after which the whole is allowed to

settle, and treated as before.

1586. To Color Bees' Wax. Much of the imported wax has a pale dirty color, best roll annotto, cut into slices (‡ pound, paleness of the latter), is put into a clean boiler with about a gallon of water, and boiled for some time, or till it is perfectly dissolved, when a few ladlefuls of the melted wax are added, and the boiling continued till the wax has taken up all the color, or till the water is mostly evaporated. The portion of wax thus treated has now a deep orange color, whole is perfectly liquid, and has boiled for a remainder of the melted wax in the larger boiler, till the proper shade of color is produced when cold, observing to well mix the whole, when enough has been added. The copper must be then brought to a boil, and treated

with vitriol, &c., as before. (See No. 1584.) 1587. To Color Bees' Wax. Another method is to add bright palm oil to the wax till it gets sufficient color; but this plan is objectionable from the quantity required for the quality of the wax; besides which the

and permanent.

1588. Factitious, or Imitation Bees' Yax. Yellow resin, 16 pounds; hard mut-Wax. pounds; melt together.

II. As last, but substitute turmeric, 1 pound,

for the palm oil.

III. Best annotto, 6 ounces, or sufficient to color; water, 1 gallon; boil till dissolved, add hard mutton suet or stearine, 35 pounds; yelrub each cake over with a little potato starch. Used instead of wax in ointments by farriers,

1589. Braconot's Method of Making Any animal grease or

in the inside, with a number of small holes pletely turned, when the curd is struck down distinguished from wax lights. The turpentine is separated from the other oil, and evaporated by means of distillation; and this oil, when purified and whitened with animal charcoal, is of great service in the preparation and for household purposes. This animal oil, when saponified with potash, and then by means of the sulphuric acidulated soda often contained in the mother lye, can be changed into a hard soda soap. There is also a sul-

1590. Modeling Wax. This is made of white wax, which is melted and mixed with lard to make it malleable. In working it, the tools and the board or stone are moistcolor.

1591. Wax for Polishing Floors. To prepare this, 12½ pounds yellow wax, rasped, are stirred into a hot solution of 6 pounds good the tub, letting the whey run off through the pearl-ash, in rain water. Keeping the mixture fingers until it becomes cleared, and ladling well stirred while boiling, it is first quiet, but it off as it collects. A third method is to resoon commences to froth; and when the effervescence ceases, heat is stopped, and there skimmer. Of these the second plan is said to are added to the mixture, while still stirring, 6 pounds dry yellow ochre. It may then be many of which are lost by the other methods. poured into tin cans or boxes, and hardens on hot to the floor by means of a paint-brush. It dries in a few hours, after which the floor is to be polished with a large floor-brush and afterwards wiped with a coarse woolen cloth. A coat of this paint will last six months.

heese. skimmed milk to that rich in cream, according to the quality of the cheese required. The materials being ready, the greater portion of dry. It is employed for curdling milk.

bored in the sides and the bottom. From several times with the skimming-dish, after these little boxes the liquid is pressed out gradually, but sufficiently to get rid of the covered with cheese-cloth is next placed on a turpentine oil and all the fluidity. The firm horse or ladder over the tub, and filled with mass remaining must be washed a long time curd by means of the skimmer; the curd is in water, to take away the smell of the oil of turpentine, and then kept fluid for several hours with animal charcoal freshly prepared the curd rises to about 2 inches above the and afterwards filtered whilst boiling. When edge. The cheese thus partially separated cooled, it is a substance beautifully white, from the whey is now placed in a clean tub. half transparent, dry, brittle, and free from and a proper quantity of salt added, or the taste or smell; and will mix well with chlosalt is added to it without removing it from rine or muriatic acid, or with 1 of wax to give the vat, after which a board is placed over it the necessary suppleness. In this state and under it, and pressure applied for 2 or 3 the mass can be made into candles not to be hours. The cheese is next turned out and surrounded by a fresh cheese-cloth, and pressure again applied for 8 or 10 hours, when it is commonly removed from the press, salted all over, and pressed again for 15 to 20 hours. The quality of the cheese especially depends of a soap extremely well adapted for the trade on this part of the process, as, if any of the whey be left in the cheese, it will not keep, but will rapidly become bad flavored. Before placing it in the press the last time, the edges should be pared smooth and sightly. It now only remains to wash the outside of phate of potash, much in demand in the alum works, to be obtained from it. the cheese in warm whey or water, wipe it dry, color it with annotto, and place it in a This is made cool place to mature or ripen.

1593. To Collect the Curd in Making Cheese. There are several methods adopted of collecting the curd, and as the flavor of ened with water, to prevent its adhering; it the cheese varies accordingly, it is as well to may be colored to any desirable tint with dry notice them. One way is to break the curd early, and to remove the whey as soon as possible; another plan is to gather it with the hands very gently towards the sides of move it as quickly as possible with the curdbe the best, as it preserves the oily particles,

1594. To Make Cream Cheese. This cooling. When wanted for use, a pound of it is made either of the "strippings" (the last is diffused in 5 pints boiling hot water, and of the milk drawn from the cow at each milkthe mixture well stirred, applied while still ing), or of a mixture of milk and cream. It is usually made up into small pieces, and a gentle pressure, as that of a 2 or 4 pound weight, applied to press out the whey. After twelve hours, it is placed upon a board or wooden trencher, and turned every day, until dry. In about three weeks it will be ripe. Nothing but raw cream, turned with a little rennet (see No. 1595) is employed, when a very rich cheese is wanted. A little salt is generally added, and frequently a little pow-The materials employed in dered lump sugar. The vats employed for making cheese are milk and rennet. The cream cheeses are usually square, and of small milk may be of any kind, from the poorest size.

1595. Rennet. The stomach of the calf, freed from the outer skin, fat, and usepoorest kind of cheese is made from the less membrane, is washed, treated with either former, and the finer from the latter, to which brine or dry salt for a few hours, and then additional cream is frequently added. The stretched out upon a stick and hung up to the milk is put into a large tub, and the re- piece of the requisite size is cut off and soaked mainder sufficiently heated to raise the whole for some hours in whey or water, after which quantity to the temperature of new wilk. The whole is added to the milk slightly The whole is then whisked together, the rennet (see No. 1595) added, and the tub covered 120° Fahr. In a short time the milk sepaover. It is now allowed to stand until com- rates into a white curd, and a yellowish fluid

rennet are sufficient for a cheese of 60 pounds. minutes.

1596. Essence of Rennet. Knead to-5 or 6 weeks in a cool place; then add 18 spoonfuls will curdle a quart of milk.

Condensed Milk. 1597. difficulty in manufacturing condensed milk, the article. The evaporation should be conbecoming brown and acquiring a bitter taste.

It is best to stir it constantly, or the skin of coagulated casein at the top will prevent quick evaporation. When sufficiently thick or condensed it is mixed with ‡ its weight of granulated sugar, stirred well, filled in tins, and soldered up.

preservatives. These consist of such substances or methods as are These consist employed for preventing decay in fruits, meat, and other perishable matter; together with

valuable antiseptics. To Dry Fresh Meat. 1599. Cut the flesh into slices from 2 to 6 ounces in weight, immerse a small portion at a time in boiling water for 5 or 6 minutes, using only just water enough to cover the meat, and adding fresh water only to keep the liquor up to its original quantity. Lay the meat to dry on open trellis-work in a drying stove, keeping the temperature at about 122° Fahr. In about two days the meat will be completely dry, having lost about \ its weight. Add a litliquor or soup in which the meat was immersed, and then evaporate it to a gelatinous consistence. When the flesh is perfectly dry, dip it, piece by piece, in the gelatinous matter liquefied by a gentle heat, and replace it in the stove to dry, repeating this varnishing and drying 2 or 3 times, so as to get the coating uniformly thick. Meat thus dried will

keep good for a year. 1600. To Smoke Meat. This process consists in exposing meat, previously salted, to wood-smoke, in an apartment (usually called a smoke-house), into which the smoke is admitted by flues at the bottom of the side walls. The meat absorbs the pyroligneous acid of the smoke, and gets dried at the same time. It may be protected from soot by rubbing over with bran, or wrapping in a cloth. The smoke from oak or beech wood is preferable; and the smoking is better slow and gentle than rapid and powerful; the latter plan being too often adopted from motives of Hams thus prepared, as is often the case, are ham merely on the surface, and corned pork inside. This process is some-times imitated by immersing the meat but it is apt to harden or toughen the meat.

called whey. 2 square inches from a good flavor to fish or meat dipped into it for a few

1602. To Dry-Salt and Pickle Meat. gether 12 ounces fresh rennet cut small, and This is best performed by well rubbing the 3 ounces common salt; leave the mixture for meat with a mixture of salt, 2 pounds; saltpetre, 2 ounces; and moist sugar 11 ounces, ounces water, and 2 ounces good rum or till every crevice is thoroughly penetrated, proof spirit. Digest for 24 hours; filter, and color with a little burnt sugar. 2 or 3 teaday, when it should be covered with fresh salt in such parts as require it. It may then be There is no advantageously placed in any proper vessel, lensed milk, and subjected to pressure, adding a little fresh and the process consists only in careful evap-salt as necessary, and turning it daily till suf-oration, addition of sugar, and sealing up of ficiently cured. When the brine as it forms is allowed to drain from the meat, the process ducted in a vacuum, to prevent the milk from is called dry-salting; but when, on the contrary, it is allowed to remain on it, the article is said to be wet-salted. On the small scale, the latter is most conveniently performed by rubbing the meat with salt, &c., as above, and after it has lain a few hours, putting it into a pickle formed by dissolving 4 pounds salt, 4 or 1 pound sugar, and 2 ounces salt-petre in 2 gallons water. This pickling liquor gets weaker by use, and should therefore be occasionally boiled down a little and skimmed, at the same time adding some more of the dry ingredients.

1603. Pickle to Give Meat a Red Mix brown sugar, bay salt, com-Color. mon salt, each 2 pounds; saltpetre, 8 ounces; water, 2 gallons; this pickle gives meat a fine red color, while the sugar renders it mild and of excellent flavor. Large quantities

are to be managed by the above proportions.

1604. To Salt Meat by Injection. The sooner meat is salted after being killed, the better, as it then possesses considerable absorbent power, which it gradually loses by age. On this property is based the process of M. Gannel for the preservation of animals intended for food in a fresh state. This operation consists in injecting a solution of chlortle salt and spice, especially coriander, to the ide of aluminum at 10° Baumé, into the carotid, by means of a syphon, as soon as the blood ceases to flow from the slaughtered animal, both extremities of the jugular vein being previously tied. 9 to 12 quarts of the solution are sufficient for an ox. When the animal has been well bled, and the injection skillfully performed, it is scarcely perceptible that the animal has undergone any prepara-tion. The injected animal is cut up in the usual way; and when intended to be eaten within 2 or 3 weeks, merely requires to be hung up in a dry situation free from flies; but if it is to be kept for a longer period, it is directed to be washed with a mixed solution of common salt and chloride of aluminum at 10° Baumé, and then simply dried and packed in clean air-tight barrels, and kept in a cool, dry place. If the air cannot be perfectly excluded, it should be packed in dry salt, not for the purpose of preserving it, but to prevent the meat from becoming musty from exposure and the action of moisture. Meat preserved by this process may be kept for several years, and merely requires soaking for 24 This process is some- hours in water, for the purpose of swelling its times imitated by immersing the meat pores, to give it the appearance and taste of for a few hours in diluted pyrolygneous acid, fresh meat, fit either for roasting or boiling.

1605. Pelouze's Process of Preserv-Smoking Fluid. One drop of ing Meat. The meat is to be cut up into creosote in a pint of water imparts a smoky pieces of convenient size, and subjected to

an atmosphere of carbonic oxide under pres-|cool cellar, where it will keep sound for several After this a current of dry air is passed months. over the meat, so as to carry off all the mois-

tight vessel. the cask until the hams are completely covered. The hams should remain in this pickle at least three months, and a little longer time the steam condenses. (See No. 1634.) would do them no harm. A handful each of mace and cloves scattered in the brine will

greatly improve the flavor of the meat.

1607. To Cure Beef and Pork. each gallon of water add 11 pounds salt, pound sugar, ½ ounce saltpetre, and ½ ounce potash. Let these be boiled together until all the dirt from the sugar rises to the top and is skimmed off. pork, to remain the usual time, say 4 or 5 least 2 days after killing, during which time fills it with its larvæ, or maggots. it should be slightly sprinkled with powdered usual, and will be found excellent. ceipt has been tried with complete satisfaction.

1608. Brine or Pickle for Pork, &c. Brown sugar, bay salt, common salt, of each 2 pounds; saltpetre, ½ pound; water, 1 gallon. 2 pounds sugar or molasses, ½ pound nitre, and sufficient water to dissolve it. To cure hams, mix 5 ounces nitre with 8 ounces coarse sugar;

it into 8 times its weight of cold water, and heat it gradually to the boiling point. When meat yield 1 ounce extract. Fat recarefully excluded, or it will not keep.

the meat, drying and laying in strong vinegar; of sugar being sufficient for a five-pound fish. or by being boiled in the vinegar, leaving it in 1616. Aseptin. A substance called

1611. To Can Meat. ture, and this being accomplished, a solution bones from fresh meat, parboil the flesh, put either of salt or saltpetre, or much diluted it into a clean tin can, and fill up with rich carbolic acid, is to be brought into contact seasoned soup; solder on the lid, pierced with with it, and the mass then sealed up in a a very small hole. Next put the tin into a bath of brine and heat until the steam issues 1606. To Cure Hams. Cover the bottom of the cask with coarse salt, lay on the time remove the can from the bath. In a hams with the smooth or skin side down, short time the pressure of the air will induce sprinkle over fine salt, then another layer of a slight concavity of the top and bottom of hams, and so continue until the cask is full. the can. If the process has been successfully This ought to be of the larger kind. A cask performed, this concavity will be permanent; holding 64 gallons is small enough, and it but if, at any future time, the concavity has would be better if it held 120 gallons. Make a ceased, or the ends become slightly convex, brine in the following proportions: 6 gallons it is a sure sign that the meat has become water, 9 pounds salt, 4 pounds brown sugar, 3 ounces saltpetre, 1 ounce saleratus. Scald later years applied to preserving fresh fruits and skim, and when cold pour the brine into and vegetables, and is done on substantially the same principles, namely, filling the can with steam, and hermetically sealing before

1612. To Keep Meat Fresh. Place the meat on a wooden support (or suspend it) in a close vessel, on the bottom of which some To strong acetic acid has been poured. In this way it may be kept fresh for a considerable time.

1613. Preservation of Hams. Most grocers, dealers in hams, and others, who are Then throw it into a tub to particular in their meat, usually take the precool, and when cold, pour it over the beef or caution to case each one, after it is smoked, in canvas, for the purpose of defending it from weeks. The meat must be well covered with the attacks of a little insect, the dermestes pickle, and should not be put down for at lardarius, which, by laying its eggs in it, soon troublesome and expensive process may be alsaltpetre, which removes all the surface together superseded by the use of pyroligneous blood, &c., leaving the meat fresh and clean, acid. With a painter's brush, dipped in the Some omit boiling the pickle, and find it to liquid, one man, in the course of a day, may answer well, though the operation of boiling purifies the pickle by throwing off the all danger. Care should be taken to insinuate dirt always to be found in salt and sugar, the liquid into all the cracks, &c., of the un-Ham cured in this manner may be smoked as | der surface. This method is especially adapted to the preservation of hams in hot climates.

1614. To Make Carbolic Acid Paper for Preserving Meats. Carbolic acid paper, which is now much used for packing fresh meats, for the purpose of preserving them against spoiling, is made by melting 5 parts Boil gently and remove the soun. Another stearine at a gentle heat, and then stirring in meat pickle is made with 12 pounds salt, thoroughly 2 parts carbolic acid; after which 5 parts melted paraffine are to be added. whole is to be well stirred together until it cools; after which it is melted and applied rub it on the ham, and in 24 nours 140 March pounds salt, and in two weeks 2 pounds more. Same way as in preparing the waxeu paper to much used in Europe for wrapping various should lie in the salt a month or 5 weeks.

1000 Tiobio's Extract of Meat. Cut

1615. To Preserve Fish Fresh with method adonted in Portugal for

the lean of fresh-killed meat very small, put Sugar. A method adopted in Portugal for preserving fish consists in cleaning and sprinkling sugar over the interior, keeping the fish it has boiled for a few minutes, strain it in a horizontal position, so that the sugar may through a cloth, and evaporate the liquor penetrate as much as possible. It is said that gently by water-bath to a soft mass. 2 pounds fish prepared in this way can be kept commeat yield 1 ounce extract. Fat must be pletely fresh for a long time, the savor being as perfect as if recently caught. Salmon thus 1610. To Preserve Meat with Vine- treated before salting and smoking possess a gar. This may be done either by washing much more agreeable taste; a table-spoonful

Aseptin. the vinegar until cold, and then set aside in a asceptin has recently been introduced into trade by a Swedish dealer as a preservative butter-milk, will succeed by this method, but material for milk, meat, etc. This is said to the application of it to butter clarified by the aseptin consisting of two parts of borax to article that will keep longer good than butter one part of alum. Putrefaction is said to be cured by any other process yet discovered. prevented by the addition of this preparation, a septin has been brought into notice, thousands of pounds are now sold almost daily in Scandinavia and Germany.

1617. Sportsman's Beef. Take a fine round of beef, 4 ounces saltpetre, 4 ounce allspice, rub it well on the beef, and let it stand 24 hours; then rub in as much common salt inch of the top, and to lay on it common as will salt it. Lay it by 12 days, turning it every day; then put it into a pan, such as large inch, and then to cover the pot up with any pies are baked in, with 3 or 4 pounds beef-suet, some under, some over. Cover it with a thick crust, and bake it for 6 hours. It will keep for 2 months, and most excellent it is.

1618. Preservation of Meat. By repeatedly immersing the meat in hydrochloric acid, subsequently drying, it is sufficiently cured to keep for a considerable time. When required for use, the acid must be neutralized by a little carbonate of soda, by which it will be salted. The strength of the hydrochloric acid must be determined by experiment.

1619. To Keep Dead Poultry, &c., Fresh. Dead birds may be preserved in a fresh state for some time by removing the intestines, wiping the inside out quite dry with a towel, and then flouring them. A piece of blotting paper, on which one or two drops of in a water-bath with some fresh-burnt and creosote have been placed, is now to be put coarsely powdered animal charcoal (which has inside them, and a similarly prepared piece of paper tied round them. They should then be hung up in a cool dry place, free from the attacks of flies or vermin, and will be found to keep much longer than without undergoing this process. (See No. 1614.)

1620. To Preserve or Cure Butter. Melt the butter in well glazed earthen pans, at a heat not exceeding 180° Fahr, in a water bath, and keep it heated, skimming it from time to time, until the butter becomes quite transparent, then pour off the clear into another vessel, and cool it as quickly as possible by surrounding it with cold water or ice. The above is the method of preserving butter employed by the Tartars who supply the Constantinople market, and in this state it may be preserved perfectly fresh for 6 months, if as Mr. Eaton; the latter states that butter by ours, will keep good and fine-tasted for 2 years. Any of the following methods of salting may be adopted.

1621. To Preserve Butter by Salting. Mix well together 1 ounce each saltpetre and white sugar, and 2 ounces best salt, butter thus prepared is then to be tightly of bicarbonate of soda. pressed into clean glazed earthenware vessels, (which must be well corke Any good well-made fresh butter, free from and sweet for several weeks."

be simply boracic acid, or borax; the double Tartar plan, as described above, produces an

1622. To Preserve Butter by Saltbut mouldiness in animal substances is not. ing. Take fresh butter, 16 pounds; salt, 1 Although a very short time has elapsed since pound. Or: Fresh butter, 18 pounds; salt, 1 pound; saltpetre, 11 ounces; honey or fine brown sugar, 2 ounces. Proceed as in the

last receipt.

1623. To Preserve Butter from the Air. The best method to preserve butter from the air, is to fill the pots to within an coarse-grained salt, to the depth of 1 or 2 flat article that may be convenient. The salt. by long keeping, will run to brine, and form a layer on the top of the butter, which will effectually keep out the air, and may at any time be very easily removed by turning the pot on one side.

1624. To Preserve Butter Sweet. To every 20 pounds of butter take 3 pounds salt, 1 pound loaf sugar, 2 pound pulverized saltpetre; mix, and put a layer of butter about 8 inches thick, then sprinkle on a light covering of the above preparation alternately, until your cask is full. Pack in air-tight casks. Butter packed in this way will keep sweet for 2 or 3 years.

To Restore Rancid Butter. 1625. Rancid butter may be restored by melting it been thoroughly freed from dust by sifting) and straining it through clean flannel. A better and less troublesome method is to well wash the butter, first with good new milk, and next with cold spring water. Butyric acid, on the presence of which rancidity depends, is freely soluble in fresh milk.

1626. To Improve Strong Butter. This operation is extremely simple and practicable; it consists in beating the butter in a sufficient quantity of water, in which put 25 to 30 drops chloride of lime to 2 pounds of butter. After having mixed it till all its parts are in contact with the water, it may be left in it for 1 or 2 hours, afterwards withdrawn, and washed in fresh water. The chloride of lime, having nothing injurious in it, can with safety be augmented; but it will generally be kept in a close vessel and a cool place. This found that 12 to 14 drops to a pound of butter plan received the approval of Thenard, as well are sufficient. Butter, the taste and odor of which were insupportable, has been sweetened melted by the Tartar method, and then salted by this simple means. We have tried the above receipt, and find that the chloride removes the rancid taste of the butter, making it suitable for cooking, but scarcely purified enough for table use.

1627. To Preserve Milk. The following receipt appears in Cosmos: "To every all in very fine powder, then add I ounce of liter (about I quart) of unskimmed milk, this mixture to every pound of butter, and previously poured into a well-annealed glass thoroughly incorporate them together. The bottle, add 40 centigrammes (about 6 grains) Place the bottle (which must be well corked) containing the so as to have no vacant spaces. This butter milk for about 4 hours in a water-bath, heated does not taste well before it has stood for 2 or to 194° Fahr. On being taken out, the bottle 3 weeks, after which it acquires a rich marrow is to be varnished over with tar; and in that flavor, which no other butter ever possesses, state the milk contained in it will keep sound

1628. To Keep Milk Sweet. A tea- have the appearance of chocolate, and are method: Procure bottles, which must be perfectly clean, sweet, and dry; draw the milk from the cow into the bottles, and as they are filled, immediately cork them well, and fasten a sufficient number of tin cans of suitable size, the cork with pack-thread or wire. spread a little straw in the bottom of a boiler. on which place the bottles, with straw between them, until the boiler contains a sufficient quantity. Fill it up with cold water, and as soon as it begins to boil, draw the fire and let the whole cool gradually. When quite cold, take out the bottles and pack them in sawdust in hampers, and stow them away in the coolest part of the house.

1629. Preservation of Eggs. When newly laid, eggs are almost perfectly full, but the shell is porous, and the watery portion of its contents begins to evaporate through its pores the moment it is exposed to the air, so that the eggs become lighter every day. To preserve the interior of the egg in its natural state, it is necessary to seal up the pores of the shell air-tight. This may be done by dipping them in melted suet, olive oil, milk of lime, solution of gum-arabic, or covering them with any air-proof varnish. They are then packed in bran, oats, mesl, salt,

ashes, or charcoal powder.

1630. To Preserve Eggs. Vegetable oils, more especially linseed, simply rubbed on to the egg, hinders any alteration for a sufficiently long period, and presents a very simple and efficacious method. We believe eggs better than any other method that has yet been suggested. Or perhaps a single coating of paraffine might be equally effective.

To Distinguish Good Eggs. To ascertain whether an egg is good or bad, hold it up to the light. A good egg is translucent, but a bad one is perfectly opaque; the difference is as easily perceived as that be-

tween a blue egg and a white one.

To Preserve by Alcohol. decomposition in both vegetable and animal bodies. They penetrate the substances, combine with its juices, and as the organic tissues have less attraction for the spirituous mixture, and harden in the same way as when salted. Alcohol also obstructs change by seizing upon the oxygen in the atmosphere, in virtue of its superior attraction for that gas, thus preventpreserved.

1633. German Soup Tablets. Reinsch gives the following receipt for making the soup tablets so much in use in the German army during the late war: Take 11 parts by weight of good suet, melt it an iron pan, and make it very hot, so as to become brown;

spoonful of fine salt or horse-radish in a pan chiefly intended for the use of soldiers while of milk will keep it sweet for several days. in the field. A quantity of about 1 ounce of Milk can be kept a year or more as sweet as this preparation is sufficient to yield, when when taken from the cow by the following boiled with some water, a ration of good sonp, and, in case of need, the cakes, being agreea-

ble to the taste, may be eaten raw.
1634. To Can Fresh Fruit. Then fill them quite full with the fruit, and solder them securely. Next pierce a small pin-hole in the top of each can, to allow the air to be expelled; place the cans in a boiler as deep as the cans are high, pour boiling water into the boiler until within 1 inch of the top of the cans; keep the water hot over a moderate fire, but not boiling, until the air ceases to escape from the eans, and then seal the air holes with solder before removing the cans from the water. The cans should then be taken out, wiped dry, and allowed to cool; when cold, if the cans have been closed perfeetly air-tight, the vacuum inside will cause the top and bottom of the cans to become concave or hollowed inwards. (See No. 1611.) Tomatoes are also kept fresh in this manner.

1635. To Insure Success in Canning Fruit. Select fresh fruit that is perfectly ripe; but, at the same time, perfectly sound. One unsound berry may injure all in contact

with it.

The boiling water poured into the boiler will be considerably cooled by contact with the cans; care must be taken not to let the water return to the boil while the cans are in it; and yet it must become hot enough to

expel the air from the cans.

The surest way to attain the desired object that two coatings of collodion should preserve eggs better than any other method that has yet been suggested. Or perhaps a single answer best, but it must never exceed the latter degree. To ascertain when all the air possible has been expelled, put one drop of hot water on the air hole; the cessation or absence of air bubbles passing through it will denote that the cans are ready for final sealing.

1636. To Can Berries. Peaches, apples, pears, plums, &c., can be kept perfectly fresh in tin cans in the manner described in Strong alcoholic liquors are used to prevent No. 1634, and will retain their fresh flavor almost, if not entirely, intact. Raspberries, strawberries, &c., are kept in better condition by adding ½ pound white sugar to each pound of fruit, letting them come to the boil, and it escapes; and the tissues themselves shrink then filling the cans quite full, soldering the lid of the can immediately. The hot fruit will, to all intents, expel the air from the can. No water should be used with fruits, except in cases where a little is necessary to dissolve ing it from acting upon the substance to be the sugar, as it tends to render them insipid. Most vegetables can be kept in cans in this way, omitting the sugar, and scalding them in water sufficient to cover them.

1637. To Expel the Air from Cans. Air, by heating, expands many times its own bulk; consequently, if you take a jar and cover it tightly with the exception of a hole add, while keeping the fat stirred, 18 parts the size of a pin through the cover, and set it rye meal, and continue heating and stirring so in boiling water, as air expands 20 times its as to make the mass brown; add then 4 parts bulk by heating, it is obvious that $\frac{10}{20}$ of the air dried salt and 2 parts coarsely pulverized pases out through the pin hole in the cover; caraway seed. The mixture is then poured now drop a little sealing wax or solder over into tin pans somewhat like those used for the pin hole and you have but $\frac{1}{20}$ of the air making chocolate into cakes. The cakes in the jar that was in it before heating it. Of

course the fruit and syrup, if put into the cloudy and stormy days, they can be brought jar cold, displaces most of the air; but putting into the house, and set against the side of the it in as hot as it can be, and filling as full as 100m near the stove or fire-place. possible, expels the air to all intents and purposes. Cans managed in this way, when made of sheet metal, frequently collapse from and put it at once into earthen glazed pans, outside atmospheric pressure as they cool off, deep enough to contain two or three layers of showing that the exhaustion was complete; even more so than needed.

1638. To Keep Fruit Fresh in Jars. Use only self-sealing glass jars. Put into a porcelain-lined preserving kettle, enough to fill 2 quart jars; sprinkle on sugar, 1 pound; place over a slow fire and heat through, not boiled. While the fruit is being heated, keep the jars filled with moderately hot water. As soon as the fruit is ready, empty the water from the jars, fill to the brim with fruit, and they have been allowed to lay on the shelves seal immediately. As it cools a vacuum is in the fruit-room, and sweat, they should be formed, which prevents bursting. In this wiped dry, and packed in boxes with dry sawway every kind of fruit will retain its lavor. dust enough to exclude the air from them. Sometimes a thick leathery mould forms on The saw-dust from resinous woods should not the top—if so, all the better. The plan of be used. If they were packed in dry sand, keeping the jars full of hot water is merely to they would keep equally, and perhaps better; prevent the danger of cracking when the hot but the objection is that it is very difficult to fruit is inserted. Some prefer to set the bottles clean them from sand, and therefore they full of cool water in a boiler of water and always eat gritty when so kept heating all together gradually; but the other way is much simpler and equally effective.

Pack them as closely as possible in a can without any sugar. When the can is full, pour in sufficient pure cold water to fill it. pour in sufficient pure cold water to fill all what has sunk away. Seal up the cau, and all is done. Canned in this way, peaches retain all their freshness and flavor. There will not be enough water in them to render them taste most natural without any sweetening.

inch thick; nail the long strips across the ends of the short ones, and it makes a frame to the other. After the apples are pared, they are quartered and cored, and with a needle and twine, or stout thread, strung into lengths long enough to reach twice across the frame; the ends of the twine are then tied together, and the strings hung on the nails across the frame. The apples will soon dry so that the strings can be doubled on the nails. and fresh ones put on, or the whole of them ing them in its aqueous solution. removed and others put in their place. As fast as the apples become sufficiently dry they can be taken from the strings, and the same drive away insects, and make the meat keep strings used to dry more on. If large apples are used to dry, they can be cut in smaller pieces. Pears and quinces, and other fruits that can be strung, may be dried in this way. In pleasant weather the frames can be set may be obviated by placing a small plate conout of doors against the side of the building, taining a little crossote immediately under or any other support, and at night, or on each piece of meat as it hangs in the larder,

fruit, and each pan having a tightly-fitting lid. If the fruit sweats, the exudation dries on the fruit's surface, and helps to keep in the moisture and flavor. The cover helps to do the same, and to exclude the light. Keep the pans in a dry, cool place, and never wipe the fruit until required for dessert. Pears may be kept in the same way, but require careful and constant watching.

1642. To Keep Fruit Fresh. After

1643. Preservation of Fruit in Gly-Glycerine of purest quality has cerine.

the interstices between the peaches, and reach ty Flour. Carbonate of magnesia, 3 parts; the brim of the can. Let it stand long enough flour, 760 parts. Mix and use the flour in the for the water to soak inte all the crevices— usual way. This will not only greatly imsay six hours—then pour in water to replace prove bad flour, but the bread will be much lighter, more wholesome, and keep longer than when alum is used.

1645. To Keep Game. Newly ground coffee, sprinkled over game, will keep it sweet and fresh for several days. Clean the game; insipid. If preferred, a cold syrup could be and fresh for several days. Clean the game; used instead of pure water, but the peaches that is, wipe off the blood, cover the wounded parts with absorbent paper, wrap up the 1640. To Dry Apples, Pears and heads, and then sprinkle ground coffee over other Fruits. Have a frame made in the and amongst the feathers or fur, as the case following manner:—Two strips of board 7 may be; pack up carefully, and the game feet long, 2 or 2½ inches wide—two strips 3 will be preserved fresh and sweet in the most feet long, 1½ inches wide, the whole 4 of an unfavorable weather. Game sent open and loose, cannot, of course, be treated in this ends of the short ones, and it makes a frame manner; but all game packed in boxes or 7 by 3 feet, which is a convenient size for all hampers may be deodorized as described. A purposes. On one of the long strips, nails are tea-spoonful of coffee is enough for a brace of driven 3 inches apart, extending from one end birds; and in this proportion for more or for

larger game. 1646. To Preserve with Creosote. Creosote, a pungent compound existing in common smoke, and which starts the tears when the smoke enters the eyes, is a powerful antiseptic, or preventer of putrefaction. is employed to preserve animal substances, either by washing it over them or by immers-A few drops in a saucer, or on a piece of spongy paper, if placed in a larder, will effectually several days longer than otherwise. the modes in which creosote has hitherto been employed in preserving meat, it has acquired a disagreeable taste and smell.

and covering them both over with a cloth. A small quantity added to brine or vinegar is commonly employed to impart a smoky flavor to meat and fish, and its solution in acetic acid is used to give the flavor of Scotch whiskey to plain spirit. The preservative effect of smoke-drying is partially due to creosote, which gives to the meat its peculiar smoky taste, and partly to desiccation.

1647. To Test Creosote. A large proportion of ordinary creosote is simply carbolic acid; but the pure creosote, which constitutes the peculiar smell of smoke, is quite a different substance, and may be distinguished from the false by its behavior with collodion. A mixture of this latter with carbolic acid gives a gelatinous precipitate, while with true creosote the collodion remains clear. Dr. Hager gives another test: To a weak solution of iron, a few drops of ammonia are added, until the precipitate which originally forms is dissolved. Carbolic acid communicates a blue or violet tinge to the solution, while genuine creosote gives a green color, afterward turning to brown.

1648. Charcoal as an Antiseptic. It is well known that charcoal possesses extraordinary powers in checking decomposition, as well as in deodorizing animal substances which have already begun to undergo change. Meat, either before or after it is cooked, may be preserved for a considerable time, even in warm weather, by being placed in the centre of a clean earthenware vessel, and closely surrounded with pieces of common charcoal. To prevent the flies from "blowing" the meat, the vessel ought to be covered with wiregauze. Putrid water is immediately deprived of its bad smell by charcoal. When meat. fish, &c., from intense heat or long keeping, are likely to pass into a state of corruption, a simple mode of keeping them sound and healthful is by putting a few pieces of charcoal, each about the size of an egg, into the pot or saucepan wherein the fish or flesh is to be boiled.

1649. Caution About Charcoal. It must be recollected that in all cases, to exercise its highest powers as a disinfectant, deodorizer, and bleacher, charcoal should be both fresh-burnt and fresh-powdered, and carefully preserved out of contact with the air, until about to be employed. Exposed to the air, it rapidly loses its valuable qualities.

the air, it rapidly loses its valuable qualities.

1650. To Prevent Water From Putrefying. Keep it in an iron vessel, or immerse fragments of iron in it. Distilled water should be kept in stoppered glass bottles.

Solutions for Anatomical Preparations. These antiseptic fluids are used for preserving anatomical preparations, objects of natural history, &c., by immersing them therein, or by injection into the veins and arteries, arresting putrefaction, and preventing decay. Those containing corrosive sublimate (bichloride of mercury) are apt to render animal substances very hard.

1652. Creosote Antiseptic Solution. Nearly saturate water with sulphurous acid, and add a little creosote.

and covering them both over with a cloth. A small quantity added to brine or vinegar is commonly employed to impart a smoky flavor to meat and fish, and its solution in acetic acid (hydrochloric) acid.

1653. Chloride of Tin Antiseptic Solution. Dissolve 4 parts chloride of tin in 100 parts water containing 3 parts muriatic (hydrochloric) acid.

1654. Antiseptic Solution of Ammonia. Mix 1 part, by weight, strong liquor of ammonia, with 3 parts water and 3 parts rectified spirit. Or:—1 part sal ammoniae and 10 or 11 parts water; for the muscular parts of animals. A solution of 1 part sulphate of zinc in about 20 parts water may also be used for the same purpose.

1655. Babington's Antiseptic Solution. 1 part of wood naphtha to 7 parts water. Wood naphtha undiluted serves for

injection.

e acid gives a gelatinous precipitate, ith true creosote the collodion remains Dr. Hager gives another test: To a substance is immersed in this for 2 to 4 days, plution of iron, a few drops of ammonia and then dried in the air.

1657. Gannal's Antiseptic Mixture. Dissolve ½ pound each alum and table salt, and ½ pound saltpetre, in 1 gallon water.

1658. Réboulet's Antiseptic. For pathological specimens. Dissolve 1 part nitre (saltpetre), 2 parts alum, and 4 parts chloride of lime in 16 to 20 parts water. To be afterwards diluted according to circumstances.

1659. Thwaites' Fluid. Mix 1 ounce spirit of wine with crossote sufficient to saturate it; rub up with chalk to form a thin paste, and mix gradually with 16 ounces water. To this may be added an equal quantity of water saturated with camphor.

1660. Simple Creosote Solution. Dissolve 1 drachm creosote in 1 drachm pyroligneous acid, and mix gradually with 1 pint cold water.

1661. Passini's Solution. For bloodglobules, nerves, and white tissues generally. Chloride of mercury, 1 part; chloride of sodium, 2 parts; glycerine, 13 parts; distilled water, 113 parts.

1662. Preservative Fluids for Microscopic Objects. Canada balsam, spirit and water, glycerine solution of gelatine, saturated solutions of alum, chloride of zine, and chloride of calcium, are all used to preserve microscopic objects.

1663. Solution for Preserving Feathers. Dissolve 16 grains strychnine in 1 pint rectified spirit.

1664. Corrosive Sublimate Antiseptic Solution. Dissolve 1 part corrosive sublimate (bichloride of mercury), and 3 parts chloride of sodium (table salt), in 100 parts water containing 2 parts muriatic (hydrochloric) acid.

1665. Goadby's Antiseptic Solutions. 2 ounces bay salt, 1 ounce alum, 1 grain bichloride of mercury (corrosive sublimate), and 1 pint of water. This is good for ordinary purposes. But for tender tissues, or where there is a tendency to mouldiness, double the proportions of corrosive sublimate and of water. For subjects containing earbonate of lime, double the proportion of bay salt, and omit the alum.

Or:—‡ pound bay salt, 10 grains arsenious acid, and 1 pint water; adding 1 grain corrosive sublimate when there is any tendency to softening in the parts of the subject. These are excellent antiseptic solutions.

1666. Embalming. pounds dry sulphate of alumina, I quart warm as a preservative, and its uses are increasing. water, and 100 grains arsenious acid. Inject Thus, diluted with about 50 times its bulk of 3 or 4 quarts of this mixture into all the vessels of the human body. This applies as well in preserving fish and other objects; and, in to all animals, birds, fishes, &c. This process fact, the larger fish, such as rays, sharks, etc., supersedes the old and revolting mode, and has been introduced into the great anatomical schools of Paris.

1667. Preparation for Stuffing Birds increases its preservative strength. and Animals. Camphor, 1 ounce; corrosive sublimate, 1 ounce; alum, ½ ounce; sulphur, 1 ounce; all finely powdered and mixed.

1668. Antiseptic for Preserving Birds and Animals. The simplest means preparations is the use of the following solution: Saturated solution of alum, 100 parts; saltpetre, 2 parts. The article to be preserved is immersed in the solution, when it becomes decolorized; but in a few days the color reand kept in a saturated solution of alum and water only.

1669. Bécœur's Arsenical Soap. Camphor, 5 drachms; arsenic, 4 ounces; white soap, 4 ounces; carbonate of potash, 12 ounces; air-slaked lime, 4 ounces; make a stiff paste with a little water. Used for preparing the skins of birds and other small

animals. 1670. Bécœur's Fluid Arsenical Soap. soap into thin slices, put it with a little water into a pot upon the fire, stirring frequently with a wooden spoon until dissolved; add 6 ounces carbonate of potassa and 2 ounces chalk. Then take it off the fire, and add 1 pound arsenious acid, stirring it in thoroughly; lastly, pound 3 onnees camphor in a mortar with a little alcohol, and incorporate it with the rest of the ingredients. This makes a composition of a consistence of paste. When required for use, dissolve 2 ounces in a pint of alcohol, and apply with a brush.

1671. Laurent's Antiseptic Soap. Place to ounce powdered soap in a bottle with 2 drachms each of arsenite of potassa, sulphate of alumina, and pulverized camphor; pour upon them 6 ounces alcohol, and allow them to stand 24 hours. When thoroughly combined, add 3 drops oil of thyme, and cork the bottle carefully.

1672. Beconi's Arsenical Soap. Arsenious acid, 32 ounces; carbonate of potassa, 12 ounces; camphor, 5 ounces; white soap, 32 ounces; powdered lime, 8 ounces. Reduce each to a powder, and mix. Used as a preservative for specimens of natural history

against the attacks of insects. 1673. Carbolic Acid as a Preservative. Reference has been made in some of the scientific journals to experiments upon carbolic acid as a means of preserving objects of natural history, and the anticipation has agent may be able to replace all the ordinary the animal is entirely lost. For many purposes, shrink more uniformly.

Mix together 5 however, carbolic acid has proved of much value water, it forms a capital substitute for alcohol can be kept much better by its aid than even by means of alcohol. Added in small quantity to very weak spirit, it very materially

1674. Carbolic Acid as a Temporary Preservative. Although carbolic acid cannot be used as a substitute for the usual methods in setting up birds and mammals, it can be employed to very great advantage in of preserving anatomical and pathological keeping them fresh until they can be properly skinned. An experiment of this kind was once made by Dr. Totten, of New York, who prepared a solution of 1 drachm of carbolic acid, 12 ounces each of glycerine and dilute alcohol, and injected it into the mouth, the turns, when it is taken out of the solution, rectum, and under the skin of a large cormorant. The bird was kept on board ship until it reached New York, a period of about two months after its capture, and was then sent to a taxidermist, who found it to be in perfect condition, and who was able to mount it as satisfactorily as if it had been but just killed.

Von Vetter's Process for the 1675. Preservation of Anatomical Specimens. Add to 7 parts of glycerine at 22° Baumé, 1 part raw brown sugar and 2 part nitre, till This is prepared as follows:—Cut 1 pound a slight deposit is formed at the bottom of the vessel. The portion required to be preserved is then immersed (dried or not dried) and left in the mixture for a time proportional to its dimensions; a hand, for example, should remain eight days in the liquid; when it is taken out it is as stiff as a piece of wood, but if it be suspended in a dry and warm place the muscles and articulation recover their suppleness.

1676. Preserving Insects. A good way to render insects durable is to perforate their bodies once or twice with a long pin dipped in a strong solution of corrosive sublimate. If you have cases full, clean the in-sects and cases as thoroughly as possible, paint the inside of the cases over with a brush dipped into a solution of the sublimate, and after putting a few pieces of camphor at the bottom of the case, fix the lid on, and paste a strip of paper over the crevices.

o Preserve Wood. following receipts for preserving timber from decay have been obtained from various sources, and are the results of careful experiment by scientific experts.

1678. To Prevent the Splitting of Logs and Planks. Logs and planks split at the ends because the exposed surface dries faster than the inside. Saturate muriatic acid been indulged in by many that this powerful with lime, and apply like whitewash to the ends. The chloride of calcium formed attracts methods of taxidermy. This, however, is a moisture from the air and prevents the split-very great mistake, since it can be used to a small extent only in the preparation of en-images, have usually a hole bored through tire bodies of animals that are to be preserved their centre, from top to bottom; this in a dry-because the process of desiccation will great measure prevents the outer surface from inevitably proceed until the original form of cracking, by allowing the wood to dry and

To Preserve Timber from Dry-Rot. The best way to 1679. Decay and Dry-Rot. preserve timber exposed to the action of the weather is to force into the pores of well-seasoned wood as much carbolic acid, or creosote. as possible. This soon resinifies, and most effectually prevents the timber from dry-rot and decay. On a large scale, as for railway sleepers, expensive appliances are needed; but for barns or outbuildings it may be applied to considerable advantage by the use of a paint brush

1680. Solution to Preserve Wood. With every 25 gallons of water required, mix 5 pounds chloride of zinc. Wood steeped in this solution will effectually resist dry-rot.

1681. To Kyanize Wood or Cordage. Immerse the wood or cordage in a solution of 50 or 60 parts water and 1 part corrosive sublimate. This preserves it from decay, and renders wood tough and more difficult to split.

To Preserve and Harden Wood. Wood steeped in a solution of copperas becomes harder and more indestructible.

1683. German Receipt for Coating Wood with a Substance as Hard as Melt together 40 parts chalk, 50 resin, and 4 linseed oil; to this should be added 1 part oxide of copper, and afterwards 1 part sulphuric acid. This last ingredient must be added carefully. The mixture, while hot, is applied with a brush, and forms, when dry, a varnish as hard as stone. This is an excellent application to protect posts, tubs, or other wooden articles which are set in the earth.

1684. To Preserve Wood Under Water. Wood impregnated with creosote oil has been found to resist effectually the ravages of the teredo worm; this worm being the cause of decay by honey-combing the entire substance of the wood. In Germany chloride of zine is used for this purpose, the timber being placed in boilers, partly exhausted of air, and the vapor of chlorine thus driven in-to it. These remedies are recommended by a committee of practical experts, appointed by the Academy of Sciences in Holland to ascertain the best means for preserving timber under water.

1685. Preservation of Wood. mand Muller has instituted some interesting experiments upon this subject, and arrives at the conclusion that the phosphate of baryta, formed by the mutual decomposition of phosphate of soda and chloride of barium, in the pores of the wood, is one of the best preservative agents available to chemists. Soak the wood 5 days in a 7 per cent. solution of phosphate of soda, and after drying, suspend in a 13 per cent solution of chloride of barium for 7 days. It is believed that wood thus prepared will withstand the action of moisture better than with any other preparation. The chief obstacle to the use of such chemicals is in their cost.

1686. To Petrify Wooden Objects. Take equal quantities of gem-salt, rock-alum, be transformed into petrifactions.

Mixtures for Freezing without Ice. In the following table, the water should not be warmer than 50° Fahrenheit.

	Fahrenheit Degrees
Mixtures.	Thermometer of Cold Sinks from Produced
Nitrate of Ammonia, 1 Water 1	part. 50° to 4°
Muriate of Ammonia 5	, , , , , , , , , , , , , , , , , , ,
Nitrate of Potash 5	
Water16	" \ 50° to 10°40°
Muriate of Ammonia 5	")
Nitrate of Potash 5	"
Sulphate of Soda8	" 50° to 4°46°
Water16	"
Sulphate of Soda 3	")
Diluted Nitric Acid 2	\ 50° to3°53°
Nitrate of Ammonia. 1	· · · · · · · · · · · · · · · · · · ·
Carbonate of Soda 1	" { 50° to —7°57°
Water 1	" 30 to 1
Phosphate of Soda 9	· · ·)
Dilute Nitric Acid 4	50° to —12°62°
Sulphate of Soda 8	
Hydrochlorie Acid 5	\ 50° to 0°50°
Sulphate of Soda 5	(
Diluted Sulphuric Acid, 4	,, 50° to 3°47°
	")
Sulphate of Soda 6 Muriate of Ammonia 4	\
	, 50° to —10° 60°
Nitrate of Potash 2 Diluted Nitric Acid 4	44
	·- J
Sulphate of Soda 6	" KO2 to 142 C48
Nitrate of Ammonia 5	··· } 50 t0 —1404
Diluted Nitric Acid 4	")

1688. Table of Freezing Mixtures with Snow.

Mixtures,		Fahrenheit Thermometer Sinks from	
Snow	parts. }	32° to —23°.	55°
Snow		32° to27°	
Snow		32° to30°.	
Snow	** }	32° to -40°.	72°
Snow		32° to —50°	
Snow	" }	32° to —51°	83°

1689. Freezing Mixtures with Pounded Ice or Snow. The following mixtures reduce the temperature down to a certain degree of cold, irrespective of the temperature of the materials at mixing.

oute of the materials at mixing.	
Mixtures.	Fahr. Ther- mometer Sinks.
Snow, or Pounded Ice	
Snow, or Pounded Ice 5 Muriate of Soda 2 Muriate of Ammonia 1	to —12°
Snow, or Pounded Ice, 24 " Muriate of Soda. 10 " Muriate of Ammonia. 5 " Nitrate of Potash. 5 "	}to —18°
Snow, or Pounded Ice 12 " Muriate of Soda 5 " Nitrate of Ammonia 5 "	to —25°
Snow, or Pounded Ice	} to _4°

Metallic Freezing Mixture. 1690. Take equal quantities of gem-salt, rock-alum, An interesting experiment may be made by white vinegar, chalk and pebbles, powdered. Mix all these ingredients; ebullition will ensue. 183 bismuth. If this be finely rasped or After it has ceased, throw some wooden ob- powdered, and introduced into 108 parts, by jects into this liquid, and let them soak for 4 weight, of quicksilver, a thermometer imor 5 days, at the end of which time they will mersed in the mixture will sink to nearly 3° Fahr.; and water placed in a thin test-tube,

and allowed to remain for a few minutes in this bath, will be completely frozen.

No refrigerator or ice-box will prevent, or even fluid composed of sesquichloride of iron, retard the melting of the ice, which does not chloride of manganese, chlorine, and carcombine the following conditions: It must bolic acid. The sesquichloride of iron has combine the following conditions: It must bolic acid. have double sides, bottom, and lid, with the been found by experiment to deodorize more space between the two casings filled with some non-conducting substance, in order to zinc, or other disinfectants. It is therefore exclude the external temperature; and the recommended as an important constituent of inner lid or cover should be practically, if not any disinfectant. Sesquichloride of iron is hermetically, air-tight, in furtherance of the same result. If external air enters, it will bring its own temperature with it. There 10 per cent. of carbolic acid. This forms the should be also a drainage-pipe at the bottom | fluid in a concentrated form, and is largely to carry off, instantaneously, every drop of water formed by the melting of the ice, and this pipe should either be fitted with a trap or curved in such a manner as to prevent the are compound. cold air from escaping. It is even more indispensable to carry off every drop of the water. than it is to exclude the air—a view not decomposition and fermentation, and the generally entertained by consumers of the article, but which, according to experiments made, seems to be fully demonstrated. Thus, on exposing a piece of ice weighing, say 25 pounds, to the air, at a temperature of 75°, but so placed that it is perfectly drained, it will be found to have scarcely disappeared at the end of 24 hours. Wrap the same piece in 3 or 4 ant for stables and slaughter-houses is a thicknesses of blanket or flannel, and place it] in a small tub exposed to the same temperature, and as the water filters through the blanket, the ice will stand in its own water, and not tainting the meat with any unpleasant will be all dissolved in 5 or 6 hours. Wrap the same piece of ice carefully in a blanket, and place it on a grating, or on four crossed sticks, so that no water can accumulate underneath, and at the end of 3 or even 4 days it will not have entirely melted.

which absorb, neutralize or destroy putrescent effluvia and miasmata, and thus remove the causes of infection. The principal disinfectants are chlorine, the chlorides (hypochlorites) of lime and soda, chloride of air for 10 minutes at a time; in addition to zine, charcoal, carbolic acid, the fumes of which the floor should be mopped or sprinkled nitrie, nitrous, and sulphurous acids, and ventilation. The clothing, bedding, &c., of patients laboring under contagious diseases, may be effectually disinfected by exposing to a temperature of about that of boiling water. Neither the texture nor color of textile fabrics is injured even by a heat of 250° Fahr. is a practice at some of the poorhouses to bake the clothes of the paupers who have the itch, or are infested with vermin. Quicklime rapidly absorbs carbonic acid, sulphuretted sprinkled with it. hydrogen, and several other noxious gases, and is therefore commonly used as a wash for the walls of buildings. Acetic acid, camphor, fragrant pastils, cascarilla, and other similar substances, are frequently burnt or volatilized ic acid, in the following manner: Put ½ ounce by heat, for the purpose of disguising un-pleasant odors. The chlorides as well as the sulphates of iron and lime have the property of rapidly destroying noxious effluvia. quantity of either of these sulphates thrown into a cesspool, for instance, will in a few hours remove the fetid smell.

1693. Disinfecting Metropolitan The Board of Health of the city of Fluid, How to Keep Ice in Summer. New York have recommended a disinfecting effectually than chloride of lime, sulphate of diluted with water at the time of using. All night scavengers are compelled by the Board of Health of New York to use it. Its effects The iron checks fermentation, and the chlorine acts as an oxidizing agent. Its carbolic acid also aids in arresting whole combination, therefore, by its chemical action, decomposes the sulphuretted hydrogen.

1694. To Disinfect Stables and Slaughter-Houses. Dr. Letherby, Health officer of the city of London, says in a recent report on the subject, that the best disinfectmixed chloride and hypochlorite of zinc, and it has the advantage of mixing freely with the liquid matters of the slaughter-house, and odors; and it is also applicable to the disinfection of houses in place of chloride of lime, which it much resembles ir its chemical na-

ture and mode of action.

1695. Burnett's Disinfecting Fluid. A solution of chloride of zinc, made by dissolving zinc in commercial muriatic acid to saturation, and known as Sir William Burnett's Disinfecting Fluid, has been found isinfectants are substances most useful as a purifying agent, and in removing and destroying contagion. In purifying sick rooms or crowded places the solution should be moistened by means of a piece of flannel cloth, about 3 or 4 feet square, attached to a long rod and waved through the over with the same dilute solution, if necessary, several times a day, and a small quantity put into the close-stools and bed-pans. water-closets should also be cleansed with it, and 2 gallons occasionally thrown down each. When floors and woodwork are washed with the solution, the use of soap or soda should be avoided immediately before or after its application; and whitewashing should not be applied to any part recently washed or

> 1696. To Purify a Sick Chamber. The nitrous acid vapor, so invaluable as a disinfectant in contagious fevers, is obtained by decomposing nitre by means of heated sulphursulphuric acid in a crucible glass or china cup and warm it over a lamp or in heated sand, adding to it from time to time a little nitre. Several of these vessels must be placed in the sick chamber and in the neighboring apartments and passages, at a distance of 20 feet or more from each other, according to the

by whom it was originally practiced, received matter has been destroyed. discovery

1697. Hyponitrous Acid as a Disinfectant. A special commission was appointed by the Academy of Sciences at Paris, to study the different means of disinfecting those localities which, during the siege, had been appropriated to persons afflicted with application of disinfectants. It was agreed that the very first place among destructive agents which can attack and destroy infeccised, however, by those employing the very oak-bark powder, 40; tar, 5; and oil, 5 parts.

dangerous nitrous vapors.

1698. Carbolic Acid as a Disinfect-The French commission (see No. employed by mixing with sand or sawdust in the heat till the solution is complete. the proportion of 1 part by weight of acid, and 3 parts of the inert material. The mixdaily the floors and the bedding of sick cham-fected clothes should be dipped in it bers. It has been stated by M. Devergie, wrung out, just before they are washed. that water containing only the 4000 part of purifies night commodes, water-closets its weight of carbolic acid sufficed for the It may also be used in its pure state. bodies

1699. Collins' Disinfecting Powder. burnt alum. To be set in shallow dishes in rooms, &c., with or without the addition of

water.

1700. Ellerman's Deodorizing Fluid. This consists chiefly of perchlorides and chlorides of iron and manganese. In a report addressed to the Metropolitan Board of Works of London in 1859, Drs. Hoffman and Frankland stated that the perchloride of iron was the cheapest and most efficient deodorizer that could be applied to sewage; ½ gallon deodor-ized 7500 gallons. 1 bushel lime, or 3 pounds to take refreshment of the ordinary kind, obchloride of lime, would do the same.

1701. Condy's Solution. A saturated solution of permanganate of potassa is one of the most efficient and elegant of all disin-A tea-spoonful in a soup-plate of water, exposed in a room, quickly removes any offensive smell; when the pink color disappears more must be added. It has been used to remove the smell of bilge-water and guano from ships. A word as to economy: One ounce of the crystallized salt costs about as much as a pound of the crude, which is while cold, but more rapidly and completely upon boiling, passes into the deep red so been added. The same treatment must be characteristic of the permanganate, and is applied to the bed-clothes, &c., which have fit for use. It speedily cleanses foul water been used.

height of the ceiling and the virulence of the and makes it drinkable. A tea-spoonful to a contagion. As an evidence of the value of hogshead is generally enough, but if added this method of disinfection it may be men- until the water acquires a permanent faint tioned that Dr. Carmichael Smyth, of London, tinge, we are certain that injurious organic Then, as Condy from Parliament a premium of £5,000 for his suggests, if a piece of clean stick be put into the liquid, or if a little tea or coffee be added, the pink color will disappear, and the water will be fit for use. The very small amount of potassa remaining in the solution could not possibly do any harm, as it would not amount

to 100 part of a grain to the gallon. 1702. Siret's Compound. Sulphate contagious diseases. Its report furnishes of iron, 20 pounds; sulphate of zinc, 3½ some useful guides to the selection and the pounds; wood or peat charcoal, 1 pound; sulphate of lime, 261 pounds; mix and form To be placed in cesspools, &c., into balls. to deodorize them. M. Siret has subsequently modified this compound thus: Sulphate of tious germs, should be assigned to hyponi-modified this compound thus: Sulphate of trous acid. Great precaution should be exeriron, 100 parts; sulphate of zinc, 50; tan or

1703. Ledoyen's Solution. This is a solution of nitrate of lead, and contains about 20 ounces of the salt in a gallon. The 1697) also reported that carbolic acid is much specific gravity should be 1.40. A similar more easily applied, is less dangerous and expensive than hyponitrous acid, and seems to litharge with 6 pints water, and adding 12 offer guarantees of quite equal efficacy, ounces nitric acid at 1.38 specific gravity founded on experimental evidence. It is best (or 8 ounces at 1.50) and digesting at a gen-

1704. Chloride of Lime as a Disir fectant. It is a great purifier. 1 pound ture is placed in earthen pots. Carbolic acid, requires 3 gallons of water; use the clear diluted with 25 to 30 times its weight of solution. To purify rooms, sprinkle on the water, has been found useful in sprinkling floor, and, if needful, on the bed-linen. Infected clothes should be dipped in it and purifies night commodes, water-closets, &c. disinfection of a dead-house during the hot-test weather, when it contained from 6 to 7 sinks, and wherever there are offensive putrid gases, sprinkle it about, and in a few days the smell will pass away. If a cat, rat, or mouse, Mix 2 parts dry chloride of lime with 1 of idies about the house, and sends forth an offensive gas, place some chloride of lime in an open vessel near the place where the nuisance is, and it will soon purify the atmosphere. The presence of chloride of lime in a room causes iron or steel to rust rapidly. Articles of that material should therefore be removed during the use of this disinfectant.

1705. Precautions to be Observed Before Entering a Sick Room, particularly where there is Fever.

Never enter fasting; if it is inconvenient

tain a glass of wine and a cracker.

Do not stand between the patient and the door, if possible. Avoid sitting on or touching the bed-clothes as much as possible, and do not inhale the patient's breath. The hands should always be washed in clean water, if the patient has fever, before leaving the room

to touch other people or things.

After visiting a fever patient, &c., change the dress, if possible. As soon as the fever is over, and the patient is convalescent, the dress which has been used by the nurse or just as good for deodorizing purposes. The attendant should be destroyed if there are crude gives a greenish solution, which, even no means of fumigation at hand, or it must be boiled in water to which carbolic acid has great rapidity; besides this, they will prevent and pure. (Sce No. 1701.) the spread of the disease. As a disinfectant 1713. To Purify Dirty Water. Since,

keep them out of the stomach.

To Prevent Infection. communication with the sick by actual contact be as far as possible avoided. Let the patient be lightly covered with the bed-clothes, his chamber freed from all unnecessary articles of furniture, and kept perfectly clean; the sheets and body linens frequently changed and removed from the sick room, as well as all substances producing, or likely to produce, any smell; and above all things let the chamber and the adjoining apartments and passages be completely and freely ventilated by opening opposite doors and windows; for although contagion may be carried by the air, it be-comes inert when, instead of being concentrated, it is sufficiently diffused.

1708. Special Preservative Against Infection. In a lecture delivered in the Royal Institution, Professor Tyndall proved, surest filter in a contagious atmosphere is dex cotton wool. "If a physician," said the Professor, "wishes to hold back from the lungs Boi of his patient, or from his own, the germs by which contagious disease is said to be propagated, he will employ a cotton wool respirator. In the crowded dwellings of the London poor, where the isolation of the sick is difficult, if liquor (see No. 104) to the gallon; then lift not impossible, the noxious air around the out and steep for an hour in a sour of 1 winepatient may by this simple means be restored to practical purity. Thus filtered, attendants may breathe the air unharmed, for it is exceedingly probable that the germs which lodge in the air-passages, and which, at their hours in the bleaching liquor; wash from this leisure, can work their way across the mucous and steep again for 1 hour in a clean sour, membrane, are those which sow in the body epidemic disease. If this be so, such disease may be warded off by filters of cotton wool."

1709. To Diffuse a Fragrant Odor. A few drops of oil of sandal wood dropped on a hot shovel, will diffuse a most agreeable

balsamic perfume through the room.

Simple Mode of Purifying A table-spoonful of pulverized alum sprinkled into a hogshead of water (the water stirred at the same time) will, after a few clearness of the finest spring-water. A pailful, containing 4 gallons, may be purified by a

single tea-spoonful of the alum.

1711. To Test the Impurity of the Atmosphere. A simple method of ascertaining the presence of impurity (carbonic acid) in the atmosphere, is to nearly fill a glass tumbler with lime-water, and to place it in any convenient position, as on the mantelpiece of a room. The rapidity with which a have been employed in cleansing wool. The pellicle forms on its surface, or the water be- fat may be saved by distilling off the solvent, comes cloudy, corresponds to the amount of which may be used over and over again. the carbonic acid present in the atmosphere (See No. 439.) Sulphurous acid gas unites that surrounds it. A little moist carbonate of very easily with water; and in this combinalead put on a plate or saucer, and exposed in tion it may be employed for bleaching wool the same way, will turn black, should any and silk. sulphuretted hydrogen be contained in the air.

Onions as a Disinfectant. 1712. To Purify Water in a Cistern. Onions placed in the room where there is 2 ounces of permanganate of potassa thrown small-pox will blister, and decompose with in a cistern will render the foulest water sweet

they have no equal, when properly used; but in dry seasons, any water may be of high value, at least for cattle drinking, M. Meunier advises to place, in a large-sized cask, a false bottom perforated with some holes; and to put on that bottom, first, clean pebbles, next, well washed sand, then a layer of coarsely granulated charcoal, and over all this a piece of canvas. The water, even that standing in shallow ditches after a shower of rain, may be poured into this filter, and thus become available for cattle-drinking, though it may not be quite clear.

leaching. Under this head are included general receipts for bleaching and decolorizing. The methods employed for special purposes, such as bleaching fabrics for dveing, removing stains, &c., will be found by a series of interesting experiments, that the in their proper places by reference to the in-

To Bleach Cotton Pure White. Boil for 3 hours in water containing 1 gill to the gallon of either caustic potassa or caustic soda; wash well from the lye, then lay the yarn or fabric to steep for 4 or 5 hours in cold water containing 1 pint of bleaching glassful of sulphuric acid to the gallon of water; lift, and wash well; then boil for 2 hours in a caustic lye, half the strength of the first; wash from this, and steep again for 4 made in the same manner as the first; wash well from this, and dry. A little smalt blue is put into the last washing water to clear the white.

To Bleach Wool. The first kind 1716. of bleaching to which wool is subjected, is to free it from grease. This operation is called scouring. In manufactories, it is generally performed by an ammoniacal lye, formed of 5 measures of river water and 1 of stale urine; the wool is immersed for about 20 minutes in hours, by precipitating to the bottom the impure particles, so purify it that it will be Fahr; it is then taken out, suffered to drain, found to possess nearly all the freshness and and rinsed in running water. This manipulation softens the wool, and gives it the first It is then repeated a degree of whiteness. second, and even a third time; after which the wool is fit to be employed. In some places, scouring is performed with water slightly impregnated with soap; and indeed, for valuable articles, this process is preferable; but it is too expensive for articles of less value. Bisulphide of carbon and benzine

1717. Sulphuration. The process by This is a delicate test for that destructive gas. which silk, cotton, woolen, and straw goods, keep up the slow combustion of the sulphur, the fumes of which are sulphurous acid.

(See Nos. 360 and 364.)

1718. To Prepare Sulphurous Acid either as gas or in solution in water, which dissolves 50 times its volume of the gas. In the former case sulphur is burned in a close room in which the stuffs (moistened) are hung; for small articles a barrel with a lid answers well. 2 exposures, of 24 hours each, suffice for wool. (See No. 360.) To get a solution of sulphurous acid, the cheapest and best plan is to heat in a glass retort 12 ounces sulphuric acid and 2 ounces sulphur. The gas, which comes off quietly, is collected in a large glass bottle partially filled with water; or, better, a series of bottles so connected together that the gas must pass successively through the water contained in each.

1719. A New Wash for Wool and Silk. Instead of using the fumes of sulphur, M. Frezon proposes the following mixture: 4 pounds oxalic acid, 4 pounds table this mixture for an hour. They are then generally well bleached, and only require to be thoroughly rinsed and washed. For bleaching straw it is best to soak the goods in caustic soda and afterwards to make use of chloride of lime or Javelle water. (See Index.) The excess of chlorine is afterwards to be removed by hyposulphite of soda, called anti-

chlor.

To Bleach Straw Bonnets. Get a deep box, air-tight, if possible; place at the bottom a stone, on the stone a flat piece of iron red hot, or a pan of charcoal, on which scatter powdered brimstone; close the lid, and let the bonnet remain a night. There should be hooks on the receipt.)

To Bleach Sponge. Sponge may be bleached almost snow-white by repetitions of the following process: Soak it in diluted muriatic acid 10 or 12 hours, then wash it with water and immerse in a solution of hyposulphate of soda to which a small quantity of diluted muriatic acid has been added.

Wash and dry it.

1722. Blanched Sponge. Soak the sponges for several days in cold water, renewing the water and squeezing the sponges occa-Then wash them in warm water, them out and wash them thoroughly in soft water; then immerse them in an aqueous sulphurous acid (specific gravity 1.034) for a instance, sponge, animal gut, isinglass, &c., week. They are afterwards washed in plenty of water, squeezed, and allowed to dry in the bleached by sulphurous acid.

&c., are bleached or decolored by exposure to into cold water to harden. Lac thus purified the fumes of burning sulphur. This is effected is used to make pale varnishes and the more in a close chamber of a size proportioned to the delicate tints of colored scaling-wax. Shelscale on which the operation is conducted, lac bleached by this method is liable to stain and supplied with only just sufficient air to furniture inlaid with brass. The following process is free from this objection, and has the additional advantage of being much

cheaper:
1724. To Bleach Shellac with Anifor Bleaching. Sulphurous acid is used mal Charcoal Any quantity of yellow shellac, previously broken in small pieces, is conveyed into a flask, alcohol of .830 specific gravity poured upon it, and the whole heated on a stove, or, in the summer, in the sun, until the shellac is dissolved; upon this so much coarsely powdered animal charcoal is added to the solution that the whole forms a thin paste; the flask is closed, not quite air-tight. and left so for some time exposed to the sun; and in 8 to 14 days a small sample is filtered. sufficient to ascertain whether it has acquired a light yellowish brown color, and whether it yields a clear, pure polish, on light colored woods. If this be the case, it is filtered through coarse blotting paper, for which purpose it is best to employ a tin funnel with double sides, similar to those employed in filtering spirituous solutions of soaps, opodel-The portion which first passes salt, 200 quarts water. The goods are laid in through the filter may be preserved separately, and used as a ground or first polish. Then some more spirit is poured over the charcoal upon the filter, and the solution used as a last coating. The solution of shellac purified by animal charcoal has a brown yellow color, but it is perfectly clear and transparent; when diluted with alcohol, the color is so slight that it may be used in this state for polishing perfectly white wood, such as maple, pine, &c., without the wood acquiring the least tint of yellow.

1725. To Bleach Gutta Percha. Dis-

solve 1 part gutta percha in 20 parts hot benzole, shake the solution with $\frac{1}{10}$ part freshly calcined plaster, and set aside, with occasional agitation, for 2 days. The clear pale brownishbox, on which to hang the bonnets. (See last yellow liquid is then decanted into another vessel containing double its bulk of alcohol fortius (see No. 1439), when the gutta percha will be precipitated in the form of a brilliantly white tenacious mass, which is pounded together in a mortar, and rolled into cylindrical

1726. Bleaching Woolen Rags. These are most effectually bleached by the application of sulphurous acid. Of course, in many instances, the color of the rags, supposing the same to be dyed or printed goods, will be also destroyed. Chlorine cannot be used for this purpose, because it causes woolen and silk and place them in cold water to which a little fabrics to become yellow, and impairs the muriatic acid has been added. Next day take strength of the fibre, by entering into chemical combination with the wool, silk, and other similar substances of animal origin; as, for

1727.New Method of Bleaching To Bleach Lac. Dissolve the Feathers. This process is an entirely newlac in a boiling lye of pearlash or caustic pot- ly-discovered one, whereby the feathers of ash, filter it and pass chlorine through the ostriches and other birds may be bleached, solution until all the lac is precipitated. Collect the precipitate, wash well in hot water, dark gray colored. The feathers are placed and finally twist into sticks, and throw them for from 3 to 4 hours in a tepid dilute solution

some nitric acid has been added. After this very fine powder. lapse of time the feathers will be found to roasted, stirring all the time till it is reduced have assumed a greenish hue, owing to the oxide of chromium precipitated on the substance; in order to remove this, the feathers is carbonized. are placed in a dilute solution of sulphurous digested with dilute hydrochloric acid, and acid in water, whereby the feathers become perfectly white and bleached. Care is to be taken that the solution of bichromate be not admirable form for decolorization. For such made too strong, and especially that not too liquids as decoction of logwood it is four times much nitric acid be used, which would cause as efficient as animal charcoal. an irremovable yellow color.

1728. Table Showing the Number of Parts of a Weak Bleaching Liquor, Required to be added to 1 Part Bleaching Liquor of 6° Twaddell, to Produce a Liquor of a given Strength. According to Mr. Crum, the strength of liquor for bleaching cotton should be less than 10 Twaddell; the following table enables an operator to increase the strength of a weak bleaching liquor with a great degree of accuracy. The left liquor, expressed in 12 parts of 1°. At the head of the other columns stands the degree of strength required, and under these headings will be found the number of parts of weak liquor required to be added to 1 part of a liquor of 6° Twaddell, to produce the required strength of the mixture. (See No. 68.)

Strength of Sample.	Strength Required.			
	8°	6°0	12°	30
Water.	8 parts	11 parts	17 parts	23 parts
μο	9‡ "	13½ "	23 "	35 "
Å	11 "	17 "	35 "	71 "
3 12	131 "	23 "	71 "	
A ₂	17 "	35 "		
,5 1.2	23 "	71 "		
6 12	35 "			
<u>7</u>	71 "		<u> </u>	

1729. Properties of Charcoal. article, when fresh, possesses the property of taking lime and other saline matter from syrups and other aqueous solutions, especially organic ones, at the same time that it decolors them. As a decolorizer and deodorizer, animal charcoal (prepared from bones) is vastly superior to vegetable charcoal. Charcoal should be fresh burnt and fresh powdered and its valuable qualities. (See No. 1752.)

and very efficient decolorizing agent. Dis- row of holes at about 18 inches from the botsolve in water 54 parts of the sulphate of som of the generator, equidistant, and 1 an alumina of commerce, and mix with 922 parts inch in diameter, bored in about every other finely powdered wood charcoal. When the charcoal is saturated, evaporate to dryness, from the outside downward inside. There is and heat to redness in covered Hessian crucibles till the water and acid are dissipated. ter, 6 inches below the false top; this hole The charcoal contains just 7½ per cent. of should slant from the outside, downward inanhydrous alumina.

coal-tar pitch. Add 2 pounds fluid coal-tar, current of air should pass through the tub.

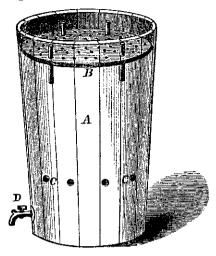
of bichromate of potassa, to which, cautiously, | and mix. Stir in 7 pounds hydrate of lime in The thick mass is now to a fine powder. It is then ignited in a covered crucible till all the vegetable matter The charcoal, when cold, is finally washed with water in a filter, and dried. Dr. Stenhouse recommends this as an

Vinegar. Vinegar is dilute acetic acid more or less mixed with gum, sugar, and other vegetable matter. It can be made from any liquid which is susceptible of the vinous fermentation. In this country it is made chiefly from cider and alcoholic liquors; in England, from malt liquors and hand column gives the strength of the weak molasses; in wine growing countries, from liquor, expressed in 1'z parts of 1°. At the inferior or damaged wine. The cultivation of the vine is gradually gaining importance in this country, and it seems more than probable that, at no distant time, vinegar will be made here largely from wine.

1733. To Make Vinegar by the German, or Quick Method. Many methods have been invented to produce vinegar; but that known as the "German, or quick method," has superseded all others, and is now in general use in the United States. By this process (which is very simple) time and labor are both greatly abridged, and a very fine article is produced. The method will be found

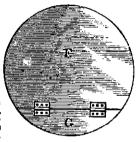
embodied in the five following receipts:

1734. How to Make a Vinegar Generator. The construction of a vinegar generator is very simple. A is a tub, 8 feet in height, 3 feet in diameter at the bottom, and 3½ feet in diameter at the top, with a cover, E, of which one part, G, is movable, in order to permit the liquid to be poured in when necessary. B is a shelf or false bottom perforated with a number of holes tof an inch in dia-This meter, placed about 8 inches from the top of the generator, at which place a stout hoop must be nailed to support it. When this false bottom is placed in the generator, it should be packed carefully on the sides with cotton batting, so as to prevent the liquid from escaping at any place except through the holes. The shelf or false bottom has also four 2 inch holes, in which are inserted 4 open reed tubes preserved from contact with the air. Unless as air vents, each having its ends projecting these precautions be observed it rapidly loses above and below the shelf, the upper ends projecting at least 11 inches below the top 1730. Aluminized Charcoal. This is cover, E, and the other ends penetrating the recommended by Dr. Stenhouse as a cheap contents of the generator. C Cisa horizontal stave, and in a vertical or slanting direction also a hole for the insertion of the thermomeside. The holes are bored in this manner to 1731. Charcoal from Coal-Tar. Heat prevent the vinegar from running out. It is gently in an iron pot till it melts, I pound essential to the success of the process that a



perforated false bottom about 2 inches below

the slanting ventilation-holes, to support the shavings, leaving the portion of the tub below free; others prefer a similar false bottom about 2 inches above the holes, in order to prevent the shavings from coming in contact with the holes and obstructing



the ventilation. D is a stop-cock, or faucet, 6 inches from the bottom of the generator, the discharging capacity of which must be controlled by the size of the generator. Never draw off the vinegar below this faucet.

1735. How to Pack a Vinegar Genetor. Having made the generator, the next part of the process of making vinegar consists in packing or charging it; this is done in the following manner: Take pieces of beech board about 18 inches in length (maple or basswood boards will do, but not as well as beech), and plane thick, heavy shavings from cut clean corn-cobs into pieces 11 or 2 inches The shavings and corn-cobs must be thoroughly soaked in water; or, what is still better, boiled in vinegar. Fill the tub half full with the corn-cobs, and let the cobs remain in the tub just as they are thrown there, without further arrangement. Then fill up the balance of the generator with the beech shavings and arrange them so that those which touch the upper false bottom are more strongly pressed than the rest, as the degree of pressure should increase as you pack from the bottom to the top of the generator. generator being filled, the false bottom must be fitted in and rest level upon the shavings, and great care must be taken not to have the air-tubes stopped up, or the cobs packed too solid in the vicinity of the slanting holes. The shavings or cobs may be loosened at the of a stick thrust therein. The generator may vinegar made in this way finds ready sale.

In order to establish this circulation, the also be entirely packed with beech shavings above holes are made, and the air enters by or entirely with cobs; the latter, however, are them, and passes out through the tubes in the inferior, as they soon rot and become worthless. Beech chips are preferred to shavings

by some vinegar manufacturers.

1736. Mode of Acetifying Shavings. The next step in the process of manufacturing vinegar consists in acetifying the shavings and cobs; and this is accomplished in the following manner: Preserve a temperature of between 75° and 85° Fahr., and pour over the shavings and cobs, every hour, a mixture of 2 gallons vinegar and ‡ gallon common whiskey (this liquid should first be heated, to hasten fermentation), until there are 10 gallons in the generator above the faucet, but not more. Muspratt recommends a standard liquor, both for the acetification of the shavings and for generating of vinegar. It consists of 50 gallons 60 per cent. whiskey, and 37 gallons beer or malt wort. A mixture of 5 gallons of the above mixtures with 40 or 50 of weak vinegar, acetifies still quicker than the standard mixture used alone. Draw off from the generator false bottom above. Some parties insert a every hour 2 gallons, and add it again at the top; continue this until the fermentation commences; this usually begins at the top of the generator in the course of 4 or 5 days. The contact of the air with the minutely divided liquid promotes the acetification, which consists essentially in the oxidation of the alcohol. As the oxygen is absorbed, the temperature of the liquor rises to 100° or 105°, and when the thermometer indicates that temperature when placed through the opening in the cover, the generator is ready, and in proper condition for the manufacturer. Pay special attention to the fermentation, for that is the principal point to be observed. It is scarcely necessary to say that the vinegar used for acetifying the shavings should be pure, or at all events free from the mineral acids. It is well known that essential oils, or a mere trace of wood-vinegar, arrest acetification; consequently the vinegar must also be free from pyroligneous acid. After the

acetification occurs, proceed as follows:
1737. Mode of Manufacturing Vinegar. Keep the vinegar room at a temperature of from 75° to 85° Fahr., and maintain the temperature of the generators at 95° to 100°. the edge; the shavings should curl and roll Then make up a mixture or wash composed of up, or they must be rolled up and tied. Next the following ingredients: 3 gallons common Then make up a mixture or wash composed of whiskey; 4 gallons manufactured vinegar; 33 gallons pure water. Muspratt uses 15 or 20 gallons of his standard liquor (see last receipt), diluted with 60 gallons soft water. The water, if not clear, must be filtered through charcoal. Draw off every hour 4 gallons of vinegar from each generator, and pour in at the top 4 gallons of the above wash, with an additional quart for waste in manufacturing; and pour the vinegar into another generator as soon as it is drawn. Vinegar is thus made by being passed only once or twice through the shavings, according to the quality and degree of strength required. Keep a large tank to hold the vinegar when made, and put ½ gallon of molasses into it every day until you get a bed 2 or 3 inches thick. The molasses will improve the vinegar and give it a fine color. This is the quickest process which has yet been obtained thermometer and ventilating-holes, by means for manufacturing large quantities, and the Vinegar by the Quick Method. The the neck downward, and expose it to the sun success of the whole process of making vine- for some time. When the vinegar is come, gar by the German, or quick method, depends | draw off one-half into a vinegar cask, and set almost entirely upon the free circulation of it in a cool place above ground, for use when air throughout the generator. It sometimes clear. With the other half in the first cask, happens that the vinegar, when it comes from proceed to make more vinegar in the same the generator, is not perfectly clear and trans- way. Thus one cask is to make in, the other parent; to remedy this, some manufacturers to use from. When making the vinegar, let use two false bottoms to each generator, and there be a moderate degree of heat, and free have a bed of white sand, 15 inches deep, upon the lower one. The sand will have to be packed in before the chips are, as follows: First cover the false bottom with flannel, to prevent the sand from coming through the holes, then put in a layer of sand 5 inches deep, cover this with two thicknesses of flannel, and then another layer of sand; repeat this again, and then pack in the chips as already directed. This will produce an article of a fine color, and will pass for a fine winevinegar if colored. Persons who are skeptical about this way of making vinegar may test it at a trifling expense on a small scale by experimenting with a keg arranged on the same principle as the generators. Those who desire to go into the business extensively, can have a series of generators. They may be arranged one above the other, and connected from floor to floor by gutta percha tubes, and thus vinegar may be made by passing once through three generators, instead of two or three times through one generator.

1739. To Make Vinegar Quickly. Take a cask or hogshead with the head out, and a faucet near the bottom; fill it with beech shavings prepared as in No. 1735; or, instead of shavings, the casks may be filled with corncobs or beech chips; over these lay a coffee sack, and cover it with fine shavings, to keep on the shavings, and let it soak in for a few hours; then draw it off through the faucet and throw it on to the shavings again, repeating this until the shavings are thoroughly soured, and adding each time 1 quart of high wines to the vinegar before throwing it back on the shavings; this addition prevents the vinegar from becoming flat by the absorption of the acid by the shavings. Then mix I gallon 90 per cent. high wines, and 1 quart molasses, with 14 gallons river water; pour it alcohol, which he says has proved entirely upon the shavings; draw it off and put it on the shavings again 2 or 3 times a day until plaint that the oxidation of spirits of wine in sour. By using several casks, sufficient vinegar may be made at a time to put into barrels. Sour ale, or the rinsings of sugar hogsheads, may be poured on the shavings and turned into good vinegar in this way. It is better for the fluid to be weak at first, adding the tinum, and dissolve it in 5 pounds alcohol; molasses or other material being converted into vinegar, by degrees during the successive drawings. By following this plan, the drawings. strength of the vinegar may be gradually increased to almost any degree.

1740. To Make Good Cider Vinegar. Take 10 gallons apple juice fresh from the press, and suffer it to ferment fully, which alcohol is rapidly oxidized. When the charmay be in about 2 weeks, or sooner if the weather is warm; and then add 8 gallons like juice, new, for producing a second fermentation; in 2 weeks more add another like new quantity, for producing a third fermentation. does not possess the flavor of wine or eider

1738. Useful Hints to Those Making | stop the bunghole with an empty bottle, with access of external air. The process is hastened by adding to the cider, when you have it, a quantity of the mother of vinegar, as it is called—a whitish, ropy coagulum, of a mucilaginous appearance, which is formed in the vinegar and acts as a ferment. The strength of vinegar depends on the amount of sugar or starchy matter to be utimately converted into acetic acid

1741. To Make Alcohol Vinegar. The following is the German method of making acetic acid, and is excellent and simple: In a bell glass or tall glass case, arrange shelves a few inches apart, one above another, on which place small flat dishes of earthenware or wood; then fill these dishes with alcohol, and suspend over each, in small trays or capsules, a portion of the black powder of platina (see Platinum-Black); hang strips of porous paper in the case, with their bottom edges immersed in the spirit to promote evaporation. Set the apparatus in a light place at a temperature of from 68° to 86° Fahr., for which purpose the sunshine will be found convenient. In a short time the formation of vinegar will commence, and the condensed acid vapors will be seen trickling down the sides of the glass, and collecting at the bottom, whence it may be removed once or twice a day. We shall find that during this process, the heat in. Next throw some good vinegar produced by the mutual action of the platina and the vapor of alcohol, there will be an increase of temperature, which will continue till all the oxygen contained in the air enclosed in the case is consumed, when the acetification will stop; the case must then be opened for a short time, to admit of a fresh supply of air, when the operation will commence again.

1742. Artus' Process for the Manufacture of Vinegar. Dr. Artus has discovered a process for making vinegar from the vinegar process is far from complete, and that the results are not equal either in quality or quantity to what ought to be expected from the materials employed. His plan is as follows: Take a ounce dry bichloride of plawith this liquid moisten 3 pounds wood charcoal broken in pieces the size of a hazel-nut; heat these in a covered crucible, and afterwards put them in the bottom of a vinegar vat. Here the platinum in its finely divided spongy state absorbs and condenses large quantities of oxygen from the air, by which coal has been in use for 5 weeks it should be again heated in a covered crucible

1743. To Improve Alcohol Vinegar. Vinegar made from pure alcohol and water This third fermentation is material. Now vinegar, and is therefore inferior to them for renders it agreeable. Raw spirits containing some fusel oil produce a more pleasantly flavored vinegar than refined spirits; hence a few drops of fusel oil added to rectified spirits, in making the wash for vinegar, improves its aroma. A little oil of cloves or butyric ether added in the same manner improves its flavor. A very small quantity of sulphuric acid. cider vinegar gives a large quantity of whiskey vinegar a pleasant flavor. chicory is sometimes added to high wine vine- present. gar, to give it the color of cider vinegar.

1744. To Keep Up a Constant Supply of Cheap Vinegar. A supply of vinegar can be kept constantly on hand by retailers in ignited, the sample contains nitric acid. the following manner: Before a barrel is quite 1749. To Strengthen Weak Vinegar. the following manner: Before a barrel is quite sold out, fill up the barrel with 1 gallon molasses to every 11 gallons soft water. This put it in the pickles, and when lukewarm, mixture will become good vinegar in about 3 weeks-and can be treated in its turn in the Where less than a barrel a week is used, 3 barrels thus treated and used in rotation, will be sufficient to keep up a perpetual | thrown away. supply. If the barrels stand on end, there must be a hole made in the top, protected of the vinegar alone freezes, leaving the with gauze to keep out insects. If standing acid in solution in the remaining water. on the side, the bunghole must be left open and similarly protected.

or barrel with the bunghole open, but protect-

ed with gauze against insects.

1746. Distilled Vinegar. Put 1 gallon vinegar in a retort; and distill by a sandor pewter worm must be avoided, as it renders

the product cloudy and poisonous.

To Make Vinegar from Sugar, acetic acid. other fruits, and of beets, may be thus made 16 grains. into vinegar, either alone or in combination Vinegar made in this manner with syrup.

tests of purity will be found useful:

Paper written on or smeared with pure vine-

fully 2 per cent. of sulphuric acid.

Dip a small porcelain capsule or china cup into a solution of ½ ounce sugar in 15 ounces water, and then heat the capsule to a temperature of 212° Fahr. A drop of vinegar let fall on it will not be materially discolored if pure; it will turn a dark brown or black, if the vinegar contains only 300 part of sulphuric to Decolorize Vinegar and other Vege-acid; the presence of 1000 of sulphuric acid table Liquids. Fill a crucible with the will cause the spot to turn an olive green; a most compact parts of ox and sheep bones,

table use; but a little acetic ether added to it less proportion will produce a pale green color.

Chloride of barium testifies the presence of the same acid by forming a heavy white precipitate; each grain of this precipitate, after being dried and gently ignited, represents .344 grain of dry sulphuric acid; and if the precipitate from 1000 grains of vinegar exceed $2\frac{1}{2}$ grains, it contains an undue proportion of

If a solution of nitrate of silver gives a An infusion of cloudy white precipitate, hydrochloric acid is

If, after the addition of 2 or 3 grains carbonate of potash, and evaporation of the sample to dryness, the residuum deflagrates when

If in pickles, turn it off, heat it scalding hot, put in a small piece of alum the size of a filbert, and a brown paper 4 inches square, wet with molasses. If it does not grow sharp in 2 weeks it is past recovery, and must be Or, freeze it and remove the ice which forms on the surface. of the vinegar alone freezes, leaving the acetic

1750. To Determine the Strength of Vinegar. The hydrometer is not to be 1745. To Make Vinegar in Three much relied on in testing the strength of vine-Weeks. Mix in the following proportions: gar. The simplest test is to take a fragment The simplest test is to take a fragment 1 quart molasses, 1 pint yeast to 3 gallons of fine marble, weigh it and suspend it by a warm rain water. Put the mixture into a keg thread in a known measure of vinegar until all action ceases and the liquid has no longer a Take out the marble, wash and sour taste. dry it, and note the loss of weight it has sustained. 5 of this is real (hydrated) acetic bath, 7 pints. This should produce a vinegar acid. An ounce of good vinegar should sat-of specific gravity 1.0065. The use of a lead urate from 30 to 32 grains of pure and dry carbonate of soda; such vinegar contains about 5 per cent. of anhydrous (absolute) Vinegar above 30 per cent. of An excellent domestic vinegar may be made real acid will dissolve the essential oils and by dissolving 11 pounds sugar to each gallon camphor. The strength of vinegar may also water used, with 1 pint good yeast. If the be ascertained in the same way as any other heat of the mixture be maintained at 70° to acid (see Nos. 69 and 78); but vinegar manu-80° Fahr., acetification will set in, so that in 2 or | facturers designate the strength of their pro-3 days it may be racked off from the sediment | ducts by the number of grains of pure carinto a cask; it then receives the addition of 1 bonate of potassa required to neutralize 1 ounce cream of tartar, and 1 ounce crushed fluid ounce of the vinegar tested. Thus, if 1 raisins; when completely free from sweet fluid ounce of a sample of vinegar requires 16 taste, it should be bottled and corked closely. grains of carbonate of potassa to neutralize The juice of currants, gooseberries, and many lit, the vinegar is said to be of a strength of

1751. To Deprive Vinegar and Other Vegetable Liquids of their Color. keeps better than that made from malt liquors. take away the color of vinegar, 2 pints red 1748. Tests for Vinegar. The methods wine vinegar, cold, are mixed with 11 ounces of testing the strength of vinegar are given bone-charcoal (prepared as directed in the under the head of Acetimetry. The following next receipt) in a glass vessel. Shake this next receipt) in a glass vessel. Shake this mixture from time to time, and in 2 or 3 days the color completely disappears. When gar, is not charred when strongly warmed the process is to be performed in the large before the fire; if it is, the vinegar contains way, throw the charcoal into a cask of vinefully 2 per cent of culture and the contains way. gar, which must be stirred from time to time. The highest colored red wines treated in the same manner become perfectly limpid. Ivoryblack possesses the same property as boneblack. Filtering through charcoal will pro-

duce the same result. 1752. To Prepare Animal Charcoal opening at the top, place the crucible on a black pepper, 54 grains; poppy seed, 94 grains; forge fire, and heat it gradually till red; when garlie, 2 heads; cinnamon, 1 scruple; cardathe flame from the oily and gelatinous parts mom, 5 seeds; 8 cloves, 1 or 2 chillies; half a has ceased, diminish the opening and suddenly raise the fire; when cold, reduce the on a stone charcoal to fine powder. (See No. 1729.)

Sauces, Catsups, and Pickles. The following receipts are given to illustrate the methods employed in preparing a number of well known condi-ments. This department of our work might thought advisable to occupy space with particulars that may be found in any of the popular treatises on cookery:

1754. Soy. The pure article is imported from China, but an excellent substitute may be prepared by boiling 1 gallon of the seeds of Doliehos soja (if this cannot be had, haricot or kidney beans will answer) in sufficient water until soft; add 1 gallon bruised wheat, and keep in a warm place for 24 hours; then keep for 2 or 3 months in a tightly bunged stone jar; after which, press out the liquor.

1755. Epicurean Sauce. Indian soy, 2 ounces; walnut catsup, mushroom catsup, each 8 ounces; port wine, 2 ounces; bruised white pepper, ½ ounce; shallots, 3 ounces; cavenne, 1 ounce; cloves, 1 ounce. Macerate for 14 days in a warm place, strain, and add white wine vinegar to make up a pint.

1756. Kitchener's Sauce Superlative. Port wine, and mushroom catsup, of each 1 pint; walnut or other pickle liquor, ½ pint; pounded anchovies, 4 ounces; fresh lemonpeel cut thin, siced shallots, and scraped horseradish, of each 1 ounce; allspice and black pepper, of each ½ ounce; cayenne, 1 drachm; curry powder, 3 drachms; celery seed, 1 drachm; put them into a wide-mouthed bottle, stop it close, shake daily for 2 weeks, and strain; 4 pint soy may be added.

1757. To Make Quin Sauce. Mix together 2 gallons walnut catsup, 2 gallons mushroom catsup, 1 gallon soy, 1 pound garlic, and 6 pounds sprats. Boil for 15 minutes, strain and bottle.

To Make Harvey's Sauce. 1758. Take 48 parts Quin sauce, 16 parts soy, and 1 part cayenne.

1759. Worcestershire Sauce. Mix together $1\frac{1}{2}$ gallons white wine vinegar, 1 gallon walnut catsup, 1 gallon mushroom catsup, ½ gallon Madeira wine, ½ gallon Canton soy, 2½ pounds moist sugar, 19 ounces salt, 3 ounces powdered capsicum, 1½ ounces each of pimento and coriander, 11 ounces chutney, 4 ounce each of cloves, mace and cinnamon, brandy 20 above proof. Boil 2 pounds hog's liver for 12 hours in 1 gallon of water, adding water as required to keep up the quantity; this to the sauce.

curry is said to be thus made: Coriander to settle. Decant the clear liquor and eark

lute the cover, carefully leaving only a small ginger, 4½ drachms; cummin seeds, 18 grains: cocoa-nut grated; all but the last to be ground

1761. Italian Tamara. Coriander seed. cloves, and cinnamon, of each 8 ounces; anise and fennel seeds, of each 4 pounds; mix.

1762. Bengal Chutney. Chillies, 13 pounds; unripe mangoes (or apples), 1 pound; red tamarinds, 2 pounds; sugar candy, 1 pound; fresh ginger root, 11 pounds; garlie, 2 to $1\frac{1}{2}$ pounds; sultana raisins, $1\frac{1}{2}$ pounds; fine salt, I pound; and 5 bottles of the best vinegar; soak the chillies for 1 hour in the vinegar. have been greatly extended, but it was not then grind all with a stone and muller to a paste

1763. Kitchener's Essence of Soup Herbs. Take of lemon thyme, winter savory, sweet marjoram, and sweet basil, of each 1 ounce; grated lemon peel and eschalots, of each ½ ounce; bruised celery seed, ½ ounce; proof spirit, 1 pint. Digest for 10 to 14 days. A superior flavoring essence for soups, gravies, seasonings, &c.

1764. Essence of Savory Spices. add 1 gallon salt, and 2 gallons water, and Take of ground black pepper, 4 ounces; powdered turmeric, 3 drachuis; ground coriander seeds, 14 drachms; oil of pimento, 14 fluid drachms; oil of nutmeg, oil of cloves, oil of cassia, and oil of caraway, of each a drachm; alcohol, 1 pint. Digest with agitation for 2 weeks.

1765. Tincture of Savory Spices. Take of black pepper, 11 ounces; allspice, 5 drachms; nutmegs and burnt sugar, of each dounce; ground cloves, cassia, coriander and caraway seeds, of each 1 drachm; proof spirit, 1 pint. Digest with agitation for 2 weeks; press and filter. Used for flavoring. When made with alcohol and double the above weight of spices it makes an essence of savory spices.

1766. Cautions in the Preparation of Catsups, &c. In preparing catsups, pickles, &c., vessels of earthenware, stoneware or well-tinned copper pans should alone be used, as salt, vegetable juices and vinegar rapidly corrode copper, and render the results poisonous. Nothing in the shape of copper, lead, or pewter should be allowed to come in contact with them at any time. Even a plated copper spoon left in a bottle of catsup for some time will render its contents poisonous. Unpleasant and even dangerous attacks of vomiting, colic, and diarrhoea have resulted from neglect of these precautions.

1767. Mushroom Catsup. Lay alternate layers of mushrooms and salt in an earthenware pan, using 4 pound of salt to each 2 quarts of mushrooms. After 6 hours, break them into pieces, and set in a cool place for 3 days, stirring every morning. and 61 drachms assafeetida dissolved in 1 pint strain, and to every quart of the juice add 1 ounce each allspice and ginger, & tea-spoonful powdered mace, and 1 tea-spoonful cayenne pepper. Put it into a closely covered stone then mix the boiled liver thoroughly with the jar, set in a pan of boiling water, and boil water; strain it through a coarse sieve. Add briskly for 5 hours; then empty it into a porcelain lined kettle and simmer gently for 1 1760. Indian Curry. The true Indian hour; let it stand over night in a cool place seed, 6 drachms; turmeric, 5 scruples; fresh tightly in bottles filled to the mouth. It is

the pulp is dissolved; strain and press, first through a cullender, then through a hair-sieve; then boil for 5 hours with 1 ounce salt, 1 ounce mace, 1 table-spoonful black pepper, 1 teaspoonful cayenne, 1 table-spoonful powdered cloves, 7 of ground mustard, and 1 of celery seed; this last tied in a thin muslin bag; stir frequently, especially during the last hour; turn it into a stone jar to cool; and, when cold, add 1 pint strong vinegar; take out the bag of celery seed, and bottle. Seal the corks, and keep in a dark cool place.

1769. Tomato Catsup. Cut 1 bushel tomatoes to pieces, and boil them in their own liquor until soft; strain and press through a hair-sieve to separate the skins and seeds; boil down to a thick pulp, stirring all the time; then add 6 ounces salt, 6 drachms allspice, 1 ounce 5½ drachms yellow mustard, 3 ounces black pepper, 6 drachms cloves, 3 drachms mace, 2 drachms cayenne pepper, and 1 gallon vinegar. The spices must all be ground fine before using them. Les the whole boil up twice, and, when cool,

Walnut Catsup. Take young. tender walnuts, prick them in several places, bruise them with a wooden billet, and place in a jar with sufficient water to cover them, adding a handful of salt for every 25 walnuts; stir them twice a day for 14 days; then drain off the liquor into a saucepan. Cover the walnuts with boiling vinegar, crush to a pulp and strain through a cullender into the liquor in the saucepan. Add, for every 2 quarts, 2 ounces each black pepper and ginger, 1 ounce each cloves and nutmeg pounded fine, a pinch of cayenne, a shallot minced fine, and a the vinegars. thimbleful of celery seed tied in a muslin bag. Boil all together for an hour, and, when cold, bottle. In the above manner an excellent catsup may be made from butternuts.

1771. Tarragon Vinegar. Put fresh tarragon leaves into a stone jar, and pour on them a sufficient quantity of the best wine vinegar to cover them. Set the jar in a warm place for 14 days; then strain through a jelly bag. In the same way may be made elderflower, basil, green mint, and Burnet vinegars.

1772. Cress and Celery Vinegars are made with a ounce of the bruised seed to a

quart of vinegar.

1773. Horseradish Vinegar, with 3 and a little ounces of the scraped root, 1 ounce of minced the surface. shallots, 1 drachm cavenne, to 1 quart vinegar.

1774. Garlic Vinegar is made with 2 ounces minced garlic to 1 quart wine vinegar.

1775. Shallot Vinegar in the same manner, using challots instead of garlic.

Chili Vinegar, with 50 chillies (peppers) cut or bruised (or ‡ ounce cayenne pepper), to 1 pint of the best vinegar; digest for 14 days, strain, and keep in half-pint bottles.

better to seal the corks and tie down with for 1 month, and strain. Or: Vinegar, 1 bladder, and to use small bottles, as it soon quart; walnut catsup. 1 pint; mushroom catspoils when exposed to the air.

1768. Tornato Catsup. Take 1 peck cayenne, 2 ounce; soy, 2 table-spoonfuls; ripe tomatoes, cut a slit in them, and put port wine, 2 glasses; 3 anchovies, and 1 them into a porcelain lined kettle. Boil until table-spoonful of salt; put them into a bottle. shake daily for a month, and decant.
1778. Curry Vinegar. Infuse 3 ounces

curry powder in 1 quart vinegar, near the fire,

for 3 days.

1779. Superfine Raspberry Vinegar. Pour 1 quart vinegar on 1 quart raspberries; the next day press and strain the juice upon another quart of the fruit, and repeat this every day for 6 days. Then add 1 pound white sugar to every pint of the vinegar, and put it into a jar, which must be placed in a pot of boiling water to be scalded through.

1780. Fine Raspberry Vinegar. Bruised ripe raspberries and white wine vinegar, of cach 3 pints; macerate 24 hours, press, strain, and to each pint add white sugar, I pound; boil, skim, cool, and to each pint add brandy, 2 ounces. In a similar way may be made Strawberry Vinegar and Cherry Vinegar.

1781. Raspberry Vinegar. Macerate 2 pounds fresh raspberries with 1 pint best vinegar for 14 days, and strain; or, to 1 quart of juice add 2 ounces strong acetic acid or enough to render it sufficiently acid.

1782. Raspberry Vinegar from Raspberry Syrup. Mix together 2 pints raspberry syrup and 1 fluid ounce acetic acid. Added to iced water according to taste, this is one of the most delightful of refrigerant drinks.

1783. Eschalot Wine. Bruised shallots. 3 ounces; sherry wine, 1 pint; infuse for 10 days; 1 ounce scraped horseradish and 1 drachm thin lemon-peel may be added. Dr. Kitchener says this is the most elegant preparation of the onion tribe. Wines of several herbs may be made in the same proportion as

1784. Table Mustard. Mix 8 spoonfuls of flour of mustard with 2 of salt and 9 of water. Mix to a smooth paste, add 6

spoonfuls more water, and mix.

1785. Le Normand's Superior Table Mustard. Take of best flour of mustard, 2 pounds; fresh parsley, chervil, celery, and tarragon, of each 1 ounce; garlic, 1 clove; 12 salt anchovies (all well chopped); grind well together, add of salt, 1 ounce; grape juice or sugar sufficient to sweeten, with sufficient water to form the mass into a thinnish paste by trituration in a mortar. When put into pots, a red-hot poker is to be thrust into each, and a little vinegar afterwards poured upon

1786. Soyer's Table Mustard. Steep mustard seed in twice its bulk of distilled vinegar for 8 days; grind to a paste, and put it into pots, thrusting a red-hot poker into each

1787. Moutarde à l'Estragon. Gently dry 1 pound black mustard seed: then powder it fine, and mix it with 2 ounces salt, and sufficient tarragon vinegar to make a paste. In a similar way are prepared several other 1777. Camp Vinegars. Take 12 mustards, by employing vinegars flavored chopped anchovies, 2 cloves of garlic minced, with the respective substances, or walnut or 1 drachm cayenne, 2 ounces soy, 4 ounces mushroom catsup, or the liquors of the richer walnut catsup, and I pint best vinegar; digest pickles, in proportions to suit the taste.

salt, $1\frac{1}{2}$ pounds; scraped horseradish, 1 pound; fire for 2 or 3 days, till they turn yellow; then garlie, 2 cloves; boiling vinegar, 2 gallons; put away the water, and cover them with hot macerate in a covered vessel for 24 hours; vinegar, set them near the fire, and keep them strain, and add of flour of mustard a sufficient hot for 8 or 10 days, till they become green;

quantity.

1789. This is prepared from the pods of the Chili or Half a dozen peppers improve a jar of cucumare placed in layers with wheaten flour in a the latter. dish or tray, and exposed in a stove room or well set up, the dough is cut into small pieces, and pour over them hot spiced vinegar. and brittle. It is then beaten or ground to vinegar.

powder, and forms cayenne pepper.

cupful of sugar, boil it, and return it to the pickle jar while hot. The occasional addition thin muslin bags. Most pickles, if well kept, improve with age, by the vinegar losing its pers. raw taste, and the flavor of the spices, &c., 17 improving and blending. (See No. 1766.)

1791. Spiced Vinegar for Pickles Bruise in a mortar 2 ounces Generally. black pepper, 1 ounce ginger, & cunce allspice, and 1 ounce salt. If a hotter pickle is desired, add ½ drachm cayenne, or a few capsicums. For walnuts add also I ounce shallots. Put these in a stone jar, with a quart of vinegar, and cover them with a bladder wetted with the pickle, and over this a piece of leather. simmer the vinegar gently with the spices, which is best done in an enameled saucepan. For walnuts it is used hot; for cabbage,

&c., cold.

Pickled Cauliflower. 1792. should be sliced, and salted for 2 or 3 days, then drained, and spread upon a dry cloth before the fire for 24 hours; after which they are put into a jar, and covered with spiced vinegar. Dr. Kitchener says that if vegetables are put into cold salt and water (4 pound salt to 1 quart water) and gradually heated to a boiling heat, it answers the same purpose as letting them lie some days in salt.

1793. Pickled Cucumbers. Gherkins. Small cucumbers, but not too young, are wiped clean with a dry cloth, put into a jar, the fire for some hours; put it into a stone jar, and boiling vinegar, with a handful of salt, and add sufficient white vinegar, or pale white poured on them. Boil up the vinegar every vinegar, to cover, with a little mace and a few 3 days, and pour it on them till they become white pepper-corns. green; then add ginger and pepper, and tie 1800. Pickled Red Cabbage. Remove them up close for use. Or cover them with the outer leaves and stalks, and cut the cab-

Moutarde Superbe. Take of this and set them on the hearth before the then pour off the vinegar, cover them with To Make Cayenne Pepper, hot spiced vinegar, and keep them close. bird-pepper. The ripe pods, dried in the sun, bers, as the heat of the former is absorbed by

1794. Pickled Onions. Let them lie half cold oven until perfectly dry; they are in strong salt and water for 2 weeks; then then removed from the flour and ground to take them out and peel them; put them in fine powder; to every ounce of this powder, fresh salt and water for 2 weeks more; take 15 ounces wheaten flour are added, and made them out, wash them clean, and let them lie into a dough with a little tepid water and a in fresh water all night. Next day place them tea-spoonful of yeast; after fermentation is on a cloth to drain; then put them in a jar, and baked in a slow oven until perfectly hard you wish them of a nice color, use white

1795. Pickled Onions. Peel small sil-1790. Pickles. In making pickles, use ver button onions, and throw them into a none but the best cider vinegar. Never keep stew-pan of-boiling water; as soon as they pickles in glazed earthenware, but in glass or look clear, take them out with a strainer-ladle, hard stoneware, and well covered with vine place them on a folded cloth covered with gar. They should be examined every month another, and when quite dry put them into a or two, and soft pieces removed. If there is jar and cover them with hot spiced vinegar. much tendency to soften, it is advisable to (See No. 1791.) When quite cold, bung them strain off the vinegar, add to each gallon a down, and cover with bladder wetted with the pickle.

Pickled Peppers. 1796. Soak fresh of a little sugar keeps pickles good, and improves them. Spices in pickles should be used a warm place, changing the brine every day, whole, slightly bruised, but preferably not ground; if ground, they should be tied up in pickles are not required very hot, take out the seeds from the greater portion of the pep-

Beetroot Pickles. Simmer the 1797. roots till 3 parts done (from 11 to 21 hours); then take them out, peel and cut them in thin slices. Put them into a jar, and pour on sufficient cold spiced vinegar (see No. 1791)

to cover them

1798. Pickled Walnuts. Take 100 young walnuts, lay them in salt and water for 2 or 3 days, changing the water every day. (If required to be soon ready for use, pierce each walnut with a larding pin, that the pickle Set the jar near the fire for 3 days, shaking it may penetrate.) Wipe them with a soft 3 times a day; then pour it on the walnuts or cloth, and lay them on a folded cloth for other vegetables. To save time, it is usual to some hours. Then put them in a jar, and pour on sufficient hot spiced vinegar (see No. 1791) to cover them. Or they may be allowed to simmer gently in strong vinegar, then put into a jar with a handful of mustard seed, 1 ounce ginger, 1 ounce mace, 1 ounce allspice, 2 heads of garlic, and 2 split nutmegs, and pour on them sufficient boiling vinegar to cover them. Dr. Kitchener recommends the walnuts to be gently simmered with the brine, then laid on a cloth for a day or two, till they turn black, put into a jar, and hot spiced vinegar poured on them.

1799. Pickled White Cabbage. Cut white cabbage into thin slices, put it into an earthen pan, sprinkle with salt, and let it lie for 2 days; then drain and spread it out before

salt and water (as above) in a stone jar, cover; bage in quarters, then shred them into a cul-

put them into a jar, and pour on sufficient of its own condition. 1791.) Others hang up the cabbage for a few days to dry, then shred the leaves, and put them in layers in a jar with a little salt, pepper, and ginger, and fill up with cold vinegar. Others use vinegar without spice

1801. Pickled Nasturtiums, French Beans, and other small green vegetables, are made in the same manner as directed for

gherkins. (See No. 1793.)

1802. Pickled Mushrooms. the mushrooms with water and flannel, throw them into boiling salt and water in a stewpan, and boil for a few minutes. Drain them in a cullender, and spread out on a linen cloth, covering them with another. Put into bottles with a blade or two of mace, and fill up with white vinegar, pouring some melted mutton fat on the top, if intended to be kept long.

1803. Pickled Tomatoes. Tomatoes are pickled in the same manner as cucumbers.

(See No. 1793.)

Imitation Pickled Mangoes. 1804. Large cucumbers, or small melons, are split so that a marrow-spoon may be introduced, and the seeds scooped out; they are then parboiled in brine strong enough to float an egg, dried on a cloth before the fire, filled with mustard seed and a clove of garlic, and then covered with spiced vinegar. (See No. 1791.) Real mangoes are pickled in the same way.

mustard, 3 ounces bruised ginger, 2 ounces turmeric, 8 ounces skimmed shallots, and 2 ounces garlic, the last two slightly baked, 1 pound salt and 2 drachms cavenne pepper. Digest these near the fire, as directed in No. 1791 for spiced vinegar. Put into a jar, gherkins, sliced cucumbers, sliced onions, button onions, cauliflower, celery, French beans, nasturtiums, capsicums, large cucumbers, and small melons. All except the capsicums to be parboiled in salt and water, drained, and dried on a cloth before the fire. The melons and large cucumbers to be prepared as directed in last receipt for mangoes. Pour on them the above pickle.

1806. Mixed Pickle. Take 1 pound ginger-root and $\frac{1}{2}$ pound garlic (both previously salted and dried), 2 gallons vinegar, $\frac{1}{2}$ ounce turmeric, and ½ pound long pepper. Digest together for 2 or 3 days near the fire in a stone jar; or gently simmer them in a pipkin or enameled saucepan. Then put in almost any vegetables except red cabbage and walnuts, all previously salted and dried.

Yeast is either the froth or east. the deposit of fermenting worts, according to the character of the fermentation. According to Liebig, yeast is a substance in a state of putrefaction or fermentation, the boiled with hops, in the same manner as in atoms of which are in a continual motion, and the brewing of beer (see No. 858), and when this condition it communicates by contact, to cooled to 90° or 100° Fahr., the decomposed fermentable substances. siders yeast an organic body, acting on the to be added, and the whole kept in a warm

lender, and sprinkle with salt; next day drain, | and not by mere contact and communication This view receives cold spiced vinegar to cover them. (See No. | considerable support by examination of its particles by a microscope, and also from its fermenting power being destroyed by trituration or strong pressure. Cooley believes both views to a certain extent correct, and that the atoms in a state of continual motion or change, referred to by Liebig, are developed by the organs of vital yeast, when in contact with sugar under circumstances favorable to fermentation.

Preparation of Brewers' Yeast. 1808. To do this, 72 pounds unkilned malt and a handful of hops are gradually stirred in a clean tub containing 7 gallons water of 170° Fahr.; and to this 5½ gallons water of 200° are added. The tub is then covered tightly and left quiet for 1 hour. Supposing this to be done at 6 P. M., the whole is left undisturbed till 7 o'clock next morning, when it must be cooled rapidly, which is done by setting in cans filled with cold water. When the temperature of the mash has reached 70°, the tub is covered again and left during the day till 6 P. M.; at this time 11 gallons fresh beer yeast are to be stirred in. In 12 hours pierce a hole in the layer formed by the husks of the malt, and dip 31 gallons of the liquor beneath, then stir the whole up and dip 12 gallons from it (husks and liquor). This is the mother-barm, from which you can generate yeast all the year round in using it in the way described 1805. Piccalilli, Indian, or Mixed instead of the ordinary beer leaven. To the Pickle. To each gallon strong vinegar put remainder in the tub add 5 gallons wort of instead of the ordinary beer leaven. To the 4 ounces curry powder, 4 ounces good flour of 90° (see No. 858), and make use of it in within 2 hours. The mother-yeast also must be used the same day for fermenting another portion.

1809. Yeast for Hot Climates. Boil 2 ounces of the best hops in 4 quarts water for ½ hour; strain it, and let the liquor cool down to new milk warmth. Then put in a small handful of salt and ½ pound brown sugar; beat up 1 pound best flour with some of the liquor, and mix all well together. The third day add 3 pounds potatoes boiled and mashed, and let it stand until the next day. Then strain, and it is ready for use. Stir frequently while making, and keep near a fire. Before using, stir well; it will keep 2 or 3 months in a cool place. This yeast is very strong; half the usual quantity necessary for a baking is sufficient. This yeast may be kept in a tem-

perature as high as 104° Fahr.

1810. To Prepare Yeast without a Ferment. Common wheat flour is to be mixed with water into a thick paste, and kept, slightly covered, in a moderately warm place, for some time. About the third day it begins to emit a little gas, and to exhale a disagreeable, sour odor, like stale milk; after the lapse of a few days, that is, about the sixth or seventh day, the smell changes, much gas is evolved, accompanied by a distinct and agreeable vinous odor, and it is then in a state to excite the vinous fermentation. A quantity of wort is next to be prepared, and Lüdersdorff con- dough, thoroughly mixed with tepid water, is sugar contained in the saccharine solution, situation. After the lapse of a few hours, active fermentation takes place, carbonic acid | municate a most disagreeable taste to bread. is disengaged, and when the action is complete, and the liquor clear, a large quantity of yeast, of excellent quality, is found at the bottom of the vessel.

1811. To Make Yeast without allert. Boil & peck malt in 3 pints water; ment. pour off 2 pints, and keep it in a warm place principle, and use only the stiff portion that for 30 hours; add 4 pints of a similar decoetion, stir it well in, again ferment, and repeat acquires a bitter taste from keeping, which is this addition of 4 pints until a sufficient quantity of yeast is obtained; 10 pints will yield hops. To remedy this, throw into the yeast yeast sufficient for a brewing of 40 gallons; it is preferable to brewers' yeast, particularly

when used for raising dough.

1812. To Make Good Yeast without Ferment. Put 2 ounces best hops into 9 pints cold water; boil 1 hour, strain while hot, and add 2 ounces fine table salt and $\frac{1}{2}$ pound sugar. When the mixture becomes blood-warm, put 1 pound sifted flour into a the hand, add the liquor by degrees, stirring with a spoon until the whole is thoroughly incorporated. Let it stand for 2 days in a warm place, stirring it 3 or 4 times a day; then boil and mash finely 3 pounds good potatoes, and mix them in. After standing 1 day more, there should be a heavy dark scum on the surface. Stir it thoroughly, strain through a sieve or cullender, put it into a stone jar, cork and tie down firmly, and keep in a cool cellar. This is a self-fermenting yeast, improves by keeping if not left uncorked, and will not make sour bread.

1813. To Make Yeast with a Ferment. Mix 2 quarts water with wheat flour, to the consistence of thick gruel; boil it gently to preserve it as much as possible from air and for 1 hour, and when almost cold, stir into it moisture. Or: Mix and pack, as just described, pound sugar and 4 spoonfuls good yeast. Put the whole in a large jug or earthen vessel, with a narrow top, and place it before the fire, so that it may, by a moderate heat, ferment. The fermentation will throw up a thin liquor, which pour off and throw away; keep the remainder for use (in a cool place) in a bottle, or jug tied over. The same quantity of this as of common yeast will suffice to bake or brew with. 4 spoonfuls of this yeast will make a fresh quantity as before, and the stock may be always kept up, by fermenting the new with the remainder of the former quantity.

1814. Patent Yeast. Simmer 6 ounces hops in 3 gallons water for 3 hours; strain it, and in 10 minutes stir in ½ peck ground malt. Next re-boil the hops in water, and add the liquor to the mash already made, which must be well stirred up, covered over, and left for 4 hours; then drain off the wort, and when cooled down to 90° Fahr., set it to work with 1 pint yeast (patent is best); after standing for 20 to 24 hours, take off the scum, strain it through a coarse hair sieve, and it is ready for nure. Break the bones into small pieces, or use. I pint is said to be enough for I bushel pulverize them, if the means are available; of bread.

1815. To Preserve Yeast. Ordinary beer yeast may be kept fresh and fit for use 40 pounds oil of vitriol to 100 pounds bones. for several months, by placing it in a close Work the mixture with long wooden poles canvas bag, and gently squeezing out the until the mass is uniform. Allow it to remoisture in a screw press till the remaining main 24 hours, by which time it will be permatter becomes as stiff as clay, in which state feetly dry. A couple of shovelfuls added it must be preserved in close vessels.

1816. To Remedy Bitterness in Bones may also be dissorted by mining an Yeast. Yeast is often so bitter as to com-old barrel with alternate layers of wood ashes To Remedy Bitterness in

This may be derived from an excess of hops. To rectify this, mix with the yeast a considerable quantity of water, and set it by to rest for some hours, when the thickest part will fall to the bottom. Pour off the water, which will have extracted part of the bitter has fallen to the bottom. But yeast sometimes guite independent of that derived from the a few clean coals freshly taken from the fire, but allowed to cool a little on the surface. The operation appears to depend in principle upon the power of freshly burnt charcoal to absorb gases and remove offensive odors.

1817. Baking Powder. This is chiefly employed as a substitute for yeast. 1 or 2 tea-spoonfuls are mixed with the dry flour and other ingredients, which are then made large basic, make a well in the centre with into a dough, as quickly as possible, with cold water, and at once baked or boiled, as the case may be. By the addition of about ½ drachm turmeric powder to each pound of baking powder, it is converted into egg powder. These preparations should be kept in well corked bottles or tins, to prevent absorption of moisture.

1818. To Make Baking Powder. Powder and thoroughly dry separately, by gentle heat, } pound tartaric acid, } pound pure bicarbonate of soda, and } pound potato farina; mix them in a dry room, pass the mixture through a sieve, and at once put into packages, observing to press it hard, and to cover it with tinfoil or close-made paper, and 1 pound tartaric acid, 1 pound alum, 2 pound pure bicarbonate of soda, I pound farina, and 3 ounces sesquicarbonate of ammonia. Or: 5 pounds tartaric acid, 8 pounds pure sesqui-carbonate of soda, and 16 pounds farina. In using, 1 or 2 tea-spoonfuls are mixed with the dry flour, which is then made up quickly with cold water, and baked immediately. Any other flour or starch may be used instead of the potato flour.

eccipts for the Flower and Kitchen Garden.

The aim of the following receipts is to afford information for the treatment of ornamental in-door plants, and for the general requirements and improvement of the flower and kitchen garden, without entering into the principles of

either agriculture or horticulture.

1820. To Dissolve Bones for Maput them into a hole in the ground, or, preferably, a stone tank. Pour upon them about daily to a dung-heap will form a fine compost.

Bores may also be dissolved by filling an

and fresh bones, slightly wetting from time to time with hot water. This is a more econom-

Composts are mixtures of several for the improvement of the general soil under cultivation, or for the culture of particular plants. In respect to composts for the soil of the garden, their quality must depend upon that of the natural soil; if this be light, loose, or sandy, it may be assisted by heavy loams, clays, etc., from ponds and ditches, cleanings of sewers, etc. On the other hand, heavy clayey and all stubborn soils may be assisted by light composts of sandy earth, drift, and 112 pounds crude sulphate of ammonia; and sea-sand, the shovelings of turnpike roads, the cleansing of streets, all kinds of ashes, 1829. Fertilizing Powder. To 18 can be most conveniently procured.

1822. To Prepare Composts. The the drainings from a dunghill; and after be-preparation necessary for heavy and light ing drained, but while still wet, should be composts for general enrichment, and of the sprinkled with the powder and then dried. above different earths, consists in collecting ridges of 3 or 4 feet broad, and as high, turn-ring, 2 parts crushed bones in 1 part oil of viting them every 6 weeks or 2 months for a year riol and 3 parts water forms a super-or a year and a half before they are used, phosphate of lime, which, mixed with water, Peat earth, being generally procured in the dry earth, or sand, forms an excellent manure. state of turf full of the roots and tops of heath, 1831. How to Select and Manage requires 2 or 3 years to rot; but after it has through a small sieve will be found fit for use. Some nurserymen use both these loams and peats as soon as procured, and find them manures enter, not less than 1 year ought to be allowed for decomposition and sweetening.

of leaf-mould may take its place.

for use. Sheep's-dung, 1 peck to 30 gallons. Sulphate of ammonia, 11 ounces to every gallon.

Blowing of Flowers. To hasten the blowing of flowers the following liquid has been the water employed to moisten them.

1826. Artificial Manure for Clover. Mix together 10 parts each sulphate of amical plan than by the use of sulphuric acid, monia, common salt, and oil of vitriol; 15 and is said to make a more soluble compound, parts chloride of potassium; 17 parts each 1821. Composts for Improving the gypsum (plaster of Paris) and sulphate of potassa; 20 parts saltpetre; 25 parts crude earths, or earthy substances, or dungs, either Epsom salt (sulphate of magnesia); and 33 parts sulphate of soda (Glauber salts.

1827. Artificial Manure for Wheat, Turnips, or Grass. Take 28 pounds crude potash, 1 cwt. common salt, 2 cwt. each bone dust and gypsum (plaster of Paris), and 15 bushels wood ashes. Mix them together.

1828. Artificial Guano. Mix 11 pounds dry sulphate of soda (Glauber salts) with 28 pounds wood ashes; 84 pounds common salt;

1829. Fertilizing Powder. To 18 rotten tanners' bark, rotten wood, sawdust, parts very fine bone dust add 1 part each and other similar light opening materials that gypsum (plaster of Paris) and sulphate of ammonia. The seed should be steeped in

1830. Phosphate for Manuring. each soil in the compost ground, in separate Macerate for some days, with frequent stir-

1831. How to Select and Manage Cuttings. The choice of cuttings should be lain 1 year it may be sifted, and what passes made from the side shoots of trees and plants, and, when possible, from such as recline towards the ground, observing to leave a little wood of a former year or season's growth answer perfectly for most plants; but for attached to them, as such are found to take delicate flowers, and especially bulbs, and all root more readily than when they are wholly florists' flowers, and for all composts in which composed of new wood. The time to take cuttings is as soon as the sap gets into full motion. Before setting them they should be 1823. Universal Composts. The pre- cut across, just below an eye or joint, with as paration of many separate kinds of composts smooth a section as possible, observing not to may be obviated by the general use of the injure the bud. The superfluous leaves may following mixture: Fibrous peat, 1 part; leaf-be removed, but a sufficient number should be mould, 2 parts; thoroughly rotted dung, 1 left on for the purposes of vegetation. The part; light hazelly loam, 4 parts; and 1 part practice of removing all or nearly all of the sharp sand. There is scarcely any flowering leaves of cuttings is injudicious. In some plant but will grow well in such a mixture, cases leaves alone will strike root. In the and if peat is not to be had, an additional part case of tubular stalked plants, it is said to be advantageous to insert both ends into the soil, 1824. Liquid Manure. The principal each of which will take root, and may then be materials now used for liquid manures are to divided, when two plants will be produced be used in the following proportions for all or- instead of one. An equable temperature, a dinary purposes: Guano, dissolve 50 pounds moist atmosphere, a shady situation, and weight in 10 gallons water, and of this strong a moderate supply of water, are the princisolution, add 5 ounces to 10 gallons of water pal requisites to induce speedy rooting. Excess of any of these is prejudicial. When the size of the cuttings admits, it is better to place them under a hand or bell glass, which 1825. Liquid Guano to Hasten the will preserve a constant degree of heat, and prevent evaporation from the surface of the leaves, which is the most common cause of used with great advantage: Sulphate or their dying, especially in hot, dry weather. nitrate of ammonia, 4 ounces; nitrate of | What the degree of heat ought to be is decipotash, 2 ounces; sugar, 1 ounce; hot water, ded by the degree of heat requisite for the 1 pint; dissolve and keep it in a well-corked mother plant. Most species of the erica, bottle. For use, put 8 or 10 drops of this dahlia, and geranium, strike better when supliquid into the water of a hyacinth-glass or plied with rather more heat than is requisite jar for bulbous-rooted plants, changing the for the growth of these plants in green-houses. water every 10 or 12 days. For flowering Cuttings of the myrtle tribe camellias, and plants in pots, a few drops must be added to most other plants, require rather less heat than the plants in their growing state.

if inserted in a mere mass of earth, will hard-stirred, so as to thoroughly mix the ingredily throw out roots, while, if inserted at the ents. The quantity of stearine to be added is side of the pot so as to touch the pot in their whole length, they seldom fail to become Care must be taken not to add too much rooted plants. The art is to place them to stearine, as it would sink to the bottom and touch the bottom of the pot; they are then injure the flowers. The vessel, with its cover to be plunged in a bark or hot-bed and kept moist

by Charcoal. A horticulturist in England purchased a rose-bush full of promising buds the flowers, however, were of a faded hue. the leaves being thus prevented from touch-He covered the earth in the pot about an ing each other. The vessel is then put into a inch thick with pulverized charcoal, and was hot place, such, for instance, as the top of a surprised, some days afterward, to find the blooms of a fine lively rose color. He then tried the powdered charcoal upon petunias, and found that both the white and violet colored flowers were equally sensitive to its action. It always gave great vigor to the red or violet color of the flowers, and the white petunias became veined with red or violet ter. Mix a little saltpetre or carbonate of tints; the violets became covered with irregular spots of a bluish or almost black tint. Many persons who admired them thought they were choice new varieties from the seed. Yellow flowers appear to be insensible to the immersing them half-way up their stems in influence of charcoal.

1834. To Turn White Flowers Red. The juice of the Virginian pokeweed sprinkled on the white hyacinth will turn it red. The same effect is produced on many other

white flowers.

To Preserve Cut Flowers. Place a vase containing the cut flowers in the proves useless. centre of a flat dish, into which a little water has been poured; invert a bell glass over the by the water, thus forming an air-tight chamconstantly moist, and will remain so as long as the supply of water in the dish is kept un-diminished. We recommend those who love set in the sun to grow. to see plenty of fresh flowers in their sittingrooms in dry weather, to adopt this plan. The experiment can be tried by inverting a tumbler over a rose-bud in a saucer of water. water upon it. When cool, use the liquid oc-If some charcoal has been previously steeped in the water, or a small piece of camphor dissolved, it will greatly assist in keeping the flowers fresh. Violets may be preserved for a long time by sticking them with short stems Blue. into a glass dish filled with damp silver-sand, and then inverting a tumbler over them.

1836. To Preserve Flowers. Flowers may be preserved for many months by dipping them carefully, as soon as gathered, in tinually grown in the same, from the cutting perfectly limpid gum water; after allowing them to drain for 2 or 3 minutes, arrange them in a vase. The gum forms a complete coating on the stems and petals, and preserves their shape and color long after they have become

Preservation of Flowers with their Natural Colors. The mode in which the operation is effected is this: A vessel May, that are required to flower in those with a movable cover and bottom is provided, and having removed the cover from it, a piece of metallic gauze of moderate fineness is fixed over it, and the cover replaced. A quantity of sand is then taken, sufficient to ing the plants to produce only one cluster of fill the vessel, and passed through a sieve into flowers each, and taking off all the suckers and an iron pot, where it is heated, with the addiside shoots to strike for flowering the follow-

1832. To Insert Cuttings. Cuttings, | tion of a small quantity of stearine, carefully at the rate of \(\frac{1}{2} \) pound to 100 pounds of sand. on and the gauze beneath it, is then turned upside down, and, the bottom being removed, The Color of Flowers Changed the flowers to be operated upon are carefully placed on the gauze and the sand gently poured in, so as to cover the flowers entirely, baker's oven, where it is left for 18 hours. The flowers thus become dried, and they retain their natural colors. The vessel still remaining bottom upwards, the lid is taken off, and the sand runs away through the gauze, leaving the flowers uninjured.

1838. To Preserve Flowers in Wasoda with water, and it will preserve the

flowers for 2 weeks.

1839. To Restore Faded Flowers. Faded flowers may be generally restored by very hot water, and allowing them to remain in it until it cools, or they have recovered. They must then be removed, the coddled portion of the stems cut off, and placed in clean cold water. In this way a great number of faded flowers may be restored, but there are some of the more delicate kinds on which it

1840. To Raise Hyacinths in Winter. Put the bulbs in glasses or earth, and set them vase, so that the rim of the glass is covered in a dark closet to sprout. If in glasses, the water should not be higher than 1 inch below ber. The air surrounding the flowers will be the bulb, until the roots have reached the water, when the glasses may be filled up, a piece of charcoal put in the water, and the plants

Soot Water for Roses. 1841. the soot obtained from the pipe or chimney of a wood fire, into a pitcher, and pour hot casionally to water the rose plants. Its effects are extraordinary in strengthening the growth

of the plants and flowers.

1842. To Make Hydrangea Flowers If they are grown in a tolerably strong maiden loam, which contains a portion of oxide of iron, the flowers will become blue without further trouble; but they will require to be potted in this said compost, and conpot, to ensure their flowers coming blue. If the soil itself will not make the flower blue, they should be watered with a solution of alum for some time previous to flowering. The solution may be made by mixing at the rate of 1 ounce alum to a gallon of rain water. The plants should be struck from small cuttings of the soft wood, from February till months the following year. They should be potted in time enough for their roots to fill them before winter. It is advisable to flower them the following spring in the pots, allowing spring, as old plants cannot be depended | the plant is grown, it will frequently, although is excellent to destroy black ants. color to a light blue. A cutting, however, places infested by these vermin. (See No. taken from the plant thus changed, and grown 1909.) without iron filing, reverts to its previous

1843. To Prevent Damping or Fogging Off. Cuttings in heat, and seedlings pricked out, are very liable to damp off, if in a confined air, with too much moisture. of damping appear, to give more air, and increase the temperature 5 degrees, and, at the same time, to sprinkle the surface of the soil with a mixture of silver-sand and powdered peat, crumbled to the fineness of snuff.

1844. To Remedy American Blight. Take 1 peck quicklime, 1 pound flowers of sulphur, and 1 pound lampblack. Mix with boiling water, enough to form a thick paint. With this, in the winter, when the leaves are off, paint the branches, having first removed all loose bark. In doing this, be sure to remove the soil from the bottom of the stem to the main roots, and paint all the underground part. February is a good time for this. If one application is not sufficient, repeat. Use the paint warm. When this has become dry, the trees should be looked over, and all cracks again, to close any cracks that may occur.

1845. To Destroy Aphides, and Other Insects on Plants. Take of quassia chips, 31 ounces; larkspur seed, 5 drachms; boil these together in 7 pints water until the decection is reduced to 5 pints. When the liquid is cooled it is to be strained, and used with a wateringpot or syringe, as may be most convenient. This is a most excellent method of destroying insects on plants, without injury to the latter. It is recommended by the highest authorities.

1846. Blight on Fruit Trees, Roses, and Fruit Bushes. When winter dressings have failed, and the pests appear in spring to such an extent as to endanger the crop, procure a quantity of ammoniacal liquor from the gas-works, and to every pailful of the li-quor add 6 of water, and boil as soon as possible in a large copper. Apply this in the evening, hot, with a syringe, drenching every part of the trees, and letting not a leaf escape. It should be used as hot as can be borne by placing the hand in it, and thrown with as much force as possible into all the crevices in its strength, will also destroy the insects. the bark, on the under sides of the leaves, and splashed vigorously against the wall on which espaliers are trained. It may be used also for benefit. Two days after give another syringing with plain warm water. To clean the reach copper in which the mixture is prepared, fill it with water, throw in a shovel of einder ashes and a pound of soda, and let it boil for half an hour,

1847. To Prevent Ants from Injuring Fruit Trees. Make a line of gas-tar round the stem of the tree, or if it be trained on a will prevent ants from ascending.

1848. To Destroy Black Ants. Boil upon to produce blue flowers. If & part of 4 ounces quassia chips in 1 gallon water, for iron filings be mixed with the earth in which 10 minutes, and add 4 ounces soft soap. This not always, change from its original pink Sprinkle pulverized borax over the plants or

> 1849. To Prevent Mildew on Trees. The best preventive against mildew is to keep the plant subject to it occasionally syringed with a decoction of elder leaves, which will prevent the fungus growing on them.

1850. To Remove Mildew from Roses, best mode of treatment is, as soon as evidences | Pelargoniums, Etc. Mildew has been suecessfully removed from roses and pelargoniums, by dissolving 1 ounce nitre to 1 gallon water, and watering the plants with it occasionally; another way is to wash the diseased parts with a decection of elder leaves. But the most effectual remedy is flowers of sulphur dusted over the foliage, by means of a dredging-box with very fine holes.

1851. To Remove Green Fly. a still evening, and let the plants be quite dry. Arrange them together in a close place; put into an iron pan, or a flower-pot, a few red-hot cinders that do not smoke, upon which lay the tobacco or tobacco-paper; a cloud of smoke will soon arise. When the frame is well filled with smoke, remove the pan, and be exceedingly careful that the tobacco does not break out into a flame.

and holes stopped with well worked clay, and after frost the clay-stoppings should be dressed bacco Smoke. There are various modes of employing the smoke of tobacco for the destruction of insect pests in plant houses, but the best is as follows: -According to the size of the place to be fumigated provide one or more pieces of cast-iron 1 inch thick and 3 inches of surface. Make these red-hot and place each in a large-sized pot; and on them as much tobacco as may be considered necessary to completely fill the house with smoke. An ordinary eight-light house will require 3 heaters, and 1 pound of tobacco, divided into 3 equal parts. If the tobacco is previously soaked in a strong solution of saltpetre, its ignition is more rapid and complete, and a less quantity suffices.

1853. To Drive Worms out of Pots. Securely cork up all the drainage holes in the pot, and then flood it for several hours with clear lime-water.

1854. To Destroy Green Fly. Syringe the plants with tobacco water. One part ammoniacal liquor from the gas-works, mixed with 5 or more parts of water, according to

1855. Wash to Prevent Cattle from Barking Trees. Take \$ cow-dung and \$ lime; mix with a little water, to the consistroses and fruit bushes, with the most certain ency of thick lime-wash, and lay this on the stems of the trees as far as the cattle can

1856. To Prevent Grub in Onions. Make some strong lime-water, add to it as much soot as will make it into a thin paint, and water the crop with it the moment the magget appears. This soot mixture is so stimulating a manure that it should always be used to increase the weight of the crop. wall, make a horizontal line near the ground, House-slops mixed with lime and soot would on the wall, and one round the stem; this be still more powerful, both to destroy maggot and improve the plant; but unless rain

to drench the ground with pure water the day after application. Ground intended for a crop of large onions should be prepared in the autumn, and after being dug over, should be Seed. Take all the seeds that sink in water watered with a mixture of sulphuric acid and water, made so strong as to burn the tongue. This will destroy every animal in the soil, and to 90° or 95° Fahr., and then rub the seeds the winter rains will wash it away entirely

before spring. 1857. To Prevent Attacks of Red Spider. In cases where the infested plants To Prevent Attacks of Red can be well syringed, a few times repeating this operation will cause them to disappear. When this cannot be resorted to with safety, the flues or pipes may be washed over with sulphur, and should be kept warm to raise an effluvia in the house, which will soon eradicate these pests. If a little soft soap is mixed with the water to syringe with, it will as red spider, and will not injure the foliage of the plant, providing the plants are not syringed when the scorehing hot sun is upon them

1858. To Kill Thrips on Cucumbers and Melon Plants. To kill thrips on cucumbers and melon plants, they should be syringed with tobacco water, and a little sulphur added, or with a decoction of elder will suffice; or the infested parts may be dusted over with flowers of sulphur, and allowed to remain on for 3 or 4 days, when it should be washed off thoroughly with a syringe. (Sec No. 1850.)

1859. To Destroy Maggot in Roses. A bushel of unslacked lime in powder, ½ pound sulphur also in powder; mix these about as thick as molasses, and boil for 1 hour; then add just enough soot, moistened to the same consistence, to darken the color; lay this on with a brush all over, stock and head,

in the latter part of March. 1860. Every second year fruit trees should dipped in strong brine, so as to moisten every part of the bark of the stem and branches. This not only destroys the moss, but insects of all kinds, and is beneficial to all trees, whereas applications of lime choke up the treated will never appear again. respiratory pores, and sometimes produce canker.

To Remove Moss on Gravel Walks. This may be kept down by the use of a broom made of wire; if the wire is made of iron the broom should be well dried and dipped in oil before and after being used.

1862. To Protect Lettuce and Strawberry Beds from Snails. If the beds are surrounded by a slate or board edging, made to stand 5 inches above the ground, and occaoil and soot, it will form a barrier over which odor and may be driven away by it.

snails will not pass.
1863. To Prove Cucumber and Melon cut; if the seed has been dried and kept for employed for this purpose.

followed immediately, it would be advisable any length of time, it will probably all swim. though it has not lost its vegetating proper-

> To Clean Cucumber and Melon and put them into a hair sieve; pour some warm water over them that has been heated about in the sieve. The warm water will divest them of the glutinous matter, and it may be easily rubbed off them through the sieve, after which they may be laid to dry. Cucumber and melon seeds will vegetate after

they have been kept for years. 1865. To Kill Moss on Lawns. Water the lawn with a weak solution of ammoniacal liquor (see No. 1854); 1 gallon of this liquor is sufficient to mix with 4 gallons of water, and should be put on with a rose water-pot. It will cause the grass to look brown afterprove obnoxious to many other insects as well wards for a while, but it will become green again. Another way is to procure some very fine siftings of coal-ashes, and sow them all over the parts where moss abounds. It will only be requisite to sow them very thinly, and if done just before a shower of rain, so much the better, as the rain will wash it in; this will kill the moss without injuring the grass. The presence of moss indicates that the soil is exhausted, and a top-dressing of leaves; either of these repeated a few times intrate of soda or soot will be found beneficial. If the grass is made to thrive, it will always

noke the moss. (See No. 1876.) 1866. To Kill Moss on Meadow Land. The mossy parts of the meadow should be well manured with good well-rotted stable dung in the autumn; and, if practicable, the grass should be fed off the following spring with sheep. Nitrate of soda sown on the well whilst dry, then add water to make it mossy parts of the field will also kill the moss, and is an excellent manure for the grass; but this should not be sown at the rate of

choke the moss.

more than 1½ cwt. per acre.
1867. To Kill Docks, Dandelions, etc. Cut the tops off in the spring or summer To Destroy Moss on Fruit time, and pour some gas-tar, or sprinkle some salt on the wound. Either of these be well scrubbed with a scrubbing brush will kill the root, by eating to the very extremity.

1868. To Destroy Burdocks. close to the ground with a sharp hee, and apply a few drops of kerosene. The plant so

1869. To Prevent the Growth of Weeds in Garden Walks. A weak solution of carbolic acid applied with a wateringpot to garden walks will be an effectual mode of preventing the growth of weeds. The solution should not be stronger than 1 part pure carbolic acid to 1000 to 2000 parts water. Pure carbolic acid is a virulent poison. When applied in too strong a solution, larger plants may suffer; very weak solutions destroy only very small plants and animals, as parasites, sionally coated with a paste made of train miasma. Even flies and mosquitoes avoid its

1870. To Destroy Thistles, Grass, and Weeds, in Gravel Walks. Sow When the fruit is first cut, the seed coarse salt upon the plants; the thistles should be put into a bowl of water, and that should be first cut to the ground, and the which swims on the surface is worthless; the fresh roots be covered with the salt. The good will sink to the bottom. This can only refuse article from the beef, pork, or salt be depended upon at the time the fruit is first fish barrel is quite good enough, and may be

Cleanliness for Flants. 1871. quently the cause of the languidness of plants in rooms, arises from want of care in cleans-Plants breathe by their ing the leaves. leaves, which should be kept perfectly clean, otherwise their respiration is interfered with. The mere watering of the roots is not enough. Plants also perspire by their leaves, and any accumulation of dirt and dust retards this useful function. Plants also feed by their leaves, by absorbing the carbonic acid of the atmosphere; and, to speak familiarly, dirt destroys both their appetite and digestion. Let any one examine a sickly plant, long kept in a sitting-room, or draw a piece of white linen or leather over the surface of the leaves, and he will probably discover the cause of the plant's drooping.

1872. To Keep Cucumbers Fresh. When the cucumbers are at their best they should be cut, and laid in a box made just to fit them, and then bury the box in some dry sand, covering it over to the depth of a foot. There should not be any hay or moss put with them in the box. as it will cause them to turn yellow. If laid in the box without hay or moss, their color and bloom may be preserved for two weeks to look as fresh as the day they were cut. Melons may also be kept in the same way.

To Cure Gumming in Fruit Trees. The place where the gum accumulates should be well washed and cleaned, and then stopped well up with a paste made of horse-dung, clay and tar. This will prevent the accumulation of the gum, and will assist the wound in healing over.

1874. To Prevent the Bottoms of Plant Sticks Rotting. Dip the bottoms of the plant sticks (as far as they are inserted into the ground) into hot asphalt three or four times, until the asphalt is the $\frac{1}{16}$ of an inch thickness on them; this will preserve them a long time. Those that have not the convenience of dipping them in asphale, may substitute tar, and they will endure nearly as long as those that have been asphalted.

1875. To Destroy Weeds and Worms in Gravel Walks. Lay a coat of sait all over the walk, and then water it, using a rose water-pot; but this should not be done where there is a box edging, or it will kill that likewise. Where the edging is turf, slate, or tiles, there is nothing to fear.

To Destroy Worms in Lawns, **1876**. Grass Plots, etc. Mix at the rate of 10 pounds slacked lime to 30 gallons water; stir it up well together, and then let it stand for 2 or 3 days, in which time pour it off the sediment, and water the lawn with it by means of a rose water-pot; this will fetch the worms require to be swept up with a broom and carsurface; and the lawn should be rolled the evening previous, which will not only assist in bringing the worms nearer the surface, but The following night they will again open the consistency of soft soap. holes in which they lie, and thereby afford

Fre-|liquor will answer the same purpose, but it will make the grass look brown for some time

afterwards. (See No. 1865.)

1877. Composition for Wounds on North Mark nitch 1 Rose-Bushes. Take 5 parts black pitch, 1 part each resin, tailow, and bees' wax; these should be mixed in a small pipkin, and dissolved over a slow fire. Apply it to the wounds with a brush, and it will heal them, as well as prevent their dying back.

1878. Bleeding in Vines. Work together 1 part calcined oyster-shells beaten to fine powder in a mortar, and 3 parts cheese, until they form a sort of paste. This mixture is to be forced into the pores of the wood where bleeding takes place, by means of the thumb and finger. A second application is sometimes necessary. (See Nos. 1880 and 1881.)

1879. Composition for Healing Wounds in Trees. Take 3 parts pounded chalk and 1 part common vegetable far; mix thoroughly, and boil them with a low heat till the composition becomes of the consistency of bees' wax; it may be preserved for use in this state for any length of time. If chalk cannot conveniently be got, dry brick-dust may be substituted. After the broken or decayed limb has been sawed off, the whole of the saw-cut must be very carefully pared away, and the rough edges of the bark, in particular, must be made quite smooth; the doing of this properly is of great consequence; then lay on the above composition hot, about the thickness of half a dollar, over the wounded place, and over the edges of the surrounding bark; it should be spread with a hot trowel.

1880. New Grafting Wax. Melt 1 pound resin over a bow fire, add 1 ounce beef tallow, and stir with a perfectly dry stick or piece of wire. When somewhat cooled, add 1 table-spoonful spines of turpentine, and lastly 5 ounces of 95 per cent. alcohol in small quantities, stirring the mass constantly. Should the alcohol cause it to lump, warm again until it melts. Keep in a bottle. Lay it on in a very thin coat with a brush. In a room of moderate temperature, the wax should be of the consistence of molasses. Should it prove thicker, thin it down with alcohol. It is always ready for use, is never affected by heat or cold, and heals up wounds hermetically

1881. Grafting Wax. Take 4 ounces pitch, 4 ounces resin, 2 ounces hogs' lard, and 2 ounces bees' wax; put them all together into a pipkin, and dissolve them over a slow fire, and it will form an excellent grafting wax. By spreading some of this mixture on paper The French it makes the grafting paper. out on the top of the ground, and they will make very good grafting wax by mixing together equal quantities of bees' wax and resin, ried away. The best time to do this is in damp and adding as much tallow as will cause it to weather, as the worms are then nearer the dissolve at a low temperature. For an application where limbs have been removed in pruning, nothing is better than coal tar.

1882. Grafting Clay. Take strong adwill fill up all the holes they have forsaken. hesive loam or clay, and knead it till of the Take also some horse droppings, and rub through a riddle of the water greater facility to reach them the half-inch mesh. Mix the two ingredients next day without wasting much by its soak, with fresh cow-dung, all in equal parts, to ing into forsaken holes. Diluted ammoniacal a uniform consistency. When grafting, the

pot; the bottom being covered with small season.

whole is saturated to the brim.

a voyage of many months, without injury to their vegetating properties.

1885. To Prepare Name to rees. These should be of cast iron if they reing they should can be obtained. Before using, they should be heated red-hot, and then thrown into cold linseed oil. This gives them a varnish which preserves them from rusting, and prevents the mortar of the wall from sticking to them

when they are drawn.
1886. Method of Covering a Bank of Earth With Grass. To cover a steep bank quickly with grass the following method is recommended by a German Horticultural Association: For each square rod to be planted, take & pound lawn grass seed, and mix it infeet of good dry garden earth and loam. This is placed in a tub, and to it liquid manure, diluted with about & of water, is added and well stirred in, so as to bring the whole to the consistency of mortar. The slope is to be cleaned off and made perfectly smooth, and then well watered, after which the paste just mentioned is to be applied with a trowel, and made as even and thin as possible. Should it crack by exposure to the air, it is to be again watered and smoothed up day by day, until the grass makes its appearance, which will be in 1 or 2 weeks, and the whole declivity will soon be covered by a close carpet of green.

1887. Substitute for Glass for Hot-Houses. Apply, with a common painter's brush, boiled oil, or Canadian balsam, diluted with oil of turpentine, to the surface of white muslin previously stretched out and fastened mation on the subject.

in the position it is intended to occupy.

1888. To Preserve Potatoes and Other These are preserved in different ways, according to the object in view. Tuberous roots, as those of the dahlia, pæonia, tuberose, etc., intended to be planted in the succeeding spring, are preserved through the winter in dry earth, in a temperature rather under than above what is natural to them: So may the bulbous roots of commerce, as hyacinths, tulips, onions, etc.; but, for convenience, these are kept either loose, in cool dry may be preserved in an ice-house till the re-linto the water, and climbs on the reck. The

operator should have at hand some finely-'turn of the natural crop. After studing the riddled ashes, into which the hands should be interstices with straw, and covering the surdipped to prevent the clay from adhering, and face of the ice with the same material, place enable him to give the whole a neat finish. on it boxes, casks, baskets, etc., and fill them 1883. To Propagate Marsh Plants. with turnips, carrots, beet 1 ots, and, in particular plan is by means of a stone trough ticular, potatoes. By the cold of the place, 6 inches to a foot deep, and of any convenient vegetation is so much suspended that all these length and breadth, with a hole for a tap at articles may be thus kept fresh and uninjured one corner. This is to be treated as a flower-till they give place to another crop in its natural

stones, and the trough filled up with a compost of peat and light loam. The surface is rubbed in water to get rid of the dirt and also then covered with any description of light some of the nuccous substance that would moss that can be got, and watered till the otherwise render them mouldy; the larger are then to be cut, split, or pecled, but in most 1884. To Prepare Seeds for Expor- aromatic roots, the odor residing in the bark, Seeds intended for exportation they must not be peeled; they are then to be should not be gathered until they have be-spread on sieves or hurdles, and dried in a come perfectly ripe; they should then be laid heat of about 120° Fahr., either on the top of in a stove, or exposed in the sun to dry, as an oven, in a stove, or a steam closet, taking getting them perfectly dry is the principal care to shake them occasionally, to change the point. They may be packed in bags, papers, surface exposed to the air. Thick and juicy or boxes. If they are kept dry, they will bear roots, as rhubarb, briony, peony, water-lily, etc., are cut in slices, strung upon a thread, and hung in a heat of about 90° to 100°. Squills are scaled, threaded, and dried around the pipe of a stove, or in a hot closet. Rhubarb should be washed, to separate that nucous principle which would otherwise render it black and soft when powdered. Potatoes are cut in slices and dried.

1890. To Transplant Large Shade In the autumn, before the frost comes on, dig a trench around the tree and cut the roots, but not too near the tree. Remove the tree through the winter, when the ground is frozen. Raise it up with the frozen earth adhering to the roots. The whole mass is easily raised with levers on to a strong sled, timately and thoroughly with about 6 solid and can then be drawn erect by means of oxen or horses. Trees from 20 to 30 feet high can be moved by this method, and they will

grow in the spring.

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1891. To Drain Land in Level Places, sink a well down to the first porous stratum. The water from the upper soil will flow readily into the well, especially if drain pipes or tiles be laid in its direction.

the Extermination of Vermin. The following comparatively few receipts and directions for destroying, trapping and driving away insects and vermin of all kinds, have been selected as the most efficacious, from a large amount of infor-

To Catch Rats. Cover a common 1893. barrel with stiff, stout paper, tying the edge round the barrel; place a board so that the rats may have easy access to the top; sprinkle cheese parings or other feed for the rats on the paper for several days, until they begin to think that they have a right to their daily rations from this source; then place in the bottom of the barrel a piece of rock about 6 or 7 inches high, filling with water until only enough of it projects above the water for one rat to lodge upon. Now replace the paper, shelves or lofts, or the finer sorts in papers, first cutting a cross in the middle, and the first till the season of planting. Roots of all kinds rat that comes on the barrel top goes through

others, who share the same fate.

side of the cover, exactly opposite each other, 40 dead rats. as a pirot, and fit in the barrel, so that a light weight will readily tip the cover. Put the bait on top, in a firm way, and place an empty barrel or box near by. This is a simple, but excellent map.

some bait in a common or wire spring trap, and the trap be set in an infested locality, in a short time the cage will be found occupied borax should be pulverized a d sprinkled by vermin. Rats and mice possess a great around the infested places. liking for the oil, and will risk anything to

obtain it.

Take a 1896. To Catch Muskrats. steel trap with a single spring, set it 11 inches under water, hang part of a sweet apple over the foot plate, and chain the trap to a stake or rush. The reason why the trap should be set under water is that when the muskrat sees the apple he will jump for it; when he comes down he gets his paws in the trap.

1897. Rat Poison. Recent experiments

have shown that squills is an excellent poison for rats. The powder should be mixed with some fatty substance, and spread upon slices of bread. The rulp of onions is also good.

Rats are very fond of either.

1898. To Drive Rats from a Building. Dissolve 2 ounces glue, 2 ounces tincture of in a wire cage trap, baited with corn meal scented with oil of anise, catch two or three in such a way as to hurt them as little as possible, then give them a slight coating with open the windows and air thorough the above mixture, heated warm; let them brimstone will be found to have also loose into their holes, and there will be no the paint if it was a yellowish white. more trouble with the rats for months to This mixture will last 2 years. Or: Take chloride of lime, and scatter it dry all tine, 1 ounce corrosive sublimate, and 1 pint around, and into their holes, and wherever alcohol. they haunt, and they will leave at once.

Phosphorus Paste for Vermin. Introduce 1 drachm phosphorus into a Florence flask, and pour over it 1 ounce rectified spirit. Immerse the flask in hot phosphorus is now reduced to a finely divided state. This, after pouring off the spirit, is to be mixed in a mortar with 1½ ounces lard. 5 ounces flour and 1½ ounces brown sugar, previously mixed together, are now added, and banisher of these pests. the whole made into a paste with a little water. Cheese may be substituted for sugar when the paste is intended for rats or mice. the preparation of this paste.

paper comes back to its original position, and carbon seems to be useful in certain cases, the second rat follows the first. Then begins when it may be applied without inconvenience a fight for the possession of the dry place on to the human species. In an atmosphere conthe stone, the noise of which attracts the taining $\frac{1}{20}$ of its volume, it has, according to others, who share the same (at).

Cloez, a very rapid action on the animal or-894. Rat Trap. All a barrel about ganism, more rapidly, apparently, upon rats, half full of water. Make the cover 1 inch rabbits, &c., than upon birds and frogs. Cloëz smaller all a ound than the inside of the top introduced 14 ounce sulphide in a culvert, of the berrei. Drive a nail or whe on each and found within 20 ya. ds from the place some

1901. To Exterminate Cockroaches. Borax is one of the best of roach exterminators. There is something neguliar, either in the smell or touch of borax, which is certain death to them. They will flee in terror from 1895. Bait to Catch Rats and Mice. it, and never appear again where it has once If a drop of oil of rhodium be poured upon been placed. It has also the great advantage of being perfectly harmless to human beings; hence there is no danger from poisoning. The

around the infested places.
1902. To Kill Cockrouches and Croton Bugs. Boil 1 ounce poke-root in 1 pint water until the strength is extracted; mix the decoction with molasses and spread it in plates in the kitchen or other apartments which are infested by these insects. Paris green sprinkled around the apartments will also exterminate them; but should be used

with caution, as it is very poisonous.

1903. To Destroy Bed-bugs. Rub
the bedsteads in the joints with equal parts of spirits of turpentine and kerosene oil, and the cracks of the surbase in rooms where there are many. Filling up all the cracks with hard soap is an excellent remedy. March and April are the months when bedsteads should

be examined to kill all the eggs.

1904. To Destroy Bed-bugs in Paperassafætida, and 2 ounces potash in water, and ed Rooms. Clean the paint of the room add ½ ounce phosphorus to the mixture. Then thoroughly, and set in the centre of the room a dish containing 4 ounces of brimstone. Light it and close the room as tight as possi-ble, stopping the keyhole of the door with parats; if they are very numerous, more will ble, stopping the keyhole of the door with pabe necessary; singe the hair partly off these per, to keep the fumes of the brimstone in the room. Let it remain for 3 or 4 hours, then open the windows and air thoroughly. brimstone will be found to have also bleached

1905. Bed-bug Poison. Mix together 2 ounces camphor, 4 ounces spirits of turpen-

To Kill Bed-bugs. Benzine or gasoline will kill these pests as fast as they can be reached. By using a spring-bottom oiler, the fluid may be forced into cracks and crevices more thoroughly than by any other water until the phosphorus is melted, then means. As this fluid is highly inflammable, put a well-fitting cork into the mouth of contact with fire must be avoided. The room the flask, and shake briskly until cold. The should be well aired and ventilated afterwards,

until the gas passes away. (See No. 346.)
1907. To Exterminate Bed-bugs. Wash the article infested with a weak solution of chloride of zinc. This is an effectual

1908. Benzine as an Insect Destroyer. A mixture of 10 parts benzine, 5 parts soap, and 85 parts water, has been very successful-There is said to be no danger whatever of ly used to destroy the parasites which infest spontaneous ignition, either during or after dogs. It has also been used with good results in veterinary practice, as an application in 1900. An Insect Killer and Destroyer certain diseases of the skin; and thus diluted, of Noxious Animals. The bisulphide of is found to answer better than when used pure.

few leaves of green wormwood, scattered exposed parts, will effectually keep off those among the haunts of these troublesome insects, is said to be effectual in dislodging them.

(See No. 1848.)

To Exterminate Red Ants. 1910. Grease a plate with lard, and set it where these insects abound. They prefer lard to anything else, and will forsake sugar for it. Place a few sticks around the plate for the ants to climb up on. Occasionally turn the plate bottom up over the fire, and the ants will fall in with the melting lard. Reset the plate, and in a short time you will catch them all. Powdered borax sprinkled around the infested places will exterminate both red and black (See No. 1901.)

1911. To Kill Flies. Beat up the yolk of an egg with a table-spoonful each of molasses and black pepper finely ground; set it about in shallow plates and the flies will be A sweetened infusion of rapidly killed. quassia will answer the same purpose. solve 1 drachm extract of quassia in a gill of poison especially fatal to insects. water, mix with 1 gill molasses and pour the mixture on a flat dish where the flies have access. The quassia acts on them like a nar-

1912. Fly Poison. Boil dounce small chips of quassia in 1 pint water; add 4 ounces

are soon destroyed by it.

1913. To Banish Fleas. The oil of pennyroyal will certainly drive them off; but a cheaper method, where the herb flourishes, is to dip dogs and cats into a decoction of it once a week. Mow the herb and scatter it the herb cannot be got, the oil may be procured. In this case, saturate strings with it and tie them around the necks of dogs and cats, pour a little on the back and about the Scatter chloride of lime ou a board in a stable, ears of hogs, which you can do while they are feeding, without touching them. By repeating these applications every 12 or 15 days, the fleas will leave the animals. Strings saturated with the oil of pennyroyal, and tied around the neck and tail of horses, will drive off lice; the strings should be saturated once a day.

1914. To Exterminate Fleas. Sprinkle chamomile flowers in the beds, and the fleas

will leave.

An Excellent Flea Trap. 1915. you should happen to have the consciousness of having a flea about your person, you have but to introduce, before getting into bed, a piece of new dannel between the sheets, and on may depend on finding yourself forsaken for the flannel.

1916. To Prevent the Attacks of Gnats. The best preventive against gnats, as well as the best cure for their stings, is

1917. To Clear a Room of Mosqui-Take of gum camphor a piece about ‡ the size of an egg, and evaporate it by placing it in a tin vessel, and holding it over a lamp or candle, taking care that it does not ignite. The smoke will soon fill the room, and expel

1918. To Keep Away Mosquitoes. Dip a piece of sponge or flannel in camphorated spirits, and make it fast to the top of the bedstead. A decoction of pennyroyal, for reference.

1909. To Disperse Black Ants. A or some of the bruised leaves, rubbed on the troublesome insects.

1919. To Destroy Vermin in Children's Heads. Take 1 ounce each vinegar and stavesacre, ½ ounce each honey and sulphur, and 2 ounces sweet oil. Make into a liniment, and rub the head with it. Insects are immediately suffocated by benzine. Those sometimes found in the heads of human beings are destroyed by it at once, without any inconvenient result being perceived. It has been employed very successfully in banishing the insects which infest domestic animals, (See No. 1906.) The use of larkspur seed for the destruction of the insects infesting the human head is a time-honored application among country people—beds of the plant being cultivated frequently for the express purpose of furnishing material for the decoction. The efficiency of this remedy seems to depend on the presence of the alkaloid called delphine, which appears to be a

1920. To Destroy Body Vermin. Apply stavesacre ointment or red precipitate.

1921. To Clean Canary Birds. These pretty things are often covered with lice, and may be effectually relieved of them by placing a clean white cloth over their cage at night. molasses. Flies drink this with avidity, and In the morning it will be covered with small red spots, so small as hardly to be seen, except by the aid of a glass; these are the lice, a source of great annoyance to the birds.

1922. Lice on Poultry. If infested with lice, damp the skin under the feathers with water, then sprinkle a little sulphur on in the beds of the pigs once a month. Where the skin. If the bird be covered with insects or parasites, they will all disappear in the course of 12 hours.

1923. To Drive Flies from Stables. to remove all kinds of flies, but more especially biting flies. Sprinkling beds of vegetables with even a weak solution, effectually preserves them from caterpillars, slugs, &c. A paste of 1 part powdered chloride of lime and part of some latty matter placed in a narrow band round the trunk of the tree, prevents insects from creeping up it. Even rats, mice, cockroaches, and crickets flee from it.

To Keep Flies from Horses. 1924. Procure a bunch of smartweed, and bruise it to cause the juice to exude. Rub the animal thoroughly with the bunch of bruised weed. especially on the legs, neck, and ears. Neither flies or other insects will trouble him for 24 hours. The process should be repeated every day. A very convenient way of using it, is to make a strong infusion by boiling the weed a few minutes in water. When cold it can be conveniently applied with a sponge or brush. Smartweed is found growing in every section of the country, usually on wet ground near highways.

Drepared Paper. Paper frequently requires some special preparation to fit it for many purposes for which it would be useless in its original state. The following methods of preparing paper will be found useful, and in some cases indispensable,

1926. To Make Transfer Paper. To paper required; keep the result of each sifting prepare transfer paper, take some thin post separate. Then smooth on both sides, with or tissue paper, rub the surface well with pumice stone, any good tough paper, and black lead, vermilion, red chalk, or any coloring matter; wipe this preparation well off of muslin is far preferable to paper. If large with a piece of clean rag, and it will be ready sheets are used it is better to glue the edges

Neustadt.

1928. To Make Tracing Paper with Benzine. If paper be damped with pure The paper resumes its opacity as the benzine stiff paper where formerly only a slight tissue could be used.

1929. To Make Transparent or Tracing Faper. Dissolve a piece of white bees' wax, about the size of a walnut, in ½ pint spirits of turpentine; then having procured ner as glass paper (see No. 1933), using some very fine white, woven tissue paper, lay it on a clean board, and, with a soft brush 1936. Phenyl Paper. This article dipped in this liquid, go over one side, and then turn it over and apply it to the other; add a small quantity of resin, or use resin in-

stead of wax

1930. To Make Tracing Paper. Lay open a quire of paper, of large size, and apply with a clean sash tool a coat of varnish, made of equal parts of Canada balsam and oil of turpentine, to the upper surface of the first sheet, then hang it on a line, and repeat the operation on fresh sheets until the proper quantity is finished. If not sufficiently transparent, a second coat of varnish may be applied as soon as the first has become quite

1931. Iridescent Paper. Boll in water, 8 parts nut-galls, 5 parts sulphate of iron, 4 parts each sal ammoniac and sulphate of indigo, and i part gum-arabic. Wash the paper in this decoction, and then expose it to am-

monia.

1932. To Powder Glass. Heat the glass red-hot, throw it into cold water; dry, glued upon paper or muslin for polishing; also to rub down corns upon the feet, after they

have well soaked and dried.

To Make Glass Paper or Cloth. Powder the glass (that with a greenish hue ness, to suit the different degrees of the glass stances.

on a frame (similar to a small quilting frame), 1927. To Make Tracing Paper with and when dry, damp the paper or muslin and Petroleum. Saturate ordinary writing paper stretch it, in the same manner as the muslin with petroleum by means of a brush, then is strained for sized roller blinds. Give the wipe it off until it is dry. This makes a surface a coating of strong glue size, and imtracing paper equal to the manufactured mediately dust the glass of the required finearticle, for all ordinary purposes. It was ness equally and thoroughly all over, using discovered by Mr. Häusel, an architect at the same sieve that was used to separate it from the rest of the powdered glass. When dry, throw off the surplus glass for future use.

1934. To Make Stone Paper. As, in and fresh distilled benzine, it at once assumes cleaning wood-work, particularly pine and a transparency, and permits of the tracing be other soft woods, one process is sometimes ing made, and of ink cr water colors being found to answer better than another, we may used on its surface without any running, describe the manner of manufacturing a stone The paper resumes its opacity as the benzine paper, which, in some cases, will be preferred evaporates, and if the drawing is not then to sand paper, as it produces a good face, and completed, the requisite portion of the paper is less liable to scratch the work. Having must be again damped with benzine. This prepared the paper as described in the last renew discovery of the properties of benzine ceipt, take a quantity of powdered pumice will prove of great service to many branches of the art profession, in allowing the use of sieve of moderate fineness. When the surface has hardened, repeat the process till a tolerably thick coat has been formed upon the paper, which, when dry, will be fit for use. 1935. To Make Emery Paper or Cloth.

This is prepared in precisely the same man-

would be useful for packing meat and other substances liable to decay. (See No. 1614.) hang it up in a place free from dust to dry. It can be prepared by fusing 5 parts stearic It will be ready for use in a few days. Some acid at a gentle heat, mixing well with 2 parts carbolic acid and 5 parts melted paraffine, and stirring until the whole has become solid, and applying it to paper in the same manner as waxed paper is made. (See No.

> Solvent for Silk, Paper, &c. 1937. The ammonio-oxide of copper is a solvent for silk, paper, and the cellular tissue of plants. If its action be limited to a few moments it

converts the surfaces into a gelatinous mass. 1938. To Make Waxed Paper. Take cartridge or other paper, place it on a hot iron and rub it with bees' wax, or make a solution of the wax in turpentine, and apply it with a brush. It is generally prepared on a large scale by taking a quire of paper and opening it flat upon a table, and then going over it quickly with a very hot smoothing-iron, against which is held a piece of wax, which, melting, runs down upon the paper and is absorbed by it. A little practice will soon and pulverize it, coarse or fine as required, in determine the amount of wax that should be an iron mortar. It is used to filter acids; is melted off from time to time. When the upper sheet is saturated it is taken off, and the one below is treated in a similar manner. Any excess of wax applied in the first instance readily penetrates through to the lower layers. Useful for making water or air-proof pipes, is the best), and sift it through a very fine for chemical experiments, also for tying up wire sieve, to separate the finest portion of the necks of bottles, covering preserve jars, the powder; this is for the smoothest degree and for enveloping tobacco and other substanof glass paper; sift the remainder successively ces that require to be kept from the air, rethrough sieves gradually increasing in coarse-placing generally tin-foil and similar sub-

1939. To Make Oiled Paper. Brush fire, and suspend them on a line until dry. Waterproof. Employed to tie over pots and

jars, and to wrap up paste blacking, &c.
1940. Oiled Paper as a Substitute for
Oiled Silk. Boiled linseed oil is reboiled with litharge, acetate of lead, sulphate of zine, and burnt umber, an ounce of each to a gallon. The sheet of paper being laid on a square board, it is well covered with this mixture. The first sheet is covered on both the paper will be colored brown, especially on sides; the second, placed on this, receives one coating; and so on to 20 or 50. Separate and

hang up to dry.

1941. To Make Paper Fire and Warrproof. Take 26 ounces alum, and 4 ounces white soap, and dissolve them in a quart of water; into another vessel dissolve 2 ounces gum-arabic and 1 ounce glue, in the same quantity of water as the former, and add the two solutions together, which is now to be kept warm, and the paper intended to be made waterproof dipped into it, passed between rollers, and dried; or, without the use of rollers, the paper may be suspended until it has perfectly dripped, and then dried. The alum, soap, glue, and gum, form a kind of artificial leather, which protects the surface of the paper from the action of water, and also renders it somewhat fireproof. A second immersion makes it still better.

into it, then throw it over a line to dry. This yellow or neutral chromate of potash in 1 galslip of the paper in the flame of a candle, and damped with water when required for use.

second time.

1943. To Make Fireproof Paper. Newspapers may be rendered fireproof by dipping into a solution of soluble glass of 25°

1944. To Make Paper Waterproof. Melt in 10 pints hot water, 30 ounces glue, gelatine or size, and 3 ounces gum-arabic. In another 30 pints hot water, melt 20 ounces soap and 4 pounds alum; mix both liquids together in one pot. This constitutes compomaterials, resin, oil, and copal or mastic varnish may, in some cases, be added. This is composition No. 2. First dip the article to be waterproof into the composition No. 1 in a heated state, and then dry it. Next apply canthe composition No. 2, in a cooled state, with a 195 brush, or in any other convenient manner.

paper, boiled in water, beaten to a paste in a a thin solution of glucose or honey instead mortar, and then mixed with a solution of of water. On coming out of the press the gum-arabic in size, to give tenacity. It is variously manufactured by being pressed into brings or oiled moulds, afterwards dried, covered with illegible. a mixture of size and lamp-black, or other-

wise ornamented, and varnished.

1946. To Detect the Presence of sheets of paper over with boiled oil, in which Plaster in Paper. Calcine the paper in a dissolve a little shellac carefully over a slow close vessel, and dilute the residue with vinegar, in a silver spoon; if sulphuretted hydrogen is disengaged, which blackens the spoon. the presence of a sulphate (plaster) will be shown. This adulteration has lately become very common among the paper-makers, with the view of increasing the weight.
1947. To Detect Woody Fibre in

1947. To Detect Woody Fibre in Paper. The paper is touched with ordinary strong nitric acid. If wood fibre is present

warming.

1948. Magic Copying Paper. make black paper, take lamp-black mixed with cold lard. Red paper — Venetian red mixed with lard. Blue paper — Prussian blue mixed with lard. Green paper-chrome green mixed with lard. The above ingredients to be mixed to the consistency of thick paste, and applied to the paper with a rag. Then take a flannel rag, and rub until all the color ceases coming off. These sheets, alternated with writing paper and written on with a solid pen, produce 2 or 3 copies of a letter at once.

1949. Manifold Copying Process. This is a method patented by Mr. Underwood, of London, for taking copies of writing by pressure; by this means as many as twenty copies or more of a letter or other writing can

be obtained.

1942. To Make Fireproof Paper. The copying paper is prepared by being Take a solution of alum and dip the paper wetted with a solution of 200 grains of the is suitable to all sorts of paper, whether plain lon of distilled water. This paper can be or colored, as well as textile fabrics. Try a used immediately, or may be dried, and if not sufficiently prepared, dip and try it a The copying ink to be used for the original writing must be made by dissolving (in a water-bath) about 6 pounds pure extract of

logwood in 1 gallon distilled water.

Damp 6 sheets of the prepared paper, and Baumé; next neutralizing the alkali by dilu- remove all superfluous moisture with good ted muriatic acid of 10° Baumé while hot, blotting paper, place the original writing on and drying by the atmosphere. Fire cannot the upper sheet, and put in the copying-press then destroy the texture of the paper. for about half a minute: then remove the original and substitute in its place 6 more damp sheets of the paper, and press for a quarter of an hour. Then take the original again and lay it on the top of 5 more damped sheets of the paper, and press for about two minutes; finally remove the original, and in its sition No. 1. In another pot heat ½ gallon place put 3 more sheets of the paper, then benzole and 1 gallon paraffine, and melt in it press for a quarter of an hour. This process 24 ounces resin; let it boil until it attains a will give twenty copies. If more than twenty moderate degree of consistency. To these copies are to be made, the writing of the original should, before the ink is quite dry, be dusted over with a powder composed of 5 parts extract of logwood, 1 part powdered gum-arabic, and 1 part powdered gum-traga-

1950. Process for Copying Very Old Vritings. Niepec St. Victor gives a new Writings. 1945. Papier-Maché. A plastic mate-process for copying very old writings. Ordinal, formed of cuttings of white or brown nary copying paper is used, but is wetted with paper is exposed to strong ammonia, which brings out very clearly lines otherwise almost

> 1951. To Prepare Paper for Varnishing. To prevent the absorption of varnish,

muslin. It may be applied with a clean soft paint-brush, the first coat, especially, very lightly. The best brush for this purpose is the kind used by varnishers for giving the finishing flow coats of varnish, wide, flat and soft; or, where there is much danger of injuring a design, and the paper article will allow of it, it is a good plan for the first coat, to pour the solution into a wide, flat dish, and pass the paper through it once, and back again, and then hang it up to dry. For less delicate purposes, a little light-colored glue, soaked over night in enough water to cover it, and then dissolved by heat, adding hot water enough to dilute it sufficiently, will make an excellent sizing.

1952. To Size Paper. The paper must be passed or steeped in a mixture of glue and clum water. For transparent or semi-transparent paper, a mixture of starch, or dextrine

and alum.

1958. Albuminous Size. Beat up the white of an egg with twice its bulk of cold Used as a water, until well incorporated.

also to size drawing paper.

1954. Pounce. Powdered gum sandarae generally passes under this name; it is used to prepare parchment for writing on, and to prevent ink from spreading on paper after crasure. Powdered cuttle-fish bone is occasionally used in the same way. Packers rub the surface of porous and greasy wood with a powders (usually ultramarine) used by pattern drawers, for sprinkling over pricked papers, are also called pounce.

1955. Lithographic Paper. In order to prevent the ink tracings or design from adwould render a perfect transfer to the stone

proper preparation.

1956. To Prepare Lithographic Paper. Lay on the paper 3 successive coats of sheep-foot jelly, I layer of cold white starch, and 1 layer of gamboge. The first layer is applied with a sponge dipped in a hot solution of the jelly, thinly, but very evenly, over in 1 pint distilled water. the whole surface; the next 2 coats are laid on in succession, each previous coat being first allowed to dry. The layer of starch, and then tightly on a hoard with drawing pins, and the coat of gamboge, are each applied with a sponge in the same way as the jelly. When the paper is dry it must be smoothed by passing it through the lithographic press; the smoother it becomes, the better. The transfer of traces from the gamboge surface of upwards, and give it 1 or 2 coats in the same paper thus prepared is perfect.

The gamboge must be dissolved the same day it is used, as it becomes oily by standing.

removed from its surface.

1957. Lithographic Paper. Take rather strong, unsized paper, and cover it with a varnish composed of 120 parts starch, or erayon drawings consists in moistening the

<u>la kalalakkilajan minikiki dikindani dalah katamanan kararasan merekananaka rawe kalamanta talimata dikerata basar bera-</u>

and injury to any color or design on the pa- 40 parts gum-arabic and 20 parts alum. Make per, it is necessary to first give it 2 or 3 coats a moderate paste of the starch by boiling, of size. The best size for white or delicate dissolve the gum and alum separately, and colors is made by dissolving a little isinglass then mix all together. When well mixed, in boiling water, or by boiling some clean apply hot with a flat, smooth brush, to the parchment cuttings until they form a clear soleaves of paper. Then dry and smooth by lution; then strain through a piece of clean passing under the scraper of the lithographic press.

1958. Bernard and Delarne's Lithographic Crayons. Melt 4 parts pure white wax over a slow fire; stir in by degrees 2 parts gum lac, broken into small pieces; next mix in 2 parts dried soap (made of tallow and soda), reduced to fine shavings; then stir in 1 part oil copal varnish into which 1 part lampblack has been previously ground. Continue to heat and stir until the paste has acquired a proper consistence, which can be ascertained by forming a crayon with it in a mould, and allowing it to become cold. The mould should be first wiped with a greased

rag.

Lasteyrie adopts a somewhat different formula for his crayons: Dried white tallow soap, 6 parts; white wax, 6 parts; lampblack, 1 part. The soap and tallow are to be put into a small goblet and covered up. When the whole is thoroughly fused by heat, and no clots remain, the black is gradually sprin-

kled in with careful stirring

1959. Rouget's Method of Preservvarnish for leather binding and kid gloves; ing Pencil Drawings. This invention consists in fixing drawings, tracings, or sketches, by directly projecting on these latter a. suit-able adhesive liquid reduced to a fine spray, or in what is commonly called the atomized or pulverized state, by causing the liquid to pass rapidly under pressure through one or more capillary tubes or openings. By this method the defects of the transudation process are sounce consisting of whiting or powdered entirely done away with, besides which the esin, to make it bear the ink. The colored operation is executed in less time, and may be performed at once by the artist without the slightest difficulty. For the fixing liquid, any colorless, or nearly colorless liquid, which allows of being atomized, and which, after becoming dry, causes the particles of the hering to and sinking into the paper, which charcoal, or other drawing materials made use would render a perfect transfer to the stone of, to adhere sufficiently firmly to the paper impossible the surface of the paper requires or other drawing surface, may serve for the purpose. Thus, for instance, a liquid which has given the most satisfactory results is obtained by adding to a solution of 3 ounces white sugar candy and 2 ounces white shellac. in about 2 pints spirits of wine, a decoction of about 1 ounce fucus crispus (Irish moss)

1960. To Fix Pencil or Chalk Drawgive the back 2 or 3 coats of a solution of 5 parts isinglass, or gum-arabie, in 12 parts water, using a varnisher's flow brush, and manner. This will usually be sufficient to fix the drawing, but the addition of 1 or 2 coats of a solution of 4 parts Canada balsam, The starch should be a day old, and the skin in 5 parts turpentine, will afford still further protection.

have the solution either too concentrated or stiff. too thin, but such as will flow readily on the paper, making it transparent when moist, and paper for & a minute in strong sulphuric acid, leaving no spots behind on evaporation. In and afterwards in water containing a little this way the drawings will become perma-ammonia. When dried it has the toughness nently fixed, and may afterward be painted in and appearance of parchment. water-colors so as to produce a very excellent

1962. To Fix Fencil Drawings. A simple method, and sufficient for general purto the thickness of the paper, sufficient to white of eggs, or mucilage of gum-arabic. wet it through but not enough to allow any 1970. Composition for Drawing of the liquid to run on the surface of the drawing. Pin it on a line to dry. Some prefer using pure milk.
1963. To Take Creases out of Draw-

with another sheet of the same, very slightly damped, and iron with a moderately warm

flat iron.

1964. To Make Parchment Trans-Soak a thin skin of parchment in a parent. strong to of wood ashes, often wringing it out till you find it becomes transparent; then strain it on a frame, and let it dry. This will be much improved if, after it is dry, it receives a coat, on both sides, of clear mastic varnish,

diluted with spirits of turpentine.

1965. To Make Artificial Parchment. strength indicated, and not warmer than the this purpose. surrounding atmosphere.
1966. To Paste Parchment Paper.

the glue or paste then be applied, the union vill be perfect. A piece of very thin paper inserted between the surfaces of the parch-Lent paper will also make a firm joint. Glue or aste should be used, as gum-arabic will not

1967. New Method of Making Parchnent Paper. An improved method of preparing this substance, consists in using the Picture Prints. Septimus Piesse gives the commercial oil of vitriol in an undiluted state. The paper is first passed through a solution of alum, and thoroughly dried, previous to its immersion, thus preventing any undue action of the corrosive principle of the vitriol. After the application of the acid, the paper is passed into a vat of water, and then through an alkaline bath, to be again washed. Written and printed paper may undergo this improved process without materially affecting the clearness Now wet the paper with water made sour and distinctness of the letters, and the paper with white vinegar. Finally wet the paper retains all i .qualities, even after being wetted with water containing a little bleaching powseveral times in succession, while paper preder, and again rinse with clean water; then

back of the sheet with a solution of bleached pared in the usual manner loses, to a great shellac in alcohol, care being taken not to extent, its pliancy, and becomes hard and

> 1968. Papyrine. Dip white unsized

1969. To Color Parchment. The only color given to parchment is green. Boil 8 parts cream of tartar and 30 parts crystallized verdigris, in 500 parts water; when this soluposes, is to put into a large flat dish, a mixture tion is cold, pour into it 4 parts nitric acid. of equal parts milk and water. The back of Moisten the parehment with a brush, and then the drawing should be floated over the surface apply the above liquid eventy over its surface. of the milk and water once or twice, according The necessary surface finish is given with

Crayons. Take 6 parts shellac, 4 parts spirit of wine, 2 parts turpentine, 12 parts of coloring powder, such as Prussian blue, orpiment, white lead, vermilion, &c., and 12 parts ing Paper or Engravings. Lay the paper clay. The clay must be thoroughly washed, or engraving, face downwards, on a sheet passed through a hair sieve and dried; it is of smooth, unsized white paper; cover it then well incorporated by trituration with the shellac (previously dissolved in the spirits of wine), the turpentine and the coloring pig-ment. The doughy mass is pressed in proper moulds so as to acquire the desired shape, and then dried by stove heat.

1971. Charcoal Crayons. finest-grained, softest, and blackest pieces of charcoal, into slips of the size required, put them into a pipkin of melted wax, and allow them to macerate over a slow fire for half an hour, then take them out and lay them on blotting-paper to dry. The above process De le Rue's patent. Strong unsized paper is may also be employed for red and black chalk. immersed for a few seconds in oil of viti ol, Drawings made with these crayons are very diluted with half its volume of water. 1: is permanent, and if warmed slightly on the then washed in pure water or weak ammonia wrong side, the lines will adhere and become water. It strongly resembles animal parchase durable as ink. These crayons may also ment, and is used for the same purposes. be made by simply shaping the charcoal with The acid solution must be exactly of the a knife. Willow charcoal should be used for

1972. To Clean Engravings. Secure the engraving with drawing pins on a smooth Thick, smooth paper does not generally hold long when pasted together or on wood. This finely powdered; pour and squeeze lemon difficulty is easily overcome. If the surface juice upon this salt, so as to dissolve a confitchat part of the paper which is to be joined siderable portion of it. Now elevate one of that part of the paper which is to be joined. be first moistened with alcohol or brandy, and of the board, that it may form an angle of about 45° with the horizon. Pour lastly on the engraving boiling water from a tea-kettle, until the salt and lemon juice be all washed off; the engraving will then appear perfectly clean, and free from stains. It must be dried gradually, on the same board, or on some

smooth surface. (See Nos. 411. fc.) 1973. To Clean Printed Paper and follo ing receipt for that purpose: Fasten the paper to a board with button drawing pins, then wash it with water in which is dissolved an ounce of carbonate of ammonia to every pint of water. This do with care, employing a camel's-hair brush for the purpose. Then rinse the paper well with plenty of fresh water. When dry, repeat the same process for the reverse side of the paper.

will become white, excepting where printed, and grease; but more quickly as follows:
To stiffen the print give it a coat of parchment, 1983. To Dye Ivory Black.

restored.

1974. over the vapor of iodine. Dip a slip of white drosulphuret of ammonia. paper in a weak solution of starch, and, when delicacy and finish.

a wall of paper round it, and, when completed, pour in some finely-powdered plaster of Paris mixed in water; jerk the plate repeatedly, to allow the air bubbles to fly upwards, and let it stand 1 hour; then take the cast off the plate, and a very perfect impres-

sion will be the result. 1976. Hydrographic Faper. This is a name given to paper so prepared, that, when

written upon with water, or some other color-

become visible.

1977. brush off the loose portion, and a pen dipped in water will write black.

1978. with Water. mixture of sesquisulphate of iron and ferrocythe last receipt. Write with water as before, appear until the ammonia is evaporated.

and the characters will appear blue.

iron in the last receipt, use sulphate of copper; and characters written with water will be reddish-brown.

ferrocyanide of potassium, and dry it again; be blue.

vory, Alabaster, &c. The following receipts relate to the manipulation of ivory, bone, alabaster, meerschaum, horn, tortoise-shell, pearl, and marble.

1982. To Color or Dye Ivory or Bone. With regard to dyeing ivory, it may in general be observed, that the colors penetrate better before the surface is polished than afterwards. Should any dark spots appear, they may be cleared up by rubbing them with chalk; after which the ivory should be dyed once more, to produce a perfect uniformity of shade. On taking it out of the boiling hot dye bath, it should be plunged immediately into cold water, to prevent the chance of fis-sures being caused by the heat. Ivory may potash, and afte be ayed by any of the ordinary methods em-acetate of lead.

dry it by exposure to air and sunshine. It ployed for woolens, after being freed from dirt

size. Most valuable prints have been thus ivor; being well washed in an alkaline lye, is steeped in a weak neutral solution of nitrate To Transfer Engravings to of silver, and then exposed to the light, or Paper. Place the engraving a few seconds dried and dipped into a weak solution of hy-

1984. To Dye Ivory Deep Black. A dry, in a weak solution of oil of vitriol. When still finer and deeper black may be obtained again dry, lay a slip upon the engraving, and by boiling the ivory for some time in a strain-place both for a few minutes under a press ed decoction of logwood, and then steeping it The engraving will be reproduced in all its in a solution of red sulphate, or red acetate of

iron

1975. To Print Engravings on Plaster. Cover the engraved plate with ink, and infusion of cochineal in water of ammonia, polish its surface in the usual way; then put then immerse the pieces therein, having previously soaked them for a few minutes in water very slightly acidulated with aquafortis.

1986. Fine Red Dye for Ivory. A beautiful red color may be imparted to ivory thus: Take 4 parts, by weight, pieric acid, and dissolve in 250 parts boiling water; add, after cooling, 8 parts liquid ammonia. Dissolve also 2 parts crystallized fuchsine (magenta) in 45 parts alcohol, dilute with 375 parts hot water, and next add 50 parts ammoless fluid, instead of ink, the characters will nia. As soon as the red color of the magenta solution has disappeared, the two solutions To Write Black Characters are mixed together. Ivory and bone should with Water. Thoroughly dry and reduce be placed in very weak nitric or hydrochleric to a very fine powder a mixture of 4 parts acids before being immersed in the ammonianut-galls, and 1 part calcined sulphate of iron; cal liquid; wood cannot be dyed by this lirub it over the surface of the paper, then quid unless it has been previously painted over with paste made from flour. When to the ammoniacal liquid some gelatine solution be added, it may serve as a red ink which To Write Blue Characters does not attack steel pens. By varying the Prepare the paper with a proportions of the magenta and picric acid, the tints obtained may be varied from a bluish anide of potassium, by the same method as red to a bright orange-red. The colors do not

aracters will appear blue.

1987. To Dye Ivory Blue. Steep it in a weak solution of sulphate of indigo which with Water. Instead of the sulphate of has been nearly neutralized with selt of tartar; or in a solution of Prussian blue. A still better plan is to steep in the dyer's green indigo vat; or, insert the ivory for 15 to 20 minutes 1980. To Write Blue with a Colorless in diluted muriatic acid (\frac{1}{2} ounce of acid for 1) Fluid. Wet the paper with a solution of pound of water, having the taste of a good vinegar), and from this acidulated water transwrite on it with a pen dipped in a solution of fer the ivory into a more or less concentrated sesquisulphate of iron, and the writing will solution of indigo-earmine (soluble indigo), and keep it in that solution until the ivory has assumed a uniform blue color; then dry

and polish.

1988. To Dye Ivory Purple. Steep The in a weak neutral solution of terchloride of gold, and then expose it to the light. Or, soak the ivory in a solution of sal ammoniac into 4 times its weight of nitrous acid.

1989. To Dye Ivory Green. Dissolve verdigris in vinegar, and steep the pieces therein for a short time, observing to use a glass or stoneware vessel; or in a solution of verdigris, 2 parts, and sal ammoniae, 1 part, in soft water; or, dye the ivory blue by the third receipt for that purpose, and then insert in a solution of pieric acid, as prescribed for the dark lemon color. (See No. 1991.)

1990. To Dye Ivory Yellow. Steep the ivory in a bath of neutral chromate of potash, and afterwards in a boiling solution of

Or: Steep the pieces for 24 hours in a solution of sugar of lead, then take them out, and its Original Whiteness. when dry, immerse them in a solution of chromate of potassa.

Or: Dissolve as much of the best orpiment in water of ammonia or hartshorn as it will take up, then steep the pieces therein for some hours; lastly, take them out and dry them,

when they will turn yellow.

1991. To Dye Ivory Dark Lemon. Dissolve ‡ ounce pierie acid in ‡ ounce boiling water. Dilute ‡ ounce strong sulphurie acid with 1 ounce hot water, by pouring the acid gradually into the water. Insert the ivory in ly, in order to admit the acid to all parts, remove the ivory from the fluid and dry it. Then insert the dried ivory in the boiling solution of pierie acid, turn it also around, and leave it in the solution until all parts appear of a uniform yellow color. Then remove it from the solution of pieric acid, dry, and polish the ivory with soap water and finely levi-gated chalk. After the polishing the ivory possesses a permanent dark lemon-vellow color.

To Dye Ivory Violet. Dye red, and afterwards blue; or place the ivory in a highly-diluted solution of tin, and boil in the

logwood bath.

1993. Aniline Dyes for Ivory. Any of these colors give a fine and permanent col-

or to ivory by immersion.
1994. To Make Ivory Flexible. Ivory is rendered flexible by immersion in a solution of pure phosphoric acid (specific gravity 1.13) until it loses, or partially loses its opacity, when it is washed in clean cold water, and dried. In this state it is as flexible as leather, but gradually hardens by exposure to dry air. Immersion in hot water, however, restores its softness and pliancy. The following method may also be employed: Put the ivory to soak in 3 ounces nitric acid mixed with 15 ounces water. In 3 or 4 days the ivory will be soft.

1995. To Dye Ivory when Softened. If it is desired to dye ivory when thus softened, dissolve, in spirits of wine, such color as Whimay be desired to use. When the spirits of Mix wine is sufficiently tinged with the color,

dyed to suit

ivory after it has been softened, wrap it up in a sheet of white paper, cover it with dry, decrepitated salt, and lay it by for 24 hours, when it will be restored to its original hard-

To Bleach Ivory. Ivory is whitened or bleached by rubbing it with finely powdered pumice-stone and water, and exposing it to the sun whilst still moist, under ā glass shade, to prevent desiccation and the occurrence of cracks; observing to repeat the process until a proper effect is produced. Ivory may also be bleached by immersion for a short time in water holding a little sulphurous acid, chloride of lime, or chlorine in solution; or by exposure to the fumes of burning sulphur, largely diluted with air. In many cases where, as in piano keys, the ivory cannot be removed, the polishing process will be found partially successful.

To Restore Yellow Ivory to 1998. A thin limepaste is prepared in a pot, and heated over a stove; the ivory is placed in this and left until white, when it is taken out, dried, and

polished.

1999. To Bleach Articles made of This process is recommended by Dr. Ivory. J. Artus. The objects made of this substance are first placed into a solution containing 111 ounces carbonate of soda in crystals, and 45% ounces water. After having been left in this fluid for 2 days, the ivery objects are well washed in pure water, and then immersed into the acidulated water, turn it around repeated- a solution composed of 17 ounces sulphite of soda, and 45½ ounces water, and kept therein for 5 or 6 days, after which time there is added to the liquid, yet containing the ivory objects, 1 ounce hydrochloric acid diluted with 5½ ounces water. After the acid has been added, the vessel (glass or porcelain) containing the liquid and ivory should be covered and left standing for from 24 to 36 hours, after which time the ivory is taken out, washed in clean water, and dried. The quantities of ingredients herein specified suffice for

221 ounces of ivory, 2000. To Polish Ivory. If ivory be polished with putty-powder and water, by means of a rubber made of hat, it will in a short time produce a fine gloss. Or, set the ivory in the turner's wheel, and, after having worked it, take some rushes and pumice-stone, mix a subtle powder with water, and rub till it becomes perfectly smooth; then heat it by turning it over a piece of linen or sheepskin, and when hot rub it with a little whitening diluted with olive oil; then rub it with a little dry whitening alone, and finally with a piece of soft white rag, and the ivory will look re-

markably white.

2001. Fluid for Marking Ivory. Take nitrate of silver, 2 parts; nitric acid, 1 part; water, 7 parts; mix

2002. Etching Fluid for Ivory. Take of diluted sulphuric acid and diluted muriatic

acid, equal parts. Mix.

2003. Etching Varnish for Ivory. White wax, 2 parts; tears of mastic, 2 parts.

2004. To Etch on Ivory. Cover the plunge in the ivery, and leave it there till it is ivery to be etched with a thin coating of bees' wax, then trace the figure you desire to pre-1996. To Harden Ivory. To harden sent through the wax. Pour over it a strong solution of nitrate of silver. Let it remain a sufficient length of time, then remove it, with the wax, by washing in warm water. The design will be left in dark lines on the ivory.

2005. To Gild Ivory. Immerse it in a solution of nitro-muriate of gold, and then, while yet damp, expose it to hydrogen gas. Wash it afterwards in clean water. Another plan of gilding ivory is by immersing it in a fresh solution of protosulphate of iron, and afterwards in a solution of chloride of gold.

2006. To Silver Ivory. Immerse the ivory in a weak solution of nitrate of silver, and let it remain till the solution has given it a deep yellow color; then take it out and immerse it in clear water, and expose it in the water to the rays of the sun. In about 3 hours the ivory acquires a black color; but the black surface, on being rubbed, soon becomes changed to a brilliant silver.

tifully white.

2008. but less carefully, owing to its inferior value. of young pigeons may thus be tinged of a rose color in 24 hours, and of a deep scarlet in 3 or 4 days; but the bones of adult animals take fully 2 weeks to acquire a rose color. The bones nearest the heart become tinged segmest. In the same way logwood and the

young pigeons purple.

2009. Ivory Size or Jelly. The dust or shavings (ivory dast, ivory shavings) of the turner, form a beautiful size or jelly when

boiled in water.

Artificial Ivory for Photo-2010. Tablets for photography are made graphy. by mingling finely pulverized sulphate of baryta or heavy spar with gelatine or albumen, compressing the product into sheets and dry-

ing it.

Artificial Ivory. The process by which the most successful imitation of natural ivory is obtained appears to consist in tint, next washing well with alcohol, then adding, in fine powder, either sulphate of baryta, sulphate of lime, sulphate of lead, alumina, or chalk, in quantity proportioned to the desired density and tint, kneading well, and finally subjecting to heavy pressure. A very tough product, capable of taking a very high polish, is obtainable in this way.

for their whiteness and transparency.

2013. To Dye Horn. Horn is dyed with the same dyes, and in the same manner, as ivory. (See Nos. 1982, &c.)

To Prepare Horn. Horn is 2014. softened by sawing it into plates or sheets, and then exposing it to powerful pressure between hot iron plates. Before pressing, the pith has to be removed, and the texture softened, first by soaking for some days, and then boiling in water.

2015. To Unite Horn. The surfaces and edges of pieces of horn may be united or cemented together by softening by the heat of boiling water, then placing the parts in

contact under strong pressure in a vise, and again exposing to the heat of boiling water.

2016. To Dye or Stain Horn Tortoiseshell Color. The horn to be dyed must be shell Color. The horn to be dyed must be powdered white lead; immerse the east in first pressed into proper plates, scales, or other flat form, and the following mixture the effect desired. Then wash off the coverconsistence of a soft paste, with soap lye. gypsum (plaster of Paris). The etching is Put this paste over all the parts of the horn, produced by the solvent action of the water except such as are proper to be left transpar-lon the gypsum.

2007. To Clean Ivory Ornaments, ent. in order to give it a near resemblance to When ivory ornaments get yellow or dusky- the tortoise-shell. The horn must remain in looking, wash them well in soap and water this manner covered with the paste till it is with a small brush, to clean the carvings, and thoroughly dry; when, the paste being brushed place them, while wet, in full sunshine; wet off, the horn will be found partly opaque and them for 2 or 3 days, several times a day, with partly transparent, in the manner of tortoisesoapy water, still keeping them in the sun; shell, and, when put over a foil of Dutch gold then wash them again, and they will be beau- metal, will be scarcely distinguishable from it. It requires some degree of fancy and judg-Bone for Ornamental Pur- ment to dispose of the paste in such a manposes is treated in a similar way to ivory, ner as to form a variety of transparent parts, of different magnitudes and figures, to look The bones of living animals may be dyed by like the effect of nature; and it will be an mixing madder with their food. The bones improvement to add semi-transparent parts, which may be 'one by mixing whiting with some of the pare, to weaken its operation in particular places, by which spots of a reddishbrown will be produced, which, if properly interspersed, especially on the edges of the dark parts, will greatly increase the beauty of extract of logwood will tinge the bones of the work, and its similitude to real tortoiseshell.

2017. To Stain Horn in Imitation of Tortoise-shell. Mix an equal quantity of quicklime and red lead with strong soap lees, lay it on the horn with a small brush, in imitation of the mottle of tortoise-shell; when

dry, repeat it two or three times.

2018. To Join or Weld Tortoise-shell Horn. Provide a pair of pincers or or Horn. tongs, constructed so as to reach 4 inches beyond the rivet: then have the tortoise-shell filed clean to a lap-joint, carefully observing that there is no grease about it; wet the joint with water, apply the pincers hot, foldissolving either india-rubber or gutta-percha lowing them with water, and the shell will be in chloroform, passing chlorine through the joined as if it were one piece. The heat must solution until it has acquired a light yellow not be so great as to burn the shell, therefore

try it first on a piece of white paper.
2019. To Polish Tortoise-Shell or Horn. Having scraped the work perfectly smooth and level, rub it with very fine sandpaper or Dutch rushes; repeat the rubbing with a bit of felt dipped in very finely powdered charcoal with water, and, lastly, with rotten-stone or putty-powder; and finish with a piece of soft wash-leather, damped with a 2012. Horn. For practical purposes, a piece of soft wash-leather, damped with a the horns of the goat and sheep are preferred little sweet oil; or, still better, rub it with sub-

nitrate of bismuth by the palm of the hand.
2020. Alabaster. Oriental alabaster is a substance of a pure, semi-translucent whiteness, occasionally found variegated with undulating veins of yellow, red and brown. The common alabaster, usually met with in ornaments &c., is made of gypsum (plaster of Paris), and prepared so as to imitate the gen-The following receipts are for the gypsum imitation, and not the real alabaster. By using any of the hardening processes, beautiful imitations of marble may be produced, but they require great care and skill.

2021. To Engrave or Etch on Imitation Alabaster. Cover every part of the surface, except those portions to be etched, with a solution of 1 part white wax in 4 parts oil of turpentine, thickening with a little finely prepared: Take of quicklime 2 parts, and ing solution with oil of turpentine, and brush litharge 1 part; temper them together to the over carefully the etched parts with powdered to a heat about equal to that of a baker's are commonly added to a solution of clear oven: withdraw from the heat, and when con- size, which is then made into a paste with siderably cooled, immerse them for from 2 to 5 plaster. In this manner colored stucco of minutes in pure river water. The operation great hardness and durability is produced. may be repeated a second time, and 3 or 4 days are allowed to elapse before polishing them. A weak solution of alum in water may be

substituted for the river water. 2023. To Dress Plaster of Paris with Wax in Imitation of Alabaster. Dip the cast or model, previously warmed, and suspurest white wax, melted in any suitable vessel. The operation should be repeated until the liquid wax begins to rest unabsorbed on the surface of the plaster, when the article must be placed aside (suspended) until the next da, when it may be polished with a clean brush. None but the hardest, purest, * wax will do for the above purpose. aly sold is mixed with spermaceti, e, or tallow, and not unfrequently with Japanese wax and potato starch. (See No. 1582.)

2024.To Render Plaster Figures **Durable.** First thoroughly dry the plaster figure in a warm dry atmosphere; place it in a vessel and cover it with the clearest linseed oil, just warm. After 12 hours, take it out, drain, and let it dry in a place free nom dust. When dry it will look like wax, and can be washed without injury.

2025. To Harden Plaster. Mix up the plaster of Paris with a weak solution of gum arabic (1 ounce to 1 pint of water); or, for common purposes, a weak solution of size. This not only renders the plaster harder, but gives the surface a pleasing smoothness.

To Harden Imitation Alabas-202C. ter with Aum. Suspend the article by a fine silken cord or wire in a strong and perfectly clear solution of alum, letting it remain until the alum crystallizes on the surface; then polish with a wet cloth.

Paris. Mix with weak alum water, instead of water, for easting; or, a solution of 11 or 2 ounces of gum-arabic to the pint of water; or, for common purposes, a weak solution of

size may be used. 2028. To Harden Plaster with Sulphate of Potassa. If equal parts of common calcined plaster of Paris and of sulphate of potassa be mixed together, they will harden in a moment with less than an equivalent weight of water; so much so, indeed, that the mixture cannot be poured out of the vessel. If, however, 1 part of each of the salts and 2 of water be used, they form a mass which cannot be poured out, and the surface of which will be found coated with a crust of sulphate of potash. The rapidity of hardening, therefore, can be made to vary with the percentage of water, the mass solidifying even if 6 parts of water be used.

2029. To Stain or Color Alabaster. This is effected by mixing with the water used for working the gypsum, any of the ordinary pigments or colored solutions that are not decomposed by contact with sulphate or carbonate of lime. A little sienna in very fine powder, or ground with water, imparts a Marble may be stained or dyed of various

2022. To Harden Alabaster. Expose good color for busts, medallions, &c. For the unpolished articles for from 12 to 24 hours rough and architectural purposes, the colors Objects formed from the solid alabaster may be stained in the same way, and with the same materials, as marble, (See Nos. 2036, &c.)

2030. To Polish Alabaster. The object, received in the rough state from the hands of the sculptor or turner, is rubbed with finely-powdered pumice-stone, or dried pended by a fine silken cord or wire into the shave-grass (equisetum) and water, and afterwards with a paste formed of finely-powdered and sifted slacked lime and water. The rough polish thus produced is then brought up and finished off by friction with finely-powdered tale, or French chalk, until a satiny lustre is produced.

2031. To Prevent Expansion or Shrinkage in Casting Plaster. Use lime water instead of plain water to mix the plaster of Paris. 1 an ounce of sulphate of potassa dissolved in each quart of water will have the same effect, but weakens the plaster.

2032. To Make Artificial Marble for Paper Weights or other Fancy Articles. Soak plaster of Paris in a solution of alum; bake it in an oven, and then grind it to a powder. In using, mix it with water, and to produce the clouds and veins, stir in any dry color you wish; this will become

very hard, and is susceptible of a high polish.
2033. To Polish Mother-of-Pearl. Go over it with pumice stone, finely powdered dirt), with which you may polish it very smooth; then apply putty powder as directed for ivory, and it will produce a fine gloss and a good color. (See No. 2000.)

2034. To Clean Alabaster. Soap well and wash with hot water. If stained, apply fuller's earth, pipe-clay, or whiting, for 3 or 4 alum crystallizes on the surface; hours, then wash off. If very dirty and with a wet cloth.

To Make Hard Plaster of with water. Or: Take ground pumice stone of the finest quality, and mix it up with verjuice; let it stand for 2 hours, then dip in a sponge and rub the alabaster with it; wash with a linen cloth and fresh water, and dry with clean linen rags. Any kind of marble may be done in the same manner.

To Polish Marble. 2035. piece of very fine sandstone, rub the slab backward and forward, using very fine sand and water, till the marble appears equally rough, and not in scratches; next use a finer stone and finer sand, till its surface appears equally gone over; then, with fine emerypowder and a piece of felt or old hat wrapped round a weight, rub it till all the marks left by the former process are worked out, and it appears with a comparative gloss on its surface. Afterward finish the polish with putty powder and fine clean rags. As soon as the face appears of a good gloss, do not put any more powder on the rags, but rub it well, and in a short time it will have a fine polish. Defects may also be brought up with tripoli, followed by putty powder; both being used along with water.

To Dye or Stain Marble. 2036.

cation of the colors requires considerable experience. By their skillful use a pleasing effect, both of color and grain, may be pro-

2038. Brown Stain for Marble. Tincture of logwood. (See No. 2036.)

2039. Crimson Stain for Marble. A solution of alkanet root in oil of turpentine.

(See No. 2036.)

(See No. the marble hot enough to melt it. 2036.

Gold Color Stain for Marble. A mixture of equal parts of white vitrioi, sal ammoniac, and verdigris, all in fine powder,

carefully applied. (See No. 2036.)

2042. Green Stain for Marble. An alkaline solution or tincture of sap green, or No. 2036.)

of dragon's blood, alkanet root, or cochineal. phial.

(See No. 2036.)

Yellow Stain for Marble. 2044.

(See No. 2036.)

2045. Acids Injurious to Marble. Marble being a carbonate of lime, and the two substances not having a very great affinity, care should be taken in the use of marble furniture and ornaments, as tables, mantels, statuary, etc. Acids of any kind will more or less affect marble, and they should not be allowed to touch it. The slabs on which acids are allowed to stand soon lose their polish, and are liable to a degree of disintegration which impairs their beauty. Fruits, sauces, vinegar, etc., should not be allowed to come in contact with a marble-topped table or

purpose.

2047. Artificial Meerschaum. Artificial meerschaum may be made by immersing carbonate of magnesia in a warm solution of silicate of soda or potash for some time, or by precipitating from a solution of epsom salts simple rocket. by means of the silicates.

materials employed in this art are charcoal, withdrawn when the charge is complete, and saltpetre, and sulphur, combined with filings of the space it has left is filled with a quick iron, steel, copper or zinc, or with resin, cam- match (see No. 2060), which thus sets fire to phor, lycopodium and other substances, to the entire charge at once. This central space impart color, or to modify the effect and duration of the combustion. Gunpowder is used, tion of this arrangement is necessary for either in grain, half crushed, or meal (finely large rockets, especially those having heavy ground), as ci-cumstances may require. Iron pots filings give red and bright spots. Copper 20 filings give red and bright spots. Copper 2053. To Choke Firework Cases. A filings give a greenish tint to flame; those of short cylindrical piece of wood, of the same

colors by applying their solutions to the stone zinc, a fine blue color; sulphuret of antimony made sufficiently hot to make the liquid just gives a less greenish blue than the zinc, but simmer on the surface. Success in the appli- with much smoke; amber, resin and common salt afford a yellow fire. Lycopodium burns

with a rose color and a magnificent flame, &c. 2049. The Leading Fireworks. The duced. The following are the substances leading simple fireworks are rockets, Roman 2037. Blue Stain for Marble. Tincture or solution of litmus, or an alkaline solution of indigo. (See No. 2036.)

2038. Brown Stain for Marble. Tincture or solution of indigo. (See No. 2036.) as blue lights, Bengal lights, &c. These form the fundamental principles of all pyrotechnic display. The endless variety of their combisolution of alkanet root in oil of turpentine. nations in the shape of vertical and horizontal wheels and "set pieces," requires considerable 2040. Flesh Color Stain for Marble. fertility of invention and mechanical ingenuity, Wax tinged with alkanet root, and applied to combined with a thorough practical knowledge of the nature of firework compositions, and the appropriate means of displaying them to the best advantage. The weights used in the

following receipts are avoirdupois.
2050. To Make Plain Rockets. cases are made of stout cartridge paper, rolled on a rod whose thickness is equal to the desired diameter of the bore. The rod is slightly wax strongly colored with verdigris, or stain tapering, to allow of its easier withdrawal the stone first blue, and then yellow. (See after the case is rolled and pasted. The No. 2036.) 2043. Red Stain for Marble. Tincture a neck is made in it, similar to the neck of a (See No. 2053,) The composition (see No. 2054) is next rammed tightly into the case (see No. 2052), which is supported by Tincture of gamboge, turmeric, or saffron, a closely fitting mould during this operation, finishing with a small charge of gunpowder to explode when the rocket goes out. The top of the case is then stopped with clay and a conical cap fastened on, to decrease the resistance of the air in its upward flight; and the bottom or choked end of the case is furnished with priming and touch-paper. The whole is secured to the end of a willow stick, to direct its course through the air.

2051. To Make Display Rockets. Rockets whose discharge ends in display, are furnished with an extra case, called the pot, about 1 the length of the rocket; its inside diameter is the same as the outside diameter of the rocket case, over which it is glued 2046. To Polish Meerschaum! The firmly, and takes the place of the conical cap. dust of meerschaum is the best article for this The garniture, consisting of stars, serpents, &c., as the case may be (see No. 2055), is inserted in the pot and connected with the charge in the rocket case by a quick match. (See No. 2060.) The whole is finished with the clay and cap, the same as the head of a

<u>edang panggan kalabakan sa manggan kalaban kalaban kalaban kalaban kalaban kalaban kalaban kalaban kalaban kal</u>

2052. To Charge Rocket Cases. In charging rocket cases, in order to increase the rapidity of its discharge a wire is sometimes inserted through the centre of the charge, the rammer being constructed with a yrotechny. This is the art of small bore through its length, to receive this making fireworks. The three principal wire when ramming the charge. This wire is small bore through its length, to receive this

2053. To Choke Firework Cases. A

diameter as the thin end of the rod used for



rod has a hole bored in it to receive this wire loosely. A is the rod on which the case is to be rolled: C the cap of the same diameter as the end of the rod, having the wire inserted firmly in its axis. The rod is bored, as the dotted lines at B denote, to receive the wire. The outside dotted lines indicate a case on the rod, choked at N. This is effected by stretching a piece of strong cord, a single turn of which is passed round the case at N. compressing it firmly and leaving a bore of the same size as the wire between the rod and the cap. In rolling a case to be choked, the wide enough to make about 3 thicknesses when rolled over the rod, and the choking done after each piece is rolled. When finished, the rod is withdrawn from the mouth of the case, and the cap and wire from the other

2054. Composition for Rockets. For 2 ounce rockets:—Mix 54½ parts nitre (saltpetre), 18 parts sulphur, and 27½ of charcoal, all in fine powder. Sift through lawn. For 4 ounce rockets:—64 parts nitre, 16 parts sulphur, and 20 parts charcoal. For 8 ounce to 1 pound rockets:-62% parts nitre, 15% parts sulphur, and 211 parts charcoal. For rockets 4 inch in diameter:-16 parts nitre, 4 parts sulphur, and 7 parts charcoal. For rockets 14 inches in diameter use 1 part more nitre, and for still larger rockets, another additional part nitre. By using 1 part less charcoal, and adding respectively 3, 4, and 5 parts fine steel filings, the above are converted into brilliant fires: or, by using coarse iron filings, and still less charcoal, they become Chinese fire.

2055. Chinese Fire for Sky Rockets. If inch or under, nitre, 16 parts; charcoal, 4 parts; sulphur, 8 parts; cast-iron borings, 4 parts. Mix. Or: If over 1 inch and under 2 inches bore, nitre 16 parts; charcoal, 4 parts; sulphur, 4 parts; iron borings, 5 parts. Mix.

2056. Golden Rain. Mealed powder, 4 ounces; saltpetre, 1 pound; sulphur, 4 ounces; brass filings, 1 ounce; sawdust, 2½ ounces; glass powder, 6 drachms.

2057. Silver Rain. Mealed powder, 2 ounces; saltpetre, 4 ounces; sulphur, 1 ounce;

steel dust, \(\frac{1}{2} \) ounce.

2058. Trailed Stars for Rockets and Roman Candles. Saltpetre, 4 ounces; sulphur, 6 ounces; sulphate of antimony, 2 ounces; resin, 4 ounces. With sparks. Mealed powder, 1 ounce; saltpetre, 1 ounce; camphor, 2 ounces. Other receipts for stars suitable for rocket garniture will be found under the head of "Colored Fires." (See No. 2065, &c.)

To Prepare Touch Paper. Soak unglazed paper in a solution of nitre in plodes by moderate friction. The requisite vinegar or water. The stronger the solution, quantity of each ingredient should be weighed the faster will it burn. A good plan is to dip and placed on a clean sheet of white paper, it in a weak solution, dry it, try it, and if it and mixed lightly with a bone knife; they burns too slowly, make the solution stronger may then be more thoroughly mixed by siftand dip it again to make it burn faster.

2060. To Make Quick Match. rolling a case, is furnished with a wire, the match is made by immersing lamp-wick in a thickness of which must be the same as the solution of saltpetre with meal powder, winddesired bore of the choke. The end of the ing it on a frame, and afterwards dusting with meal powder. To 28 ounces cotton, take saltpetre, 1 pound; alcohol, 2 quarts; water, 3 quarts; solution of isinglass (1 ounce to the pint). 3 gallons; mealed powder, 10 pounds.

2061. Inextinguishable Match. Take 4 parts dry nitre, 2 gunpowder, 2 charcoal, and 1 sulphur, and mix them: then ram the compound into paper cases 9 inches in length and of the thickness of a common quill. When this composition is inflamed, rain will not extinguish it; the burning end of the match must be cut off to stay the fire.

2062. To Make Roman Candles. The cases for Roman candles are not choked, but well secured at the bottom with clay. small charge of gunpowder is first introduced, then a star, followed by a charge of composition (see No. 2063); these are gently paper should be used in pieces, each piece ramined down, and the same routine of gunpowder, star, and composition, is repeated until the case is full. Lastly, prime and close with touch paper. The stars are flat cylinders of a paste composition, cut to fit the bore of the case, and having a hole bored in their centre to allow the fire to pass through to the charge behind them. The stars which are nearest to the mouth of the case should fit a little tightly, and gradually a little more loosely as they are further from the mouth. charges of powder behind them should also decrease by degrees as their position is further from the mouth of the case. It is also advisable to put a loose wad of one thickness of paper, with a hole in the centre, between each star and the gunpowder behind it.

2063. Composition for Roman Candles. Mix 2 pound meal-powder, 22 pounds saltpetre, and 1 pound each sulphur and glass dust

2064. Colored Stars may be made by using any of the receipts for colored fires, with a solution of isinglass, & ounce; camphor, bounce; and alcohol, bounce. Make into cylindrical cakes of the requisite size, punch a hole in the centre of each, roll in gunpowder, and dry in the sun.

2065. Colored Fires. Great care is necessary in the preparation of these combustibles. The ingredients should be separately reduced to powder and sifted; then put into well-corked, wide-mouthed bottles until the time for mixing them for use. Colored fires deteriorate rapidly by keeping, and are nearly all dangerously inflammable; they should, therefore, be mixed as soon as possible before using them. The ingredients should be pure and perfectly dry; uniformly powdered, but not so fine as to be dusty. Nitrate of strontia, alum, carbonate of soda, and other crystals, should be gently heated in an iron pan until they lose their water of erystallization and crumble into dry powder. (See Drying, No. 3842.) Chlorate of potassa must be very cautiously handled, as it exing through a fine wire seive.

2067. Colored Fires for Stars, &c. The compounds may be put into small pillboxes, with a little priming and a quick match 22 parts sulphur, 60 parts nitrate of baryta. (see No. 2000) attached to each. If kept, 2083. Light Green Fire. Mix 16 they should be put where no damage can happen in case of their catching fire.

2068. To Make Colored Fires. display, are among the very best that are 250 parts nitrate of baryta. known. These fires have in some theatres light; color being communicated by passing parts sulphur, 49 parts chlorate of potassa.

the rays of light through colored glass. The unpleasant smell of colored fires is avoided, and the effects can be prolonged at pleasure,

instead of lasting merely a few moments.

2069. Blue Fire. Mix 2 parts realgar (red arsenic). 3 parts charcoal, 5 parts chlorate of potassa, 13 parts sulphur, and 77 parts

nitrate of baryta.

2070. Bird's Blue Fire. 1 part charcoal, 1 part orpiment (yellow sulphuret of arsenic), 16 parts black sulphuret of antimony, 48 parts nitre, and 64 parts sulphur.

2071. Bengal, or Blue Signal Light, used at Sea. 1 part tersulphide of antimony, 2 parts sulphur, and 6 parts dry nitre. (See No. 2065.)

2072. Bengal Lights. Braunschweizer recommends the following mixtures as not sulphur, 5 parts chlorate of potassa, and 16 producing injurious fumes: For red lights: parts fused nitrate of strontia. 9 parts nitrate of strontia, 3 parts shellac, 12 parts chlorate of potassa. For green: 9 parts nitrate of baryta, 3 parts of shellae, 1½ parts chlorate of potassa. For blue: 8 parts amparts sulphur, 23 dried chloride of calcium, 61 moniacal sulphate of copper, 6 parts chlorate parts sulphur, 23 dried chloride of calcium, 61

of potassa, 1 part of shellac.

2073. Blue Fire for Stage Effect. 15 parts of sulphur, 15 parts sulphate of potassa, 15 parts ammonio-sulphate of copper, 27 parts nitre, and 28 parts chlorate of potassa. The blue is made darker or lighter by increasing or diminishing the potassa and copper ingredients. This is Marchand's preparation.
2074. Marsh's Blue Fire. Mix 7

parts sulphate of copper, 24 sulphur, and 69

parts chlorate of potassa.

2075. Marsh's Crimson Fire for Pots. Mix 17 parts chlorate of petassa, 23 willow charcoal, 90 parts sulphur, and 270 parts nitrate of strontia.

2076. Marsh's Crimson Fire for Stars and Boxes. Mix 17 parts charcoal, 22 parts sulphuret of antimony, 69 chlorate of potassa, 72 parts sulphur, and 220 parts nitrate of strontia.

2077. Marchand's Purple Crimson Fire. Mix 16 parts sulphur, 23 parts dry chalk, 61 parts chlorate of potassa.

2078. Green Fire for Ghost Scenes. Equal parts charcoal and nitrate of baryta.

2079. Brilliant Green Fire. A magnificent green fire can be prepared by mixing 8 parts chlorate of thallium, 2 parts calomel, and 1 part resin.

2080. Green Fire. Take 2 parts metallic arsenic, 3 parts charcoal, 5 parts chlorate of ting the mouth quickly on the burning raisins, potassa, 13 parts sulphur, 77 parts nitrate of extinguishes them instantly. when burnt before a reflector of glass or metal. for cannon is composed of 3 parts nitre, 2

2066. Colored Fires for Illuminations. | 2081. Marchand's Green Fire. Mix Pack the compounds lightly into small cups 10 parts boracic acid, 17 sulphur, and 73 parts chlorate of potassa.

2082. Green Fire for Theatrical Tableaux. Take 18 parts chlorate of potassa,

parts sulphur, 24 carbonate of baryta, 60 parts chlorate of potassa.

2084. Green Fire for Pots of Stars. following receipts for the preparation of these Take 7 parts charcoal, 7 sulphuret of around, effective aids in pyrotechnic and dramatic 42 parts sulphur, 93 parts chlorate of po assa,

2085. Lilac Fire for Pans. Take 6 been assisted, if not superseded, by the calcium parts black oxide of copper, 20 dry chalk, 25

2086. Lilac Fire for Stars. parts black oxide of copper, 22 parts dried chalk. 25 parts sulphur, 50 chlorate of potassa.

2087. Red Fire. Mix 16 parts sulphur, 23 parts carbonate of strontia, 61 parts chlorate of potassa.

2088. Red Fire for Stage Effect. Mix 20 parts chlorate of potassa, 24 sulphur, 56 parts nitrate of strontia.

Orange Red Fire. 2089. Take 14 parts sulphur, 34 chalk, 52 parts chlorate of potassa

2090. Purple Red Fire. Sulphur, 16 parts, 23 parts chalk, C1 parts chlorate of potassa.

2091 Purple Fire. Take 1 part each of lampblack, red arsenic, and nitre; 2 parts

2092. Pink Fire for the Stage. Mix 1 part charcoal, 20 chalk, 20 parts sulphur, 27 parts chlorate of potassa, 32 parts nitre.

2093. Rose Colored Fire. Take 16

parts chlorate of potassa.

2094. Pale Violet Fire. parts sulphur, 16 parts alum, 16 carbonate of

potassa, 54 parts chlorate of potassa. 2095. Dark Violet Fire. parts alum, 12 parts carbonate of potassa, 16 parts sulphur, 60 parts chlorate of potassa.

2096. White Fire for Theatres. Take 2 parts charcoal, 22 sulphur, 76 parts nitre. 2097. White Fire for Pans or Stars. Take 60 parts nitre, 20 parts sulphur, 10 black antimony, 4 parts powdered camphor, 6 parts meal powder.

2098. Marsh's White Fire for Pans. Take 25 parts gunpowder, 36 zine filings, 46 parts sulphur, 93 parts nitre.

2099. Yellow Fire. Take 16 parts sulphur, 23 parts dried (See No. 2065) carbonate of soda, 61 chlorate of potassa.

2100. Marsh's Yellow Fire. Mix 12 parts charcoal, 149 parts dry (see No. 2065) nitrate of soda, 39 parts sulphur.

2101. Fire-eating Ghosts. strong warm spirits into a flat dish, sprinkle some salt into it, and set it on fire on a table in a perfectly dark room, taking care to protect the table from injury. Persons standing round the table will appear of a deathly pallor, and by eating raisins dipped in the burning spirit, will appear to eat fire. Shut-

sulphur, and 1 gunpowder, well mixed and of slags, which greatly mar the effect. It is,

igniting fireworks.

2103. Signal Lights. Such lights are a small quantity of metallic sulphuret. Mix 600 grains nitre, 2 sulphur, and 100 yellow

be substituted for that of arsenic.

2104. Indian White Fire Signal.

Dry (see No. 2005) nitre, 24 parts; sulphur, 7 parts; powdered charcoal, 1; or instead of the charcoal, 2 parts red sulphuret of arsenic. Mix them intimately in an iron vessel, and ram the mixture into thick paper cylinders of the latter class we will mention only one: about 3 inches in length by 1 in diameter. These are kept in a dry place, and when one is required to be used, it is set on end, and a serve mention, though not equal to the last:

piece of red-hot charcoal placed upon it.
2105. Iron Sand for Fireworks. Used to give corruscations in fireworks, is far better than iron or steel-filings. It is made by beating cast steel or iron into small pieces on an anvil. These are sifted into 4 sizes, the smallest for the smallest pieces, and vice but bluish white, is the following: Saltpetre, versa. The corruscations produced by these 12 parts; sulphur are exceedingly brilliant. The sand should autimony, 1 part. be kept in a dry place in a well-closed bottle, as any rust damages it. Fireworks containing it should not be made very long before using.

2106. Open Fires. The following article and receipts for open fires are by Professor Ferrum, and we quote them from the "Amer-

ican Druggists' Circular":

Among the many receipts for open fires, but few deserve to be recommended, and these have been selected. The white and red fires only show a clear, distinct color. The green is generally pale, and shows off only when burnt after a red. A pure blue is very difficult to obtain. The following should be observed as general rules: The ingredients for the fires are dried singly at a slightly elevated temperature, finely powdered, and preserved in well-stoppered bottles, until required for The mixing of the ingredients is best performed on a sheet of paper by means of a card, and should be done very carefully so as to ensure a complete mixture. Sifting is in most cases admissible, while triturating in mixing, the powder is piled in small heaps in phur, 16 parts; black sulphuret of antimony, open vessels, for which purpose small flowerpots or flower-pot dishes are well adapted. On top of these several piles, some gunpowder is placed to facilitate the lighting. The vessels should be arranged in such a manner that the flame may illuminate the intended object without being seen by the spectators. The distribution of the material into a greater or less number of dishes is governed by circumstances. A great number of small flames from a certain quantity of mixture generally give a more intense, but so much shorterlived light than the same quantity distributed in larger portions; beyond a certain limit, however, even that intensity is not materially heightened by a few more lights. If the fire ture form a correspondingly greater amount are formed by filling cylinders of thin writing

rammed into cases. These are also useful for therefore, best in such cases to burn off a number of small charges successively

2107. White Fire. The following mixgenerally composed of sulpbur and nitre, with ture we recommend as the very best for white lights, being unsurpassed in brilliancy and

power by any other?

sulphuret of arsenic, and ram it into a conical paper case. When touched with a red-hot iron it deflagrates rapidly with a brilliant white light. The sulphuret of antimony may be substituted for that of arsenic.

Sattpetre, 18 parts; sulphur, 10 parts; black sulphuret of antimony, 3 parts; burnt lime, 4 parts. The sulphur is used in the form of flowers previously dried: the lime is not to be slacked, but must be figure powdered; it must be fresh, and be powdered immediately before use. All other mixtures for white fires have either a bluish tinge or contain deleterious ingredients, which render them at least unsuitable for indoor use. Of Saltpetre, 12 parts; sulphur, 4 parts; sulphite of tin, 1 part. Two other mixtures de-

I. Saltpetre, 48 parts; sulphur, 13½ parts; sulphide of sodium, 7½ parts; and

II. Saltpetre, 64 parts; sulphur, 21 parts;

gunpowder, 15 parts. 2108. Blue Fire. The only mixture to be relied on, though the light is not purely blue, 12 parts; sulphur, 4 parts; black sulphuret of

2109. Red Fire. The following mixture is the best in use; its composition may

be altered by various admixtures:

I. Nitrate of strontia, 13 parts; sulphar, 1 part; powder dust, 1 part. The latter ingredient is prepared from tine gunpowder, rubbed up carefully in a mortar and then sifted through a hair sieve. Another receipt is:

II. Nitrate of strontia, 24 parts; chlorate of potassa, 16 parts; stearine, 4 parts; powdered charcoal, 1 part. In using chlorate of potassa the precautions given in No. 2124 must be strictly observed, and all pounding and rub-

bing avoided.

III. Nitrate of strontia, 20 parts; chlorate of potassa, 4 parts; sulphur, 5 parts; black sulphuret of antimony, 2 parts; powdered charcoal, 1 part. Gives a very strong light. The nitrate of strontia for these fires, as the ingredients for all others, must be well, but carefully dried. (See No. 2065.)

2110. Yellow Fire. This color, which is very little used, is produced by the followa mortar is above all to be avoided. After ing mixture: Nitrate of soda, 48 parts; sul-

4 parts; powdered charcoal, 1 part.
2111. Green Fires. The coloring ingredients for these lights are the salts of baryta. The color is generally not very deep.

I. Nitrate of baryta, 45 parts; sulphur, 10 parts; chlorate of potassa, 20 parts; calomel,

2 parts; lampblack, 1 part.

II. Nitrate of baryta, 60 parts; chlorate of potassa, 18 parts; sulphur, 22 parts.

III. Chlorate of baryta, 3 parts; sulphur, 1 part.

IV. Chlorate of baryta, 24 parts; stearin, 3 parts; sugar of milk, 1 part.

V. Chlorate of baryta, 3 parts; sugar of

milk, 1 part.
2112. Colored Lights. We derive the is to continue for some time, it must further receipts for these from the same source as the be considered that large quantities of the mix- open fires. (See No. 2106.) Colored lights

mixtures. The length of the cylinder determines the duration of the light. The mixtures may be moistened and pounded into the in the one of the solutions given below, and cylinder with a wooden rod; after drying, then drying it. they will then be hard enough to allow of the A solution of position. The mixtures vary essentially from those used for colored fires.

Saltpetre, 4 White Lights. 2113. parts; sulphur, 1 part; black sulphuret of antimony, 1 part.

2114. Yellow Lights. I. Black sul-

II. Saltpetre, 140 parts; sulphur, 45 parts;

sulphur, 1 part.

II. Chlorate of potassa, 20 parts; nitrate

of baryta, 21 parts; sulphur, 11 parts.

2116. Red Lights. Nitrate of strontia, 25 parts; chlorate of potassa, 15 parts; sulphur, 13 parts; black sulphuret of antimony, 4 parts; mastich. 1 part.
2117. Pink Lights. Chlorate of potas-

sa, 12 parts; saltpetre, 5 parts; sugar of milk, 4 parts; lycopodium, 1 part; oxalate of stron-

tia. 1 part

2118. Blue Lights. Chlorate of potassa, 3 parts; sulphur, 1 part; ammoniated

copper, 1 part.

2119. Colored Lights without Sulphur—For Indoor Illuminations. These are used for the purpose of lighting up tableaux vivants, and for private theatricals

2120. White Light. Chlorate of potassa, 12 parts; saltpetre, 4 parts; sugar of milk, 4 parts; lycopodium, 1 part; carbonate

of baryta, 1 part.
2121. Yellow Light. Chlorate of potassa, 6 parts (or nitrate of baryta 10 parts); saltpetre, 6 parts; oxalate of soda, 5 parts; powdered shellae, 3 parts.

2122. Green Light. Only after yellow or red lights. Chlorate of potassa, 2 parts; nitrate of baryta, 1 part; sugar of milk, 1

part.

2123. Red Light. Nitrate of strontia, 12 parts; chlorate of potassa, 8 parts; sugar of milk, 1 part; stearine, 2 parts.

2124. Caution in the Use of Chlorate of Potassa. This substance should never be kept in admixture with any inflammable they explode with terrific violence by the most trivial causes, and not unfrequently spontaneously. All pounding and rubbing must be avoided.

2125. Paper for Producing Flashes of Colored Light. Soak unsized paper for ten minutes in a mixture of 4 parts, by measure, oil of vitriol, and 5 parts strong fuming nitric acid; wash out thoroughly in warm distilled water, and dry it thoroughly at a gentle pellet of it, lighted at one point at a flame, | violence by slight heat, friction, or concussion.

paper of about an inch in diameter with the and then thrown into the air, will produce a brilliant flash, and leave no perceptible ash. The color is given by saturating the gun-paper

A solution of chlorate of strontium makes removal of the paper, and may be further the flash a bright crimson. Chlorate of barium, strengthened by being dipped in or painted green. Nitrate of potassium, violet. Chlorover with mucilage of gum-arabic. The cyl-ate of copper, blue. Any one of the foregoing inders, when finished, are tied to the upper end chlorates may be prepared by mixing a warm of sticks fastened in the ground in a vertical solution of the corresponding chloride with an equivalent quantity of a warm solution of chlorate of potassa; the precipitate formed will be chloride of potassium, and the clear liquid, poured off, will be the desired chlorate, to be used for saturating the gun-paper.

phuret of antimony, 2 parts; chlorate of potassa, 4 parts; sulphur, 2 parts; oxalate of 26 to 30 parts, this last proportion varying soda, 1 part. fine, and make the material into a paste with alcohol; form it into dice, with a knife or oxalate of soda, 30 parts; lampblack, I part, alcohol; form it into dice, with a knife or 2115. Green Lights. I. Chlorate of spatula, about 4 inch square; let them dry baryta. 2 parts; nitrate of baryta, 3 parts; rather gradually on a warm mantel-piece, not sulphur, 1 part. tle squares in a small cleft made at the end of a stalk of broom-corn. Light the material at a candle, hold the stem downward, and await the result. After the first blazing off, a ball of molten lava will form, from which the curious corruscations will soon appear.

2127. Japanese Firework Mixture. Finely pulverized nitrate of potassa, 70 parts; washed flowers of sulphur, 30 parts; powdered lycopodium, 12 parts; best and very light lampblack, 8 parts. From 1½ to 2 grains of this powder are sufficient for use packed in

strips of suitable paper.

2128. Colored Flames. The flame of alcohol may be colored by mixing certain salts with the spirit. A green color is given by muriate of copper, or boracic acid. Red, by nitrate of strontian, nitrate of iron, or nitrate

of lime. Yellow, by nitrate of soda, &c. 2129. Greek Fire. True Greek fire is simply a solid, highly combustible composition, consisting of sulphur and phosphorus dissolved in the bisulphide of carbon, to which occasionally some mineral oil is added, with the view of increasing its incendiary powers. When the liquid is thrown on any surface exposed to the air the solvent evaporates, leaving a film of the phosphorus or sulphide of phosphorus, which then inflames spontaneously. The proper mode of extinguishing such a fire is to throw damp sand, ashes, sawdust, lime, or any powder, wet sacking or carpeting, in short, any material which will exclude the air from the fire. No attempt should be made to remove the covering for matter, especially sulphur or phosphorus, as some time after the flame has been extinguished. The place should afterward be thoroughly washed by a powerful jet of water forced upon it.

"xplosives. This is a general Aterm for all substances which explode with violence. Some of these, as gunpowder, gun-cotton, &c., explode by being brought heat. The paper thus prepared is similar in line contact with fire. Others, to which the its properties to gun cotton, and a small term of Fulminates is applied, explode with

well together 100 parts of dried tartar emetic, and 3 parts of lampblack, or charcoal powder; then take a crucible capable of holding 3 smooth, and rubbed the inside with powdered nitric acid, and 830 parts alcohol. charcoal, # fill it with the above mixture. cover it with a layer of charcoal powder, and lute on the cover. Expose it for 3 hours to a strong heat in a reverberatory furnace, and, when taken out, let it stand to cool for 6 or 7 hours before removing its contents, to prevent an explosion. The crucible being now epened, the contents must be hastily transferred, without breaking, to a wide-mouthed stoppered phial, when, after some time, it will crumble down into a powder of itself. Or: Triturate together, very carefully, 100 parts antimony, 75 parts carburetted (roasted to blackness) cream of tartar, and 12 parts lampblack; preserve it in phials. When the above processes are properly conducted, the resulting powders fulminate violently on contact with water. It is to the presence of the very inflammable metal potassium that they owe this property. Another compound, made with 60 parts of carburetted cream of tartar, 120 bismuth, and 1 of nitre, treated as above, contains an alloy very rich in potassium. A piece the size of a pea introduced into a mass of gunpowder explodes it on being thrown into water.

2132. Fulminating Gold. Dissolve gold in aqua regia (made by dissolving 4 ounces sal ammoniac in 12 or 16 ounces nitric be made in very small quantities at a time, to avoid risk, as without great care it explodes with extreme violence. This is caused by the

water, pure gold will be obtained. 2133. Fulminating Silver.

2133. Fulminating Silver. Digest oxide of silver (recently precipitated, and dried by pressure between bibulous paper) in concentrated liquor of ammonia for 12 or 15 hours, pour off the liquid, and cautiously dry the black powder in the air. The decanted ammonia, when gently heated, yields, on cooling, small crystals, which possess a still more formidable power of detonation, and will scarcely bear touching, even while under the liquid. This compound is exploded by the slightest friction or percussion, and should therefore be only made in very small quantities at a time, and handled with great caution. Its explosive powers are tremendous; in fact, it can hardly be handled with safety, even in the moist state. Many frightful accidents have happened from the spontaneous explo-

can be exploded with safety at one time.

2134. Fulminating Mercury. Dissolve by a gentle heat 100 parts, by weight, of mercury in 100 parts nitric acid of specific repel the excess of acid, and then well washgravity 1.4; and when the solution has acquired a temperature of 130° Fahr., slowly longer reddens litmus paper. It is then dried pour it through a glass funnel tube into 830 at a heat not exceeding 212°. A lower temperature alcohol of specific gravity .830. As perature is still safer. The cotton thus presones cease to rise, filter it through double early in ether. Under Collodion will be paper, wash with cold water, and dry by found other preparations of Gun-Cotton.

2131. Fulminating Antimony. Grind steam (not hotter than 212°) or hot water. This is the formula of Dr. Ure, and said to be the cheapest and safest. If parts by measure be adopted, the above proportions will be, for ounces of water, and having ground its edge 100 parts, by measure, of mercury, 740 parts

2135. Fulminating Copper. copper, in powder or filings, with fulminate of mercury or of silver, and a little water. It forms soluble green crystals that explode with

a green flame.

2136. Fulminating Powder. Powder separately 3 parts nitre, 2 parts dry (see No. 2065) carbonate of potash, and 1 flowers of sulphur; mix them together carefully. If 20 grains of this compound are slowly heated on a shovel over the fire, it melts and becomes brown, exploding with a loud report.

2137. New Explosive Compound. B. G. Amend has observed that glycerine mixed with crystallized permanganate of potassa in a mortar spontaneously deflagrates

2138. Priming for Percussion Caps. To make this compound 100 grains of fulminating mercury are triturated with a wooden muller on marble, with 30 grains of water and 60 grains of gunpowder. This is sufficient for Dr. Ure recommends a solution of 400 caps. gum mastich in turpentine as a medium for

attaching the fulminate to the cap.

2139. Percussion Pellets. Mix equal parts of the chlorate of potassa and sulphuret of antimony with liquid gum, so as to form a paste. When dry it may be formed into pelacid), and precipitate with a solution of carlets, and used as percussion powder for guns. bonete of potassa. Fulminating gold should This composition, placed on the ends of splints dipped in sulphur, produces friction matches. This mixture may also be employed for percussion caps, only without the gum; the two slightest friction or sudden increase of heat, substances, mixed together dry, are forced Its fulminating property may be destroyed by into the caps, and a drop of varnish deposited boiling it in pearlash lye, or oil of vitrio; on the inside surface of each. A mixture of and by heating the powder after washing it in the fulminate of mercury, chlorate of potassa, and sulphur, however, is more commonly Digest ox- used for lining percussion caps.

2140. To Make Gunpowder. Pulverize separately, 76 parts nitrate of potassa, 11 sulphur, and 13 freshly burned charcoal, and mix them with a little water, so as to form a cake when rolled out on a board. This is then dried on a clean sheet of paper placed in a warm situation, and afterwards crumbled into grains. It will form unglazed gunpowder. The pulverized ingredients, thoroughly mixed, without the addition of any water, constitute what is called meal powder; this may also be made by pulverizing grained gunpowder very cautiously in a mortar, or with a muller.

(See Perphyrization, No. 25.)

2141. To Prepare Gun-Cotton. The simplest way consists in immersing, for a few seconds, well-carded cotton in a mixture of sion of this substance. At most 1 or 2 grains equal parts, by volume, of oil of vitriol of can be exploded with safety at one time.

2134. Fulminating Mercury. Discific gravity 1.845, and nitric acid of specific gravity of 1.500. The cotton, when well saturated is to be removed and squeezed to ed in clean cold water, until the water no

evaporate at 365° Fahr. It has been found nished, and dried again, as before, that pure nitro-glycerine, dropped upon a thor- 2148. To Make Matches Without gunpowder; but if the iron is not red hot, ling, a slight shock sometimes exploding it.

38 parts glycerine slowly, allowing it to preparations the matches are ready for diptrickle down the sides of the vessel. The ping in the phosphorus paste. glycerine will remain on the surface for hours

bicarbonate of soda or lime.

Blasting Powders. either by contact with a strong acid, a slight that it attracts moisture too easily. elevation of temperature, or the slightest fric-

2145. To Make Blasting Powder. Reduce separately to powder, 2 parts chlorate in 9 parts of water). For stearine dips: Phosof potassa and 1 part red sulf the red for arsenie; phorus, 3 parts; brown oxide of lead, 2 parts; mix very lightly together. Or:—Powder turpentine, ½ part, softened in 3 parts water. separately, 5 parts chlorate of potassa, 2 parts. Instead of the brown oxide, 2 parts of red red sulphuret of arsenic, and 1 part ferrecyanide of potassium (prussiate of potassa); mix carefully. Or:—Mix carefully, as before, after having separately reduced to powder, equal parts chlorate of potassa and ferrocyanide

of potassium.
2146. Parlor or Congreve Matches. Dissolve 16 parts gum-arabic in the least possible quantity of water, and mix with it 9 parts phosphorus in powder (see No. 2696) then add 14 parts nitre (saltpetre), and 16 parts of either vermilion (red sulphuret of mercury), or binoxide (black oxide) of manganese, and form the whole into a paste. Dip the matches into this paste, and then let them dry. When quite dry they are to be dipped into a very dilute copal or lac varnish, and again dried; by this means they are less likely to suffer from damp weather.

Cheap Parlor Matches. cheaper paste for dipping may be made by stronger than the substances joined. The soaking 6 parts glue for 24 hours in a little first point that demands attention, is to bring

2142. Nitro-glycerine. This is an oily, water, and liquefied by rubbing in a heated colorless liquid, with a specific gravity of 1.60. mortar; 4 parts phosphorus are next added It has no smell, but a taste which at first is at a heat not exceeding 150° Fahr.; then add sweet, but soon becomes pungent, like pepper; 10 parts finely powdered sultpetre; and lastly is soluble in other and methylic alcohol, but 5 parts red lead and 2 parts smalts are mixed not in water, but the presence of water di- in, the whole being formed into a uniform minishes the risk of explosion. It begins to paste. The matches are dipped, dried, var-

oughly red hot iron, assumes a spheroidal state Sulphur. To obviate the use of sulphur for and flashes off into vapor in the same way as igniting the wood of the match, the ends of the matches are first slightly charred by rubonly hot enough to cause the nitro-glycerine bing them against a red hot iron plate, and to boil suddenly, a frightful explosion takes then dipped into as much white wax, melted place. The explosion of a single drop in this in a suitable vessel, as will cover the bottom manner will cause serious damage. This danabout \(\frac{1}{3} \) inch in depth. Or they may be gerous compound requires most careful hand-dipped into camphorated spirit. Or into a ht shock sometimes exploding it. solution of 1 ounce Venice turpentine and ½

To Prepare Nitro-glycerine. ounce camphor, in ½ pint oil of turpentine, Mix 100 parts fuming nitric acid at 50° Baume with a little gum-benzoin and cascarilla by with 200 parts sulphuric acid; when cool, add way of perfume. After any of the above

2149. Substitute for Lucifer Matches. without mixing. Stir the glycerine and acids The dangers arising from the universal adopwith a glass rod for 10 seconds, pour it into tion of the common lucifer match have in-20 times its volume of water, and the nitro- duced chemists to seek a substitute for it. M. glycerine will be instantly precipitated to the Peltzer has recently proposed a compound extent of 76 parts, or double the amount of which is obtained in the shape of a violet glycerine employed. It must be repeatedly powder, by mixing together equal volumes of washed with water, and then saturated with solutions of sulphate of copper, one of which is supersaturated with ammonia, and the Neither other with hyposulphite of soda. A mixture fresh nor salt water has any injurious effect of chlorate of potash and the above powder on blasting powders; they need only to be will catch fire by percussion or rubbing; it dried to regain their explosive character, burns like gunpowder, and leaves a black Their emitting but little smoke renders them residue. M. Viederbold proposes a mixture useful in underground operations, and their of hyposulphite of lead, or baryta, or chlorate explosive force is eight times that of gun-powder. They explode with extreme facility, The only inconvenience of this compound is

2150. Mixtures for Matches. tion. In preparing them, therefore, excessive sulphur dips: Phosphorus, 3 parts; glue, 6 precaution is necessary, especially in mixing parts; sand, 1 part; incorporated below 100° the ingredients. A straw, slightly wetted Fahr., with 10 parts of water. Or, phosphowith oil of vitriol, applied to a small heap of the powder, will cause instantaneous explosion.

2145. To Make Blasting Powder.

pwith oil of vitriol, applied to a small heap of the parts; fine sall, 4 parts; red ochre, 1 part (or, ultramarine), ½ part; gum-arabic, 5 parts. in 6 pints of water (or, 4 parts of glue lead stirred up with & part of nitric acid may

ements and Uniting Bodies. In the preparation of cements and all substances intended to produce close adhesion, whether in a semi-fluid or pasty state, freedom from dirt and grease is a most essential and necessary condition. Quite as much depends upon the manner in which a cement is applied as upon the cement itself. The best cement that ever was compounded would prove entirely worthless if improperly applied. The preparations given below will be found to answer every reasonable demand; and if properly prepared and used strictly according to the directions laid down, will seldom fail to form a union as strong, if not

the surface to be united. This end is best reached, when using hot cements, by making the edges to be joined at least as hot as the cement when applied, or as nearly so as can be done without injury to the substance; in cement on the heated edges. Another very important point is to use as little cement as possible. When the surfaces are separated by a large mass of cement, we have to depend mastic. upon the strength of the cement itself, and not upon its adhesion to the surfaces which it is used to join; and, in general, cements are comparatively brittle. Sealing-wax is a very good agent for uniting metal to glass or stone, provided the masses to be united are made so hot as to fuse the cement; but if the cement is applied to them while they are cold, it will not stick at all. This fact is well known to venders of cement for uniting earthenware. By heating two pieces, so that they will fuse shellac, they are able to join them so that worthless in their hands, simply because they do not know how to use it. They are afraid to heat a delicate glass or porcelain vessel to a sufficient degree, and they are apt to use too much of the material, and the result is a failure; the cement is consequently deemed good for nothing. The great obstacles to the junction of any two surfaces are air and dirt. The former is universally present, the latter is due to accident or carelessness. All surfaces are covered with a thin adhering layer of air which it is difficult to remove, and unless this is displaced, the cement cannot adhere to the surface to which it is applied, simply because it cannot come into contact with it. most efficient agent in displacing this adhering air is heat. Metals warmed to a point a little above 200° become instantly and completely wet when immersed in water. Hence, for cements that are used in a fused condition, heat is the most efficient means of bringing them in contact with the surfaces to ate pressure and friction.

2152. Armenian or Jeweler's Cement. The following is a receipt for a strong cement used by some oriental nations. for the purpose of attaching precious stones to metallic surfaces: Take 6 pieces of gum water, then gradually add boiling water until mastic, the size of a pea, and dissolve them a proper consistence is acquired, being parin the smallest possible quantity of 95 per ticularly careful to keep it well stirred all the cent. alcohol. Soften some isinglass in water, then gradually add boiling water until a proper consistence is acquired, being parintenance. ter (though none of the water must be used), and saturate strong brandy with it till you have 2 ounces of glue; then rub in 2 small pieces of gum ammoniac. Mix the two preparations at a heat. Keep well stoppered. Set the bottle in hot water before using. It is said by the Turks that this preparation will unite two metallic surfaces, even of polished

2153. Keller's Armenian Cement for Glass, China, &c. Soak 2 drachms cut resists water, and a moderate degree of heat, isinglass in 2 ounces water for 24 hours; boil and is useful for joining small pieces of marble down to 1 ounce; add 1 ounce spirit of wine, or alabaster.

the cement itself into intimate contact with | and strain through linen. Mix this, while not, with a solution of 1 draches mastie in 1 cune rectified spirit, and trit-rate thoroughly with 1 drachm powdered gum ammonia

2154. Ure's Diamond Cement. Take I ounce isinglass and 6 ounces distilled water; some cases it is even preferable to melt the boil down to 3 ounces; add 11 ounces rectified spirit. Boil for 2 minutes, strain, and add, while hot, I ounce of a milky emulsion of ammoniae, and 5 drachms tineture of gum

2155. Chinese Cement. Take of orange shellac, bruised, 4 ounces; highly rectified spirit of wine, 3 ounces. Set the mixture in a warm place, frequently shaking it till the shellac is dissolved. Wood naphtha may be substituted for the spirit of wine, but the unpleasant smell of the naphtha is some objection

2156. To Mend Broken Glass. much better process for mending broken glass, china and earthenware with shellae, than heating them, is to dissolve the shellac they will rather break at any other part than in alcohol to about the consistence of molasses, along the line of union. But although people and with a thin splinter of wood or penciland with a thin splinter of wood or pencilconstantly see the operation performed, and brush touch the edges of the broken ware. In buy liberally of the cement, it will be found a short time it sets without any heating, which in nine cases out of ten the cement proves is often inconvenient. It will stand every contingency but a heat equal to boiling water.

2157. To Mend Crockery Ware. One of the strongest cements and easiest applied for this purpose is lime and the white of an egg. To use it, take a sufficient quantity of the egg to mend one article at a time, shave off a quantity of lime, and mix thoroughly. Apply quickly to the edges and place firmly together, when it will very soon become set and strong. Mix but a small quantity at once, as it hardens very soon, so that it cannot be used. Calcined plaster of Paris would answer the same purpose.

2158. Badigeon. A cement used by operatives and artists to fill up holes and cover defects in their work. Statuaries use a mixture of plaster and free-stone for this purpose; carpenters, a mixture of sawdust and glue, or of whiting and glue; coopers use a mixture of tallow and chalk. The same name is given to a stone colored mixture used which they are to be applied. In the case of for the fronts of houses, and said to be comglue, the adhesion is best attained by moder- posed of wood-dust and lime slacked together, stone-powder, and a little umber or sienna, mixed up with alum water to the consistence of paint.

2159. Japanese Cement. Intimately mix the best powdered rice with a little cold in a clean sauce-pan or earthen pipkin. This glue is beautifully white and almost transparent, for which reason it is well adapted for fancy paper work, which requires a strong and colorless cement.

2160. Curd Cement. Add ½ pint vinegar to ½ pint skimmed milk. Mix the curd with the whites of 5 eggs well beaten, and sufficient powdered quick-lime sifted in with constant stirring, so as to form a paste. It

mixed with glycerine yields a compound limuch the appearance and characteristics of pound; linseed oil, † pound.

India rubber. The two substances united 2171. Cement for Rooms. M. Sarel, fluids is at once solved by brushing or paintbuffers of stamps, as benzine or petroleum will clean them when dirty in the most perfect time. Water must not be used with this com-

2162. Cement to Resist Petroleum. A cement peculiarly adapted to stand petroleum or any of its distillates is made by boiling 3 parts resin with 1 caustic soda and 5 water. This forms a resin soap which is afterward mixed with half its weight of plaster of Paris, zinc white, white lead, or precipitated chalk. The plaster hardens in about 40 min. is suited for many purposes where a strong utes.

Cement for Aquaria. Mix 3 pounds well dried venetian red (finely powdered) with 1 pound oxide of iron, and add as much boiling oil as will reduce it to a stiff

2164. Cement for Marine Aquaria. Take 10 parts by measure litharge, 10 parts wood, stone, metal, or glass, and hardens under water. It is also good for marine aquahas been cemented.

2165. Water Cement. Manganese is found to be a valuable ingredient in water cements. 4 parts gray clay are to be mixed about 90 parts good lime stone reduced to fine powder, the whole to 'e calcined to expel a stiff paste, with 60 parts washed sand.

2166. Cement for Glass Syringes. Take resin, 2 parts; gutta percha, 1 part; melt together over a slow fire, apply hot, and

trim with a hot knife.

2167. Quickly-Setting Rust Joint Cement. Make into a paste with water 1 part by weight sal ammoniac in powder, 2 parts flower of sulphur, and 80 parts iron borings.

2168. Slowly-Setting Rust Joint Cement. Make into a paste with water, 2 parts sal ammoniac, 1 part flower of sulphur, and cohol to effect a solution. Then soak 2 200 parts iron borings. This cement is better ounces isinglass, or fish-glue until it is thorthan the last if the joint is not required for oughly softened. Dissolve the isinglass in immediate use.

2169. Red Lead Cement for Face Joints. Mix 1 part each white and red lead moniac. Warm the two mixtures together with linseed oil to the proper consistence.

2161. To Make a Cement that will wax, and stir in 1 pound red ochre (highly Resist Benzine and Petroleum. It has dried, and still warm), with 4 ounces Paris quite recently been discovered that gelatine plaster, continuing the heat a little above 2120 and stirring constantly till all frothing ceases. quid when hot, but which solidifies on cooling, Or, (for troughs), resin, 6 pounds; dried red and forms a tough, elastic substance, having ochre, 1 pound; calcined plaster of Paris, 1

form a mixture entirely and absolutely insol- of Paris, has made an invention which is prouble in petroleum or benzine, and the great nounced better than plaster of Paris for coatproblem of making casks impervious to these ling the walls and ceilings of rooms. A coat fluids is at once solved by brushing or paint of oxide of zinc, mixed with size, made up ing them on the inside with the compound. like a wash, is first laid on, and over that a This is also used for printers' rollers and for coat of chloride of zinc applied, prepared in buffers of stamps, as benzine or petroleum the same way as the first wash. The oxide and chloride effect an immediate combination. manner and in an incredibly short space of and form a kind of cement, smooth and polished as glass, and possessing the advantages of oil paint without its disadventages of smell.

2172. Coppersmith's or Blood Cement. Bullock's blood thickened with finely powdered quicklime makes a good cement to secure the edg. and rivets of copper boilers, to mend taks from joints, &c. It must be used as soon as mixed, as it rapidly gets hard. It is extremely cheap and very derable, and

cement is required.

2173. Pew's Composition for Covering Buildings. Take the hardest and purest limestone (white marble is to be preferred), free from sand, clay, or other matter; calcine it in a reverberatory furnace, pulverize, and pass it through a sieve. 1 part, by weight, is to be mixed with 2 parts clay well baked and plaster of Paris, 10 parts dry white sand, 1 similarly pulverized, conducting the whole part finely powdered resin, and mix them, when wanted for use, into a pretty stiff putty first powder. The second is to be made of 1 with boiled linseed oil. This will stick to part calcined and pulverized gypsum, to wood oten metal or class and harden which is added 2 parts clay, baked and pulverized. These two powders are to be comria, as it resists the action of salt water. It is bined, and intimately incorporated, so as to better not to use the tank until 3 days after it form a perfect mixture. When it is to be used, mix it with about a fourth part of its weight of water, added gradually, stirring the mass well the whole time, until it forms a thick paste, in which state it is to be spread with 6 parts black oxide of manganese, and like mortar upon the desired surface. It becomes in time as hard as stone, allows no moisture to penetrate, and is not cracked by the carbonic acid; when well calcined and heat. When well prepared it will last any cooled, to be worked into the consistence of length of time. When in its plastic or soft state, it may be colored of any desired tint. 2174. Hard Hydraulic Cement.

cement which is said to have been used with great success in covering terraces, lining basins, cementing stones, etc., resisting the filtration of water, and so hard that it scratches iron, is formed of 63 parts well-burned brick, and 7 parts litharge, pulverized and moistened with linseed oil. Moisten the surfaces to

which it is to be applied.

2175. Universal Cement. Dissolve 2 ounces mastic in just enough 95 per cent. alproof spirits sufficient to form a strong glue, and then add 1 ounce finely pulverized gumamover a slow fire, and when they are thorough-2170. Singer's Cement for Electrical ly mixed, bottle and hermetically seal them. Machines and Galvanic Troughs. Melt This cement becomes perfectly dry in 12 or together 5 pounds resin, and 1 pound bees' 15 hours. When the cement is to be used, the bottle should be heated in a water bath to liquefy it; the fragments to be cemented should also be heated before joining them, and, as a matter of course, the surfaces well cleaned. Glass, crockery, &c., restored by the above cement, are as solid as before having been mended, and the seams are scarcely visible.

2176. To Cement Amber. Amber is joined or mended by smearing the surfaces with boiled linseed cil, and strongly pressing them together, at the same time holding them over a charcoal fire or heating them in any other way that will not injure the amber.

2177. To Cement Alabaster and Plaster. Ornaments of alabaster or plaster may be joined together by means of a little white of egg, thickened with finely-powdered quick-lime, or by a mixture of newly-baked and finely-powdered plaster of Paris, mixed up with the least possible quantity of water.

2178. Mending Plaster Models. Wax and resin, or shellae varnish, is recommended for the above purpose. Dr. Chaim suggests the use of liquid silex. Wet the two surfaces with it, and allow a few moments to dry. It will be found very useful in cases of accident used as in No. 2182, yields a violet red cement. to a cast.

2179. Waterproof Mastic Cement. Mix together 1 part red lead to 5 parts ground: lime, and 5 parts sharp sand, with boiled oil. hardness. Or: 1 part red lead to 5 whiting and 10 sharp sand mixed with boiled oil.

2180. Marble Workers' Cement. Flower of sulphur, 1 part; hydrochlorate of afford an exceedingly firm black cement. ammonia, 2 parts; iron filings, 16 parts. The 2194. Dark Grey Cement. Zinc above substances must be reduced to a powder, and securely preserved in closely stop- 2182, yield a hard dark grey cement. ped vessels. When the cement is to be employed, take 20 parts very fine iron filings, add 1 part of the above powder, mix them together with enough water to form a manageable paste. This paste solidifies in 20 days and becomes as hard as iron.

2181. Masons' Cement for Coating the Insides of Cisterns. Take equal parts beneath the water.

Colored Cements. 2182. Professor and great hardness by mixing various bases with soluble glass. Soluble soda glass of 33° Baumé is to be thoroughly stirred and mixed with fine chalk, and the coloring matter (see 12 following receipts) well incorporated. In quired. the course of 6 or 8 hours a hard cement will set, which is capable of a great variety of uses. As soluble glass can be kept on hand in liquid form, and the chalk and coloring matters are permanent and cheap, the colored cements can be readily prepared when wanted, and the material can be kept in stock, ready for use, at but little expense. Boettger recommends the following coloring matters:

2183. Black Cement. Well sifted sulwhich, after solidifying, can be polished or burnished with agate, and then possesses a fine metallic lustre.

2184. Grey-Black Cement. Fine iron dust, mixed as in No. 2182, gives a grey-black cement.

2185. Grey Cement. Zinc dust. This, used as in No. 2182, makes a grey mass, exceedingly hard, which, on polishing, exhibits a brilliant metallic lustre of zinc, so that broken or defective zinc castings may be mended and restored by a cement that might be called a cold zinc easting. It adheres firmly to metal, stone, and wood.

2186. Bright Green Cement. Carbonate of copper, used according to No. 2182,

gives a bright green cement.
2187. Dark Green Cement. Sesquioxide of chromium, mixed as in No. 2182, gives a dark green cement.

2188. Blue Cement. Thénard's blue, used as in No. 2182, makes a blue cement.

2189. Yellow Cement. Litharge, with soluble glass, &c., see No. 2182, gives a yellow cement.

2190. Bright Red Cement. Cinnabar, used as directed in No. 2182, makes a bright red cement.

2191. Violet Red Cement. Carmine,

White Cement. 2192. The soluble glass with fine chalk alone (see No. 2182) gives a white cement of great beauty and

2193. Black Cement. Sulphide of antimony and iron dust, in equal proportions, stirred in with soluble glass (see No. 2182),

2194. Dark Grey Cement. Zinc dust and iron in equal proportions, used as in No.

2195. Portland Cement. Portland cement is formed of clay and limestone, generally containing some silica, the properties of which may vary without injury to the ce-The proportion of clay may also vary ment. from 19 to 25 per cent. without detriment. The only necessary condition for the formation of a good artificial Portland cement, is of quicklime, pulverized baked bricks, and an intimate and homogeneous mixture of car-wood ashes. Thoroughly mix the above subwood ashes. Thoroughly mix the above sub-stances, and dilute with sufficient olive oil to form a manageable paste. This cement imme-are raised to a white heat in kilns of the propdiately hardens in the air, and never cracks er form, so that they are almost vitrified. After the calcination all pulverulent and scorified portions are carefully pricked out and Boettger prepares cement of different colors thrown away. The remainder is then finely ground and becomes ready for use. The amount of water which enters into combination with it in mixing is about .366 by weight. It sets slowly, from 12 to 18 hours being re-Made into a thin solution like whitewash, this cement gives woodwork all the appearance of having been painted and sanded. Piles of stone may be set together with common mortar, and then the whole washed over with this cement, making it look like one immense rock of grey sandstone. For temporary use a flour-barrel may have the hoops nailed, and the inside washed with a little Portland cement, and it will do for a year or more to hold water. Boards nailed phide of antimony, mixed with soluble glass together, and washed with it, make good hot-and chalk (see No. 2182), gives a black mass, water tanks. Its water-resisting properties water tanks. Its water-resisting properties make it useful for a variety of purposes.

2196. Mastic Cements, or Pierre Artificielle. Boettger says that these cements are mixtures of 100 parts each of sand, lime-When pressed, however, the mixture gradualstone, and in six months time will emit sparks sand giving the body, and limestone or chalk filling up the interstices.

2197. Coarse Stuff for Plastering. Coarse stuff, or lime and hair, as it is sometimes called, is prepared in the same way as procured from the tanner, which must be well mixed with the mortar by means of a three-pronged rake, until the hair is equally dis-The tributed throughout the composition. mortar should be first formed, and when the lime and sand have been thoroughly mixed, the hair should be added by degrees, and the whole so thoroughly united that the hair shall appear to be equally distributed throughout.

2198. Fine Stuff for Plastering. This is made by slacking lime with a small portion of water, after which sufficient water is added to give it the consistence of cream. It is then allowed to settle for some time, and the superfluous water is poured off, and the sediment suffered to remain till evaporation reduces it to a proper thickness for use. some kinds of work it is necessary to add a

small portion of hair.

2199. Stucco for Inside of Walls. This stucco consists of 3 parts fine stuff (see No. 2198) and 1 part fine washed sand. Those can be used extensively, applied in modes that parts of interior walls which are intended to be painted are finished with this stucco. In artist, to high class decoration. using this material, great care must be taken that the surface be perfectly level, and to secure this it must be well worked with a

2200. Gauge Stuff. This is chiefly used for mouldings and cornices which are run or formed with a wooden mould. It consists of about ½ plaster of Paris, mixed gradually with 4 fine stuff. (See No. 2198.) When the work is required to set very expeditiously, the proportion of plaster of Paris is It is often necessary that the increased. plaster to be used should have the property of setting immediately it is laid on, and in all such cases gauge stuff is used, and consequently it is extensively employed for cementing ornaments to walls or ceilings, as well as for easting the ornaments themselves.

2201. Higgins' Stucco. To 15 pounds best stone lime add 14 pounds bone ashes, finely powdered, and about 95 pounds clean, washed sand, quite dry, either coarse or fine, according to the nature of the work in hand. These ingredients must be intimately mixed, and kept from the air till wanted. When required for use, it must be mixed up into a proper consistence for working with lime water, and used as speedily as possible.

2202. Durable Composition for Orstone, and litharge, with 7 parts linseed oil. naments. This is frequently used, instead These ingredients, carefully mixed and well of plaster of Paris, for the ornamental parts of worked together, will have the consistency of buildings, as it is more durable, and becomes moist sand, and at first but little coherence. in time as hard as stone itself. It is of great use in the execution of the decorative parts ly acquires the hardness of ordinary sand-stone, and in six months time will emit sparks picture frames, being a cheaper method than when struck with steel. The binding agents carving, by nearly 80 per cent. It is made as in such cements are the litharge and oil, the follows: 2 pounds best whitening, 1 pound glue, and a pound linseed oil are heated tegether, the composition being continually stirred until the different substances are thoroughly incorporated. Let the compound cool, and then lay it on a stone covered with powdered whitencommon mortar, with the addition of hair ing, and heat it well until it becomes of a tough and firm consistence. It may then be put by for use, covered with wet cloths to keep it fresh. When wanted for use it must be cut into pieces adapted to the size of the mould, into which it is forced by a screw press. The ornament, or cornice, is fixed to the frame or wall with glue, or with white

> 2203. Roman Cement. Calcine 3 parts of any ordinary clay, and mix it with 2 parts lime; grind it to powder, and calcine again. This makes a beautiful cement, improperly called Roman, since the preparation was en-

tirely unknown to the Romans.

2204. New Plastic Material. A beautiful plastic substance can be prepared by For mixing collodion with phosphate of lime. The phosphate should be pure, or the color of the compound will be unsatisfactory. setting, the mass is found to be hard and susceptible of a very fine polish. The material will suggest themselves to any intelligent

2205. Concrete. A compact mass, composed of pebbles, lime, and sand, employed in the foundations of buildings. The floating tool or wooden trowel. This is done by sprinkling a little water occasionally on the stucco, and rubbing it in a circular direction with the float, till the surface has attained a high gloss. The durability of the work much depends upon how it is done, for if not depends upon how it is done, for if not the worked it is apt to crack.

This is done to proper the property of lime; others recommend 80 parts pebbles, 40 parts river sand, and only 10 parts lime. The pebbles should not exceed about ½ pound each in weight. Abbé Moigno, in his valuable scientific journal, "Les Mondes," relates his personal experience best proportions are 60 parts of coarse pebbles, 25 of rough sand, and 15 of lime; others rewith a concrete formed of fine wrought and cast iron filings and Portland cement. Abbé states that a cement made thus is hard enough to resist any attempts to fracture it. As he states that the iron filings are to replace the sand usually put into the mixture, we presume that the relative quantities are to be similar.

Concrete Floors and Walks. 2206. Compost for barn and kitchen floors:--After the ground on which the floor is intended to be made is leveled, let it be covered to the thickness of 3 or 4 inches with stones, broken small, and well rammed down; upon which let there be run, about 11 inches above the stones, 1 part by measure calcined ferruginous marl, and 2 parts coarse sand and fine gravel, mixed to a thin consistence with water. Before this coating has become thoroughly set, lay upon it a coat of calcined marl, mixed with an equal part of fine sand, 1 to 11 inches thick, leveled to an even surface. The addition of blood will render this compest harder. The calcined marl mentioned above is the

Portland cement of commerce. 2195.

2207. Concrete Gravel Walk. weeks to harden, but makes a splendid hard surface which sheds water like a roof. not use too much tar. It is only necessary to use enough to make the ingredients cohere under pressure, and a little is better than too a great while.

3 bushels coal ashes from a blacksmith's shop make into a paste with concentrated glycerine with 2 byshels gas lime, and then add sufficient gas tar to make a stiff mortar. If the and smear a thin layer on both sides of the ammoniacal liquor has been separated from the casting so as to completely cover the fracture. tar, its place must be supplied by adding wa- This layer can be rubbed off if necessary when ter till the tar is thin enough for use. For stables and cattle sheds, the mortar can be laid down with a spade, and fine sharp sand or gravel sifted over it; then roll well, and you will have a good concrete floor. It will take a few days to get thoroughly hard, even in dry weather; but it will be a good piece of work, if carefully done. Autumn is the best time for laying this kind of pavement.

2209. Keene's Marble Cement. is made of baked gypsum or plaster of Paris, steeped in a saturated solution of alum, and then recalcined and reduced to powder. For use, it is mixed with water, as ordinary plaster of Paris. This cement has been most qualities (when colored by the simple process rivals the best cement in its durability of infusing mineral colors in the water with which the cement powder is finally mixed for of polish, produce beautiful imitations of mosaic, and other inlaid marbles, scagliola, &c. The cement is not adapted to hydraulic purposes, nor for exposure to the weather, but has been used as a stucco for internal decorations, and from its extreme hardness is very durable. cement by adding a little solution of green copperas to the alum liquor.

2210. Parker's Cement. This valuable cement is made of the nodules of indurated and slightly ferruginous marl, called by mineral-ogists septaria, and also of some other species of argillaceous limestone. These are burned in conical kilns, with pit coal, in a similar way to other limestone, care being taken to avoid the use of too much heat, as, if the pieces undergo the slightest degree of fusion, even on the surface, they will be unfit to form the

(See No. grinding, and immediately packed in barrels, to keep it from the air and moisture. It is Dig tempered with water to a proper consistence, away the earth to the depth of about 5 inches, and applied at once, as it soon hardens, and then lay a bottom of pebbles, ramming them will not bear being again softened down with well down with a paving rammer. Sweep water. For foundations and cornices exposed them off as clean as possible with a broom, to the weather, it is usually mixed with an and cover the surface thinly with hot coal tar. equal quantity of clean angular sand; for use Now put on a coat of smaller gravel (the first as a common mortar, with about twice as bed of pebbles should be as large as goose much sand; for coating walls exposed to cold eggs), previously dipped in hot coal tar, and wet, the common proportions are 3 of drained, and rolled in coal ashes, with an sand to 2 of cement, and for walls exposed to intermixture of fine gravel, and roll it down extreme dryness or heat, about 21 or 3 of sand as thoroughly as possible. Let the roller run to 1 of cement; for facing eistern work, water slowly, and let a boy follow it with a hoe to frontages, &c., nothing but cement and water scrape off all adhering gravel. Next put on a should be employed. This cement, under the coat of fine gravel or sand, and coal tar, with name of compo, or Roman cement, is much some coal ashes, to complete the surface, and employed for facing houses, water-cisterns, roll again as thoroughly as possible; the setting the foundations of large edifices, &c. more rolling the better. It will take some It is perhaps the best of all cements for stucco.

2211. Pollack's Cement for Iron and Stone. This cement takes some little time to dry, but turns almost as hard as stone, and is fire and water-proof. For mending cracks much. Such a surface will last in a farmyard in stone or cast-iron ware, where iron filings cannot be had, it is invaluable. Take litharge 2208. Cheap Concrete Flooring. Mix and red lead, equal parts, mix thoroughly and nearly dry by an old knife or chisel. M. Pollack has used it to fasten the different portions of a fly-wheel with great success; while, when placed between stones, and once hardened, it is easier to break the stone than the joint.

Cement from Furnace Slag. 2212. Furnace slag can be made to furnish an excellent cement by selecting such portions of it as are readily dissolved in dilute hydrochloric acid. On subjecting it to the action of the acid, silica is thrown down, which is afterward to be washed, dried, and pulverized. One part of this is next to be mixed with 9 parts powdered slag and the necessary quantity of extensively applied as a stucco; but the finer slacked lime. This matter soon hardens, and

2213. Zeiodite. This substance is made by mixing 20 to 30 parts roll sulphur with 24 working), being susceptible of a high degree parts powdered glue or pumice, which forms a mass as hard as stone that resists the action of water and the strongest acids. Prof. R. Boettger recommends it, therefore, for making water-tight and air-tight cells for galvanic batteries.

> Cement for Closing Cracks in 2214. A pleasing tint is given to this Stoves, etc. A useful cement for closing up cracks in stove plates, stove doors, etc., is prepared by mixing finely-pulverized iron, such as can be procured at the druggists, with liquid water-glass, to a thick paste, and then coating the articles with it. The hotter the coating the arricks with it. fire then becomes, the more does the cement melt and combine with its metallic ingredients, and the more completely will the crack become closed.

2215. Cement for Fastening Iron to A cement for fastening iron to stone, which becomes nearly as hard as the stone cement. After being properly roasted, the itself, consists of 6 parts Portland cement, 1 calx is reduced to a very fine powder by part powdered lime, not slacked, 2 parts sand,

the proper consistency, the stone and iron attacked by strong acids. both being previously dampened. In 48 hours 2223. Vegetable Cement.

it will have set firmly.

to a red heat and boiling water.

2217. Cement for Iron. An excellent sifted peroxide of manganese and well-pulver-This mixture, when used immediately, forms sand until the proper consistency is secured,

to that given in the last receipt.

Cement for Uniting Stone, and is durable and waterproof. 2218. Derbyshire Spar, etc. Melt together 4 ounces resin, hounce wax, and about an ounce finely-sifted plaster of Paris. The articles to be joined should be well cleaned. then made hot enough to melt the cement, and the pieces pressed together very closely, so as to leave as little as possible of the composition ment, is placed in the joint, which is then between the joints. This is a general rule with all cements, as the thinner the stratum of cement interposed the firmer it will hold.

Cheap Artificial Building Stone. A large number of houses have been constructed in Paris, for workmen, of the following materials: 100 parts plaster of Paris, two next the water; the rest of the joint 10 parts hydraulic lime, 5 parts liquid glue, and 500 parts cold water, are intimately mixed and poured into moulds of any desired size and shape; and in half an hour the form can be removed. The stones are then exposed in the open air for 2 weeks, until they are thoroughly dry. Artificial stone thus prepared, has the ring and hardness of the native rock; and, where the materials are abundant, is said to be 25 per cent. cheaper than quarried stone.

2220. Simple and Useful Cement. Alum and plaster of Paris, well mixed in water and used in the liquid state, form a hard composition and also a useful cement.

2221. Cement for Fastening Instruments in Handles. A material for fastening knives or forks into their handles, when they have become loosened by use, is a muchneeded article. The best cement for this purpose consists of 1 pound resin and 8 ounces part of the powder is to be mixed with 1/2 a rolls for use. Used for fastening wood on a part of iron filings, fine sand, or brick-dust, turner's chuck. and the cavity of the handle is then to be filled with this mixture. The stem of the knife or cians, Jewelers, &c. A temporary cement fixed in its place.

a paste, hardens rapidly, and makes a suitable this applied to the article when heated, a secement for iron upon iron, for two stone sur- cure hold may be obtained, unfixed at pleafaces, and especially for fastening iron to sure by heat.

and 1 part slacked lime, mixed with water to stone. The cement is insoluble, and is not

vegetable cement may be prepared by mixing 2216. Strong Cement for Iron. To gum-arabic with nitrate of lime. The latter 4 or 5 parts clay, thoroughly dried and pulver- is prepared by dissolving an excess of marble ized, add 2 parts iron filings free from oxide, in nitric acid, and filtering. The filtered so-1 part peroxide of manganese, ½ part of sea lution will contain 33.3 per cent. nitrate of salt, and ½ part borax. Mingle thoroughly, lime, which may be dried by evaporation. and render as fine as possible; then reduce to For the cement, take 2 parts by weight of the a thick paste with the necessary quantity of nitrate of lime, 20 parts pulverized gumwater, mixing thoroughly. It must be used arabic, and 25 parts water. The mixture immediately. After application, it should be can be further diluted to adapt it to the uses exposed to warmth, gradually increasing almost to white heat. This cement is very ture of artificial stone, a cement of a similar hard, and presents complete resistance alike character has been found to serve a good purpose. Something of the kind is used in the Frear stone, but in the Béton-Coignet no adcement is made by mixing equal parts of ditional binding material is found necessary.

2224. Cement for Leaky House ized zinc white, adding a sufficient quantity of Roofs. Take 4 pounds resin, 1 pint linseed commercial soluble glass to form a thin paste. oil, 2 ounces red lead, and stir in pulverized a cement quite equal in hardness and resistance and apply it warm. This cement becomes hard and yet possesses considerable elasticity,

2225. Engineer's Cement. Mix ground white lead with as much powdered red lead The as will make it of the consistence of putty. This cement is employed by engineers and others to make metallic joints. A washer of hemp, yarn, or canvas, smeared with the cescrewed up tight. It dries as hard as stone. This cement answers well for joining broken stones, however large. Cisterns built of square stones, put together, while dry, with this cement, will never leak or require repair. It is only necessary to use it for an inch or may be filled with good mortar. It is better, however, to use it for the whole joint. (See No. 2169.)

Plumbers' Cement. 2226. Melt 1 pound black resin, then stir in 1 to 2 pounds brick-dust. Sometimes a little tallow is

added.

2227. Red Cement. The red cement used for uniting glass to metals is made by melting 5 parts black resin with 1 part yellow wax, and then stirring in gradually 1 part red ochre or Venetian red, in fine powder, and previously well dried, This cement requires to be melted before use, and it adheres better if the objects to which it is applied are warmed.

2228. Turners' Cement. Melt together bees' wax, 1 ounce; resin, ½ ounce; and pitch, ½ ounce; stir in the mixture some very fine brick-dust to give it a body. If too soft, sulphur, which are to be melted together and add more resin; if too hard, more wax. either kept in bars or reduced to powder. 1 When nearly cold, make it up into cakes or

fork is then to be heated and inserted into the to fix optical glasses, stones, jewelry, &c., on cavity; and when cold it will be found firmly stocks or handles for the purpose of painting, repairing, or ornamenting, is made by melting Cement for Fastening Iron together at a good heat, 2 ounces resin, Glycerine and litharge stirred to drachm wax, and 2 ounces whitening; with Leather. Wash the metal in hot gelatine, steep the leather in hot gall-nut infusion, and unite while hot.

2231. Cement for Fixing Metal to Marble, Stone, or Wood. Mix together 4 parts carpenters' glue and 1 part Venice turpentine.

2232. 2232. Cement for Coating Acid Troughs. Melt together 1 part pitch, 1 part resin, and 1 part plaster of Paris (perfectly dry.)

2233. To Cement Cloth to Polished Metal. Cloth can be cemented to polished white lead paint; this being dried hard, coat with best Russian glue, dissolved in water containing a little vinegar or acetic acid.

2234. Cement for Gas Retorts. A new cement, especially adapted to the retorts of gas-works, is very warmly recommended in a German gas-light journal. It consists of finely-powdered barytes and a soluble water-glass; or the barytes and a solution of borax. joints are to be coated several times with this cement, by means of a brush. The addition of two-thirds of a part of clay improves the cement, and the retorts will then stand a red heat very well. Instead of the water-glass, a solution of borax may be used, or even fine-

ly powdered white glass.
2235. Use of Silicate of Potassa in Strengthening Fossil Skeletons. A very judicious application of the silicate of potassa pairing a great many fossil skeletons which had been disjointed and broken by the shells bursting in this Palace of Science. The solutions have been first used diluted to about 30° Baumé, and afterwards of a higher degree of concentration. The adherence of the broken or separated pieces is brought together by applying with a brush some of the solution of the silicate of potassa on the parts to be joined, then they are left to dry, and the joint is hardly visible; and the joined part is far stronger than the remainder of the bone. Very delicate and porous anatomical pieces, as skeletons of birds, insects, etc., can be dipped repeatedly in more diluted solutions, and thus be rendered very hard and tenacious.

2236. Transparent Cement for Lenses. &c. It is frequently found necessary to cement together two surfaces of transparent glass, without destroying or injuring their transparency; this is especially the case in compound lenses. The best cement for effecting the union is Canada balsam, which, if too thick, should be thinned with a little turpentine, benzole, or ether. It is of importance that no air bubbles be present. In order to add a little more oil. cement together the two parts of an achromatic lens (this consists of a double convex lens fitting exactly into the concavity of a plano-concave lens), having thoroughly cleaned the surfaces to be brought in contact, ty the glass, previously made warm, on a taute suitably covered to prevent the under surface from being scratched. By means of a of common whitening, pounded very fine, peg of wood or otherwise, convey a drop of and mixed with linseed oil till it becomes the balsam to the centre of the lens, and then about the thickness of dough. gently lower down upon it the lens to be ce-

Cement for Fixing Metal to warm. Now apply a slight pressure, and the dark disc in the centre, indicative of optical contact, will rapidly increase in size, until at last the balsam reaches the margin and begins to ooze out at the edges, if the balsam be present in excess, as it should be. means of a piece of soft string passed crosswise over the lenses, tie the two together, and place them in a stove, an oven, or before a fire, for a short time, until the balsam at the edges shall have become hard and dry. Let the string then be removed and the lens freed from all external traces of balsam by means of benzole or ether. The above directions, iron shafts, by first giving them a coat of best | modified to suit circumstances, apply to the cementation of transparencies or opal pictures; also to the varnishing of magic fantern slides, and the protection of any transparent surfaces from the air.

2237. Cement for Chemical Glasses. Mix equal parts of wheat flour, finely-powdered Venice glass, pulverized chalk, and a small quantity of brick-dust, finely ground: these ingredients, with a little scraped lint, are to be mixed and ground up with the white of eggs; it must then be spread upon pieces of fine linen cloth, and applied to the crack of the glasses, and allowed to get thoroughly dry before the glasses are put to the fire.

2238. Hermetical Sealing for Bottles. Gelatine mixed with glycerine yields a compound, liquid when hot, but becoming solid by cooling, at the same time retaining much elasticity. Bottles may be hermetically (liquid glass) has been lately made at the sealed by dipping their necks into the liquid Museum of Natural History of Paris, in remixture, and repeating the operation until the cap attains any thickness required.

2239. Cement to Seal Bottles Containing Volatile Liquids. Chemists and others know well the difficulty of keeping volatile liquids. Bottles of ether, for example, are shipped for India, and when they arrive are found to be more than half empty. remedy with exporters is a luting of melted sulphur, which is difficult to apply and hard to remove. A new cement, easily prepared and applied, and which is said to prevent the escape of the most volatile liquids, is composed of very finely ground litharge and concentrated glycerine, and is merely painted around the cork or stopper. It quickly dries and becomes extremely hard, but can be easily scraped off with a knife when it is necessary to open the bottle.

2240. Cement for Sealing Corks in ottles. Take an equal quantity of resin Bottles. and bees' wax, melt them together, then put in an almost equal bulk of finely-powdered red chalk, add a small quantity of neatsfoot oil, let the whole boil 1 minute, then take it from the fire and stir it well; if too thick,

2241. Cement for Sealing the Corks in Bottles. Melt together 4 pound sealingwax, the same quantity of resin, and 2 ounces bees' wax. When it froths stir it with a tallow candle. As soon as it melts dip the mouths of the corked bottles in it.

2242. Painters' Putty. Putty is made

2243. Quick Hardening Putty. mented to it, also previously made slightly putty of starch and chloride of zinc hardens

2244. Cracks in Wood of any Color. Put any quantity of fine sawdust, of the same wood the work is made with, into an earthen pan, let it remain for a week or ten days, occasionally stirring it; then boil it for some time, and it will be of the consistence of pulp or paste; put it into a coarse cloth, and squeeze all the moisture from it. Keep for use, and, work off, and, if carefully done, the imperfection will be scarcely discernible.

solved; then add 4 ounces best glue, and dissolve it with the other; then slowly add $1\frac{1}{2}$ while adding and until well mixed. When cold it will resemble India rubber. To use When quantity of ale to the consistence of thick glue. It is applicable for leather, for harness, bands for machinery, cloth belts for cracker machines for bakers, &c., &c. If for leather, shave off as if for sewing, apply the cement with a brush while hot, laying a weight to keep each bint firmly for 6 to 10 hours, or over night.

2246. Cement for Leather Belting. Take of common glue and American isinglass, water sufficient to just cover the whole. it soak 10 hours, then bring the whole to a off the leather where it is to be cemented; rub the joint surfaces solidly together, let it properly put together, it will not need riveting, as the cement is nearly of the same nature as the leather itself. We know of no cement better either for emery wheels or emery belts than the best glue. In an experience of fifteen years we never found anything supe-

2247. Gutta-Percha Cement. highly recommended cement is made by melting together, in an iron pan, 2 parts common pitch and 1 part gutta-percha, stirring them 4 pounds; oxide of lead, 1 pound. Mix as diwell together until thoroughly incorporated, rected in the next receipt. and then pouring the biquid into cold water. When cold it is black, solid, and elastic; but it softens with heat, and at 100° Fahr is a thin fluid. It may be used as a soft paste, or purpose in cementing metal, glass, porcelain, ivory, &c. It may be used instead of putty for glazing windows.

2248. To Dissolve India Rubber for Cement, &c. India rubber dissolves readily in rectified sulphuric ether, which has been washed with water to remove alcohol and acidity; also in chloroform. These make regulated, so as not to burn the mixture.

odorless solutions, but are too expensive for 2252. Transparent Cement. Dissolve

quickly, and lasts for months, as a stopper of bisulphuret of carbon; or a mixture of 94 holes in metals. Cement to Stop Flaws or lute alcohol; also in caoutchoucine. (See No. 2249.) These dissolve the gum rapidly in the cold, and leave it unaltered on evaporation; they have a disagreeable odor, but they leave and pour boiling water on it, stir it well, and the India rubber in better condition than most other solvents. Oil of turpentine, rendered pyrogenous by absorbing it with bricks of porous ware, and distilling it without water, and treating the product in the same way, is also used for this purpose. It is stated that when wanted, mix a sufficient quantity of thin the solution on evaporation does not leave the glue to make it into a paste; rub it well into caoutchouc in a sticky state. Another method the cracks, or fill up the holes in the work is to agitate oil of turpentine repeatedly with with it. When quite hard and dry, clean the a mixture of equal weights of sulphuric acid and water; and afterwards expose it to the sun for some time. Benzole, rectified mineral 2245. Cement for Cloth, Leather, or or coal tar naphtha, and oil of turpentine re-Belting. Take ale, 1 pint; best Russia isinduce the gum slowly by long digestion and glass, 2 ounces; put them into a common trituration, with heat, forming a glutinous glue kettle and boil until the isinglass is disjelly which dries slowly, and leaves the gum, when dry, very much reduced in hardness and elasticity. The fats and fixed oils combine ounces boiled linseed oil, stirring all the time readily with India rubber by boiling, forming a permanently glutinous paste. (See No. 2947.) India rubber is rendered more readily this, dissolve what is needed in a suitable soluble by first digesting it with a solution of carbonate of soda, or water of ammonia.

2249. Caoutchoucine. Pure India rubber, cut into small lumps, is thrown into a cast-iron still, connected with a well-cooled worm tub, and heat is applied until the thermometer ranges about 600° Fahr., when nothing is left in the still but dirt and charcoal. The dark colored fetid oil which has distilled over is next rectified with one third its weight of water, once or oftener, until it is colorless; equal parts; place them in a glue-pot and add it is then highly volatile and of .680 specific gravity. The product is then shaken up with nitro-muriatic acid, or chlorine, in the proporboiling heat, and add pure tannin until the tion of 1 pint of acid to each gallon of the whole becomes ropey or appears like the white liquid. This is the lightest fluid known, and of eggs. Apply it warm. Buff the grain yet its vapor is the heaviest of gases. Mixed with alcohol, it dissolves all the resins, especially copal and India rubber, at the common dry a few hours, and it is ready for use; and, if temperature of the air; and it speedily evaporates, leaving them in a solid state. It mixes with the oils in all proportions; and has been used for making varnishes, and for liquefying oil paints, instead of turpentine. It is very volatile, and must be kept in close vessels.
2250. Cement for Uniting Sheet Gutta-

Percha to Silk, &c. Gutta-percha, 40 pounds; caoutchouc, 3 pounds; shellac, 3 pounds; Canada balsam, or Venice turpentine, 14 pounds; liquid storax, 35 pounds; gum mastic,

2251. Cement for Uniting Sheet Gutta-Percha to Leather. For uniting sheet gutta-percha to leather, as soles of shoes, etc. Gutta-percha, 50 pounds; Venice turpenin the liquid state, and answers an excellent tine, 40 pounds; shellac, 4 pounds; caout-purpose in cementing metal, glass, porcelain, chouc, 1 pound; liquid storax, 5 pounds. In making the cement, the Venice turpentine should be first heated; then the gutta-percha and the shellac should be added; the order in which the other materials are added is not important. Care should be taken to incorporate them thoroughly, and the heat should be

general use. The gum dissolves easily in 75 parts India rubber in 60 parts of chloro-

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How to Fasten Rubber to 2253. Wood and Metal. As rubber plates and rings are now a-days almost exclusively used for making connections between steam and be prepared as follows: Cut 1 pound of caoutother pipes and apparatus, much annoyance is often experienced by the impossibility or ble vessel over a moderate coal fire, until the imperfectness of an air-tight connection. This caoutchouc becomes duid; then add ‡ pound is obviated entirely by employing a cement powdered resin, and melt both materials at a which fastens equally well to the rubber and to the metal or wood. Such cement is prepared by a solution of shellac in ammonia. This is best made by soaking pulverized gumshellac in ten times its weight of strong ammonia, when a slimy mass is obtained, which, in three to four weeks, will become liquid without the use of hot water. This softens the rubber, and becomes, after volatilization of the ammonia, hard and impermeable to gases and fluids.

Marine Cement for Unit ng Gutta-Percha. This 2254. Leather to Gutta-Percha. leather to gutta-percha, and is imperv. is to damp. It is made by dissolving by the aid of heat, 1 part India rubber in naphtha, and, when melted, adding 2 parts shellae, and melting until mixed. Pour it while hot on metal place to cool. When required for use, melt, and apply with a brush. This cement does not adhere very well to vulcanized rub-

ber, and the joint is always weak.

2255. Cement to Unite India Rubber. Take 16 parts gutta-percha, 4 parts India rubgether, and used hot. It will unite leather or rubber that has not been vulcanized.

2256. Gutta-Percha Cement for Fastening Leather. Dissolve a quantity of make a fluid of honey-like consistence. When spread it will dry in a few moments. Heat the surfaces at a fire or gas flame until boots, etc., so as almost to defy detection, and some shoemakers employ it with great success for this purpose. It is waterproof, and will answer almost anywhere unless exposed to heat, which softens it.

2257. Caoutchouc Cement is made as follows:-Gutta-percha, 3 parts; virgin India 1 ounce linseed oil varnish, or 2 ounce Venice rubber (caoutchoue), 1 part (both cut small); turpentine; boil them together, stirring them pyrogenous oil of turpentine, or bisulphuret of carbon, 8 parts; mix in a close vessel, and dissolve by the heat of hot water. This This cement should be gently heated before being

used.

2258. Cement to Mend India Rubber Shoes. A solution of caoutchouc, or virgin India rubber, for repairing India rubber shoes, is prepared in the following manner: Cut 2 pounds caoutchouc into thin, small slices; put them in a vessel of tinned sheet-iron and pour over 12 to 14 pounds of sulphide of car-bon. For the promotion of solution, place as stills, &c., not exposed to a heat much the vessel in another containing water pre-higher than 212° Fahr., linseed meal, either the vessel in another containing water pre-viously heated up to about 86° Fahr. The alone or mixed with an equal weight of whitsolution will take place promptly, but the ing, and made into a stiff paste with water, fluid will thicken very soon, and thus render may be employed. Ground almond cake, the application difficult, if not impossible from which the oil has been pressed, may also In order to prevent this thickening, a solution be used for the same purpose. For the joints

form, and add to the solution 15 parts of tine must be added to the solution of caoutchouc in sulphide of earbon, and in such quantity that the mixture obtains the consistency of a thin paste. The solution of caoutchouc and resin in spirit of turpentine should chouc into thin, small slices; heat in a suitamoderate heat. When these materials are perfectly fluid, then gradually add 3 or 4 pounds spirit of turpentine in small portions, and stir well. By the addition of the last solution, the rapid thickening and hardening of the compound will be prevented, and a mixture obtained fully answering the purpose

of glueing together rubber surfaces, etc. 2259. To Fasten Chamois and Other Leather to Iron and Steel. Dr. Carl W. Heinischen, of Dresden, gives the following receipt for the above purpose: Spread over the metal a thin, hot solution of good glue; soak the leather with a warm solution of gall-nuts before placing on the metal, and leave to dry under an even pressure. If fastened in this manner it is impossible to separate the leather from the metal without tear-

ing it.

2260. Cement for Petroleum Lamps. A cement particularly adapted for attaching the brass work to petroleum lamps, is made by Puscher, by boiling 3 parts resin with 1 of caustic soda and 5 of water. The composition ber, 2 parts common caulkers' pitch, 1 part is then mixed with half its weight of plaster linseed oil. The ingredients are melted to- of Paris, and sets firmly in half to threeis then mixed with half its weight of plaster quarters of an hour. It is said to be of great adhesive power, not permeable to petroleum, a low conductor of heat, and but superficially attacked by hot water. Zine white, white gutta-percha in chloroform in quantity to lead, or precipitated chalk may be substituted for plaster, but hardens more slowly.

2261. Cement for Attaching Metal Letters to Plate Glass. Copal varnish, 16 softened, and apply them together. Small parts; drying oil, 6 parts; turpentine, and patches of leather can be thus cemented on oil of turpentine, of each 3 parts; liquefied glue (made with the least possible quantity of water), 5 parts. Melt together in a water-bath, and add fresh slacked lime (perfectly dry and in very fine powder), 10 parts.

2262. Cement for Metal and Glass. Mix 2 ounces of a thick solution of glue with until they mix as thoroughly as possible. The pieces cemented should be tied together for 2 or 3 days. This cement will firmly attach any metallic substance to glass or porcelain, (See last receipt.)

A composition employed to seute. cure the joints of chemical vessels, or as a covering to protect them from the vioof caoutchouc and resin in spirits of turpen- of small vessels, as tubes, &c., especially of long time, and bearing uninjured the heat at

which oil of vitriol boils

2264. Lute for Stills. A very useful the white of eggs.

Retorts. Lemery used the following lute for stopping retorts, etc.: Fine flour and fine lime of each 1 ounce; potter's earth. I ounce; make a moist paste of these with white of egg, well beaten up with a little water; this will be found to stop exceedingly close.

2266. Boyle's Lute for Retorts, &c. Boyle recommends, on experience, the following for the same purpose: Some good fine 2273. Strongly Adhering Paste. quicklime and scrapings of cheese, pounded Where great adhesiveness is required, such as

of cloth, and coating them, after they are ap-

plied, with drying oil.

Lute for Joining Crucibles. For joining crucibles to be exposed to a strong heat, a mixture of fine clay and ground bricks, mixed up with water, or preferably with a solution of borax, answers well for

most purposes.

2269. Fire Lute. As a coating for vessels, to preserve them from injury from exposure to the fire, nothing is better than a mixture of ordinary pipe-clay and horse dung, ter; the mixture is heated and stirred about made into a paste with water. This composition is used by the pipe-makers, and will thinned, if necessary, with a gum solution. stand unharmed the extreme heat of their kiln for 24 hours. It is applied by spreading Cloth or Leather on Table Tops.

it on paper 2270. Lute to Protect Glass Vessels. The following composition will enable glass vessels to sustain an incredible degree of heat: Take fragments of porcelain, pulverize, and sift them well. and add an equal quantity of fine clay, previously softened with as much of a saturated solution of muriate of soda as is requisite to give the whole a proper consistcomposition to the glass vessels, and allow it to dry slowly before they are put into the fire.

Flour Paste. The best paste for This paste is general purposes is simply wheat flour and adhesive. beaten into cold water to perfect smoothness,

glass or earthenware, small rings of India few grains of corrosive sublimate, or a little rubber slipped over and tied above and below carbolic acid, or bisulphite of lime (especially the joint, are very convenient substitutes for the first and second), will prevent insects lutes, and have the advantage of lasting a from attacking it, and preserve it (in covered ressels) for years. Should it get too hard it may be softened with water.

2272. Paper Hangers' Paste. Beat lute is formed by beating the white of an egg up 4 pounds of good white wheat flour in cold thoroughly with an equal quantity of water, water-enough to form a stiff batter (sifting and mixing it with some slacked lime in the the flour first); beat it well, to take out all state of fine powder, so as to form a thin paste. lumps; then add enough cold water to make This must be spread immediately on strips of it the consistence of pudding batter; add muslin, and applied to the cracks or joints about 2 ounces of well pounded alum. Be intended to be luted. It soon hardens, adsure and have plenty of boiling water ready; heres strongly, and will bear a heat approach- take it quite boiling from the fire, and pour ing to redness without injury. A leak in this gently and quickly over the batter, stirring lute is readily stopped by the application of a rapidly at the same time; and when it is obfresh portion. Solution of glue, or any liquid served to swell and lose the white color of albuminous matter, may be used in place of the flour, it is cooked and ready. This will make about 4 of a pail of solid paste; do not 2265. Lemery's Lute for Stills or use it while hot; allow it to cool and it will go further; about a pint of cold water may be put over the top of it, to prevent it skinning; before using, thin this with cold water to spread easily and quickly under the brush. This paste will keep a long while without fermenting, when it is useless; mould on the top does not hurt it; remove it, the remainder is

good. (See No. 2273.) 2273. Strongly in a mortar, with as much water as will bring papering over varuished paper or painted the mixture to soft paste; then spread on a walls, it will be necessary to add 1 an ounce piece of linen rag, and apply it as occasion of finely powdered resin to each ½ gallon of the batter in the last receipt. As the resin 2267. Useful Lute. A useful lute is does not dissolve so readily, set the pan commade by spreading a solution of glue on strips taining the ingredients over a moderate fire, constantly stirring until it bods and thickens, and a short time after put out to cool. Reduce the paste with thin gum-arabic water. In hanging "flock" papers with crimson in them, omit the alum, as it will injure the

2274. To Make a Fine Paste. A solution of 22 ounces gum-arabic in 2 quarts warm water, is thickened to a paste with wheat flour; to this is added a solution of alum and sugar of lead, 11 ounces each in water; the mixture is heated and stirred about to boil, and is then cooled. It may be

2275. To Make Paste for Laying pint best wheaten flour add resin, very finely powdered, about 2 large spoonfuls; of alum, 1 spoonful, in powder; mix them all well together, put them into a pan, and add by degrees soft or rain water, carefully stirring it till it is of the consistence of thinnish cream; put it into a saucepan over a clear fire, keeping it constantly stirred, that it may not get When it is of a stiff consistence, so lumpy. ence. Apply a thin and uniform coat of this that the spoon will stand upright in it, it is done enough. Be careful to stir it well from the bottom, for it will burn if not well attended to. Empty it out into a pan and cover it over till cold, to prevent a skin forming on the top, which would make it lumpy. The best paste for This paste is very superior for the purpose,

2276. To Paste Leather or Cloth and the whole just brought to a boil, while on Table Tops. To use paste in the last being constantly stirred to prevent burning. receipt, for cloth or baize, spread the paste The addition of a few drops of creesote, or a evenly and smoothly on the top of the table, GLUE. **21**9

and level with a linen cloth, and cut the edges finely-powdered glass added; use it quite hot. close to the banding with a short knife. 2281. To Make Tungstic Glue. Tungsclose to the banding with a short knife. down with a thick piece of wood made hot at the fire, for the glue soon chills. You may, border at once.

lue. The hotter the glue, the more force it will exert in keeping the two parts glued together; therefore, in all large and long joints the glue should be applied immediately after boiling. Glue loses much of its strength by frequent re-melting; that glue, therefore, which is newly made, is much preferable to that which has been re-boiled. In melting ordinary glue in the double vessel containing water, it is an excellent method to above the ordinary boiling point; the consequence is, the heat is retained, instead of passing off by evaporation, and when the water boils, the glue will be found to be thorougly and evenly melted.

2278. To Prevent Glue from Cracking. Glue is often found to crack in very dry localities, particularly when the objects glued thin layer of glue between them; in which case they sometimes fall apart. Very thin case they sometimes fall apart. layers of glue are not only exceedingly hard, but also more or less brittle when extremely dry; and, therefore, to prevent this dry and consequent brittle condition, the addition of a very small quantity of glycerine will accomplish the desired end. The quantity of glycerine must be modified according to circum-

2279. To Make a Very Strong Glue. An ounce of the best isinglass may be dissolved, by the application of a moderate heat, in a pint of water. Take this solution and strain it through a piece of cloth, and add to it a proportionate quantity of the best glue, After the whole of the materials have been brought into a solution, let it once boil up, and strain off the impurities. This glue is well adapted for any work which requires particular strength, and where the joints themselves do not contribute towards the combination of the work; or in small fillets and

2280. A Strong Glue that will Resist Moisture. Dissolve gum-sandarac and white color.

and lay your cloth on it. pressing and smooth- mastich, of each 1 ounce, in 1 pint spirits of ing it with a flat piece of wood; let it remain wine, to which add } ounce clear turpentine; till dry; then trim the edges close to the now take strong glue, or that in which isinglass cross-banding. If you cut it close at first, has been dissolved, then, putting the gums it will, in drying, shrink and look bad where into a double glue-pot, add by degrees the glue, it meets the banding all around. If used for constantly stirring it over the fire till the leather, the leather must be first previously whole is well incorporated; strain it through a dampened, and then the paste spread over it; cloth, and it is ready for use. It may now next lay it on the table, and rub it smooth be returned to the glue-pot, and 1 ounce very

Some lay their table-covers with glue instead tie glue is prepared by mixing a thick solution of paste, and for cloth perhaps it is the best of glue with tungstate of soda, and hydromethod; but for leather it is not proper, as chloric acid, by means of which a compound glue is apt to run through. In using it for of tungstic acid and glue is precipitated, cloth, great care must be taken that the glue is which, at a temperature of 800 to 1040 Fahr., not too thin, and that the cloth be well rubbed is sufficiently elastic to admit of being drawn out into very thin sheets. On cooling, this mass becomes solid and brittle, and on being by this method, cut off the edges close to the heated is again soft and plastic. This new compound, it is said, can be used for all the purposes to which hard rubber is adapted.

2282. To Keep Glue from Souring. If a little muriatic acid be put into glue when it is dissolved, ready for use, it will retain the glue in the same condition for a long time. It will neither dry up nor ferment. Liquid glue is made in this way, and sold in bottles. The use of a small portion of sugar of lead will also prevent fermentation.

2283. To Prepare Glue for Ready Use. To any quantity of glue use common whiskey instead of water. Put both together in a bottle, cork it tight, and set it for 3 or 4 days, add salt to the water in the outer vessel. It when it will be fit for use without the applica-will not boil then, until heated considerably tion of heat. Glue thus prepared will keep for years, and is at all times fit for use, except in very cold weather, when it should be set in warm water before using. To obviate the difficulty of the stopper getting tight by the glue drying in the mouth of the vessel, use a tin vessel with the cover fitting tight on the outside, to prevent the escape of the spirit by evaporation. A strong solution of isinglass together are not in close contact, but have a made in the same manner is an excellent cement for leather.

2284. Liquid Glue. The preparation of liquid glue is based upon the property of the concentrated acid of vinegar and diluted nitric acid to dissolve the gelatine without destroying its cohesive qualities. Dumoulin has given the following receipt:

2285. Dumoulin's Liquid and Unalterable Glue. Take a wide-mouthed bottle, and dissolve in it 8 ounces best glue in ½ pint water, by setting it in a vessel of water, and heating until dissolved. Then add slowly $2\frac{1}{2}$ ounces strong aqua fortis (nitric acid) 360 Baumé, stirring all the while. Effervescence takes place under generation of nitrous gas. When all the acid has been added, the liquid which has been previously soaked in water is allowed to cool. Keep it well corked, and for about 24 hours, and a gill f vinegar, it will be ready for use at any moment. This preparation does not gelatinize, nor undergo putrefaction or fermentation. It is applicable for many domestic uses, such as mending china, repairing cabinet work, &c.

2286. Russian Liquid Glue. This is prepared by softening 100 parts best Russian glue in 100 parts warm water, and then addmouldings, and carved patterns that are to be ing slowly from 5½ to 6 parts aqua fortis, and held on the surface by the glue. finally 6 parts powdered sulphate of lead. The latter is used in order to import to it a

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double its weight of water, and add 12 parts set.

(See No. 2285.)

2288. Dark Liquid Glue. Put 100 parts dark "steam glue" and 140 parts water the glue in the water, then add slowly 16 parts aqua fortis, stirring all the while. When all the acid is added, the liquid is allowed to cool. in acetic acid and alcohol.

fill it with acetic acid. Keep it in hot water for a few hours, until the glue is all melted, and you will have an excellent glue always

fluid ounces of strong methylated spirit, ½ an ounce each of sandarac and mastich; next, add which isinglass has been added, and is next superior to "Spaulding's liquid glue." filtered, while hot, through cloth or a good

sieve. (See No. 2280.)

2291. Marine or Waterproof Glue. Take of gum shellae 3 parts, caoutchoue (India-rubber), 1 part, by weight. Dissolve the caoutchoue and shellae in separate vessels, in ether free from alcohol (see No. 2248), applying a gentle heat. When thoroughly dissolved, mix the two solutions, and keep in a bottle tightly stoppered. This glue resists the Dissolve in a water-bath, and add alcohol, 1 action of water, both hot and cold, and most part of the aclas and alkalies. Pieces of wood, leather or other substances, joined together by it, will part at any other point than at the joint thus made. If the glue be thinned by the admixture of ether, and applied as a varnish to leather, along the seams where it is sewed together, it renders the joint or seam water-tight, and almost impossible to separate.

2292. Isinglass Glue. Dissolve isinglass in water and strain through coarse linen, and then add a little spirits of wine. Evaporate it to such a consistency that when cold it will be dry and hard. This will hold stronger than common glue, and is much preferred.

2293. India-Rubber Glue for Photographers and Bookbinders. A most valuable glue for photographers, and extensively used by first-class bookbinders, is made from bottle India rubber. This must be dissolved in highly rectified spirits of turpentine; the highly rectified spirit extracts every particle of grease, which is of the greatest consequence.

2294. Braconnot's Glue of Caseine. Dissolve caseine in a strong solution of bicar-

bonate of soda

2295. Dissolve caseine in a cold saturated solution of borax. Superior to gum, and may take the place of glue in many cases. May be used for the backs of adhesive tickets.

To Glue a Joint. In general, nothing more is necessary to glue a joint, after | Solutions of gum-arabic are very liable to be-

2287. Pale Liquid Glue. Dissolve in a glue both edges while the glue is quite hot. glass vessel 100 parts pale "steam glue" in and rub them lengthwise until it has nearly When the wood is spongy, or sucks up aqua fortis as directed in Dumoulin's receipt. the glue, another method must be adopted one which strengthens the joint, while it does away with the necessity of using the glue too thick, which should always be avoided; for in a wide-mouthed glass bottle, and dissolve the less glue there is in contact with the joints, provided they touch, the better; and when the glue is thick, it chills quickly, and cannot be well rubbed out from between the joints. Cork well. This liquid glue exhibits a great. The method to which we refer is, to rub the er cohesive force than that prepared after Du- joints on the edge with a piece of soft chalk, moulin's receipt. (See No. 2285.) However, and, wiping it so as to take off any lumps, still better kinds of liquid glue or mucilage glue it in the usual manner; and it will be are obtained by dissolving gelatine or dextrine found, when the wood is porous, to hold much faster than if used without chalking.

2289. Good Liquid Glue. Fill a glass 2297. To Glue on Ivory Veneers. To jar with broken-up glue of best quality, then glue on ivory veneers, take 2 parts pulverized gum-arabic and 1 part calomel, and add wa-

ter sufficient to make a paste.
2298. Excellent Liquid Glue. of best white glue, 16 ounces; white lead, 2290. Glue which Stands Moisture dry, 4 ounces; rain water, 2 pints; alcohol, 4 Without Softening. Dissolve, in about 8 ounces. With constant stirring dissolve the glue and lead in the water by means of a water-bath. Add the alcohol and continue the $\frac{1}{2}$ an ounce of turpentine. This solution is heat for a few minutes. Lastly pour into then added to a hot, thick solution of glue to bottles while it is still hot. This is said to be

2299. Glycerine Paste for Office Use. Glycerine paste for office use may be prepared by dissolving 1 ounce gum-arabic and 2 drachms of glycerine in 3 ounces boiling

water.

2300. Government Postage Stamp Mucilage. The substance used for gumming stamps is made as follows. Gum dextrine, 2 parts; acetic acid, 1 part; water, 5 parts.

2301. Mucilage for Labels. Macerate 5 parts good glue in 18 to 20 parts water for a day, and to the liquid add 9 parts rock candy and 3 parts gum-arabic. The mixture can be brushed upon paper while lukewarm; it keeps well, does not stick together, and, when moist-

ened, adheres firmly to bottles.

2302. Mucilage for Soda or Seltzer Water Bottles. For the labels of soda or seltzer water bottles it is well to prepare a paste of good rye flour and glue to which linseed oil varnish and turpentine have been added in the proportion of ½ an ounce of each to the pound. Labels prepared in the latter way do not fall off in damp cellars.

2303. Very Strong Liquid Glue. make this, put 3 parts glue in 8 parts cold water, and let them stand for several hours to soften the glue; then add ½ part muriatic acid and 2 part sulphate of zinc, and heat the mixture to 185° Fahr., for 10 or 12 hours. The mixture remains liquid after cooling, and is said to be very useful for sticking wood, crockery, and glass together.

Good Mucilage. For household 2304. Wagner's Glue of Caseine. purposes this may be made by mixing 3 ounces gum-arabic, 3 ounces distilled vinegar, with 1 ounce white sugar. Instead of the distilled vinegar, 1 part acetic acid and 5 parts water

may be substituted.

2305. To Prevent Mould in Mucilage. the joint is made perfectly straight, than to come mouldy; and while the introduction of account of the danger of poisoning, according The fancy kinds are commonly scented with a to the "Industrie Blätter," sulphate of quinine little essence of musk or ambergris, or any of is a complete protection against mould, a very the more fragrant essential oils. The addition small quantity of it being sufficient to prevent of a little camphor, or spirit of wine, makes gum mucilage from spoiling. It is quite possible that writing ink might be protected, by the same application, from a like difficulty. The use of ammonia for the same purpose is also recommended.

Elastic Glue which does not 2306. spoil is obtained as follows: Good common the lowest degree of heat that will be necesglue is dissolved in water, on the water-bath, and the water evaporated down to a mass of thick consistence, to which a quantity of glycerine, equal in weight with the glue, is added, be neither too much nor too little, but just after which the heating is continued until all the water has been driven off, when the mass is poured out into moulds, or on a marble slab. complished, the fluid mass is discharged into This mixture answers for stamps, printers' metallic moulds and left to cool. For the rolls, galvano-plastic copies, etc. 2307. Sweet Mouth Glue.

Sweet glue, for ready use by moistening with the pounds shellac, 14 pounds Venice turpentine, tongue, is made in the same way as elastic and 2 pounds finest cinnabar, mixed in the glue, substituting, however, the same quantity of powdered sugar for the glycerine.

2308. Portable Glue or Bank-Note ing-Wax. Cement. Boil 1 pound best glue, strain it sticks of sealing-wax have no polish. To very clear; boil also 4 ounces isinglass; put produce this they have to be heated again it into a double glue-pot, with 1 pound fine on the surface. For this purpose they are brown sugar, and boil it pretty thick; then put in other moulds, made of polished steel, pour it into plates or moulds. When cold, which are engraved with the desired ornayou may cut and dry them for the pocket. ments. These moulds are heated only just This glue is very useful to draughtsmen, sufficient to melt the scaling-wax on the architects, &c., as it immediately dilutes in surface, by which operation the sticks obtain warm water, and fastens the paper without the a beautiful glossy appearance. The heat-process of damping; or, it may be used by soft-ing of the moulds to stamp the mark of the ening it in the mouth, and applying it to the paper

2309. To Make Mucilage that will Adhere to Glass or Polished Surfaces. We all know the difficulty of causing labels and similar objects to stick to glass or highly varnished articles exposed to the continued drying action of a very warm room. The gum or paste dries up and cracks, causing the label livery black, and 20 parts Venice turpentine; to fall off. One or two drops of glycerine in mixed as in No. 2313 a small bottle of mucilage will entirely prevent this result. Too much glycerine must Mix together (see No. 2313) 6 pounds resin, 2 not be added, or the cement will fail to harden pounds each shellac and Venice turpentine, at all.

2310. Mucilage of Tragacanth. Triturate 1 drachm powdered gum tragacanth in a mortar with 6 drachms glycerine; add by degrees, with constant trituration, 10 fluid begin to cool. Or: By taking finely pulver-ounces water. This will produce a mucilage ized gold-leaf (see No. 25) or metal powder, at once, without the objectionable air-bubbles and stirring them into the sealing-wax inincidental to agitation.

2311. Mucilage of Tragacanth. Macerate 1 ounce tragacanth in 1 pint boiling water for 24 hours. Then triturate until smooth and uniform, and press through linen. If pretty firm this paste keeps well without the addition of an antiseptic, although a little acetic acid or creosote will more effectually prevent fermentation.

ents; and extra superfine or scented by adding mercury or vermilion).

creosote, corrosive sublimate, etc., frequently | 1 per cent. of balsam of Peru or liquid storax used to remedy this evil, is objectionable on to the ingredients when considerably cooled. The fancy kinds are commonly scented with a sealing-wax burn easier. Sealing-wax containing resin, or too much turpentine, runs into thin drops at the flame of the candle.

2313. Fine Red Sealing-Wax. Melt cautiously 4 ounces very pale shellac in a bright copper pan over a clear chargoal fire, at sary to melt it; when melted, stir in 11 cunces Venice turpentine (previously warmed), followed by 3 ounces vermilion. The heat must sufficient to allow a most thorough mixing of the different ingredients. When this is acpurpose of melting the shellac more easily, some add to the same a little alcohol. Or: 3 same manner as the preceding.

2314. To Produce a Polish on Seal-After the above process the manufacturer can be readily performed with a spirit lamp.

2315. Common Red Sealing-Wax. Melt together 4 pounds resin and 2 pounds shellac; mix in, as in the last receipt, 11 pounds each of Venice turpentine and red lead.

Fine Black Sealing-Wax. 2316. Take 60 parts shellae, 30 parts finely-powdered

and sufficient lampblack to color.

2318. Gold Colored Sealing-Wax.
This is made by stirring gold colored mica spangles into the melted resins just before they stead of the colors. A common kind is made as follows: 6 parts shellae, 2 white resin, 1 silver leaves.

2319. Marbled Sealing-Wax is made by mixing different kinds of scaling-wax together just as they begin to solidify.

2320. Yellow Sealing-Wax. Mix together 4 ounces pale shellac, 1½ ounces resin, 2 ounces Venice turpentine, and ½ ounce King's yellow (sulphuret of arsenie, or orpiment).

Sealing-Wax. All the following Take 7½ ounces shellac and 4 ounces Venice turpentine; and color with 1 ounce brown by employing the best qualities of the ingredi
ochre and ½ ounce cinnabar (red sulphuret of

3 burned selenite. green by the heat of melting the mixture;

7 ounces fine shellac, 3 ounces Venice turpentine, I ounce resin, and I ounce mineral blue.

Green Sealing-Wax. Mix 4 2324 ounces shellac, 2 ounces Venice turpentine, 11 power. ounces resin, ½ ounce King's yellow (see No. 2320), and ¼ ounce mineral blue. Or: 24 parts shellae, 12 mastic, 4 turpentine, 6 verdiindigo.

2325. To Make Perfumed Sealing-The addition of a little camphor or spirit of wine makes sealing-wax melt easier.

mon sealing-wax appear to better advantage, the sticks, being still soft, are dipped in the ground that they are liable to cause frothing. powder of a better quality, and then superficially melted, so as to produce a thin coating.

2327. Soft Sealing-Wax for Diplomas. Take 16 parts yellow wax, 3 turpentine, 1 olive oil; after it is melted, the cinnacompound.

very best sealing-wax is melted as usual by a flame, and carefully worked on the surface to a time. which it is applied, until perfectly even; the 233 it. The flame of a spirit lamp is preferable, having no tendency to blacken the wax. A beautiful dead appearance is given to the im- mixtures of a fatty character. sealing-wax, powdered vermilion. &c.

oiler Incrustations. a lengthy article on the subject, which appeared in the "Scientific American," Pro-

Preventive of Incrustation. Catechu, prices as to make their use extremely ill-advisnut-galls, oak bark, shavings and sawdust, tan ed. I have examined several of them. bark, tormentilla root, mahogany, logwood, which are at all valuable consist of one or etc. These substances all contain more or less more of the substances already mentioned, tannic acid, associated with soluble extractive and the only novel result of their use is the and coloring matters. When they are introduced into the boiler, the soluble constituents for a fair article. One which is put up in tin are dissolved by the water, and basic tannate boxes, containing about one pound, at \$2.50 of lime is formed, which separates as a loose each, contains carbonate of lime, 95.35 parts; deposit, and does not adhere to the sides of carbonate of magnesia, 0.67 parts; and oxide the boiler. It is preferable to use the aqueous of iron, 4.15 parts. It differs little from some

Blue Sealing-Wax. Take 16 crustations which would otherwise fasten parts mastic, 4 turpentine, 8 mountain-blue, themselves on the sides of the boiler. In The mountain-blue turns selecting one of these substances, the principal object is to secure the largest quantity of therefore it is better to use fine indigo, or very tannic acid and soluble extractive matter for fine Prussian blue; but in that case the shel-lac must be particularly light-colored.

2323. Dark Blue Sealing-Wax. Mix catechu being sufficient for 100 cubic feet of water. From 4 to 6 pounds of oak chips have been recommended per horse power, or & bushel mahogany chips for every 10 horse

2331. Mucilaginous Substances as Preventives. Potatoes, starch, bran, linseed meal, gum, dextrine, Irish moss, slippery elm, gris; colored with a mixture of yellow and marshmallow root, glue, etc. These substances form, sooner or later, a slimy liquid in the boiler, which prevents more or less completely Wax. Any fine sealing-wax may be per-ithe setting and naturing of the deposition of function by mixing 1 per cent. of balsam of Some of them may even hold the lime and Peru, or liquid storax, to the ingredients when magnesia in solution. Potatoes have been used for many years, wherever steam engines or ambergris will serve the same purpose, are employed; half a peck or a peck are thrown into the boiler weekly. Linseed meal mixed with chopped straw was employed on 2326. To Improve the Appearance a German railway, a peck at a time being in-of Common Sealing-Wax. To make com-troduced into each boiler. Some writers object to these organic substances, on the

2332. Saccharine Matter as Prevent-ves. Sugar, molasses, com or potato ives. Both cane and grape sugar form sýrup. soluble compounds with lime salts, and consequently prevent their separation as incrustbar, or other coloring matter, is stirred in the ations. One engineer found that 10 pounds of brown sugar protected his boiler for two 2328. To Take Proof-Impressions of months; another, that 6 pounds of corn starch Seals and Stamps. For this purpose the syrup had a similar effect. Another used molasses with success, introducing a gallon at

2333. Fatty Substances as Preventstamp is then firmly and evenly pressed into ives. One writer used whale oil to prevent incrustations, 2 or 3 gallons at a time. Others smear the inside of the boiler with various pression by dusting the stamp, before using mixed with wood ashes, charcoal and tar, has it, with a finely-powdered pigment of the been recommended, or tallow, with soap and same color as the wax; thus, for vermilion charcoal diluted with oil or tar, or tallow and graphite. This plan could not well be applied to a locomotive boiler with its numerous tubes, even though it should prove effective in cylinder boilers.

2334. Anti-Incrustation Powders, &c., for Boilers. Regarding incrustation powders in use, Professor Chandler makes fessor Chandler gives the substances referred the following suggestions and recommendato in the four following receipts, as having tions: Incrustation powders, bearing generbeen recommended by practical men, for the ally the names of their proprietors, are expurpose of preventing incrustations in boilers: tensively advertised and sold; they are either Wood Chips, Bark, &c., as a worthless or are sold at such extravagant extract, as sawdust, chips, etc., are liable to of the incrustations in composition, and is of find their way into the cocks and tubes, alno value whatever. Another contains log-though they act mechanically, receiving in wood, 75.00 parts; chloride of ammonia, GLASS. 223

used in this country at all.

tannie acid, liuseed meal, and the electromagnetic inductor.

Management of the Water to 2336. Blowing Prevent Boiler Incrustation. off. The frequent blowing off of small quantities of water, say a few gallons at a time, is undoubtedly one of the most effective and simple methods for removing sediments and when these are open they may be carried out with the water. This blowing off should take of the ordinary furnace. place at least two or three times daily, per-

haps much oftener.

2337. Incrustation in Boilers. The only effectual remedy is to blow out frequently. Blow out once a week at least ten per cent. of the water in the boilers. It should be done fords a dark green glass. Or: Yellow or while the water is at rest, that is, before starting in the feed water. A practical engineer says: Our boilers were badly incrusted. We loosened the scale with chisels and kerosene oil, and after running them a year as above, they came out as clean and bright as could be.

2338. Scale in Boilers. A practical engineer recommends the following: Get some cow or ox feet, just as they are cut off in the slaughter house, put them in a wire net fine enough to detain the small bones from getting from the boiler into the blow-off pipe. Use 5 of the feet to a 6-horse power boiler, and no further trouble with scale in the boilers will They must be replaced be experienced. every two or three months, according to the quality of the water. They do not make the water foam.

lass. This is a compound of silica (silicic acid) with the oxide of an alkaline metal, obtained by fusion. In its usual form it is brittle, transparent, non-crystalline, insolu-ble, and fusible; but it sometimes exhibits other qualities. The principle of its production is very simple, although skill and experience are necessary to insure excellence. Silica (commonly under the form of sand) is heated with carbonate of potassa or soda and slaked lime or oxide of lead, until the mixture fuses and

15.00 parts; chloride of barium, 10.00 parts. The fusion is performed in large crucibles of This is a very good article, but at the price refractory fire-clay; in making lead glass, the for which it is sold it cannot be used in quanti- crucible is covered with a dome, and an openties sufficient to produce much effect. In ing left in the side, through which the matefact, chloride of barium is too expensive to be rials are put in and the melted glass withdrawn. Carbonates and other crystalline 2335. To Guard Against Incrusta-matter used in glass making, require to be dry. tion in Boilers. Professor Chandler recom- (See No. 2065.) Certain mineral oxides give mends the following precautions: The use of glass a variety of color, sometimes of a very the purest waters that can be obtained, rain undesirable kind. Should the paste contain water wherever possible. Frequent use of the traces of iron, instead of producing white blow-off cock. That the boilers never be glass there will be only the common bottleemptied while there is fire enough to harden glass; and if the iron be in larger proportions, the deposit. Frequent washing out. Expert he dark green shade will be the result. On iments on the efficacy of zinc. lime-water, the contrary, add a certain quantity of oxide carbonate of soda, carbonate of baryta, chlor- of lead to a pure base of potash, and the ide of ammonium, some substance containing beautiful crystal glass is formed; a still larger dose, and the diamond paste, with its wonderfully dispersive power, will deceive many an unpracticed eye.

2340. Peligot's Bohemian Tube Glass. The component parts of this glass are 711 parts quartz, 20 parts dry (see No. 2065) carbonate of potassa (or its equivalent), 8½ parts quicklime, and a little manganese. It is very preventing their hardening on the sides of the intractable and difficult to melt, but the addi-boiler. The water entering the boiler should tion of a very small quantity of borax, boracic be directed in such a way as to sweep the acid, or arsenious acid, causes it to flow into loose particles toward the blow-off cocks, that a glass of great brilliancy and hardness, and capable of being wrought at the highest heat

2341. Bottle Glass. Dry Glauber salts, 11 pounds; soaper salts, 12 pounds; ½ bushel of waste soap ashes; sand, 56 pounds; glass skimmings, 22 pounds; green broken glass, 1 cwt.; basalt, 25 pounds. This mixture afwhite sand, 100 parts; kelp, 30 to 40 parts; lixiviated wood ashes, from 160 to 170 parts; fresh wood ashes, 30 to 40 parts; potter's clay, 80 to 100 parts; cullet, or broken glass, 100 parts. If basalt be used, the proportion of kelp may be diminished.

2342. Broad, or Green Window Glass. Dry Glauber salts, 11 pounds; soaper salts, 10 pounds; ½ bushel of lixiviated soap waste; 50 pounds of sand; 22 pounds of glass-pot skimmings; 1 cwt. of broken green glass.

2343. Crown, or White Window Glass. Pure sand, 100 parts; dry sulphate of soda, 50 parts; dry quicklime, in powder, 17 to 20 parts; charcoal, 4 parts. The product is white and good.

2344. Bohemian Crown Glass. Pure silicious sand, 63 parts; potash, 22 parts;

lime, 12 parts; oxide of manganese, 1 part.
2345. Nearly White Table Glass. Take 20 pounds potashes, 11 pounds dry Glauber salts, 16 pounds soaper salt, 55 pounds sand, and 140 pounds cullet or broken glass of the same kind. Or: 100 parts sand, 235 kelp, 60 wood ashes, 13 manganese, 100 broken glass. 2346.

White Table Glass. Fuse together 40 pounds potashes, 11 chalk, 76 sand, part manganese, 95 white cullet. Or: 50 parts purified potashes, 100 sand, 20 chalk, and 2 saltpetre.

2347. Crystal Glass. Take 60 parts purified potashes, 120 sand, 24 chalk, 2 saltpetre, combination takes place. When the mass be- 2 arsenious acid, $\frac{1}{16}$ part manganese. Or: comes perfectly limpid and free from air bub- Purified pearlashes, 70 parts; 120 white sand; bles, it is allowed to cool until it assumes the 10 saltpetre; ½ part arsenious acid; and ½ peculiar tenacious condition for working. part manganese. Or: 67 parts sand, 23 purified pearlashes, 10 sifted slacked lime, \frac{1}{4} part parts; dry carbonate of soda, 26\frac{1}{4} parts; manganese, 5 to 8 red lead.

2348. Clear Crystal Glass. White g sand, 15 parts; red lead, 10 parts; refined and manganese, of each a very little.

lime, 20 parts; charcoal, 24 parts.

Pure sand, 40 parts. 2350. Plate Glass.

lime, 4 parts; nitre, 1½ parts; broken plate

White glass, 25 parts. refined 2351. French Plate Glass. ashes, 4 parts; nitre, 1 part; arsenious acid quartz sand and cullet (old glass), of each 300 parts; dry carbonate of soda, 100 parts; 2349. Vienna Plate Glass. Sand, 100 slacked lime, 43 parts. Or: Pure sand, 72 parts; calcined sulphate of soda, 50 parts; parts; refined soda, 45 parts; quicklime, 48 parts; nitre, 21 parts; cullet (old glass), 43

2352. Table of Proportions of the Materials Used for Making Lead Glass, the Numbers Increasing with the Quality.

	Crystal.					Common Flint.			Optical.		Paste to imitate Diamonds, &c.		
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Silica	100	100	100					100					100
Oxide of Lead	10	30	42	45	48	66	70	80 to 85	100	100	133	154	160
Potash, purified	35	33	33	35	16	26	40	35 to 40	23	23	13	56	20
Saltpetre	}	10	15		i i	7	3	2 to 3		1.3			-20
Carbonate of Lime					8:		į	į					
Borax	!	•							i .7	1.8	1	6.3	

other salt of thallium, substituted for the lead, makes a paste of greater brilliancy and disimitation gems.

tions must be added to 1000 parts of paste No. 12 in the above cable of lead glass.

parts; and 1 part gold purple (purple of cassius. see Nos. 2720 to 2723.)

2355. For Ruby. A ruby color is given by 25 parts oxide of manganese

2356. For Amethyst. Oxide of manganese, 8 parts; $\frac{1}{5}$ part gold purple (see Nos. 2720) to 2723), and 5 parts oxide of cobalt.

2357. For Garnet. Antimony glass, 500 parts; 4 parts oxide of manganese, and 4 parts gold purple. (See Nos. 2720 to 2723.)
2358. For Sapphire. Take 15 parts

oxide of cobalt.

2359. For Aqua Marine. Take 7 parts

antimony glass, ? part oxide of cobalt.

2360. For Emerald. Take 8 parts oxide of copper, 1 part oxide of chrome.

2361. To Stain or Color Glass. ferent colors are given to glass by the addition of metallic oxides. Thus, for amethyst, oxide of manganese is used; for blue, oxide of cogold; for ruby red, suboxide of copper; for glass for optical purposes.

white, oxide of tin: for yellow, oxide of silver,

2365. Prismatic Diamond Crystals white, oxide of tin; for yellow, oxide of silver, These substances are either added to the melted contents of the glass-pot, as in preparing artificial gems (see No. 2419), or are applied in a thin layer to the surface of the object, which is then heated until the coloring compound fuses as in enameling. (See No. 2378.)

French Glass Used for Light-2362. Houses.

It has been suggested that the oxide, or Henderson, C. E., we are able to furnish the composition of both. The French glass is composed of silicic acid, 72.1 parts; soda, 12.2 persive powers for optical purposes, and for parts; and lime, 15.7 parts; including some traces of alumina and oxide of iron.

2353. Ingredients for Coloring Paste to Imitate Gems. The following propor- In Birmingham it is made from 560 pounds French sand, 203 pounds carbonate of soda, o. 12 in the above table of lead glass.

63 pounds lime, 28 pounds nitrate of soda, 2354. For Topaz. Antimony glass, 40 and 3 pounds arsenious acid. The best qualities of this glass are at present produced in the Siemens furnace.

2364. Liquid Spectroscopes. The use of transparent liquids, such as bisulphide of carbon, for the manufacture of lenses, is making rapid progress on the ground of economy; large pieces of glass, free from flaw and blemish, being difficult to obtain, and expensive. Poggendorff's "Annalen" calls attention to possible disturbances of the accuracy of liquid prisms, the lines in the spectrum varying with the temperature. The divergence, owing to changes of heat and cold, of the lines of solid prisms, is quite insignificant. A glass prism, heated in the sun and then removed to the shade, was observed to possess an increased refractive power as it cooled, while a bisulphide prism exhibited a reversed result. These facts point out the importance of the use of the thermometer in conjunction with the spectrobalt; for brown, oxide of iron; for green, scope, and also show that there is room for black oxide of copper; for purple, oxide of great improvement in the manufacture of

> for Windows. A hot solution of sulphate of magnesia, and a clear solution of gum-arabic, mixed together. Lay it on hot. For a margin or for figures, wipe off the part you wish to remain clear with a wet towel.

2366. To Drill Glass. Wet an ordinary drill with petroleum or benzine; turpentine will answer, but not so well; it will then bore The special composition of the common glass nearly as rapidly as steel. If crown glass used for the light apparatus for it is intended to bore through, the glass should light-houses was, until quite recently, kept a be first countersunk on each side with a drill secret by the manufacturers of Saint Gobain, dressed off so as to form a very flat threein France, and some firms in Birmingham, sided pyramid. Flint and plate-glass are very which had the monopoly of this branch of difficult to bore. It has been recently ascer-From the researches of David M. tained that dilute sulphuric acid is much more

effective, with less wear of the tool, than oil are first made on stone or plate and then of turpentine. It is stated that at Berlin, printed on unsized paper with an ink consistglass eastings for pump barrels etc., are drilled, ing principally of a solution of asphaltum in planed and bored like iron ones, and in the oil of turpentine made with the aid of heat, to phuric acid.

Without a Diamond. Scratch the glass affine. This mixture is strained and rapidly around the shape you desire with the corner cooled with constant stirring; it is the only of a file or graver; then, having bent a piece kind of coating which thoroughly resists the of wire to the same shape, heat it red hot and action of the corrosive acid. The printed palay it upon the scratch, sink the glass into cold water just deep enough for the water to come almost on a level with its upper surface.

Dip a piece of worsted thread in then set fire to the thread, or apply a red hot wire round the glass; if it does not immediately crack, throw cold water on it while the wire remains hot. By this means glass vessels that have been broken may often be fashioned and rendered useful for a variety of pur-

poses bottle in a vessel of water, to the height where in metal bottles, and requires very careful it is designed to break it; also fill the bottle handling. The glass must be warmed, and to the same level. Now pour coal oil inside and out on the water; cut a ring of paper, the writing or design traced through the wax by the heat will break the vessel on the water

2370. Glass of Antimony. Roast powit in a crucible until it fuses into a brownish red glass. If calcined too much, a little more antimony must be added to make it run well.

Writing on Glass. be done with a piece of French chalk, or crayons prepared for the purpose; or even with a common pen held nearly perpendicular. India ink, or, when the article will be exposed to damp, shellac varnish, thickened with a little vermilion or lampblack, for red or black color, is best adapted for the purpose. Common ink is not sufficiently opaque

To Imitate Ground Glass. ready way of imitating ground glass is to dissolve Epsom salts in beer, and apply with a As it dries it crystallizes. brush.

2373. To Make Prince Rupert's Drops. Prince Rupert's drops are made by letting drops of melted glass fall into cold waform, with a tail or neck resembling a retort. (copper or gold), on which it is fused by the They possess this singular property, that if a flame of a blowpipe, or by the heat of a small small portion of the tail is broken off, the furnace. The basis of all enamels is a highly whole bursts into powder, with an explosion, and a considerable shock is communicated to or paste. the hand that grasps it.

hydrofluoric acid on plate glass is practiced following processes depend greatly upon the now to a very considerable extent, the French duration and degree of heat employed. By manufacturers especially producing splendid increasing the quantity of sand, glass, or flux, ornamental effects by this process. The the enamel is rendered more fusible, and the drawings to be imitated or etched on the glass opacity and whiteness is increased by the addi-

same lathes and machines, by the aid of sul- which some substance is added which shows a more or less crystalline structure on cooling, 2367. To Cut Glass Round or Oval as stearic acid, spermaceti, naphthaline, parper is laid flat with the blank side on water, to which from 10 to 25 per cent. of muriatic acid has been added, and as soon as the lines 2368. To Break Glass in any Required | show signs of softening the negative printing is transferred to the glass by a slight pressure spirits of turpentine, wrap it round the glass when the paper is removed, the picture will in the direction required to be broken, and adhere to the glass, and this is afterwards exposed to the fluoric vapors in leaden troughs.

2375. To Etch or Write on Glass. writer in Dingler's "Polytechnisches Journal" recommends a solution of fluoride of ammonium, which can be used with an ordinary quill, and on drying leaves a distinct line.

2376. To Engrave on Glass. To en-2369. To Break a Glass Bottle or grave on glass, fluoric acid is used, either in Jar Across its Circumference. Place the liquid state or in vapor. This acid is kept fitting the bottle. Saturate with alcohol or with a pointed instrument. The liquid fluoric benzine, so that it touches the oil. Pour, acid is poured on it, and left to act on the unalso, some inside the bottle. Set on fire; the covered portions of the glass; or pour some cold water prevents the glass from heating of the acid in a small lead pan, which place below its surface, while the expansion caused in a still larger vessel filled with sand; heat the sand and place the glass object over the gas liberated from the heated acid, and it will soon be found to be beautifully etched. Great dered antimony in a shallow vessel over a care must be taken when this is going on, for gentle fire, until it turns whitish gray, and the gas, as well as the acid, is of a very deleceases to emit fumes at a red heat; then heat terious character. The same effect may be produced by the use of fluorspar, powdered and made into a paste with oil of vitriol, laid over the prepared surface, and covered with This may lead-foil or tea-lead; or bruised fluorspar is put in a wedgwood evaporating basin, with sufficient oil of vitriol to form a thin paste, and the prepared glass laid over the basin, so that the vapors may act on the portions from which the wax has been removed.

2377. Glass of Borax. Calcine borax with a strong heat till the water of crystallization is expelled, and the salt fuses into a clear glass.

namels. namels. A species of vitreous varnish, colored by means of metallic oxides (see No. 2393) and applied in a thin ter; the drops assume by that means an oval stratum to brightly polished metallic surfaces transparent and fusible glass, called frit, flux,

Base Frit or Flux for Enamels. 2379. To Etch on Glass. Etching with The precise qualities of the products of the apt to make the enamel effloresce and lose as much as required.

color.

for 12 hours, then pour it out into water, and reduce it to a powder in a biscuit-ware (unglazed porcelain) mortar.

white arsenic, of each 1 part as last.

III. Flint glass, 3 ounces; red lead, 1 ounce;

IV. Red lead, 18 parts; borax (not calcined), 11 parts; flint glass, 16 parts; as last.

V. Flint glass, 6 parts; flux No. II, above,

4 parts; red lead. S parts; as last.

VI. Tin, 2 to 5 parts; lead, 10 parts; calcine in an iron pot at a dull cherry-red heat, and scrape off the oxide as it forms, observing to obtain it quite free from undecomposed parts. metal; when enough of the dross is obtained. II. reduce it to fine powder by grinding and elu- 4 parts; flint powder, 3 parts; red sulphate of triation (see No. 14), then mix 4 parts of this iron, 1 part; calcine, then add flux, 5 parts to powder with an equal weight of pure sand or every 2 parts of this mixture. powdered flints, and 1 of sea-salt, or other 2386. Purple Enamels. I. Flux colcrucible, and proceed as before. The best cassius (see Nos. 2720 to 2723), or peroxide proportions of the tin and lead, for all ordinary of manganese. purposes, are about 3 of the former to 10 of II. Sulphur, nitre, vitriol, antimony, and the latter. The calcined mixed oxides are oxide of tin, of each 1 pound; red lead, 60 commonly called calcine.

of each I part; pure subcarbonate of potash,

2 parts; as before.

as before, then mix 50 parts of the calcine a reverberatory furnace for 24 hours. This is with an equal weight of flints, in powder, and said to be the purple enamel used in the mo-1 pound of salts of tartar; as before. A fine saic pictures of St. Peter's at Rome.

fuse. A fine black.

II. Calcined iron (protoxide), 12 parts; oxide of cobalt. 1 part; mix, and add an equal phase of iron, 2 parts; flux I (in No. 2379) 6 weight of white flux. (See No. 2396.)

III. Peroxide of manganese, 3 parts; zaffre, 1 part; mix and add it as required to white flux. Zaffre is crude oxide of cobalt.

2381. Blue Enamels. Either of the white fluxes colored with oxide of cobalt.

II. Sand, red lead, and nitre, of each 10 parts; flint glass or ground flints, 20 parts; oxide of cobalt, 1 part, more or less, the quantity depending on the depth of color required.

2382. Brown Enamels. I. Red lead and calcined iron, of each 1 part; antimony, litharge, and sand, of each 2 parts; mix and add it in any required proportion to a flux, alters the shade of brown.

flint powder, 8 parts; mix.

III. Manganese, 9 parts; red lead, 34 parts;

flint powder, 16 parts

2383. Green Enamels. I. Flux, 2 pounds; black oxide of copper, 1 ounce; red oxide of iron, \(\frac{1}{2}\) drachm; mix.

II. As above, but use the red oxide of cop-

per. Less decisive.

tion of oxide of tin. The use of borax should; III. Copper dust and litharge, of each 2 be avoided, or used very sparingly, as it is ounces; mitre, 1 ounce; sand, 4 ounces; flux,

IV. Add oxide of chrome to a sufficient I. Red lead, 16 parts; calcined borax, 3 quantity of flux to produce the desired parts; powdered flint glass, 12 parts; pow-shade; when well managed the color is sudered flints, 4 parts; fuse in a Hessian crucible perb, and will stand a very great heat; but in careless hands, it frequently turns on the dead-leaf tinge.

V. Transparent flux, 5 onnces; black oxide II. Powdered flints, 10 parts; nitre and of copper, 2 scruples; oxide of chrome, 2

grains. Resembles the emerald.
VI. Mix blue and yellow enamel in the re-

quired proportions.

2384. Olive Enamels. Good blue enamel, 2 parts; black and yellow enamels, of each 1 part; mix. (See Brown Enamels.)

2385. Orange Enamels. I. Red lead. 12 parts; red sulphate of iron and oxide of antimony, of each 1 part; flint powder, 3 parts; calcine, powder, and melt with flux, 50

II. Red lead, 12 parts; oxide of antimony.

alkaline matter; fuse the mixture in a Hessian ored with oxide of gold, purple precipitate of

pounds; mix and fuse, cool and powder; add VII. Lead and tin. equal parts; calcine as rose copper, 19 ounces: zaffre, 1 ounce; croabove; and take of the mixed oxides, or cal-; cus martis, 1½ ounces; borax, 3 ounces; and 1 cine (see preceding receipt) and ground flints, pound of a compound formed of gold, silver, and mercury; fuse, stirring the melted mass with a copper rod all the time, then place it VIII. Lead, 30 parts; tin, 33 parts; caleine in crucibles, and submit them to the action of

dead white enamel.

2387. Dark Red Enamel. Sulphate
2380. Black Enamels. I. Pure clay,
3 parts; protoxide of iron, 1 part; mix and
6 parts of flux IV. (in No. 2379) and 1 of

parts; white lead, 3 parts. Light red.
2389. Red Enamel. Paste or flux colored with the red or protoxide of copper. Should the color pass into the green or brown, from the partial peroxidizement of the copper, from the heat being raised too high, the red color may be restored by the addition of any carbonaceous matter, as tallow, or charcoal.

2390. Beautiful Red Enamel. most beautiful and costly red, inclining to the purple tinge, is produced by tinging glass or flux with the oxide or salts of gold, or with the purple precipitate of cassius (see Nos. 2720 to 2723), which consists of gold and tin. according to the color desired. A little oxide In the hands of the skillful artist, any of of cobalt or zaffre is frequently added, and these substances produce shades of red of the most exquisite hue; when most perfect, the II. Manganese, 5 parts; red lead, 16 parts; enamel comes from the fire quite colorless, and afterwards receives its rich hue from the

flame of the blow-pipe.
2391. Rose Colored Enamels. Purple enamel, or its elements, 3 parts; flux, 90 parts; mix, and add silver-leaf or oxide of

silver, 1 part or less. 2392. Transpa Transparent Enamels. Either of the first five fluxes in No. 2379.

2393. Violet Enamels. Saline or alkaline frits or fluxes colored with small quanti- The beautiful enameled surface possessed by ties of peroxide of manganese. As the color depends on the metal being at the maximum of oxidation, contact with all substances that the copper with sand and sulphuric acid, and would abstract any of its oxygen should be then apply the following mixture: 2 parts avoided. The same remarks apply to other white arsenic, 4 parts hydrochloric acid, I sulavoided. The same remarks apply to other metallic oxides.

2394. Yellow Enamels. Superior yellow enamels are less easily produced than most etc. The fine enamels of trade are generally other colors; they require but little flux, and prepared by fusing at high temperatures, that mostly of a metallic nature. I. Red lead, 8 ounces; oxide of antimony and tin, calcined together, each 1 ounce; mix, and add flux IV. (in No. 2379), 15 ounces; mix and fuse. By varying the proportion of the ingredients, various shades may be produced.

sand, each lounce; nitre, 4 ounces; mix, fuse. and powder, and add the product to any quantity of flux, according to the color re-

quired.

little red oxide of iron.

used, but are difficult to manage. If a thin film of oxide of silver be spread over the surface of the enamel to be colored, exposed to a moderate heat, then withdrawn, and the film part under will be found tinged of a fine yel-

oxide of antimony, alum, and sai ammoniac, each 1 part; pure carbonate of lead, 1 to 3 parts, as required, all in powder; mix, and expose to a heat sufficiently high to decompose the sal ammoniac.

enamel, the articles must be perfectly free itives or negatives, may be taken on such enfrom foreign admixture, as this would impart amels without collodion. (See Photographs a color. When well managed, either of the on Enamel.) following forms will produce a paste that will rival the opal. Calcine (from 2 parts of tin and 1 part of lead calcined together), 1 part; fine crystal or frit, 2 parts; a very trifling quantity of manganese; powder, mix, melt, and pour the fused mass into clean water; dry, powder, and again fuse, and repeat the whole process 3 or 4 times, observing to avoid contamination with smoke, dirt, or oxide of

2397. Fine White Enamel. Washed diaphoretic antimony, 1 part; fine glass (perfectly free from lead), 3 parts; mix, and proceed as before.

To Make Black Enamel for 2398. Gold or Silver. Melt together in a crucible, 1 part, by weight, of silver, 5 parts copper, 7 parts lead, and 5 parts muriate of ammonia. Add to this mixture twice its quantity of pulverized sulphur, covering the crucible immediately. Let it calcine until the excess of sulphur has passed off. Then pound the compound to coarse powder and make it into a paste with a solution of muriate of ammonia. This is the black enamel used for jewelry.

To Black Enamel Gold or Silver. Place some of the enamel paste, as prepared in the preceding receipt, on the article to be enameled; hold it over a spirit lamp until the enamel melts and flows upon it. It or so, and then to sprinkle the dry powder may then be smoothed and polished.

2400. Black or Enameled Copper. paintings on copper, may be produced, on a black ground, by the following process: Clean phuric acid, and 24 water.

2401. Enamel for Labels, Signboards, silica, oxide of tin, and oxide of lead, and spreading the mixture over the surface of a sheet of copper, gold, or platinum. jections to these enamels are, in the first place their high cost, and secondly the impossibility arious shades may be produced.

II. Lead, tin ashes, litharge, antimony, and E. Duchemin has advantageously replaced them by the following economical and efficient compound:

2402. Duchemin's Enamel for Labels, etc. Arsenic, 30 parts by weight; saltpetre, III. Flux fused with oxide of lead, and a 30 parts; silica (fine sand), 90 parts; litharge, tle red oxide of iron.

250 parts. This is spread on plates of glass IV. Pure oxide of silver added to the me- of the required shape and size, care being tallic fluxes. The salts of silver are also taken, however, that the kind of glass employed be not inferior in point of fusibility to the cnamel. Enameled glass prepared from the above substances may be drawn or written on as readily as if it were paper, and in less of reduced silver on the surface removed, the time than one minute the writing may be rendered indelible by simply heating the plate in a small open furnace or muffle. Drawings, 2395. Bright Yellow Enamel. White autographs, legal acts, public documents, historical facts and dates of importance, labels for horticultural purposes or destined for outof-door exposure, coffin plates, signboards, show-case signs, etc., may thus be cheaply made, which will resist atmospheric influences 2396. Dead-White Enamel. For white for ages. First-class photographs, either pos-

2403. Enamel for Iron Hollow Ware. The enamel of iron hollow ware is made of powdered flints, ground with calcined borax, fine clay, and a little feldspar. This mixture is made into a paste with water and brushed over the pots after they have been scoured with diluted sulphuric acid and rinsed clean While still moist they are with water. dusted over with a glaze composed of feldspar, carbonate of sodium, borax, and a little oxide of tin. Thus prepared, the pots are gradually dried and then the glaze is fired or fused under a muffle at a bright red heat. Oxide of lead, although increasing the fusibility of the glaze, impairs its efficiency, as it will not resist the action of acids in cooking.

lazes. Glazes must be reduced to Ta very fine powder. For use they are ground with water to a very thin paste or smooth cream, into which the articles, previously baked to the state called "biscuit," are then dropped; they are afterwards exposed to a sufficient heat in the kiln to fuse the glaze. Another method of applying them is to immerse the biscuit in water for a minute over the moistened surface.

timate mixture of 4 parts massicot (see Index), 2414.) 2 parts tin ashes, 3 of crystal glass fragments, 2418. Silver Lustre. Reduce ammonio-and ½ part sea salt. The mixture is suffered chloride of platin in to an impalpable powder; to melt in earthenware vessels, when the liquid flux may be made use of.

Yellow Glazing. Take equal parts of massicot, red lead, and sulphuret of antimony. Calcine the mixture and reduce it again to powder, add then 2 parts of pure sand and 1½ parts of salt. Melt the whole.

2407. Green Glazing. Sand, 2 parts; 3 parts massicot, 1 part of salt and copper scales, according to the shade to be produced. The mixture is melted as directed above.

of manganese

2409. Blue Glazing. White sand and

manganese, 2 parts; 1 of smalt, 11 of burned quartz, and 11 massicot.

2411. Brown Glazing. Take 1 part broken green bottle glass, 1 of manganese, and 2

parts lead glass.

Glaze without Lead. Common 2412. earthenware is glazed with a composition conmany purposes. The following glaze has been proposed, among others, as a substitute: 100 parts washed sand, 80 parts purified potash, mixed, and heated in a black-lead crucible, in a reverberatory furnace, till the mass flows into a clear glass. It is then to be reduced to powder. The goods to be slightly burnt, dipped in water, and sprinkled with the powder.

2413. Glaze for Porcelain. Feldspar, 27 parts; borax, 18 parts; Lynn sand, 4 parts; nitre, 3 parts; soda, 3 parts; Cornwall chinaclay, 3 parts. Melt together to form a frit, and reduce it to a powder with 3 parts calcined borax

2414. Metallic Lustres for Pottery. The appearance of a lustrous metallic surface is given to vessels of stoneware, &c., by applying the lustre over an easily-fusible glaze to the outer surface of the vessel, after which adhesure is produced by exposing it to a slight degree of heat. They are then polished with cotton or leather. The principal lustres are

given in the following receipts:
2415. Gold Lustre. Dissolve 1 drachm grain-gold in ‡ ounce aqua-regia, add 6 grains metallic tin to the solution. When dissolved, pour it gradually, with constant stirring, into a mixture of 1 drachm balsam of sulphur, (see Index), and 20 grains oil of turpentine. When the mass begins to stiffen, an additional drachm oil of turpentine must be added and well mixed in. More gold deepens and brightens the lustre; more tin turns it on the violet or purple. Applied as in No. 2414.

2416. Iron Lustre. This is a mixture of muriate of iron and spirit of tar. Used ac-

cording to No. 2414.

2417. Platinum Lustre. To bichloride

2405. White Glazing. Prepare an in- the appearance of polished steel. (See No.

grind it to the requisite consistence with a little spirit of tar, and apply with a brush as directed in No. 2414.

Artificial Gems. These consist of vitreous compounds made in imitation of gems and precious stones. Like enamels, the artificial gems have for their basis 2408. Violet Glazing. Massicot, 1 part; a very fusible, highly transparent and bril-3 parts sand, 1 of smalt, and \(\frac{1}{3}\) part black oxide liant dense glass, which is known under the name of frit, paste, strass, mayence base, &c., and which, in its state of greatest excellence, consitutes the artificial diamond. As massicot, equal parts. † part of blue smalt. lence, consitutes the artificial diamond. As 2410. Black Glazing. Black oxide of the strass or base enters largely into the manufacture of imitation gems, we give the method for making it first. It is absolutely necessary, to ensure success in the following receipts, that the substances employed be perfeetly free from impurities, particularly those of a mineral nature. Litharge, oxide of lead, and carbonate of lead especially, must be taining lead, on which account it is unfit for entirely free from oxide of tin, as the smallest particle of this imparts milkiness to the paste. All the ingredients must be separately reduced to powder; and, after being mixed, 10 of nitre, and 20 of slacked lime, all well sifted through lawn. For the finer kinds of mixed, and heated in a black-lead crucible, in mock diamonds, rock crystal should alone be employed; when sand is used, the purest white variety should be selected, and be washed thoroughly, first with muriatic acid and then with water, to remove any traces of earthy matter. Much of the minute detail in making artificial gems can only be acquired by experience. The fusion must be carefully conducted and continuous, and the melted mass allowed to cool very slowly, after having been left in the fire for 24 to 30 hours at least. Hessian crucibles are preferred for this purpose, and the heat of an ordinary porcelain kiln is usually sufficient; but a small wind-furnace, devoted exclusively to the purpose, is in general more convenient. It is found that the more tranquil, continuous and uniform the fusion, the denser and clearer is the paste, and the greater its refractive power and beauty. All the colored vitreous compounds noticed as enamels (see No. 2378, &c.) may be worked up in this way into ornamental stones. It may be further observed that the beauty of pastes or imitation gems, and especially the brilliancy of mock diamonds, is greatly dependent on the cutting, setting up, and the skillful arrangement of the foil or tinsel behind them. (See ENAMILS, No. 2378, &c.; Foils, No. 2447, &c.)
2420. Diamond Paste, or Strass.

Litharge, 20 parts; silica, 12 parts; nitre and borax, each 4 parts; white arsenic, 2 parts; powder mix, fuse in a crucible, pour the melted mass into water, separate any reduced lead, and again powder and re-melt.

2421. Mayence Base, or Strass. Silica (quartz, flint or rock crystal), 8 ounces; of platinum (a solution of platina in aquaca (quartz, flint or rock crystal), 8 ounces; regia), is added drop by drop a mixture of salt of tartar, 24 ounces; mix, bake, cool. spirit of tar and balsam of sulphur in equal wash with dilute nitric acid, and afterwards proportions, until by a trial the composition is found to give the required result. This gives carbonate of lead, and to every 12 ounces of

the mixture add borax, 1 ounce; triturate in ore, 26 grains calcined bones. Or: 10 nounds a porcelain mortar, melt in a clean crucibi. Paste, and a pound calcined bones. and pour the fused compound into cold water: dry, powder, and repeat the process a second | part oxide of manganese. Or: 1 part topaz and a third time in a clean crucible, observing coasts that has turned out opaque, and 8 parts to separate any revived lead. To the thire seass; fuse for 30 hours, cool, and fuse small frit add nitre, 5 drachms, and again melt. pieces before a blow-pipe. Or: 8 ounces strass, Very brilliant. Or: Carbonate of lead 5 oun- 84 grains each precipitate of cassius (see Nos. ces; powdered borax, 2 ounces; rock crystal, 2720 to 2723), peroxide of iron, golden sulceed as last.

2422. Gems. Works at Berlin, is a flux obtained by melting cassius; this turns on the orange. together 6 drachms carbonate of soda, 2 drachms minium, and 1½ ounces purest white sand

2423. Loysel's Strass or Paste. Pure gamese may be added to this last receipt. silex (flint or quartz), 100 parts; red oxide of lead (minium), 150 parts; calcined potash, 30 and 1 grain calcined peroxide of iron. has great brilliancy and refractive and dispersive powers, and also a similar specific gravity to the oriental diamond. It fuses at a moderate heat, and acquires the greatest brilliancy when re-melted, and kept for 2 or 3 days in a ant alkali, and perfect the refining.

Gems. Mix together 8 ounces pure silica and 24 ounces salt of tartar; bake, cool, wash with dilute nitric acid, and afterwards with water; dry, powder, add 12 ounces pure carbonate of lead, and to every 12 ounces of the and a third time in a clean crucible, observing to separate any revived lead. To the third frit add nitre, 5 drachms, and again melt. The product is perfectly limpid and extremely brilliant.

2425. Doualt-Wieland's Paste or Strass. Rock crystal, 4056 grains; minium, 6300 grains; potash, 2154 grains; borax, 276 grains; arsenic, 12 grains. Or: Sand, 3600 grains; pure carbonate of lead, 8508 grains; potash, 1260 grains; borax, 360 grains; arsenic, 12 grains.

2426. Lancon's Paste or Strass. Litharge, 100 grains; silex, 75 grains; white

tartar or potash, 10 grains. 2427. Red Cornelian. Strass, 2 pounds; glass of antimony, 1 pound; calcined peroxide of iron (rouge), 2 ounces; manganese, 1 drachm.

White Cornelian. 2428. Strass. 2 washed yellow ochre, 2 drachms; pounds; calcined bones, 1 ounce.

2429. Oriental Garnet or Carbuncle. Fuse 512 grains paste, 256 grains glass of antimony, 2 grains purple of cassius, and 2 grains oxide of manganese. Or: 359 grains paste, 178 grains glass of antimony, and 2 grains oxide of manganese.

2430. Vinegar Garnet. Take 2 pounds paste, I pound glass of antimony, and I ounce fused through it. By substituting oxide of oxide of iron.

2432. Ruby. Take 40 parts paste, and 3 ounces; manganese, & grain; mix, and pro-phuret of antimony, and manganese calcined with nitre; add I ounce or more of rock crys-Patent Base for Artificial tal. Or: 1 pound paste and 3 drachms pur-The base of these gems, as patented, ple of ca sius. Or: 4 ounces paste, 4 ounces by the Superintendent of the Royal Porcelain glass of antimony, and 4 drachm purple of

2433. Sapphire. Fuse 1152 parts paste drachms burnt borax, 1 drachm saltpetre, 3 and 68 parts oxide of cobalt for 30 hours in a luted Hessian crucible. Or: 8 ounces paste and 49 grains oxide of cobalt. A little man-

2434. Topaz. Melt 96 grains paste to 35 parts; calcined borax, 10 parts; arseni- 1008 grains paste, 43 grains glass of antious acid, 1 part. This produces a paste which mony, and 1 grain purple of cassius. (See Nos. 2720 to 2723.)

> 2435. Turquois. Take 10 pounds blue paste, ½ pound calcined bones.

2436. Yellow Diamond. Take 1 oance strass, and 10 grains glass of antimony. Or: fused state, in order to expel the superabund- 1 ounce strass and 24 grains chloride of silver.

2437. Chrysolite. Strass, 5 pounds; Fontanier's Base for Artificial calcined peroxide of iron, 3 to 4 drachms.

2438. Eagle Marine. Paste of strass, 10 pounds; copper highly calcined with sulphur (copper-stain), 3 ounces; zaffre, 1 scruple.

2439. Emerald. Lançon's paste (see No. 2426), 9512 grains; acctate of copper, 72 mixture add borax, 1 ounce; triturate in a grains; peroxide of iron, 1½ grains. Or: Douporcelain mortar, melt in a clean crucible, and ault-Wieland paste (see No. 2425), 4608 grains; pour the fused compound into cold water; green oxide of copper, 42 grains; oxide of dry, powder, and repeat the process a second chrome, 2 grains. Or: Paste, 1 ounce; glass of antimony, 20 grains; oxide of cobalt, 3 grains. Or: Paste, 15 ounces; carbonate of copper, 1 drachm; glass of antimony, 6 grains.

2440. Lapis Lazuli. Paste, 10 pounds; calcined horn or bones, 12 ounces; oxides of cobalt and manganese, of each, & ounce; mix. The golden veins are produced by painting them on with a mixture of gold powder, borax, and gum water, and gently heating till the borax fluxes.

2441. Amethyst. Take 500 grains paste, 3 grains oxide of manganese, and 2 grains oxide of cobalt. Or: 4608 grains paste, 36 grains oxide of manganese, 24 grains oxide of cobalt, and 1 grain purple of cassuis. (See Nos. 2720 to 2723.) Or: 9216 grains paste, 15 to 24 grains oxide of manganese, and 1 grain oxide of cobalt.

2442. Aqua Marina, or Beryl. Take 3200 grains paste, 20 grains glass of antimony, and I grain oxide of cobalt. Or: 2304 grains paste, 16 grains glass of antimony, and 1 grain oxide of cobalt.

2443. Aventurine, or Gold Stone. Fuse 10 grains scales of iron, 50 grains paste, and 5 grains protoxide of copper, until the copper is reduced to metallic form, then allow the mass to cool very slowly, so that the minute crystals of metal become equally difchromium for the protoxide of copper, the 2431. Opal. Take 1 ounce paste, 10 stone appears brown, filled with minute gold grains horn silver, 2 grains calcined magnetic spangles; or by using a less quantity of the

green spangles, is produced.

2444. Parisian Diamonds. These beautiful imitations of the gem are merely Parisian Diamonds. fused oxide of tin. It is a pity that their brildull in time.

Boettger's Artificial Rubies. **244**5. Moisten recently precipitated and well washed

2446. Boettger's Artificial Emerald. This is made in the same manner as his rubies, by employing nitrate of nickel instead of the chromate of potassa. The same plan, substihardness and beauty, though slightly opaque; which may, however, be lessened by the addi-

tion of a very little silica.

oils. These are leaves of polished metal, put under stones or pastes, to heighten the effect. Foils were formerly made of copper, tinned copper, tin, and silvered copper, but the latter is used for superior work at the present day. There are two dissolved in rectified spirit of wine. (See No. descriptions of foils employed, viz.: white, for 2449.) diamonds and mock diamonds, and colored, for the colored gems. The latter are prepared by varnishing the former. By their judicious use the color of a stone may be often modified. Thus, by placing a yellow foil under a green stone that turns too much on the blue, or a red one turning too much on the crimson, the hues will be brightened. By the skillful use of the following varnishes, good imitations of the gems may be cheaply made from transparent white glass or paste, and when applied to foils set under colored pastes, (factitious shellac varnish. Used when the color turns gems), a superior effect may be produced. The colors must be reduced to the finest state possible by patient grinding, as without this precaution, transparent and beautiful shades cannot be formed. The palest and cleanest mastich, and lae dissolved in alcohol, and also the palest and quickest drying oil, should alone be employed, when these substances are ordered. In every case the colors must be laid on the foils with a broad soft brush, or twice gone over while wet.

White or Common Foil. This is made by coating a plate of copper with a

polished or varnished

by coloring the preceding foil, highly polished, Liancy both of real and factitious gems.

chromium, a greenish gray stone, filled with with certain transparent solutions or varnishes. The following produce beautiful colored ef-

These fects, when judiciously employed, merely 2450. Blue Foil. Prussian blue, ground with pale, quick-drying oil. Used to deepen liancy is not permanent, as they become quite the color of sapphires. It may be diluted with oil.

2451. Green Foil. Pale shellac, dissolved in alcohol (lacquer), and tinged green hydrate of alumina, with a few drops of neu- by dissolving verdigris or acetate of copper in tral chromate of potassa, and kneaded so that it. Or: Sesquiferrocyanuret of iron and the mass assumes a scarcely perceptible tinge; bichromate of potassa, of each ½ ounce; grind then roll it out into small sticks, about the them with a stone and muller to a fine powder, thickness of a finger, and dry them slowly, add gum mastich (clean and also in fine pow-filling up any cracks that may occur in drying der), 2 ounces; grind again, add a little pywith fresh hydrate of alumina. When per-roxilic spirit, and again grind until the mass feetly dry, warm a stick a little, and bring a becomes homogeneous and of a fine transpaportion into the end of the flame of a compound (oxyhydrogen) blow-pipe. In a few length of the grinding. The predominance of minutes several minute balls form, of such in- the bichromate turns it on the yellowish tense hardness as to scratch quartz, glass, and green; that of the salt of iron, on the bluish granite. These, however, when cut and polished, appear slightly opaque.

green. For use it is to be thinned with pyroxilic spirit. This is used for emeralds. It may be brightened by adding a little yellow varnish.

2452. Yellow Foil. Various shades of yellow may be produced by tinging a weak tuting oxide of chromium for chromate of alcoholic solution of shellac or mastich, by potassa, will produce gems of considerable digesting turmeric, annotto, saffron, or socotrine aloes therein. The former is the brightest and most fit for topazes. Or: Digest hay saffren in 5 or 6 times its weight of boiling water, until the latter becomes sufficiently colored; filter, and add a little solution of guin or isinglass. When dry, a coating of spirit varnish should be applied.

2453. Red Foil. Carmine dissolved in spirits of hartshorn, or a weak solution of salt

of tartar, and gum added as above.

2454. Garnet Foil. Dragon's blood

Vinegar Garnet Foil. White **24**55. foil (see No. 2449) varnished with orange lake finely tempered with shellac varnish.

2456. Amethyst Foil. Lake and Prussian blue, ground fine in pale drying oil.

2457. Eagle Marine Foil. Verdigris tempered in shellac varnish (alcoholic), with a little Prussian blue. With this varnish white foil. (See No. 2449.)

2458. Ruby Foil. Lake or carmine, round in isinglass. Or: Lake ground in ground in isinglass. on the purple. Or: Bright lake ground in oil; used when the color turns on the scarlet or orange. Either of these are applied to white foil. (See No. 2449.)

2459. To Make an Imitation Diamond more Brilliant. Cover the inside of the socket in which the stone or paste is to be set with tin foil, by means of a little stiff gum or size; when dry, polish the surface, heat the socket, fill it with warm quicksilver, and the operation should be performed, if let it rest for 2 or 3 minutes, after which pour possible, at once, as no part should be crossed, it out and gently fit in the stone; lastly, well close the work round the stone, to prevent the alloy being shaken out. Or: Coat the bottom of the stone with a film of real silver, layer of silver, and then rolling it into sheets by precipitating it from a solution of the nitrate in the flatting mill. The foil is then highly in spirits of ammonia, by means of the oils of polished or varnished.

2449. Colored Foils. These are made Both these methods vastly increase the bril-

nks. under the general term of liquid coloring matters, were it not that they require to have the special characteristics of brilliance, permanence, and some degree of indestructibility, combined with perfect fluidity, in order to fulfill the objects for which they are generally used. Printing and lithographic and other inks are also included under this heading.

2461. Black Ink. of black ink, it appears that the quantity of to produce 131 gallons of ink. Quality very sulphate of iron should not exceed 1 part of good, but inferior to the above. that of the galls, by which an excess of color-Gum, by shielding the writing from the action of the air, tends to preserve the color, but if fuse 14 days with frequent agitation, or boil as much is employed, the ink flows badly from directed in last receipt. This ink writes pale, quill pens, and scarcely at all from steel pens. The latter require a very limpid ink. The addition of sugar increases the flowing property of ink, but makes it dry more slowly, and frequently passes into vinegar, when it acts in- of each 1 pound; water, 6 gallons; boil the juriously on the pen. Vinegar, for a like whole of the ingredients in the water for 11 reason, is not calculated for the fluid ingredi- hours, and strain 5 gallons. Good, but not fine. ent. The best blue galls should alone be employed in making ink. Sumach, logwood, galls, 1 pound; logwood, 2 pounds; common and oak bark, are frequently substituted for gum. 2 pound; green copperas, 1 pound; was galls in the preparation of common ink. ter, 5 gallons; boil. Common, but fit for or-When such is the case, only about one-sixth dinary purposes. or one-seventh of their weight of copperas 2469. Exchequer Ink. Bruised galls, should be employed.

2462. To Prevent Ink from Moulding. The addition of a few bruised cloves, or a little oil of cloves, or, still better, a few drops of creosote, will effectually prevent any

tendency to mouldiness in ink.

2463. Fine Black Ink. Aleppo galls (well bruised), 4 ounces; clean soft water, 1 quart; macerate in a clean corked bottle for 10 days, or even longer, with frequent agitation; then add 14 ounces gum-arabic (dissolved in a wine-glassful of water); lump sugar ½ ounce; mix well, and afterwards further add 1½ ounces sulphate of iron (green copperas) crushed small, agitate occasionally for 2 or 3 days, when the ink may be decanted for use; but it is better if left to digest together for 2 or 3 weeks. When time is an object, the whole of the ingredients may be at once put into a bottle, and the latter agitated daily, until the ink is made; and boiling water instead of cold water may be employed. The above will make 1 quart of beautiful ink, writing pale at first, but soon turning intensely black.

2464. Cooley's Superior Black Ink. Bruised Aleppo nut-galls, 12 pounds; water, 6 gallons; boil in a copper vessel for 1 hour, adding water to make up for the portion lost by evaporation; strain and again boil the galls with water, 4 gallons, for 1 hour, strain off the liquor and boil a third time with water, $2\frac{1}{2}$ gallons, and strain; mix the several liquors, and while still hot add green copperas (sulphate of iron) coarsely powdered, 4 pounds; gum-arabic bruised small, 3½ pounds; agitate until dissolved, and, when settled, strain pound; logwood chips and copperas, each 4 through a hair sieve, and keep it in a bunged-up cask for use. This will produce 12 gallons, very fine and durable.

Cooley recommends them very highly. He strain; add the other ingredients. Stir until

Writing inks might be included says that they are very durable and limpid. and will bear dilution with nearly an equal bulk of water, and still be superior in quality to ordinary inks. Of the latter ink he says that he has writing that was executed with this kind of iak upwards of 60 years ago, which still possesses a good color.

2465. Black Ink. Campeachy logwood er this heading. chips, 3 pounds; bruised galls, 9 pounds; boil in water, and to the mixed liquors add gummost accurate experiments on the preparation arabic and green copperas, of each 4 pounds;

2466. Asiatic Black Ink. Logwood ing matter, which is necessary for the dura- shavings and powdered galls, of each 2 pounds; but flows well from the pen, and soon turns black.

2467. Good Black Ink. Bruised galls. 2 pounds; logwood, green copperas, and gum,

2468. Common Black Ink. Bruised

40 pounds; gum, 10 pounds; green sulphate of iron, 9 pounds; soft water, 45 gallons; macerate for 3 weeks, employing frequent agi-

tation. This ink will endure for centuries. 2470. Black Steel Pen Ink. A bla ink, not corroding steel pens, and neutral, may be prepared by digesting in an open vessel, 42 ounces coarsely-powdered nut-galls, 15 ounces gum senegal, 18 ounces sulphate of iron (free from copper), 3 drachms agua ammonia, 24 ounces alcohol, and 18 quarts distilled or rain water. Continue the digestion until the fluid has assumed a deep black color.
2471. Glycerine Ink. Take copperas,

4 ounces; nut-galls, 12 ounces; logwood, 8 ounces; vinegar, 8 ounces; gum-arabic, 1 ounce; glycerine, ½ ounce; water, 48 ounces; all the solid substances are to be pulverized and boiled for an hour together; they are then set to cool, strained through a flannel bag, and after that filtered through a folded filter. A drop of oil of cloves is added, the whole well shaken and filled into bottles. This ink

will copy well.

2472. Dr. Ure's Ink. For 12 gallons of ink take 12 pounds bruised galls, 5 pounds gum, 5 pounds green sulphate of iron, and 12 gallons rain water. Boil the galls with 9 gallons of the water for 3 hours, adding fresh water to supply that lost in vapor; let the decoction settle, and draw off the clear liquor. Add to it the gum previously dissolved in 11 gallons of water; dissolve the green vitriol separately in 1½ gallons of water, and mix the whole.

2473. Japan Ink. Aleppo galls, ½ ounces; gum-arabic, 3 ounces; sugar, 1 ounce; blue vitriol (sulphate of copper), and sugar candy, each & ounce. Boil the galls and This ink, and that in No. 2463, are good. logwood in 6 quarts water till reduced one-half;

232 $I \times K S$.

cloves, to prevent mould,

of powder, to prevent moulding.

iron inks are.

mouth will preserve the ink in its normal being put in a dark place. state much longer than the ordinary kind, be-

cause less of the surface is exposed.

2477. Writing Fluids. The very general use of steel pens has caused a corresponding demand for easy flowing inks, many of soft water to make it fluid. which have been of late years introduced un-

pure water. This is the most permanent then be fit for use. and beautiful ink known. It is not affected by the addition of alcohol, but is immediately precipitated by saline matter. The precipitate, however, still possesses the property of

dissolving in pure water.

with chalk; nor become pasty with boiling subside; pour it off from the dregs, and bottle water, as when adulterated with starch, it for use. Prussian blue, rendered inferior in its color by an admixture of free oxide of iron, may be improved by digestion in dilute sulphuric or muriatic acid, washing and drying. Its relative from the pen and at last becomes ver, black. richness in the real ferroprussiate of iron may On account of the large quantity of acid it richness in the real ferroprussiate of iron may be estimated by the quantity of potash or soda which a given quantity of it requires to

is precipitated from its solution by alcohol.

dissolved. Clear and bottle. If it does not combination of sesquioxide of iron with ferroshine enough, add more gum; also a few cyanide of potassium), put it into any earthen vessel, and pour upon it as much strong 2474. Ink Powder. For an ink pow-hydrochloric, nitric, or sulphuric acid as will der take 1 pound nut-galls, 7 ounces copperas, cover it (if sulphuric acid is used it must be and 7 ounces gum-arabic. Pulverize and mix, diluted with an equal bulk of water); after This amount of ink powder will make 1 gal- standing 48 hours or more, add plenty of wa-Ion of good black ink. Two or three pow-ter, stirring it thoroughly, to remove the salts dered cloves should be mixed with each pound of iron; let it stand till all color has subsided, then draw off the clear liquid with a syphon; 2475. Permanence of Ink. The great add fresh water, and repeat the washing until difficulty with all iron inks is the precipitation ferrocyanide of potassium ceases to produce a which will take place, after a longer or shorter blue precipitate, and the water drawn off time, and which manufacturers have tried to ceases to redden blue litmus paper, then filter obviate by substituting other materials. All the product. This treatment extracts much inks, however, the basis of which is not tan- of the iron from the Prussian blue, and takes nate and gallate of iron, are not black imme- away its liability to precipitate by long standdiately, and consequently not so agreeable to ing. Next add and carefully mix 1 part the eye when using them. The alizarine or oxalic acid to every 6 parts of Prussian blue; rather indigo inks have a greenish, the chromitthen dilute, by degrees, with water sufficient um juks a reddish hue, and are not better to make the blue ink any desired tint. The adapted to withstand chemical agents than influences of air and dampness have a tendeney to destroy the color of manuscript 2476. To Keep Ink from Thickening. written with black ink, while the same influ-The only way to keep writing ink thin with ences tend to deepen and increase the color which we are acquainted is to protect it from of the Prussian blue ink. This ink is only the atmosphere. The air not only evaporates affected by continued exposure to light, which it, but oxidizes it and renders it thick. Those makes it fade in some degree; but it comink-stands which have a tapering funnel in the pletely recovers its original depth of color by

2482. Mohr's Blue Writing Fluid. Triturate to a perfectly smooth paste, 6 parts pure Prussian blue, and 1 part oxalic acid, with a little water; then dilute with sufficient

2483. Runge's Black Writing Fluid. der the title of "writing fluids," or "steel This is a cheap and good ink, and resists ordipen ink." These are mostly prepared from mary destructive agents well. It is perfectly galls in the preceding manner, but a less liquid, scarcely thickens by age, deposits no quantity of gum is employed. The blue sediment, and does not corrode steel pens. writing fluids, which either maintain their Digest 4 pound logwood in fine chips for 12 color or turn black by exposure, are prepared hours in 3 pints boiling water; then simmer from the ferrocyanide of potassium (prussiate down gently to 1 quart, carefully avoiding of potassa), or from indigo.

2478. Beautiful Blue Writing Fluid. the accordion, and dissolve in it by agitation Dissolve basic or soluble Prussian blue in 20 grains yellow chromate of potash; it will

2484. Shellac Ink, or Coathupe's Writing Fluid. To 18 ounces water add 1 ounce powdered borax and 2 ounces bruised shellac, and boil them in a covered vessel, stirring them occasionally till dissolved. Fil-2479. To Test Prussian Blue. Pure ter, when cold, through coarse filtering paper; Prussian blue feels light in the hand; adheres add 1 ounce mucilage; boil for a few minutes, to the tongue; has a lively dark blue color, adding sufficient finely-powdered indigo and and gives a smooth deep trace. It should not lampblack to color it. Leave the mixture effervesce with acids, as when adulterated for 2 or 3 hours for the coarser particles to

2485. Arnold's Writing Fluid.

nold's writing fluid is a mixture of sulphate of indigo and ordinary ink. It flows freely

contains, it is very destructive to steel pens, and for this evil we know of no cure.

destroy its blue color.

2486. Blue Fluid for Making Blue2480. Blue Writing Fluid. Dissolve Black Writing Ink. Prussian blue in fine the soluble ferrocyanide of potassium and powder, 1 ounce placed in a common phial, iron in pure water. Recombles No. 2472 but and control of the color. iron in pure water. Resembles No. 2478, but and concentrated hydrochloric acid, 2 ounces, poured over it. Effervescence ensues, and the 2481. Stephens' Patent Blue Ink. mixture soon assumes the consistence of a Mr. Stephens' process. Take Prussian blue, thin paste. After 24 hours it may be diluted (either of commerce, or the pure chemical with 8 or 9 ounces of water, and preserved in

may be lessened by water. It forms an excel-

lent blue writing fluid.

Fine Writing Fluid. Dissolve ceruleo-sulphate of potassa or ammonia (soluble indigo) in hot water, and when cold decant the clear. It is an intense blue, and dries nearly black; is perfectly incorrosive, and very permanent and easy flowing. It may be thickened with gum water, or diluted

with pure rain water, as required. 2488. Reade's Patent Blue Writing Prepare a solution of iodide of iron, Fluid. from iodine, iron, and water; add to the solution half as much iodine as first used. Pour this solution into a semi-saturated solution of ferroprussiate of potash, containing nearly as much of the salt as the whole weight of iodine. Collect the precipitate, wash it, and finally dissolve it in water, to form the blue The solution from which the precipitate is separated, evaporated to dryness, and the residue fused, re-dissolved, and crystallized, yields pure iodide of potassa.
2489. Indelible Writing Fluid.

good gall ink, add a strong solution of fine soluble Prussian blue in distilled water. This addition makes the ink which was previously proof against alkalies, equally proof against acids, and forms a writing fluid which cannot be erased from paper by any common method of fraudulent obliteration without the destruction of the paper. This ink writes greenish blue, but afterwards turns intensely black.

Precautions in Making Wri-2490. ting Fluids. All the preceding receipts for writing fluids, under proper management, produce excellent products. Care must be taken in all cases that the ingredients be pure, and unless this precaution is attended to, success is doubtful. Either of the preceding blue fluids may be used as indelible ink to mark linen, and will be found very permanent, provided the part be first moistened with alum

water and dried

2491. Gold Ink. Gold ink is prepared in the following way: Genuine gold leaf is rubbed with honey on a plate of agate or ground glass by means of a flat pestle, until the whole presents a uniform mass, in which no distinct particles of gold can be recognized. (See No. 2517.) This mass is carefully removed into a vessel with water, which will dissolve the honey, and leave the gold in an extremely disintegrated state behind. The water has, according to the size of the vessel, to be removed twice or three times, when all the saccharine matter will have been washed away. The remaining gold is then mixed with a sufficient quantity of a solution of gumarabic, shaken well, and is ready for use. (See No. 2518.) The writing is to be rubbed, after drying, with a flat piece of ivory, when it will present the lustre of pure gold.

2492. Silver Ink. Silver ink is prepared in the same way, from silver leaf, as the

gold in last receipt.

2493. Gold Labels on Glass Bottles. The finely divided gold, prepared as in No. 2491, is distributed in a solution of gum damar in naphtha, and the writing is to be done with this fluid by means of a brush. If the solution should become too thick in course of time, 2502. Fine Red Ink. Cochineal, in a little naphtha is added and well shaken, powder, 1 ounce; hot water, ½ pint; digest,

a glass bottle. The intensity of this color when the gold paint will be ready for use again. The gum damar in drying will cover the written lines with a kind of varnish that will protect the gold from the action of acids or alkalies.

2494. Purple Ink, or King of Purples. Infuse 12 pounds campeachy logwood in 12 gallons water; provide a funnel at the bottom of which a sponge has been placed; pour the infusion through a strainer made of coarse flannel into the funnel, and thence on to 1 pound hydrate or acetate of copper (verdigris); then add immediately 14 pounds alum; and for each 17 gallons of the liquid, add 4 pounds gum-arabic or senegal; let these remain 3 or

4 days and a beautiful purple will be produced. 2495. Green Ink. Boil 2 parts acetate of copper and 1 part bitartrate of potassa in 8 parts water, until the solution is reduced to half the bulk; filter through a cloth, and, when cool, buttle.

2496. Green Ink. Dissolve 180 grains bichromate of potassa in 1 fluid ounce of water; add, while warm, 1 ounce spirit of wine; then decompose the mixture with concentrated sulphuric acid, until it assumes a brown color; evaporate this liquor until its quantity is reduced to one-half; dilute it with 2 ounces distilled water; filter it, add & ounce alcohol, followed by a few drops strong sulphuric acid; it is now allowed to rest, and after a time it assumes a beautiful green color. After the addition of a small quantity of gum-arabic, it

is ready for use. 2497. Violet, Magenta, and Solferino Ink. Inks of these, and such other bright aniline colors may be made as follows: Mix 1 drachm of the proper aniline color with 13 ounces alcohol (see No. 2578) in a glass or enameled iron vessel; let it stand for 3 hours. Then add 13 ounces distilled water, and subject the whole to a gentle heat until the alcohol has evaporated, that is, until no odor of alcohol is perceptible; then add 4 drachms gum-arabic dissolved in 3 ounces water. Mix and strain. As the aniline colors of commerce vary a great deal in quality, the amount of dilution must vary with the sample used, and the shade determined by trial.

2498. Heusler's Red Ink. Take 2 ounces best Brazil wood, ½ ounce pulverized alum, ½ ounce crystals of bitartrate of potassa, and 16 ounces distilled water; boil down to Then dissolve in it 1 one half, and strain. ounce gum-arabic, and add 1½ drachms cochineal dissolved in 1½ ounces alcohol of spe-

eific gravity .839.

2499. Brilliant Red Ink. Brazil wood, ounces; muriate of tin, ½ drachm; gumarabic, 1 drachm; boil down in 32 ounces water to one half, and strain.

Ground Brazil 2500. Good Red Ink. wood, 8 ounces; vinegar, 10 pints; macerate for 4 or 5 days; boil in a tinned-copper vessel to one half, then add roche alum, 8 ounces;

and gum, 3 ounces; dissolve.

2501. Buchner's Carmine Ink. Pure carmine, 12 grains; water of ammonia, 3 ounces; dissolve, then add powdered gum, 18 grains; ½ drachm of powdered drop lake may be substituted for the carmine where expense is an object. This makes a superb carmine ink.

color of this is very fine.

2503. Redwood's Red Ink.

immerse the paper in the fluid, then slightly acidulate the solution with sulphuric or hydrodevelop it; when developed it is perfectly chloric acid. The method found to answer black; and it does not injure the texture of the best has been to spread the ferrocyanide thin finest fabric. with a feather or a bit of stick cut to a blunt acquires its full intensity, and is beyond compaper be carefully and dexterously applied rubbed off. The acid chiefly employed is the muriatic; but both the sulphuric and nitric succeed very well. They should be so far 2510. Fine Marking Ink. Marking

to turn yellow, and appear as if of many

years' standing.

2506. To Write on Greasy Paper or Parchment. Put to a bullock's gall I handful of salt, and 1 pint vinegar, stir it until it is mixed well; when the paper or parchment is greasy, put 1 drop of the gall into the ink, and the difficulty will be instantly obviated.

To Remove Ink Blotches from When ink blotches have been 2507. Writing. formed over writing which it is desired to spot carefully with a weak solution of oxalic acid by means of a camel's-hair pencil. In this way layer after layer of the superincumbent ink will be removed, and finally the writing itself will, in most cases, come to This is especially possible where some considerable interval has elapsed between the 20 grains distilled water is then added to 20 two applications of ink. As soon as the let-ters are visible the brushing should be continued for a time with clean water, so as to lastly 10 grains of glycerine. 4 parts of the arrest the tendency of the acid solution to aniline solution thus prepared are mixed with make a further change in the ink.

12 ounces crystallized carbonate of soda in since it invariably becomes black after a few

BBB BBB BB in the control of the properties the recommendation of the control of

and when quite cold, add spirit of hartshorn, separate portions of distilled water, and mix 4 pint; or liquor of ammonia, 1 ounce; dilute the solutions; collect the resulting precipitate with 3 or 4 ounces of water; macerate for a on a filter, wash it thoroughly with distilled few days longer, then decant the clear. The water, and introduce it, while still moist, into a wedgwood-ware mortar; add 8 scruples Guaran- tartaric acid, and triturate the whole until efeine and liquor of ammonia, of each 1 ounce: fervescence has ceased; next add sufficient distilled water (cold), 1 pint; triturate to-ammonia to dissolve the tartrate of silver; gether in a morter, filter, and dissolve in the mix in 4 fluid drachms archil, 4 drachms solution gum arabic ½ ounce. (Cooley.) white sugar, and 12 drachms finely-powdered gum-arabic; then add sufficient distilled water with Chlerine. Expose it to the vapor of to make 6 ounces of the mixture. This ink sulphuret of ammonia, or dip it into a solution fulfills all the conditions that a marking ink of the sulphuret. Or: Ferrocyanide of posshould possess: It flows freely from the pentassa, 5 parts; water, 85 parts. Dissolve, and without running or blotting; it does not require a very strong or long continued heat to

2509. Indelible Ink. The linen is first point. Though the ferrocyanide should occamoistened with a fluid consisting of a mix-sion no sensible change of color, yet the moture of 2 parts carbonate of soda in crystals, ment the acid comes upon it, every trace of a 2 parts gum-arabic, 8 parts water, and then letter turns at once to a fine blue, which soon dried. When quite dry, it is rubbed with a glass or smooth pebble to render it as smooth parison stronger than the color of the original as possible, so that it may be easier to write trace. If, then, the corner of a bit of blotting upon. The composition of the ink itself is as follows: $1\frac{2}{8}$ parts nitrate of silver, 16 parts near the letters, so as to imbibe the superfludistilled water, 2 parts gum-arabic, and 1 part ous liquor, the staining of the parchment may sap green. The nitrate of silver is first disbe in a great measure avoided; for it is this solved in the distilled water, and the gum-arasuperfluous liquor which, absorbing part of bic and sap green are subsquently added. It the coloring matters from the letters, becomes is necessary to write with a quill pen, all mea dye to whatever it touches. Care must be tallic pens except gold ones decomposing the taken not to bring the blotting-paper in con- ink. It is a good plan to trace the letters on tact with the letters, because the coloring the linen with a pencil before writing them. matter is soft whilst wet, and may easily be This and the four following receipts are by

diluted as not to be liable to corrode the linen is most conveniently effected by using parchment, after which the degree of strength a small stiff brush and a small copper plate does not seem to be a matter of much nicety. with perforations corresponding to the letters 2505. To make New Writing Look required. This stencil plate is laid upon the Old. Take 1 drachm saffron, and infuse it linen, and the ink is rubbed into the cut-out into ½ pint ink, and warm it over a gentle fire, and it will cause whatever is written with it of service for marking linen with a stencil plate: 2 parts nitrate of silver, 4 parts distilled water, 2½ parts gum-arabic, 3 parts carbonate of soda crystals, 5 parts liquid ammonia. The best way to prepare the ink is to first dissolve the nitrate of silver in the liquid ammonia, and the gum-arabic and soda in the distilled water. The two solutions are then mixed together and slightly warmed, when the whole mixture becomes brown. A few drops of a solution of magenta makes the ink somewhat more distinct. When this method decipher, we are advised to brush off the is used, the linen requires no previous preparation.

2511. Aniline Marking Ink. Dissolve 8½ grains bichloride of copper in 30 grains distilled water, then add 10 grains common salt, and 9½ grains liquid ammonia. A solution of 30 grains hydrochlorate of aniline in grains of a solution of gum-arabic (containing 2 parts water, 1 part gum-arabic), and 1 part of the copper solution. The liquid 2508. Redwood's Indelible Marking which results has a green appearance, and Ink. Dissolve I ounce nitrate of silver and may be at once employed for marking linen,

as a quill. If it is desirable not to wait so powdered metal and mix with gum water. long for the appearance of the black color, a (See also No. 25.) het iron may be passed over the writing when 2518. Liquid Gold, for Vellum, &c. the ink is dry, or the linen may be held over Take gold leaf and grind it with gum water; the flame of a spirit lamp, or over a hot plate, then add a small quantity of bichloride of or hot water, when the black tint will readily appear. It is a good plan to put the linen, 2519. Liquid Silver, for Vellum, &c. appear. It is a good plan to put the linen, when marked, into a tepid solution of soap, which has the effect of bringing out a fine or glaire of egg. bluish tint. The ink must be so limpid that it is able to permeate the tissue of the linen, so that the marks appear on both sides. It is perty. This property may be given to any advisable to mix the solutions together, only ordinary ink by the addition of sugar. Lately, when the ink has to be used. It is perfectly however, glycerine has been substituted for salt, viz.: that it is chemically indelible.

2512. Purple Marking Ink. A purple With fine white copying paper the ink will marking ink can be prepared by mixing 1 part copy well without the use of a press. biehloride of platinum with 16 parts distilled 2521. Ink for Marking Packages. bichloride of platinum with 16 parts distilled 2521. Ink for Marking Packages. water. The place where the letters have to be Take lampblack and mix thoroughly with sufand 12 parts water. The spot is then dried instead of lampblack, makes a fine and made smooth. After the letters have ing mixture for the same purpose. been written with the platinum ink and become dry, the linen is moistened with a soluwater, when an intense and beautiful purple-

red color makes its appearance.

2513. Cheap Brown Marking Ink. A very cheap brown marking ink may be prepared from 4 parts acetate of manganese dispart gum-arabic, 3 parts water. The linen, having been saturated with the above solution, dry, the following solution is spread over the brown, and their color cannot be removed by alkalies, nor by acids, with the exception of dilute hydrochloric acid.

2514. Carbon Ink. Genuine Indian ink rubbed down with good black ink until it will flow easily from a pen. This ink resists chlor-

ine, and oxalic acid.

Indian or Chinese Ink. **2515**. pure article can only be obtained from China. A good imitation may be made with ivory black, ground to an impalpable powder, made into a paste with weak gum-arabic water, perfumed with a few drops of essence of musk and half as much essence of ambergris, and is completed. then formed into cakes. (See No. 2716.)

2516. Perpetual Ink for Tombstones, &c. Equal parts of Trinidad asphaltum and oil of turpentine. Use in a melted state to fill in the letters and devices on tombstones, &c. Without actual violence it will last as long as

the stone.

To Pulverize Gold and Silver 2517. Leaf. This is effected by grinding upon a porphyry slab, with a muller, gold or silver leaves with white honey, until they are reduced to the finest possible state of division. with 4 parts oil of turpentine; color with a

days. A steel pen may be employed as well Then wash the honey thoroughly from the

Take silver leaf and grind it with gum-water

ordinary ink by the addition of sugar. Lately, indelible, and so easy to write with that the sugar, and is decidedly to be preferred. A finest devices may be drawn with it. This good copying ink may be made from common ink has the advantage of being cheaper than violet writing ink by the addition of 6 parts ink has the advantage of being cheaper than violet writing ink, by the addition of 6 parts the ink prepared from nitrate of silver. It glycerine to 8 parts of the ink. Using only has also another advantage over the latter 5 parts glycerine to 8 of the ink, it will copy well in fifteen minutes after it has been used

written must be moistened with a solution of ficient turpentine to make it thin enough to 3 parts carbonate of soda, 3 parts gum-arabic, flow from the brush. Powdered ultramarine. instead of lampblack, makes a fine blue mark-

2522. Ink for Marking Packages. An excellent and very cheap ink is made by tion of 1 part chloride of tin in 4 parts distilled mixing 1 ounce bichloride of potassa and 4 ounces extract of logwood in a stone jar or demijohn, with 2 gallons of hot water. Shake well and let it stand for about 2 weeks,

shaking occasionally.

2523. Permanent Ink for Writing solved in 12 parts water. The place on the in Relief on Zinc. Bichloride of platinum, linen where the marks have to be made must dry, 1 part; gum-arabic, 1 part; distilled wabe previously moistened with the following ter, 10 parts. The letters traced upon zinc solution: 1 part yellow prussiate of potash, with this solution turn black immediately. The black characters resist the action of weak acids, of rain, or of the elements in general, is dried, and afterwards marked with the and the liquid is thus adapted for marking manganese solution. On the letters becoming dry, the following solution is spread over the posure. To bring out the letters in relief, spot with a brush: 4 parts carbonate of pot-immerse the zinc tag in a weak acid for a few ash, 10 parts water. The letters then become moments. The writing is not attacked while the metal is dissolved away

2524. Ink for Zinc Labels. drachm of verdigris, 1 drachm sal ammoniae powder, and ½ drachm lampblack, and mix them with 10 drachms water; and this will form an indelible ink for writing on zinc.

2525. To Write on Silver with a Black that will Never Go Off. Take burnt lead and pulverize it. Incorporate it next with sulphur and vinegar, to the consistency of a paint, and write with it on any silver plate. Let it dry, then present it to the fire so as to heat the work a little, and it

2526. Indestructible Inks. Employed for writing the labels on bottles containing strong acids and alkaline solutions. They are capable of resisting the action of iodine, chlorine, alkaline lyes and acids, as well as operations of dyeing and bleaching, besides being an excellent and cheap material for marking linen, as nothing will remove them without destroying the fabric.

2527. Hausmann's Indestructible Ink. Mix 1 part genuine Trinidad asphaltum

for red ink.

Close's Indestructible Ink. Mix 25 grains powdered cobalt and 200 grains oil of lavender by a gentle heat; color with 3 grains lampblack and 1 grain indigo, both in fine powder. If a red color is required, omit the lampblack and indigo and add sufficient vermilion to make the mixture a good color.

2529. Indestructible Writing Ink. Shellae, 4 parts; borax, 2 parts; soft water, 36 parts; boil in a close vessel till dissolved; then filter, and take of gum-arabic, 2 parts; soft water, 4 parts. Dissolve, and mix the two solutions together, and boil for 5 minutes as before, occasionally stirring to promote their union; when cold, add a sufficient quantity of finely powdered indigo and lampblack to color; lastly, let it stand for 2 or 3 hours, until the coarser powder has subsided, and bottle for use. Use this fluid with a clean pen, and keep it in glass or earthen inkstands, as many substances will decompose it while in the liquid state. When dry it will resist the action of water, oil, turpentine, alcohol, diluted sulphuric acid, diluted hydrochloric acid, oxalic acid, chlorine, and the caustic alkalies and alkaline earths.

2530. Simple Carbon Ink. 30 grains of sugar in 30 grains of water, to which add a few drops of concentrated sulof carbon which cannot be washed off. This stain is rendered more perfect by the decomposing action of the ink itself upon the paper, and thus resists the action of chemical agents.

2531. Drawing Ink. A very black and indelible drawing ink may be made by A very black dissolving shellae in a hot water solution of borax, and rubbing up in this solution a fine quality of Indian ink. After using, dip the drawing pen in alcohol, and wipe dry to keep it clean and bright. (See No. 2514.)

2532. Permanent Ink for Use with Stamps or Type. Mix equal parts black oxide of manganese and hydrate of potash, heat to redness, and rub with an equal quantity of smooth white clay into a paste, water being added for the purpose. Or: Sulphate of manganese, 2 drachms; lampblack, 1 drachm; powdered loaf sugar, 4 drachms; rubbed into paste with water. After stamping, dry the linen and wash well in water.

2533. Sympathetic, or Invisible Inks. for Secret Writing. These are colorless inks which require the aid of heat or some other agency to develor the characters written with them. Their use has been rendered specially practical since the recent introduc-tion of the postal correspondence cards in England and elsewhere. By previous arrangement between correspondents, the receiver of a card only needs some visible sign on the card to identify the writer or sender; this will at once suggest the means to be employed to develop the particular ink the receiver's correspondent has agreed to use.

Black Sympathetic Inks. Writing with a solution of sugar of lead will be turned black by moistening the paper with sulphide of potassium.

If nitrate of silver be used, the writing will clean mould well oiled with a swab.

sufficiency of plumbago, for black, or vermilion | become black by dipping the paper in a solution of ammonia.

Chloride of mercury will turn black when wetted with chloride of tin.

A weak infusion of galls is turned black by sulphate of iron (copperas).

Reversing the above, writing with copperas turns black by moistening with infusion of galls.

2535. Blue Sympathetic Inks. Writing with copperas turns blue if wetted with a solution of prussiate of potassa.

Nitrate of cobalt turns blue on being wetted with a weak solution of oxalic acid.

Rice water or a solution of boiled starch turns blue in a solution of iodine in weak spirit.

2536. Brown Sympathetic Ink. A diluted solution of nitrate of silver turns brown by exposure to the sunlight.

2537. Yellow Sympathetic

Chloride of antimony, used as the ink, will become yellow by moistening with a decoction of galls.

2538. Green Sympathetic Ink. Arseniate of copper, washed over with nitrate of copper, turns a beautiful green.

2539. Purple Sympathetic Ink. Purple is produced by using chloride of gold, and soaking in chloride of tin.

2540. Sympathetic Inks Developed y Heat. There are a number of colorless phuric acid. Upon heating this mixture the by Heat. There are a number of colorless sugar becomes carbonized by the acid, and substances that may be used as inks, which when applied to the paper it leaves a coating are developed by the application of heat only.

Sulphate of copper and sal ammoniac, mixed in equal parts, will become yellow if exposed to the fire.

Onion juice has the same property as the above mixture.

Lemon juice, a very weak solution of either aquafortis, oil of vitriol, common salt, or saltpetre, will turn yellow or brown on exposure to the fire.

A weak solution of chloride of cobalt and chloride of nickel is turned a beautiful green by heat.

A solution of chloride or nitro-muriate of cobalt, turns green when heated, and disappears again on cooling.

A dilute solution of chloride of copper becomes a fine yellow at a moderate heat, and disappears on cooling.

A solution of acetate of cobalt, with a little nitrate added to it, turns rose-colored by heat, and disappears again when cold.

These last, which disappear again on cooling, are the best sympathetic inks for purposes of correspondence, as the others are more or less indelible when once developed.

2541. Hoe's Composition for Printing Ink Rollers. This consists of glue and molasses, the proportions varying from 8 pounds of glue in summer to 4 pounds in winter, for each gallon of molasses. The glue should be placed for 1 an hour in a bucket, covered with water, then pour the water off and allow the glue to soften. Put it into a kettle and heat it until thoroughly melted; if too thick, a little water may be added. Lastly, the mo-lasses is stirred in and well mixed with the glue. When properly prepared, an hour's boiling will be sufficient, as too much boiling is apt to candy the molasses. Pour into a should not be washed immediately after use, cient lampblack to make the mixture black; as they will become dry and skinny, but then allow the whole to burn for 30 seconds; they may be washed hour before using again. When the flame is extinguished, add, a little In cleaning a new roller, a little oil rubbed at a time, 2 parts shellae, stirring it in con-over it will loosen the ink, and it should be stantly; put the vessel on the fire again until scraped clean with the back of a knife; it the mass is kindled, or nearly so. Put out the should be cleaned this way for about a week, flame and allow it to cool a little, and then run when lye may be used. New rollers are often spoiled by washing too soon with lye.

2543. Black Printing Ink. Boil 11 gallons old clear linseed oil to the consistence of a thick varnish; whilst hot, add to it, durresin, and next 13 pounds dry brown soap ferring to the stone. shavings; then mix in it 2½ ounces indigo blue, 2½ ounces Paris blue, and 5 pounds best lampblack. After standing for a week

should be ground.

2544. Black or Colored Printing Ink. Balsam copaiba, 9 ounces; lampblack, 3 ounces; Paris blue, 11 ounces; Indian red, 2 ounce; dry resin soap, 3 ounces. These will produce a superior black ink. By employing white soap instead of yellow, and a sufficiency of some coloring pigment instead of the black, blue, and red mixture, a good colored ink will

be obtained.

2545. New Ink for Printers. A new ink for printers has been invented by Professor Artus, and Mr. Fleckstein, a master-printer at Lichtenhain, which ink is said to be a com-plete success. The composition of it is as follows: Venetian turpentine, 4½ ounces; fluid soap, 5 ounces; rectified oleine, 2 ounces; burnt soot, 3 ounces; Paris blue (ferrocyanic acid), 1 ounce; oxalic acid, 1 ounce; distilled new, beautiful, and cheap ink is described as follows: Gradually warm the turpentine and the oleine together; put the soap on a marble plate, and gradually add, continually rubbing, the mixture of turpentine and oleine; when well mixed, add the burnt soot, which must first be well powdered and sifted; then add the Paris blue, dissolved in the oxalic acid, continually rubbing the composition on the stone, the Paris blue and the oxalic acid having been mixed before with water in the above given proportions. A solution of soda in water is sufficient to thoroughly cleanse the

type.

2546. Indelible Printing Ink. Mix 1
pound varnish (such as is used for ordinary printing ink), I pound black sulphuret of near a fire, or the saucer should be placed over mercury, 1 ounce nitrate of silver, 1 ounce a basin containing a little warm water. It sulphate of iron, 2 table-spoonfuls lampblack. may then be used with either a steel pen or a Thoroughly grind together, adding enough turpentine to reduce to the requisite consist-

2547. Lithographic Ink. gether 8 parts mastich, in tears, and 12 parts shellac; dissolve carefully by heat in 1 part Venice turpentine; after the mixture is taken from the fire, mix in 16 parts wax and 6 parts tallow; then add, by stirring, 6 parts hard talpour it out on tables, and when cold, cut into square rods.

Lithographic Transfer Ink. Melt together 8 parts white wax and 2 parts tained from coal tar (not from petroleum). In

2542. To Clean Ink Rollers. Rollers enough to take fire, stir in by degrees suffi-New rollers are it into the moulds. Ink thus made will make as fine or coarse lines as are desired, and its traces will remain unchanged for years before being transferred. When suet enters into the composition of lithographic crayons, it does ing constant stirring, first 6 pounds powdered not keep long, and requires immediate trans-

2549. Lithographic Ink. M. Lasteyrie states that, after having tried a great many combinations, he gives the preference to the nollowing:—Dry tallow soap, mastich in tears, and common soda in fine powder, of each 30 parts; sheliac, 150 parts; lampblack, 12 parts; mix as last. Used for writing on lithographic

2550. To Test the Quality of Lithographic Ink. Lithographic ink of good quality ought to be susceptible of forming an emulsion so attenuated that it may appear to be dissolved when rubbed upon a hard body in distilled or river water. It should be flowing in the pen, not spreading on the stone; capable of forming delicate traces, and very black, to show its delineations. The most essential quality of the ink is to sink well into the stone, so as to reproduce the most delicate outlines of the drawing, and to afford a great many impressions. It must, therefore, be able to resist the acid with which the stone is water, ½ ounce. The mixing process of this moistened in the preparation, without letting any of its greasy matter escape.

2551. Durable Autographic Ink. White wax, 8 ounces; and white soap, 2 to 3 ounces; melt; when well combined add lampblack, I ounce; mix well, and heat it strongly; then add shellac, 2 ounces; again heat it strongly; stir well together, cool a little, and pour it out. With this ink lines may be drawn of the finest to the fullest class without danger of its spreading, and the copy may be kept for years before being transferred. This ink is employed for writing on lithographic paper, and is prepared for use by rubbing down with a little water in a saucer, in the same way as common water-color cakes or Indian ink. In winter this should be done

camel's-hair pencil.

Aniline Colors. Aniline is a liquid of a color varying from yellow to dark brown. The commercial article is never chemically pure, being a mixture of pure anilow soap in shavings, and finally incorporate line, toluidine, and odorine. Its boiling point in the mass 4 parts lampblack. Heat and stir ranges from 356° to 482° Fahr. If aniline boils until thoroughly mixed; let it cool a little, and at a lower temperature than 356°, it contains too much odorine, and is, therefore, of poor quality. It is obtained by conversion from nitro-benzole, a preparation of the benzole obwhite soap; and, before they become hot preparing nitro-benzole on a large scale, 12

depends greatly on the purity of the inzole, and also on the management of the reaction. The conversion of nitro-benzole into aniline is, benzole, 150 clean wrought iron filings, 100 water, and 150 acetic acid; when these are mixed spontaneous heat is evolved, which causes some of the liquid to pass into the condensers, whence it is returned to the tank. As the heat is not sufficient for the complete conversion of the nitro-benzole, steam is introduced after a time, and the stirring and steaming is continued until no more nitro-benzole appears in the distilled vapor. At this point the temperature is increased, and, if necessary, aided by direct fire, to cause complete distillacomposition and boiling-point. 390° 80 per cent. will have distilled over. Aniline blue and purple require an oil which it contains less amiline than the preceding onc. converted into dyes or compounds of rosaniline, are brought about by the partial destruction of a portion of them.

2553. Rosaniline, or Fuchsine. The principal methods for the manufacture of fuchsine employ arsenic acid, the reaction being brought about in a cast iron still with movable head, connected with a condenser, and provided with a manhole, and also a place for a thermometer. This still sits in a jacket conrily completed in about 6 hours, sometimes in time the temperature is carefully regulated. Assays are taken from time to time, and the mass is transferred to a tank, in which, after cooling, it is broken up, and at once treated with water and steam. The base fuchsine (rosaniline) dissolves, leaving behind the resinous products of the reaction; the arsenic acid is separated by the addition of milk of lime. The filtered solution, after proper concentration, deposits, on cooling, fine crystals of fuchsine, as do also the first mother liquors. An inferior quality of fuchsine is obtained by adding a portion of salt, varying in quantity.

Aniline blue re-2554. Aniline Blue. sults from various processes. commonly used at present is that of Girard and rosaniline). aniline. The original process produced a blue to the substances used in the manufacture of

parts benzole are mixed with 13 parts fuming with a reddish tinge; but by the addition of nitric acid, and 8 parts oil of vitriol, in a cast some organic substances, acetic acid, and meiron apparatus. The character of the product thylic alcohol, pure blue is obtained. It is distinguished from all other blues by not appearing green in candle light. The various ing green in candle light. The various shades of purple to blue and violet are made by Béchamps' process, performed in iron tanks, from fuchsine by Hofmann's method (see No. heated by steam, and provided with stirrers, 2608), heating 1 part fuchsine and 2 iodide of and a still-head to collect the distillates. The cthyl with 2 parts alcohol in a closed vessel at tank or still is charged with 100 parts nitro- 212° for variable lengths of time; the blue resulting from longest exposure.

2555. Aniline Green. Aniline green is produced from a solution of sulphate of rosaniline in dilute sulphuric acid and some aldehyde, which is heated till its color has changed to dark green. Addition of a solution of hy-

posulphite of soda separates the color.

2556. Aniline Green, Several of the aniline greens occurring in the market are apt to undergo spontaneous destruction, some-times in less than a day. The following is a formula which any one may make: 4 parts of tion of the aniline which has formed, and which pure such sine or rosaniline are dissolved in 6 passes off with water, and separates from it on parts water and 16 parts aldehyde (see next standing, as the heavier stratum. The aniline receipt), and are heated at 212° Fahr., until a used for the various colors is taken of different drop of the mixture imparts to water acidula-A. W. Hof- ted slightly with sulphuric acid a clear blue mann has shown that a mixture of an equiva- color, when it is ready to be poured into a boillent of aniline and two of toluidine produces ing solution of hyposulphite of soda, which is the largest yield of rosaniline (fuchsine). The being stirred. A fine green precipitate forms, substance used for this manufacture begins to and a grayish one, which latter must be kept boil at about 347°, and as the heat increases to separate. The green is mordanted principally with acetate of alumina.

2557. To Prepare Aldehyde. Aldebegins to boil at 374°, and at 392° has lost only hyde is made by filling a tubulated glass re-60 per cent. Evidently with these properties tort, altogether to one-third full, with 32 parts absolute alcohol, 30 parts bichromate of po-The changes which these bases undergo when tassa, and, without previous cooling, a mixture of 35 parts oil of vitriol, and 30 of water, in small portions, through a safety-tube in the tubus. After one-half of the latter has been introduced, the mixture commences to boil and aldehyde begins to distill over, the remainder of the said mixture being added through the tubulus as required. No further purification is needed.

To Make Aniline Colors Solu-2558, ble in Water. The aniline colors insoluble taining a hot bath of palm-oil, which keeps it in water may, according to Dr. Zinsman, be at a temperature of from 320° to 356° Fahr. A rendered soluble in the following way:—A charge consists of 100 parts aniline and 200 solution of gelatine in acetic acid of about the parts arsenic acid, and the reaction is ordina- consistence of syrup is first made, and the aniline color in fine powder is gradually added, 5, but at others only in 12 hours, during which stirring all the time so as to obtain a homogeneous paste. The mixture is then to be heated over a water-bath to the temperature of completion of the process is known by the boiling water, and kept at that heat for some pure bronze color of the sample. The fused time. Colors in this state, if a very clear gelboiling water, and kept at that heat for some atine is employed, will be applicable to many decorative purposes. Bookbinders, paperstainers, and printers will find them useful. They may also, it is said, be used to color confectionery and soaps. Before they are used for confectionery, however, it will be well to make sure that no arsenic is present.

Injurious Effects of Impure 2559. Alcohol upon Aniline Colors. Dr. Tillmanns has examined several varieties of alcohol, and tested the effects upon aniline colors. The most sensitive among these, for The one most impure alcohol, is aniline purple (phenyl-It appears that empyreumatic De Laire, made by heating fuchsine with fluid substances, aldehyde, the peculiar fuseloils due

the alcohol, affect the aniline colors when dissolved in such alcohols and boiled therewith. of Aniline Dyes. It is impossible to use The best test for the purity of an alcohol is to any dye, successfully, without due regard to dissolve in it 1 per cent. of perfectly pure cleanliness. This is, perhaps, more particucaustic potassa, and to heat the solution; it larly the case with the anilines. The slightest should only acquire a bright yellow color, trace of a foreign substance will often mate-Another test is to dissolve I part of the aniline rially after the shade. Earthen or enameled purple alluded to in 50 parts of the alcohol to vessels should be used whenever practicable, be tested, and to heat the fluid for some time. Iron is generally to be avoided, if for no other If, after half an hour's heating, no change is reason than that it is difficult to say when it observed, the quality of the alcohol is good; is really clean. Woolen and silken goods, but if the latter is not pure enough, the mix-before being dyed, should be thoroughly ture soon becomes turbid, and assumes a red washed in soap and water, and then carefully of the color of the same strength (1 in 50), one with alcohol of known purity, and the other with the suspected alcohol, and then compare the intensity and shade of the solutions. dehyde is often present in alcohol, especially if it has been purified by means of charcoal.

2560. To Test the Quality of Aniline A good and practical way of testing If a new supply of dye stuff is to be tested, weigh out equal quantities of the standard coloring matter and of the one to be tested (say 10 to 30 grains); dissolve them, using the Other Dyes. Aniline colors, for dyeing pursame quantity of alcohol and water, in vessels of as nearly as possible equal size; introduce in each an equal quantity of white wool; on account of their brilliancy and cheapness. place them on a water bath; raise the temperature gradually, and after sufficient time has elapsed, take the two pieces out, dry That them carefully, and compare them. which has been dyed with the best dye, will, of course, show the fullest, brightest, and necessary, as arsenic acid is generally emclearest color. Instead of testing on skeins of wool, Mr. Shuttleworth recommends small squares of white merino or cashmere, as af it may have absorbed a considerable quantity fording a more even surface, and a greater of that dangerous article. The readiest way mass of color. A known weight of the dye for its detection is to boil the flannel, or whatshould be dissolved in alcohol and added to ever other cloth it may be, with a solution of the bath of warm water, with the necessary mordants. A square of cloth of known weight the fluid from the residue, neutralizing it with —say 10 grains—is immersed in the bath, and, hydrochloric acid. If the cloth has been after a stated time, removed. The strength dyed with an aniline color, the fluid will show and shade of the color can thus be compared a coloration. Most of the aniline dyes may with previous samples, dyed under like conditions. It is a good plan to paste these squares, by one edge, in a blank book, noting anything time than the other. worthy of remark on the margin. The colors are thus preserved from the action of the light, and will be found very useful for reference.

2561. Dyes. Aniline blue and aniline green have been found adulterated with a considerable use of zinc gray; the metallic zinc contained quantity of sugar. Mr. Joly, of Brussels, has in this powder reduces the colors, forming also found this to be the case with red aniline soluble colorless products. To apply the colors, such as fuchsine, rubine, &c., the adulprinciple, triturate 100 grains zine gray with colors, such as fuchsine, rubine, &c., the adulteration amounting in some cases to as much as 50 per cent. The amount of sugar present the mixture is homogeneous; incorporate can be ascertained by treating a sample of the suspected dye with absolute alcohol; or, still better, with a mixture of alcohol and ether; the sugar will remain undissolved

To Remove Sugar from Aniline Dyes. If it be found by the test given in No. 2561, that an aniline color has been be bleached by chlorine or bleaching liquor, adulterated with sugar, this may be removed by repeatedly washing the color with cold fabries. water, which will dissolve the sugar.

2563. General Directions for the Use Another test is to make two solutions rinsed in clean rain water. Cotton requires a previous mordanting before it can be dyed with anilines, as vegetable fibre possesses no affinity for the colors. The preparation generally consists in treatment by sumac, or stannate of soda, and subsequently by sulphuric acid; special directions will be given in those cases requiring particular treatment. Old fabrics which were dyed before, may be the merits of aniline colors is to have, and freed from color by previous boiling for an keep on hand, a standard and measure of com-parison, a sample whose value and coloring should be pure, and especially free from alde-The spirit used power has been ascertained by actual practice. hyde; methyl spirit does not appear to injure some of the dyes. Spirit containing shellac turns roseine of a bluish color.

2564. To Distinguish Aniline from poses, are now used to such an extent throughout the country as almost to exclude all others, They are, however, liable to lose in appearance by bright sunlight, and in lustre by the artificial light of gas or candles. It is, therefore, desirable to have a ready means by which they can be recognized. This is all the more ployed in their preparation; and a cloth that has been dyed with an aniline color containing caustic soda or potassa, and, after filtering also be extracted by boiling alcohol, which process, perhaps, can be performed in less

2565. To Remove Aniline Colors. There are various ways proposed to remove aniline colors, the following being the simplest Test for Sugar in Aniline and most practical. Goods dyed with aniline colors may easily be rendered white by the 50 grains mucilage marking 200 Baumé, until with this 20 grains of a solution of hyposul-phite of soda marking 20° Baumé, apply this mixture directly to the goods, let it dry and vaporize. After this operation it is best to wash the goods with water slightly acidulated with hydrochloric acid. Cotton goods may but this is not applicable to other than cotton

Another simple method consists in digest-

set in boiling water. A little hydrochloric amount of tannin solution. acid may be added if the articles are not too delicate, thereby increasing the solubility of Cotton. the aniline colors.

previously well cleaned, is now placed in the vessel, and pushed under the liquid with the glass rod, and the top of the vessel laid on. It is advisable to keep the solution warm, by immersing the stone vessel in a wooden tub properly supplied with steam or hot water. After a short time the lid should be removed by taking it off at the end of a long handle, rod the cloth is to be lifted, and if not entirely white, is to be replaced and the process conis to be transferred by means of the glass rod to a large vessel containing hot water, and rinsed off. The solution of the cyanide of chloride. potassium can be used several times without

more effectual, to wash them with a little bleaching powder, and finally with alcohol.

2567. Phosphate of Lime as a Mordant. A rather thick syrupy solution of phosphate of lime (bone-ash) in hydrochloric acid having been recently recommended as a morsolution is altogether superfluous for aniline of lime solution as a mordant for cochineal colors upon cotton he also considers as quite

in France by MM. Biot and Thisau, may be used for mordanting aniline blue upon cotton, or the iodine green upon wool. The mordant-

ing the fabrics for a sufficient length of time solved until the solution shows 2º Baumé: in 90 per cent. alcohol, which usually com- for the wool the mordanting bath should be pletes the decolorization in a short space of at a boiling heat, and the goods should also time. The same alcohol can be used several be placed in a warm bath of tannin 90° Fahr. times in succession, and can afterward be puri- for half an hour. In dyeing, a hot solution of fied by rectification or redistillation, so as to the color must be used, to which should be involve but little loss. The work is best done added, in the case of the cotton, some chloride ir a well-covered copper kettle, which is to be of zinc, and, in the case of the wool, a certain

2569. To Dye Aniline Opal Blue on To mordant the aniline color known as opal blue upon cotton it is recommended If all other methods fail, cyanide of poto rinse the goods, after bleaching, in a dilute tassium is absolutely certain. A stone vessel solution of soda crystals, to neutralize the is to be selected, in which a small quantity of acid of bleaching, then to pass them into a cyanide of potassium is to be introduced, and hot bath of soap, in which oil exists in emulhot water poured upon it, so as to make a so-sion in these proportions: Water, 100 liters (211 lution of ½° to 1° Baumé. The whole is to pints); soap, 8 kilos (21½ pounds troy); oil, be stirred well with a long and strong glass 2 kilos (3) pounds troy). Wring them out, rod, and the operation conducted in the open dry, and pass them into a solution of acetate air, so that no harm may result from the con-densation of the vapor. The fabric in question, out, dry, and rinse in hot water. Finally dye in a solution of opal blue to which acetic acid has been added. The temperature of the dye bath should be 75° to 90° Fahr. Rinse and

2570. Difficulty in Dyeing Cotton with Aniline. This difficulty consists in the irregularity of intensity of color when the ani-line colors are applied. This effect is attriallowing the vapors to pass off before the buted to the unequal oxidation of the tin salts operator comes near. By means of the glass applied before dipping the goods into the dye bath; in using these colors, avoid the use of the tin salts, which have little or no beneficial tinued still longer. When finished the cloth effect on the results in any case; and dip the goods into the dye bath, after treating with infusion of nut-galls or sumach. If tin must stirred around for a time, then removed and be used, the best salt of that metal is the bi-

2571. Aniline Black. When a salt of losing its power. Cyanide of potassium is a aniline in solution is exposed to the action deadly poison; contact with any sore or cut of certain oxydizers, as salts of copper, is extremely dangerous, and inhaling its vacchlorate, and bichromate of potassa, it yields por is sudden death. 2566. To Remove Stains of Aniline or madder blacks appear gray or green in from the Hands. The best way to remove comparison. The fastness of this color, its such stains from the hands is to either wash resistance to the action of acids, alkalies, them with strong alcohol, or what perhaps is soaps, and sunlight, render it of great importance to manufacturers, and make it one of the great achievements of late years

2572. Aniline Black for Dyeing. According to Mr. Köchlin, aniline black is produced as follows: Water, 20 to 30 parts; chlorate of potassa, 1 part; sal ammoniac, 1 dant to be used after a previous sumaching part; chloride of copper, I part; aniline, hyof the goods, Dr. Reimann states that, according to his researches, the phosphate of lime mixed together. Several other formulæ for producing aniline blacks have been devised dyes, since a sumaching with 4 pounds for dyeing purposes. It is essential in each sumach to 20 pounds cotton is of itself a of them, and always, that the preparation sufficient mordanting to fix aniline colors exshall be acid, and the more acid it is, the cellently. The application of the phosphate more rapid is the production of the blacks. The action, of course, if it be excessive, will be likely to injure the fibre of the fabric.

2573. Aniline Black on Wool. 2568. New Mordant Applicable to 2 pounds of wool a bath is prepared of 20 Aniline Colors. For this purpose the oxide quarts water, 3 ounces permanganate of of zinc, in accordance with a patent taken out potassa, 4½ ounces sulphate of magnesia. The use of sulphate of magnesia has for its object, to prevent the formation of caustic alkali, and has already been proposed by ing is effected by simply immersing the goods Tessić du Mothay. The wool is impregnated for some hours in a bath of cold water, in with this solution, and left in it until the fluid which chloride or acetate of zinc has been dis- has become colorless, or nearly so, whereby it

is colored dark-brown and covered with brown oxide of manganese. This process takes place easily in the cold, but it is best to dissolve sumach to 10 pounds cotton) for 2 hours. the permanganate in hot water. The wool is now pressed out, and, without washing, conveyed into a bath of 12 ounces commercial aniline oil, 21 ounces commercial hydrochloric acid, and 8 quarts water, where it is moved about in the cold; it attains here directly a dark green-black color. It is pressed out again, washed in water containing a little soda, and treated with a weak solution of do ounce bichromate of potassa in 10 quarts water. The color becomes now dark black, when the wool is washed with water and dried.

2574 Persoz's Aniline Black for Wool or Silk. Steep the silk or wool for 1 hour at a boiling heat, in a bath consisting of 5 grammes (77 grains) bichromate of potassa, 3 grammes (46 grains) sulphate of copper, and 2 grammes (31 grains) oil of vitriol, for each litre (210 pints) of water used. It is then thoroughly washed, and afterward passed through a solution of oxalate of aniline marking 1° to 2° Baumé, in which it at once assumes a black color. In case the fabric contains a vegetable fibre, the first bath must be replaced by a series of baths resulting in chromate of lead. This is effected by successive passages through a solution of nitrate or acetate of lead, then through a hot one of sulphate of soda; and lastly through a cold bath of from 5 to 20 grammes (77 to 300 grains) bichromate of potash to the litre (2^{1}_{10}) pints) of water.

2575. To Prepare Magenta for Dye-This color, which is also called resein, fuchsine, and aniline red, is the best known of the series. It is better adapted for the pre-paration of a liquid dye than any other. In economy, and the results obtained are generally satisfactory. It is readily soluble in alcoalcohol for dissolving the color, as the solubility in water is not always the same with different samples. To 1 pound of the crystals add 2½ gallons of spirit .8200 specific gravity. The solution may be conveniently made in an ordinary 5-gallon tin. Agitate frequently, and add 2½ gallons of hot water. This product will be suitable for sale as a liquid dye, but for dyers' use, where a large quantity of to filter before using.

To Dye Silk or Wool Magenta. Sufficient water to cover, without difficulty, the fabric to be dyed, is brought to a temperature of about 170° Fahr.; a sufficient quantity of the dye is added, and followed by the immersion of the goods, which should be the preceding, is sold as crimson, but it does moved about to prevent streaks. About half an hour's immersion is sufficient. ounce of the crystals should give a fair shade to 10 pounds of wool. A bath of soap-suds is (See Nos. 2575, &c.) Much better colors are sometimes employed instead of water, and by the use of alkali, brighter, but perhaps less permanent colors are produced. Acids render plied in the manner indicated for that color, the shade dull and bluish.

To Dye Cotton Magenta. 2577. Place the cotton in a bath of sumach (I pound Wring out, and dye in the same manner as wool. (See previous receipt.) A brighter shade is given by dissolving a ounce soap in hot water, letting the solution cool to 90°. adding 2½ ounces olive oil, and mixing with tepid water. In this 5 pounds of cotton may be worked for about 5 minutes. A bath containing 2 pound sumach and 1 ounce tin crystals is next prepared, through which the cotton should be passed, wrung out, and finally dyed in a bath of magenta and pure water.

2578. Aniline Cerise and Safranine. These colors resemble magenta in appearance, and appear to be varieties of that substance. They are readily soluble in alcohol, and more or less so in water. The colors produced are similar to those obtained from safflower, but possess greater vivacity and permanence. The shades are exceedingly delicate and beautiful, inclining to pink with a shade of yellow. The dye bath is prepared, and the fabric dyed, in the same manner as magenta. (See Nos. 2575, &c.)

2579. To Dye Aniline Yellow. This color is slightly soluble in water, and for dyers' use may be used directly for the preparation of the dye bath. It is, however, preferably prepared in a liquid state, by dissolving 1 pound of dye in 2 gallons of alcohol. (See No. 2575.) Without any addition to the dye bath very good yellows may be produced, but the color is much improved and brightened by a trace of sulphuric acid. temperature of the bath should be under 2000 Fahr.

2580. Schiff's Aniline Yellow. This matter, according to Schiff, is easily prepared the hands of the amateur it can be used with by means of hydrated antimonic or stannic acid. Stannate of soda or other alkaline antimoniate or stannate is to be pounded with hol, and to some extent in water. The latter half its weight of aniline to a clear pulpy property is taken advantage of by dyers, the consistence, then hydrochloric acid is added dye bath being prepared directly from the till the acid reaction takes place. It is then crystals. It is, however, preferable to use shaken up, and the scarlet color removed by etherized alcohol, the mass being, of course, previously dried. After proper purification it is allowed to evaporate spontaneously, and in this way are formed flakes of a hydrochlorate, having for base a red coloring matter, which must not be confounded with rosaniline. When this hydrochlorate is decomposed by alkalies, deep yellow flakes are deposited, which again become red in presence of acids. water is admissable, 14 gallons of spirit will By impregnating silk or wool with this red be found sufficient. It is sometimes necessary color, and then passing it into a hot solution color, and then passing it into a hot solution of carbonate of soda, a beautiful yellow tint is developed, similar to the yellow of picric acid, and which M. Schiff claims to possess

considerable stability.

2581. To Dye with Aniline Crimson. A solid dye, belonging to the same series as not appear to differ very materially from magenta, giving shades with a trifle less blue. It is applied in the same manner as magenta. obtained by the use of aniline yellow (see No. 2579) and magenta. The former may be apand the fabric so dyed must be passed through

a bath of magenta until the required shade is ! obtained. This will be found a satisfactory

method for amateurs.

Dye. To produce this color, aniline scarlet is required in compounding the dye bath. For the use of amateurs, aniline yellow and magenta, as indicated for crimson (see No. 2591. To Prepare Bismarck Brown 2581) is recommended. To produce scarlet for Dyeing. Mix together 1 pound Bisacid. Aniline scarlet dissolves easily in water, and the bath may be made directly from the solid substance. A liquid dye may be made, if desired, by dissolving 1 pound scarlet in 4 gallons water and 1 gallon alcohol.

2583. To Dye with Aniline Scarlet. Add to the bath containing the dye, an excess may be known by the liquid changing from a

yellowish to a pinkish red.

2584. To Dye Aniline Scarlet. every 40 pounds of goods, dissolve 5 pounds white vitriol (sulphate of zinc) at 180° Fahr., place the goods into this bath for 10 minutes, then add the color, prepared by boiling for a few water, stirring the same continually. This solution has to be filtered before being added to the bath. The goods remain in the latter hour in the same bath, after the addition of sal ammoniac. The more of this is added the redder the shade will become

To Prepare Coralline Dye. 2585. Dissolve 1 pound coralline in 11 gallons alcohol specific gravity .8200, by the aid of heat; mix the solution with 7½ gallons boiling water, and re-dissolve the precipitated dye by the cautious addition of water of ammonia.

2586. To Dye with Coralline. the color prepared as in No. 2585, to the dye bath, and neutrallize with acetic acid. The exact point is indicated by the pink color of the solution changing to an orange red. Im-

soap-suds.

2587. Water-Glass as a Solvent of Dissolve coralline in a boiling mixture of 1 part concentrated water-glass (silicate of soda or potassa of the consistency of a thick syrup), and 4 parts water, and, after cooling, apply this solution as a paint for wood (white woods containing little or no tannic acid are preferable), paper, toys, artificial flower tissues, &c.. to all of which materials this solution of coralline imparts a beautiful carmine red tint.

2588. Preparation of Innoxious Coralline. M. Guyot states that coralline is frequently poisonous, because the rosolic acid, used to obtain it, contains phenol (carbolic acid), and this dangerous quality in the pro-

compounds.

2589. To Prepare Aniline Brown for produced. By mixing the liquid yellow and Dyeing. This color may be used as a liquid magenta dyes in a bath of soap-suds, nearly dye, and for this purpose I pound of the brown every shade from magenta to orange may be may be dissolved in 2 gallons of spirit specific gravity 8200.

2590. To Dye with Aniline Brown. To Prepare Aniline Scarlet Add a sufficient quantity of the dye, prepared according to the previous receipt, to the dye dye may be used. Neither this nor coralline bath, and immerse the fabric. Wool possesses is adapted for amateur use, as great exactness a very strong affinity for this color, and no mordant is required. A snuff brown, more or less deep, is produced.

2591. To Prepare Bismarck Brown

the yellow should predominate, or the bath marck, 5 pounds water, and ‡ pound sulphuric may be rendered slightly sour by sulphuric acid. This paste dissolves easily in hot water and may be used directly for dyeing. A liquid dye may be prepared by making the bulk of the above mixture to 2 gallons with alcohol.

2592. To Dye Wool Bismarck Brown. Render the bath, prepared as in No. 2591, sour with sulphuric acid; add a quantity of sulphate of soda, immerse the wool, and add the color of alum and cream of tartar; neutralize care-fully by carbonate of soda—the exact point under 212° Fahr. Very interesting shades may be developed by combining the color with

indigo paste or picric acid. (See No. 2601.)
2593. To Dye Cotton Bismarck
Brown. Cotton requires mordanting with Brown. sumach and acetate of alumina, and is dyed in a bath under 100° Fahr., prepared according to No. 2591. By the use of bichromate of potminutes, 1 pound aniline scarlet in 3 gallons ash redder shades may be obtained. The usual color inclines to cinnamon.

2594. To Dye with Vesuvine. aniline color is prepared and used in the same

sulphuric acid. By combining with magenta (see No. 2575), very bright colors are produced.

2596. To Dye with Palatine Orange. The palatine orange dye is prepared in a similar manner to magenta. (See No. 2575.) Render the bath slightly acid by bichloride of tin, and dye at the boiling point. A very fast, but not very brilliant orange is produced. The color may be combined with magenta or indigo paste.

2597. To Dye with Phosphine. Phosphine is treated in the same way as palamerse the goods, and, when the required color Phosphine is treated in the same way as palais obtained, remove and wash in a bath of tine, omitting the sulphuric acid, and substituting a trace of carbonate of soda; or use a

soap bath.

2598. To Dye Silk with Aniline Green. Iodine green, or night green, dissolves easily in warm water. For a liquid dye, 1 pound may be dissolved in 1 gallon alcohol, and mixed with 2 gallons of water containing 1 ounce sulphuric acid. This color is almost always a failure in the hands of the amateur, and is not recommended. For silk, no addition to the dye bath is required, the

temperature being kept under 180° Fahr.
2599. To Dye Wool with Aniline
Green. For wool, prepare two baths, one containing the dissolved dye and a quantity of carbonate of soda, or borax. In this the wool is placed, and the temperature raised to 212° duct can only be avoided by using the exact Fahr. A grayish green shade is produced, proportions necessary, in manufacturing the which must be brightened and fixed in a second bath of water at 100° Fahr., to which

Then have a second water bath meantime. of 140° Fahr. ready, prepared as follows, viz.: For every 20 pounds of wool, add ½ pound sulphuric acid 66° Baumé, and pound perchloride of tin crystals, the latter previously dissolved in an equal quantity of water. Take the goods from the first bath, without washing, into the second bath, turn them in it for 15 minutes, and the green will develop vividly. For yellowish tints, shade off with pieric acid (see No. 2001), which must be added to the second bath and dyed quickly. By this method, 1 pound of iodine green paste will dissolve the powder in the dye bath. The dye dye 12 pounds of wool a medium shade. Preserve the first bath, inasmuch as one-third of the dye remains in it, which circumstance is important in renewing the bath, which will, consequently, require one-third less dye-stuff when making it for the second lot.

2601. To Dye with Picric Acid. Dissolve I pound pierie acid in I gallon of alcohol specific gravity .8200. The dye bath requires no addition, or special precaution. This color This color is used to produce shades of lemon and canary which cannot be attained by the aniline yellow or phosphine. Its chief use is for dyeing For this purpose pass the fabric through a bath containing sulphuric acid and alum, adding, after thorough immersion, a sufficient quantity of solution of picric acid and indigo extract (see No. 99) to produce the

desired shade.

2602. To Dye with Aniline Blue. To 100 pounds of fabric dissolve 11 pounds of aniline blue in 3 quarts hot alcohol; strain through a filter, and add it to a bath of 1300 Fahr., also 10 pounds Glauber's salts and 5 pounds acetic acid. Enter the goods, and handle them well for 20 minutes; next heat it slowly to 200° Fahr.; then add 5 pounds sulphuric acid diluted with water. Let the whole boil 20 minutes longer, then rinse and dry. If the aniline be added in two or three proportions during the process of coloring, it will facilitate the evenness of the color. The blue, or red shade of blue, is governed by the kind of aniline used, as there is a variety in the market. Hard and close-wove fabrics, such as braid, ought to be prepared in a boiling solution of 10 pounds sulphurie acid and 2 pounds tartaric acid before coloring with the aniline, as this will make the fabric more susceptible to the color. Blues soluble in water color more easily than those which have to be dissolved in alcohol.

2603. To Dye Silk or Wool with Aniline Blue. In this manner are used the varieties of aniline blues known as Bleu de Lyon, rieties of aniline blues known as Bleu de Lyon, tartar, or of tartaric, oxalic, or any vegetable Pure Blue, Red Blue, and all others soluble in acid may be used with advantage; but minalcohol. Into a stone jar fitted with a cover, eral acids are to be particularly avoided. The through which a hole is made to admit a stick bath should be kept at a boiling temperature.

some acetic acid has been added. Cotton re- for stirring, put 1 pound of the dye, 5 gallons alquires preparation by sunrach. (See No. 2577.) cohol specific gravity .3200, and 2 ounces sul-To Dye with Iodine Green, phuric acid; apply the heat of a water bath Mix 3 pounds of iodine green paste well with and stir frequently. After allowing the mixabout 2½ pounds of cold water; then add sucture to cool, filter, and treat any undissolved cessively, 1 pound acetic acid 8° Baumé, 80 residue with fresh alcohol until complete sopounds water of a temperature of 140° Fahr, lution is effected. From 5 to 8 gallons will be and 2 pounds liquor ammonia, stirring the required. The dye bath for wool should be mixture well all the while, and filtering it rendered sour by sulphuric acid. Tin crystals before use. Bring the dye bath to the boil- may be used, in quantity equal to about bo ing point; put in as much of the solution as is the weight of the wool, to improve the vivanecessary for the shade required, and dye for city of the shade. The bath should be brought half an hour, letting the bath cool off in the to the boiling point. For silk, prepare a soap bath, add the color, and put in the goods. When dved sufficiently, pass through a bath acidulated with sulphuric acid.

2604. To Dye Cotton with Aniline Blue. Cotton is prepared as for magenta (see No. 2577), and dyed in an acid bath as for Blue.

wool. (See No. 2603.)

2605. To Dye with Aniline Water-Blue. This color is quite soluble in water, and will answer well for preparing a liquid dye; 1 pound may be dissolved in a mixture of 1 gallon alcohol and 4 gallons water. Dyers is used in the same way as Bleude Lyon. (See No. 2603.)

2606. To Dye with Alkali Blue and Nicholson's Blue. Dissolve 1 pound of the dye in 10 gallons boiling water. Add this, by small portions, to the dye bath, which should be rendered alkaline by borax. The fabric should be well worked about between each addition of the color; the temperature must be kept under 212° Fahr. If the right proportion of borax has been used the goods will show but little color when removed from the bath. To develop this, wash with water and

pass through a bath containing sulphuric acid.

2607. To Dye with Aniline Violet and Purple. The various aniline purples known as Parme, Violet de Fuchsin, Victoria Violet, and Amaranth, are used in the same manner as Bleu de Lyon (see No. 2603), omitting the sulphuric acid. Acidulate the bath by sulphuric acid, or use sulphate of soda; both these substances render the shade bluish. Dye at 212°. To give a fair middle shade to 10 pounds of wool, a quantity of solution equal to ½ to ½ ounce of the solid dye will be required. The color of the dyed fabric is improved by washing in soap and water, and then passing through a bath soured by sulphuric acid. According to Mr. Hirsch, cotton is treated as follows: Prepare the goods for fuchsine, and turn them over a few times in a tepid solution of 21 ounces crystallized perchloride of tin, for every 10 pounds of goods. Remove the latter, add as much violet solution as the shade requires, dye for a quarter of an hour, wring well, and dry. Washing in a solution of alum and starch will render the color more solid.

2608. To Dye with Hoffman's Furple. The dye is prepared as other purples. (See No. 2607.) Some authorities maintain that this color does not require the addition of acid to the dye bath, but the color is apt to mis off when dyed in this manner. A trace of

2609. to taste as acid as vinegar; it is then brought the bath. to boiling, and kept so for 10 minutes; some blue aniline liquor is then added with stirring; the goods are submerged, and kept under while boiling until the water has lost its color; after which they are removed, fresh liquor is added, and the process continued

2610. To Dye Silk Blue with Aniline. Silk is steeped first for an hour in lukewarm temperature gradually to boiling, and continuing it at that, when a good color has been obtained, for some 5 to 10 minutes. The old acidified with sulphuric acid, and in which the silk is boiled for 10 minutes; after which more drawn through acidulated water, and lastly through water alone. (See No. 333.) 2611. To Dye Silks or Woolens Vio-

let or Purple with Aniline. Violets and purples are produced on wool in the same manner as the blue; on silk the same method is used likewise, but the water must only be No. 2488 for another method.) heated short of boiling. (See Nos. 315 and 2616. Chemique, or (

Jacobson's Method of Combining Fat and Oil with Aniline Red. The following process is given for this purpose by Dr. E. Jacobson. First separate rosaniline from commercial fuchsine by heating acid must be avoided when the compound is to add it in excess. (See Nos. 98 and 4791.) required for a varnish, as it delays the drying. Oleate or stearate of rosaniline easily dissolves in fats or oils, and colors these an intense red. If it is wanted for a linseed oil varnish, the linseed oil must be free from lead. The compound must be kept from the fire, or it soon turns blue, probably by the reducing action of the fatty acids. The best red color is obtained in linseed oil varnish. Stearine with oleate or stearate of rosaniline appears a bluish red. Paraffine appears to act as a reducing agent with the compounds of fatty acids coloring of paraffine or stearine candles. The oleate or stearate of rosaniline is a good coloring agent for hair oil or pomatum, but, from the instability of the color, seems inapplicable for oil painting.

or Silk. Fuchsine (the crystals of acetate of rosaniline), or the solution, is mixed with cold water for silk, or in water of 130° to 140° Fahr. for wool, which temperature is kept up.

To Dye Woolens Blue with are merely immersed in the bath until they To the water in the vat sulphuric have taken up sufficient of the color; it is not acid is added in sufficient quantity to cause it always advisable to work them about while in

iquid Colors for Various Purposes. These receipts include the preparation and appliance of such until the desired color has been given, the water being kent constantly at a boil. (See No. color to matter generally. Their particular uses and appliances are specified in the receipt given for each preparation. In addition to those here given, a number of other receipts water, acidulated with sulphuric acid, as for for coloring matter have been necessarily inwoolens in the last receipt, and the color must cluded under the respective headings of the be added in 4 to 5 small portions, raising the special objects for which they are used, and will be readily found by consulting the index

2615. Soluble Prussian Blue. bath is then replaced by fresh water, which is a solution of protosulphate of iron to a solution of prussiate of potash, and expose the precipitate to the air till it becomes blue, and wash it it is thoroughly washed in water and then in till the soluble salts are washed away. By suds, afterwards again in water, then once continuing the washing, the blue itself dissolves, forming a deep blue solution, which may be evaporated without decomposition. Or, add a solution of persulphate of iron to a solution of ferroprussiate of potash, keeping the latter in excess; wash the precipitate until it begins to dissolve, and dry it. (See

2616. Chemique, or Chemic Blue. Sulphate of Indigo. To 7 or 8 parts of oil of vitriol, in a glass or earthen vessel, placed in cold water, add gradually 1 part of fine indigo in powder, stirring the mixture at each addition with a glass rod or piece of tobacco-pipe. Cover the vessel for 24 hours, then dilute with with soda or digestion with ammonia; wash an equal weight of water. Sometimes it is and dry it. An oleate or stearate of rosanisold without diluting. The German fuming line is next obtained by adding the rosaniline acid answers best, 4 or 5 parts of it being sufto oleic acid or melted stearie acid as long as ficient for 1 of indigo. For dyeing silk, &c., it will dissolve, or by putting them together carbonate of potash, soda, or ammonia, is in equivalent proportions. An excess of oleic added, to neutralize the acid, taking care not

2617. Liefchild's Patent Blue for Linen. Mix 4 parts Chinese blue, 1 of Turnbull's blue, and 1 of oxalic acid; gradually add boiling water until the whole is dissolved, and lastly 4 parts of sulphate of indigo. The latter is made with 1 partindigo, and 4 sulphuric acid, neutralized with carbonate of ammonia.

2618. Blue for Linen. The ordinary kinds of cake blue consist of indigo and starch. 2619. Solvents for Indigo. Indigo will dissolve in Venice turpentine heated to its boiling point, or in boiling paraffine, with the and aniline, and changes to a dirty violet same blue color as the solution of sulphuric color; the mixture then is inapplicable to the acid; and in petroleum it forms a carmine solution, while in spermaceti it produces a car-

mine-violet, and in stearic acid a blue color. 2620. Bluing for Clothes. Take 1 te instability of the color, seems inapplicable ounce of soft Prussian blue, powder it and put in a bettle with 1 quart of clear rain water, and add ½ ounce of oxalic acid. A tea-spoonful is sufficient for a large washing.

2621. Purified Annotto. To a boiling solution of pearlash add as much annotto as it will dissolve. When cold, decant the clear For silk, a few drops of acetic acid are also solution, and neutralize with diluted sulphuric added. The strength of the dye regulates acid, avoiding any excess. Wash the precipithe quantity which is required. The goods weights of annotto and pearlash with water, mixed, remove the pot from the fire, and con-

and dilute to the required color.

Take 1 Cochineal Coloring. ounce each powered cochineal, carbonate of potash, bitartrate of potash, and alum; boil the other materials, or the lustre will suffer. these in a glazed vessel with 7 ounces water and 1 ounce spirit of wine, until effervescence ceases (about 10 minutes). In this liquid dissolve an equal weight of refined sugar by means of sufficient heat, and set aside for use. This coloring remains bright for any length of time, does not throw down any precipitate, and is almost unalterable by contact with either acids or alkalies, which is no small advantage. Dickson's coloring has some disadvantages in the large quantity of spirit and the delicacy of the ammonia tint. The first would have a tendency to cause a cloudy appearance in bright jellies and other preparations containing gelatine, and the ammonia color would be liable to be completely changed when brought in contact with lemon juice, baked fine powder, and pour upon it 2 ounces conpears, and other acids met with in the many culinary purposes for which the article is

largely used. 2624. Dickson's Cochineal Coloring. Mix together 2 ounces spirit of wine and 6 ounces water. In 3 ounces of this mixture infuse I ounce powdered cochineal for 15 min-utes, in a flask heated to nearly boiling point. Pour the infusion into another vessel, and repeat the process with 3 ounces more of the strong water of ammonia to change the infusion to the desired tint. The coloring is thus prepared without carbonate of potash, alum, etc., and is free from the objections that attach to the coloring obtained by the aid of those substances. (See last receipt.) These objections are:—1st, the coloring matter is advantages of Dickson's preparation are :-1st, the coloring-matter remains in solution, and

Cochineal Coloring. Macerate 1 ounce best carmine in 6 ounces strong solution of ammonia, until it is dissolved. Heat gently to drive off excess of ammonia, taking care not to carry it too far, so as to precipitate the carmine. Put into a quart wine bottle, and add 4 ounces rectified spirit and 3 pounds | lution stains marble of a deep red; wax tinged white sugar. Fill up with warm water, and shake until the sugar is dissolved. This is a

splendid coloring.

odor.

or porous wood. He states that it stand well, is very supple, and has no tendency to get sticky. To prepare it, boil together 8 pounds glue, previously dissolved in 16 pounds water;

2622. Solution of Annotto. Boil equal 82 pounds brown glycerine. When thoroughly tinue to stir until the liquid is cold. If the paint be desired thicker or thinner, the amount of starch and glue must be varied as well as

2627. Black Produced by the Mixture of Colorless Liquids. One of the most interesting phenomena in the operations of chemistry occurs in the decomposition of sulphate of iron by gallie acid. Into a wine-glass, containing the infusion of galls, pour a solution of the sulphate of iron. The gallie acid, from its superior elective affinity to the iron, detaches it from its former combination with the sulphuric acid, and in a short time these two fluids, previously colorless, become intensely black. To make this black fluid into ink, nothing but a little gum is required, to retard the precipitation of the coloring matter. 2628. To Make Liquid Blue.

into a bottle 1 ounce pure Prussian blue, in centrated hydrochloric acid. Effervescence ensues, and the mixture soon assumes the consistence of a thin paste. Leave it for 24 hours, and then dilute with 8 or 9 ounces water, and bottle it. The whole may be further diluted with a quart of water and still retain a sufficiently dark color for washing muslins, etc. The common blue writing fluid

is thus prepared.

2629. Carmine Purple. The dye remixed spirit and water; and a third time, with cently invented, and known as carmine purple, the remaining 2 ounces. Let the liquid stand is obtained by the solution of uric acid in till cold, when some fatty matter will rise to nitric acid, care being taken to prevent boilthe surface; filter, adding spirit and water, up ing over and too great an increase of temper-to eight fluid ounces. Lastly, add sufficient ature. The mixture should remain standing ing over and too great an increase of temperquietly for some days, after which a thick, pasty, or doughy substance is obtained, which is to be treated with warm water, filtered, and the residuum again treated with warm water. The filtered liquid possesses a reddish or yel-These lowish color, resulting from the organic substances decomposed by the nitric acid. It is thrown down as a lake, and after some time forms a layer at the bottom of the containing vessel, requiring the addition of ammonia to re-dissolve and keep it in solution; and—2d, (carmine purple) produced. After the liquid vessel, requiring the addition of ammonia to point, which would destroy the murexide re-dissolve and keep it in solution; and—2d, (carmine purple) produced. After the liquid it does not keep well. On the other hand, the and has assumed a beautiful brownish-red or violet color, it is to be allowed to cool. The -2d, it keeps well, and has no unpleasant entire quantity of the liquid should never be evaporated at one time, nor heated to the boil-

ing point. **2630.** To Color with Alkanet Root. Anchusa Tinctoria gives a fine red tinge to oils, fats, wax, turpentine, spirits, essences, etc., and is used to color hair oil, pomatums, ointments, varnishes, etc. The spirituous sowith alkanet and applied to warm marble,

leaves a fresh color.

2631. To Color with Mallow or Malva splendid coloring.

2626. Black Lustre Color for Paper,
Cloth, or Wood. Dr. Kielmeyer gives a recaint which is adapted for either paper, cloth,
waste grounds and by the waysides. It is also sometimes cultivated in this country. This flower, which gives a beautiful color to water, is used for coloring port and claret wines, and it is considered one of the best ar-1 pound potato starch, dissolved in 5½ pounds ticles that can be employed for that purpose, water; 5½ pounds campeachy extract of 6° Weigh 2 pounds, and steep the red petals in Baumé, 1 pound 2 cunces green vitriol, and cold water for 5 or 6 hours. Tartaric acid

a deep purple red.

2632. To Purify Caramel. The caramel of commerce is spirit coloring, or a solution of burnt sugar in water. (See No. 694.) In this state it is mixed with variable quantities of undecomposed sugar and certain bitter compounds. To render it quite pure, it should be dissolved in water, filtered, and alcohol added until it ceases to produce a precipitate. The caramel is thus thrown down, while the impurities remain in solution. Pure caramel is a black or dark brown powder, soluble in water, to which it gives a rich sepia tint; it is insoluble in alcohol, and incapable of fermentation.

2633. Blue Dye from Molybdenum. According to late experiments by Professor Boettger, based upon some previous researches of Dr. Schönn, if molybdic acid be dissolved to saturation in concentrated sulphuric acid with heat, an uncolored clear fluid is obtained. forming a double acid of sulphuric and molybdic acid. If a little of this double acid be placed in a porcelain dish and heated till it begins to throw off white vapors, and then a certain quantity of absolute alcohol be gradually added, a beautiful blue color is developed, as if by magic, by means of which silk can be dyed without the use of any mordant.

2634. Mordants. Substances employed to fix the coloring matters of dye-stuffs on organic fibres, and to give them brilliancy and permanency. This they effect, either by their strong affinity for the fibre and the dye matter, serving as a bond of union between the two. or by uniting with, and rendering insoluble, the dye contained in the pores of the fibre. The principal mordants are alum, and the

exides of iron or tin. (See No. 93.)

To Color Butter. Pure annotto, 2635. when properly prepared, is very successfully used for imparting a good color to fall and winter butter. (See No. 2621.) Annotto of course adds nothing to the flavor or quality of butter, but as the pure article, when thus employed for coloring, is quite harmless, there can be no serious objection to its use. In coloring butter with annotto it is important that a prime article be used, and to have it prepared so that it shall be free from sedi- florists. ment and adulteration.

2636. To Color Pickles and Sweetmeats Green. A beautiful green color, entirely destitute of any poisonous qualities, may be made by dissolving 5 grains saffron in ounce distilled water, and in another vessel distilled water. After shaking each up thoroughly they are allowed to stand for 24 hours, and on being mixed together at the expiration of that time a fine green solution is obtained, capable of coloring 5 pounds of sugar

2637. Chameleon Mineral. Mix equal weights of black oxide of manganese and pure potash, and heat them in a crucible. Keep the compound in closely-stoppered bottles. A solution of it in water passes through

mixed with the mallow gives a bright red the coloring of toilet soap. Of all the agents color, and salt of tartar (carbonate of potassa) thus far tried to give a lively yellow color to soap, sulphide of cadmium (cadmium yellow) has proved the most permanent. Age and sunlight do not affect the color, and the quantity required is exceedingly small.

2639. To Color Scap Yellow with Cadmium. The cadmium yellow (see above) is rubbed up with oil, and added to the soap under constant stirring. The color is not dissolved in the soap, but suspended in it, and much depends upon careful mixing.

2640. Liquid Colors. The following. when thickened with a little gum, are used as inks for writing, as colors to tint maps, foils, paper, artificial flowers, &c., and to paint on velvet. Some of them are very beautiful. It must be observed, however, that those made with strong spirit do not mix well with gum, unless diluted with water.

2641. Liquid Blue. Dissolve litmus in water, and add & of spirit of wine. Or, dilute Saxon blue or sulphate of indigo with water. If required for delicate work, neutralize the acid with chalk. Or, to an aqueous infusion of litmus add a few drops of vinegar till it turns

full blue.

2642. Liquid Purple. Steep litmus in water, and strain. Or, add a little alum to a strained decoction of logwood. Or, add a solution of carmine (red) to a little blue solution of litmus or Saxon blue.

2643. Liquid Green. Dissolve crystallized verdigris in water. Or, dissolve sap green in water, and add a little alum. Or, add a little salt of tartar to a blue or purple solution of litmus, till it turns green. Or, dissolve equal parts of crystallized verdigris and cream of tartar in water, and add a little gum-arabic.

Used as an ink for writing.

2644. Liquid Yellow. Dissolve gamboge in water, and add a little gum-grabic and alum. Used for ink, to stain paper, color maps, &c. Or, dissolve gamboge in equal parts of proof spirit and water. Golden colored. Or, steep French berries in hot water, strain, and add a little gum and alum. Or, steep turmeric, round zedoary, gamboge, or annotto, in spirits of wine. Or, dissolve an notto in a weak lye of subcarbonate of soda or potash. The above are used by artificial

2645. Liquid Red. Macerate ground Brazil in vinegar, boil a few minutes, strain, and add a little alum and gum. Or, add vinegar to an infusion of litmus till it turns red. Or, boil or infuse powdered cochineal in water: strain, and add a little alum and gum. Or, dissolving 4 grains indigo carmine in \frac{1}{2} ounce dissolve carmine in liquor of ammonia, or in weak carbonate of potash water; the former

is superb. (See No. 2623, &c.)

2646. To Tint Maps or Architects' Plans. Maps, paper, or architects' plans may be tinted with any of the simple liquid colors just mentioned. To prevent the colors sinking and spreading, which they will usually do on common paper, the latter should be wetted 2 or 3 times with a sponge dipped in alum water (3 or 4 ounces to the pint), or a soluvarious shades of color from green to red.

2638. Cadmium Yellow Color for fully after each coat. This will tend to give Soap. The chemical works of Schering, in lustre and beauty to the colors. The colors Berlin, have introduced two shades of sulphide themselves should also be thickened with of cadmium, a lemon and orange yellow, for gum. Before varnishing maps after coloring them, 2 or 3 coats of clean size should be ap-

plied with a brush.

2647. Sizing for Prints or Engravings pale glue, and 4 ounces white curd soap, in 3 pints boiling water; add 2 ounces powdered alum. Used for sizing prints and engravings

before coloring them.

2648. Druggists' Show Colors. These are bright and perfectly transparent liquid colors, employed by druggists in ornamental bottles for purposes of display, forming an attractive and distinctive ornament of a drug tried to render the beautiful colors of permanganates more permanent. They are liable to decompose under the influence of light and atmospheric dust, and no way has as yet been discovered to obviate this difficulty. Many druggists have proposed to fill the bottles in their windows with solutions of aniline colors, but even these have to be renewed from time lamps. to time. Neutral metallic salts, that have neither tendency to oxydize nor to reduce, are best employed for this purpose. The receipts here given are among the very best and most used for this purpose. The mixtures require careful filtration through powdered glass in a glass funnel. It will be found desirable to make a little more liquid color than is actually required, to replace the loss occasioned by a second filtration (performed in the same manner as the first), which will probably be necessary after exposure for a few weeks to the light; as any addition of water ofter filtration, to make up the deficiency, tends to weaken the color and detract from its brightness. Druggists' show-bottles are now made of colored glass, and filled with pure water. These are just as effective as the white glass bottles filled with colored waters, and obviously involve much less trouble.

2649. Amber. Digest 1 part dragon's blood, coarsely powdered, in 4 parts oil of with distilled or soft water to the desired

shade, and filter. (See No. 2648.)

2650. Indigo Blue. Dissolve indigo in sulphuric acid, and dilute with pure water to the required shade of color; filter as directed in No. 2648

2651. Blue. Dissolve 2 ounces sulphate of copper in ½ ounce oil of vitriol and 1 pint acid, 4 ounces. of pure water; filter as in No. 2648.

2652. Prussian Blue. Dissolve pure Prussian blue in slightly diluted oxalic or muriatic (hydrochloric) acid; add water to 1 gallon diluted alcohol, add sulphate of copbring the color to the desired shade, and filter. per and common salt, of each 2 ounces. (See No. 2648.)

2653. Pink. To a solution of chloride or nitrate of cobalt in water, add sufficient sesquicarbonate of ammonia to dissolve the precipitate at first formed. Filter as in No. 2648. Or: Wash 1 ounce madder in cold water; digest it, with agitation, for 24 hours in 3 pints water containing 4 ounces sesquicarbonate of ammonia; then dilute with water to the desired shade, and filter as above.

2654. Purple. To an infusion of logof potassa to make the color. Filter as direct- quantity. ed in No. 2648. Or: To an infusion of cochineal, add sufficient sulphate of indigo, nearly neutralized with chalk. Filter as above.

2655. Red. Dissolve carmine in aqua ammonia and dilute with water to the desired shade; filter as in No. 2648. Or: Dissolve to be Colored. Dissolve 4 ounces finest madder lake in a solution of sesquicarbonate of ammonia, and dilute with water; filter as

2656. Violet. Dissolve nitrate of cobalt in a solution of sesquicarbonate of ammonia: add sufficient ammonio-sulphate of copper to produce the color. Filter as in No. 2648.

2657. Yellow. Dissolve & pound sesqui-

oxide of iron (rust of iron), in 1 quart muriatie tractive and distinctive ornament of a drug (hydrochloric) acid; dilute with water, and store window. It has for a long time been filter. (See No. 2648.) Or: Dissolve Chromate or bichromate of potash in distilled water; or equal parts of either the above and of nitre (saltpetre) dissolved in water, and filtered as above.

2658. Crimson. To 1 ounce alkanet root add 1 pint oil of turpentine. Filter as directed in No. 2648. This is used chiefly for

2659. Green. Dissolve 2 ounces blue vitriol (sulphate of copper) in 1 pint water; add sufficient bichromate of potassa to turn the liquid green. Or: A solution of 2 ounces blue vitriol (sulphate of copper), and 4 ounces chloride of sodium, in 1 pint of water. Or: A solution of distilled verdigris, in acetic acid, and diluted with water. Or: Dissolve blue vitriol in water as above, and add nitric acid till it turns green. All these must be filtered as directed in No. 2648.

2660. Lilac. Dissolve crude oxide of cobalt in nitric or muriatic (hydrochloric) acid; add sesquicarbonate of ammonia, in excess; afterwards sufficient ammonio-sulphate

of copper to produce the color required. Filter. (See No. 2648.)
2661. Olive. Dissolve equal parts by weight of sulphate of iron, and oil of vitriol, in water; add sufficient nitrate of copper to produce the color. Filter as in No. 2648.

2662. Orange. A solution of bichrovitriol; when completely dissolved, dilute mate of potassa in water, either with or without the addition of some hydrochloric or sulphuric acid. Or: Dissolve gamboge or annotto in liquor of potassa; dilute with water and add a little spirit. Filter these as directed in No. 2648.

2663. Sea Green. To 1 gallon water add acetate of copper, 4 drachms; and acetic

2664. Pea Green. To 1 gallon water add nickel, 2 drachms; acetic acid, 1 ounce; and bichromate of potash, a drachm. Or: To

2665. Light Blue. To 1 gallon of water add sulphate of copper, 16 ounces.

2666. Light Green. Sulphate of copper (re-crystallized), muriatic acid (free from iron), water, alcohol, of each a sufficient quantity.

2667. Violet to Purple. To the green acid solution of sulphate of chromium add strong solution of ammonia, and filter as directed in No. 2648.

2668. Yellow. Bichromate of potassa, wood, add sufficient carbonate of ammonia or muriatic acid, water, of each a sufficient

> 2669. Bright Red. Cochineal, ground, 1 ounce. Boil with 1 pint of water, replacing that which evaporates. Towards the close

add cream tartar, ½ ounce; alum, 1 ounce; above solution and treat it with nitric and with 1 pint of water.

2670. Purple to Pink. Fuchsine dilu-

ted with spirit, as desired.

colors with water as directed in No. 2497.

solution to a strength of about 15 to 20 per cent. of alcohol. Naturally the liquids must be very dilute as regards the solids, so as to cold or spirits. Acetate of copper, with or without ammonia, a dilute solution of iodine in iodide of potassium, nitrate of cobalt, etc., are not acted on by weak alcohol. We believe that glycerine may be mixed with water for this purpose, but whether it possesses any superiority over alcohol we have not been must have sufficient space left over the fluids to allow for expansion.

)igments. These are substances employed as coloring matter in mixing paints, &c. The following receipts furnish

2674.

Turnbull's Prussian Blue. Ferricyanide (red prussiate) of potassium, 10 of potassium in part of water, and add the solution, gradually, to the solution of protosul-phate of iron previously diluted with the re-silver paper. mainder of the water, stirring the mixture during the addition. Then filter the liquid, and wash the precipitate on the filter with boiling water until the washings pass nearly tasteless. Lastly, dry it, and rub it into fine ter, boiling hot, 15 gallons; boil for 2 hours, powder. It may also be made by adding then add refined saltpetre, bruised, 3 ounces; protosulphate of iron to a mixture of yellow boil for 3 minutes longer, and add 4 ounces prussiate of potash, chloride of soda, and hy-drochloric acid. This, mixed with water, makes an excellent bluing.

Prussian Blue. Percyanide, ferrocyanide, or ferroprussiate of iron. Commercial Prussian blue is made by adding to a solution of prussiate of potash (or of prussiate cake), a solution of 2 parts alum and 1 part fully removed, without breaking it or disturbsulphate of iron, washing the precipitate repeatedly with water to which a little muriatic kind is made by adding a solution of persul- must be dried in the shade, and will be found phate or perchloride of iron to a solution of to possess extraordinary lustre and beauty. pure ferroprussiate of potash. 2674.) (See No.

2676. Action of Prussic Acid on Iron Solutions. The Germans call prussic acid dissolving it in water of ammonia. For this blausäure, because it produces a blue precipitate in certain iron solutions; but the following heat of the sun till its color is extracted and experiment undoubtedly proves that the prustitle liquor has got a fine red tinge. It must sic acid does not produce the color of that then be drawn off and precipitated by acetic precipitate, since it can be made just as well acid and alcohol, next washed with alcohol, without it. Prepare a saturated solution of and dried. Liquid carmine is a solution of green vitriol in water. Take ‡ parts of the carmine in ammonia.

and when cold, oil of vitriol, I ounce, mixed sulphuric acids, until it is changed into the sulphate of peroxide of iron. Mix this with the remaining 3 of the first solution, then add very gradually (to avoid its becoming heated) 2671. Magenta, Solferino, Water of concentrated sulphuric acid, until a precipitate the Nile, and other bright colors may be obis formed. The result will be a beautiful blue tained by mixing the various aniline or tar precipitate, equal to Prussian blue. If water is added, the precipitate is dissolved and the 2672. To Prevent Show Colors color destroyed; but if the precipitate is Freezing. It will be sufficient to bring the separated from the acid and rubbed with phosphate of soda, we obtain a beautiful blue phosphate of iron, which will resist the action of water. In all these cases the acids, suffer no precipitation of any saline matter by which possess no color, are by no means the cause of the blue color, but favor only the production of it, by depriving the mixed hydrates of protoxide and peroxide of iron of certain equivalents of water, and likewise by preventing the same from entering into a higher state of oxidation in the atmosphere.
2677. To Make Carmine by the

able to ascertain. The bottles in all cases Langlois Process. Boiling river water, 4 gallons; cochineal in powder, 1 pound; boil for 10 minutes, then add 4 ounce carbonate soda, dissolved in 1 pound water; boil again for ½ an hour; cool, add ½ ounce alum in fine powder, agitate rapidly until it be dissolved, then let it stand for 20 minutes, after which carefully decant into another vessel. The white of 2 eggs, dissolved in 1 pint water, is now to be added, and the whole well agitated; the method of preparing the pigments and apply heat until the liquor be clarified, then other coloring matters in general use, and their special appliances.

Apply heat until the liquor be clarified, then draw it off, and allow it to repose for \frac{1}{2} and hour, or longer, when the clear portion must be decanted, and the carmine that has been deposited at the bottom collected, and placed upon a filter to drain. When it has acquired ounces; solution protosulphate of iron, 1 upon a filter to drain. When it has acquired pint; water, 3 pints. Dissolve the ferricyanide the consistence of a paste, remove it from the filter with an ivory or silver knife, and finish the drying upon shallow plates, covered with

2678. To Make Carmine by Cenette's **Process.** The following is the method employed by Madame Cenette: Finest cochineal, reduced to powder, 2 pounds; pure river waof salts of sorrel (binoxalate of potassa). Boil for 10 minutes longer, then remove the heat, and allow the liquor to settle for 4 hours, when it must be decanted with a syphon into shallow plates, and set aside for 3 weeks. At the end of this time, the film of mould formed on the surface must be dexterously and careing the liquid portion. The latter must be now removed with a syphon, and the remainacid has been added, and exposing it to the ing moisture drained off, or sucked up with air till it assumes a deep blue color. A purer a pipette. The carmine which is left behind

2679. To Revive or Brighten Carmine. We may brighten ordinary carmine and obtain a very fine and clear pigment, by purpose leave ammonia upon carmine in the

Genuine cochineal has a specific gravity of and adding alum and chalk in a pasty state.

1.25; it is commonly increased in weight by slightly moistening it with gum water, and Brazil-wood and 2 pounds peach-wood in then rouncing it in a bag, first with sulphate of baryta, and then with finely powdered bone-black. In this way its specific gravity is raised to 1.35, by introducing about 12 per

cent. of useless matter.

2681. Kirchoff's Method of Making Vermilion. This is said to yield vermilion is allowed to settle, and the clear liquid evapequal to the Chinese. Rub in a porcelain orated to dryness. A little gum-arabic is dish 100 parts mercury with 23 parts flowers of sulphur, moistening the mixture with a solotion of caustic potash. Next treat it with mon qualities are made by fusing zaffre (roasted 53 parts hydrate of potash, mixed with an cobalt ore calcined with siliceous sand) with equal weight of water; warm it up and triturpotash. A finer quality is obtained by preate it again. The water must be replaced as cipitating a solution of sulphate of cobalt, it evaporates, and the operation continued for by a solution of silicate of potash. Another 2 hours. The whole is now to be evaporated cobalt blue is obtained by adding a solution to a thin paste, during constant trituration, of phosphate of soda to a solution of nitrate of and the heat removed the moment the color cobalt, and mixing the precipitate, washed, is of a good tint. Even a few seconds too but not dried, with 8 times its weight of fresh much or too little will injure the result. hydrated alumina. When dry, heat it to a When cold, the mass is washed with a solution | cherry red. It is permanent, but has little

2682. fact well known to artists that the splendidly etted hydrogen. bright color of vermilion (cinnabar, sulphide has been mixed with white lead, to become tion of nitrate of copper produced in the proaltogether obviated if, previous to being found no lime in the best samples. portion of 1 part sulphur to 8 parts vermilion.

2683. Carthamine or Safflower Lake. Wash safflower till the water comes off colorless; mix it with water holding 15 per cent. of carbonate of soda in solution, so as to form a thick paste; leave it for several hours, then press out the red liquid, and nearly neutralize it with acetic acid. Next put cotton into it, and add successive small portions of acetic acid, so as to prevent the liquid becoming alkaline. In 24 hours take out the cotton, wash it, and digest it for half an hour in water holding 5 per cent. of crystallized carbonate of soda in solution. Immediately on removing the cotton, supersaturate the liquid with a solution of alum, and heating the prewith citric acid, and collect the precipitate, cipitate. When well made, it is a good perwhich must be repeatedly washed in cold wa-ter. For pink saucers the liquid is allowed to also be employed in fresco and silicious paint-deposit in the saucers. Mixed with the ing. It is, however, somewhat affected by

scrapings of French chalk it constitutes rouge. light, losing its brilliancy slightly.

2684. Lakes are also obtained from 2691. Elsner's Preparation of Zinc 2684. Lakes are also obtained from Brazil-wood and madder, by adding alum to a concentrated decoction of the former, or to a cold infusion of the latter (made by triturating the madder, inclosed in a bag, with the water), and afterwards sufficient subcarbonate of potash or soda to throw down the alumina in com- of cobalt be employed, the product is grass bination with the coloring matter. The pre-cipitate is to be washed and dried. A little is obtained when the latter proportion of zinc solution of tin added with the alum improves oxide is again doubled. the color. Lakes may be obtained from most vegetable coloring matters by means of alum and an alkaline carbonate. Yellow lake is made from French or Persian berries, by boil-

Adulteration of Cochineal. boiling weld, or quercitron bark, in water,

water, with 1 pound alum, and pour the strained decoction on 20 pounds sifted whitening.

2686. Sap Green. The expressed juice of buckthorn berries (and sometimes of other species of rhamnus, and also of privet berries)

sometimes added to the juice.

of potash, and afterwards with pure water, and finally dried.

2682. To Preserve Vermilion. It is a cious painting. It is not affected by sulphur-

2688. Blue Verditer. It is generally of mercury) has a tendency, especially if it stated to be made by adding chalk to a solublackish brown and very dark-colored in a cess of refining silver; but Mr. Phillips did comparatively short time. This tendency is not succeed in making it by this means, and altogether obviated if, previous to being found no lime in the best samples. This mixed with oil, it is thoroughly and intimately pigment is acted upon by suphurretted hydromingled with flowers of sulphur, in the progen; it should not be used in oil, and though more stable in water, it is hardly a pigment for high art work. Certain blues are made from the natural blue basic carbonate of copper, and from malachite, but they have no

interest for the artist.

2689. New Blue. Mix equal parts of common arseniate of copper (see Mineral Green, No. 2711), and neutral arseniate of potash, fuse by heat in a large crucible, then add to the fused salt its weight of nitre. Effervescence takes place, and the salt becomes blue. Cool, pulverize, and wash.

2690. Cobalt Blue. Thénard's blue is

made by precipitating a soluble cobalt salt

Green. Sprinkle with water a mixture of 5 parts oxide of zinc and 1 part of sulphate of cobalt, dry the pulp thus obtained, then heat to redness. A deep green powder is obtained. If 10 parts oxide of zinc, and 1 part sulphate These colors, especially the latter, may replace to advantage Schweinfurt green; they apply well on a coating of lime

This is a brown color 2692. Bistre. ing them in water with a little soda or potash, which is used in water-color painting. It is and adding alum to the strained liquor as long prepared from the root of beech-wood by as a precipitate is thrown down. Or by washing away the soluble parts with water.

ter and formed into cakes.

commonly adulterated with sulphate of baryta, sulphuric acid, and i (heavy spar), and sometimes with chalk. The per cent. in weight. former may be detected by its insolubility in having been treated with sulphuretted hydrogen, or a hydrosulphuret, to throw down

the lead.

Take a piece of firm, close-grained charcoal, and, near one end of it, scoop out a cavity about 1 inch in diameter and 1 inch in depth. mentioned elsewhere that cadmium sulphide Place in the cavity a sample of the lead to be decomposes emerald green. (See No. 2712.) tested, about the size of a small pea, and apply the flame of a blow-pipe; if the sample be strictly pure, it will in a very short time, say place, and lead sulphide, which is black, be in 2 minutes, be reduced to metallic lead, leav-formed, it is better to avoid the mixture; no ing no residue; but if adulterated to the extent of 10 per cent. only with oxide of zinc, sulphate of baryta, whiting or any other caronly adulterations used), or if it be composed entirely of these materials, as is sometimes the case with cheap lead, it cannot be reduced, but will remain on the charcoal an infusible mass. It is well, after blowing upon the sample, say for a minute, by which time the oil will be burned with a knife blade or spatula, in order that the flame may pass under as well as over and against it. With proper care the lead will run into one button, instead of scattering over the charcoal, and this is the reason why the cavity above mentioned is necessary. common stearine candle or a lard oil lamp furnishes the best flame for use of the blowpipe; the flame of a coal oil lamp should not be used as pigments.

2702. The Ochres are earths colored by 2696. Zinc White (oxide of zinc) is a oxide of iron. The natural color of these

permanent pigment; is not affected by sulphuretted hydrogen; does not form soap with oils and fats, therefore it retains its opacity; does not decompose other pigments, and if used with proper vehicles retains its whiteness. It is the best and safest white that can be used. It is most durable in silicious painting, as it forms chemical compounds with pot-

ash and silica.

2697. Sulphate of Baryta, called barytes and constant white, is very permanent, of a bluish tint; has no body in oil, but is a good white in fresco, silicious, and water-color painting. Chemically it has no action on other colors, and is not itself affected by any ordinary destructive agent. It is a natural from the sulphate of iron, sulphate of lime product, called heavy spar.

2698. of tartar, and 2 pounds sulphuric acid are to in oil, water, and fresco.

The insoluble residue is mixed with gum wa- be combined with a ounce of soluble iodine violet, and the wool immersed in the solution 2693. White Lead. This pigment, at a temperature of 122° Fahr., and stirred which enters largely into the composition of round for an hour at this temperature. Anvarious colored paints, is carbonate of lead, other bath is to be made in the meantime, in obtained by suspending rolls of thin sheet lead a fresh kettle, with 3 pounds chloride of ba-over malt vinegar or pyroligneous acid in close rium, and the whole immersed in this, and vessels, the evaporation of the acid being in- kept at a temperature of 122° Fahr., for two duced and sustained by the heat of a steam- hours. By this process the sulphate of barybath or other appliances.

2694. Test for White Lead. Commerthrown down in the fibre of the wool, which cial carbonate of lead is never quite pure, being has been saturated in the first bath with the sulphuric acid, and it will gain about eighteen

2699. Cremnitz White, a beautiful dilute nitric acid, and the latter by the nitric white, with less body than ordinary white solution yielding a white precipitate with oxalic lead; it is, doubtless, made by precipitation; or sulphuric acid, or oxalate of ammonia, after it, like ordinary white lead, decomposes sulphides, and is decomposed by sulphuretted

hydrogen.

ne lead. (Cooley.)
2695. Simple Test for White Lead. These are sulphides of cadmium, and, when well prepared, are very stable; they can be used in fresco and silicious painting. It is It is not safe to use it with lead pigments, unto it continuously the blue or hottest part of less it has been most carefully prepared; and such mixture can occur in fresco or silicious painting, and it would be well if there were no chance of its occurring in any other style bonate of lime (which substances are now the of painting, by the banishment of white lead from the list of artists' pigments. No other salts of cadmium are important as pigments.

2701. Green Oxide of Chromium. This oxide is perfectly stable, and, as so many tints of it can be obtained, including the beautiful vividian, it can be used in all vehicles, and off, to loosen the sample from the charcoal is perfectly permanent in fresco and silicious with a knife blade or spatula, in order that painting. Other chromium compounds are used in painting; the chromates of lead have already been treated of. Chromate of barytes is a good, safe pigment; it is used under the name of lemon yellow. It is permanent in fresco and silicious painting. The chromates generally are unstable colors, and, as there are so many other good yellows, they should not

earths is yellow, but by burning they get darker, and some become red. Indian red, red ochre, light red, etc., are all earths with more or less of the oxide of iron in them. All the ochres are permanent and stable if they have been well prepared. They may be used safely in every style of painting.

2703. Colcothar is also an oxide of iron; it is very permanent, and generally useful as a pigment. It can be obtained of different tints. It is, however, especially useful in

fresco and silicious painting.

2704. Venetian Red, as now prepared, is an iron red; but, whether from adulteration or not, it contains lime; and, as it is made gets formed, and this prevents its employment Pfundheller's Method of Ob- in silicious painting, for with silicate of potash taining Barytes White. For each 100 a silicate of lime is immediately formed, and pounds of wool, 3 pounds alum, 1 pound cream it becomes hard and lumpy. It may be used

2705. Chrome Yellow. To a solution of bichromate of potash add a solution of or Arsenite of Copper. Dissolve 11 ounces nitrate of lead as long as a precipitate white arsenic and 2 pounds carbonate of potnitrate of lead as long as a precipitate forms. Wash the precipitate, and dry it with a gentle heat. An inferior kind is said to be made by 4 pounds pure white lead, 1 pound bichromate of potash, and 20 pounds water, and boiling till the water becomes colorless. Or 75 parts of precipitated sulphate of lead may be acted on by 25 parts of a hot solution of neutral chromate of potash. A mixed produet of chromate and sulphate of lead is thus obtained, which is said to cover as well as the pure chrome, and is much cheaper. (Riot.)

2706. Chrome Red. Melt saltpetre in a crucible heated to dull redness, and add chrome yellow, by small portions, till no more red fumes arise. Allow the mixture to settle, then pour off the melted salt from the heavy sediment, and wash the latter with water, which should be quickly poured off, and dry the pigment. The liquefied salt poured off contains chromate of potash, and It answers well in water-color painting; it is reserved for making chrome yellow.

2707. Orange Chrome is chrome yellow acted on by an alkali, which deprives it of part of the chromic acid. All the chromes are chromates of lead, and are therefore have add to the clear s to be blackened by sulphuretted hydrogen. When used with oil, they may, with care, rewind a long time, the oxidized 2714. Rinns 2714. in silicious, fresco, or any other method of water painting. They are destroyed by alkalies; they should never be used with Prussian color. blue or kindred colors. On the whole, it would be as well for artists to reject them, as better and safer pigments can be employed 2707.) for the same purpose as they are.

nitrate of potassium and cobalt. It is not acted upon by lime or by potash; it is, therefore, a good pigment for fresco and silicious painting. It may be used with safety in oil and in water. Sulphuretted hydrogen does not affect it, and it is permanent when submitted to the severest tests. It is not

affected by admixture with other colors.

2709. Naples Yellow. Mix 12 parts metallic antimony, 8 parts red lead, and 4 oxide of zinc, and calcine in a reverberatory furnace. The mixed oxides are rubbed together, fused, and the fused mass elutriated into a fine powder. (Dr. Ure.) M. Guimel recommends 1 part well-washed antimoniate of potash to be ground into a paste with 2 parts red lead, and the powder exposed to a red heat for 4 or 5 hours, keeping the heat moderate. This is a good pigment, and may safely be used with oil.

Brunswick Green. 2710, saturated solution of muriate of ammonia over copper filings in a close vessel placed in a warm situation; add more of the solution from time to time till 3 parts of the muriate have been used to 2 of copper. After standing for a few weeks the pigment is separated from the unoxidized copper by washing through a sieve. It is then to be well washed, and dried slowly in the shade. It is often color than bone-black, and is used as a pig-

2711. Mineral Green, Scheele's Green, ash, by heat, in a gallon of water. Dissolve also 2 pounds sulphate of cop. r in 3 gallons water. Filter each solution separately, and add the former gradually to the latter as long as it occasions a precipitate. Wash the precipitate, drain it, and dry it.

2712. Emerald Green. Mix 10 parts pure verdigris with sufficient boiling water to form a soft pulp, and strain this through a sieve. Dissolve 9 or 10 parts white arsenic in 100 parts boiling water, and, whilst boiling, let the verdigris pulp be gradually added, constantly stirring the mixture till the precipitate becomes a heavy granular powder. It is, on the whole, a permanent color. It should not be used with cadmium yellow, as that is a sulphide, and with it forms sulphide of copper, which is brown. It is a good oil pigment when properly used; it has but little body. cannot, however, be used in fresco or silicious painting.

2713. Green without Arsenic. solve 48 pounds sulphate of copper and 2 pounds bichromate of potash in water, and add to the clear solution 2 pounds pearlash

Rinmann's Green Pigment. oil protecting them from the action of sul- Dissolve together in sufficient water 1 part phuretted hydrogen. They cannot be used sulphate of cobalt and 3 sulphate of zinc; precipitate with carbonate of soda, wash the precipitate, and calcine it. It is a permanent

2715. Chrome Green. A mixture of chrome yellow and Prussian blue. (See No.

2716. Black for Miniature Painters. 2708. Aureolin Yellow. An excellent Take camphor, and set it on fire, and collect pigment in every respect. It is a double the soot by means of a saucer or paper funnel inverted over it. This black, mixed with

gum-arabic, is far superior to most India-ink. 2717. To Make Lampblack. This can be prepared on a small scale in the fol-lowing manner: Suspend over a lamp a conical funnel of tin plate, having above it a pipe to convey from the apartment the smoke which escapes from the lamp. Large mush-room-like concretions of a very black carbonaceous matter, and exceedingly light, will be formed at the summit of the cone, and must be collected from time to time. This black may be rendered less oily and drier by calcination in close vessels. The funnel should be united to the pipe, which conveys off the smoke, by means of wire, because solder

would be melted by the flame of the lamp.
2718. Indian Red, or Crocus. This is made from jeweler's rouge, by subjecting the scarlet calcined sesquioxide of iron to a further calcination at a very intense heat. It is then known as purple brown.

Ivory-Black. Burn shavings 2719. and waste pieces of ivory in a covered crucible, till no more smoke issues. Cover it closely It should be afterwards while cooling. washed with diluted muriatic acid, then with water till no longer acid, dried, and again heated in a covered crucible. It is of a deeper reduced with white lead; some samples conment, a tooth powder, and to decolorize tain arsenic.

2 parts crystallized perchloride of tin; this mixture, added to a solution of 1 part crystallized chloride of gold, makes a beautiful purple colored precipitate, which should immediately be washed, filtered, and dried. An excess of the protochloride produces a blue, yellow, or greenish tinge; the perchloride in excess gives a red or violet cast.

2721. French Purple of Cassius. This is similar in preparation to the last receipt, but differs in one ingredient employed, substituting perchloride of iron for the perchloride of tin. This purple keeps in the air

unaltered for a long time.

2722. Purple of Cassius. To a moderately dilute solution of sesquichloride of iron, add a solution of protochloride of tin, until the painters' use mixture becomes green, and dilute the mixture with an equal bulk of water. Next prepare a solution of terchloride of gold, as neutral as possible, in the proportion of 1 part gold in 360 parts water; then add the tin solution, with constant stirring, as long as any at a gentle heat.

2723. Buisson's Preparation of Purple of Cassius. Two solutions of tin are required. The first consists of a neutral solution of 1 part tin in nitric acid. The second is

solution.

composed of 6 parts hydrochloric acid and 1 part nitric acid; and mix the solution at once with 3500 parts water; then add the whole of the second tin solution, subsequently adding by Boil linseed oil for two hours with 3 per cent. degrees the first tin solution, ceasing the mowill produce a violet color; too much, a brown. | covering, frequently removing the cover to re-Wash the precipitate very quickly, and dry. When dry it appears brown.

2724. Improved Vehicles for Colmay be ground with the oil or the mixture. Or, a solution of shellac with borax, as in

making Coathupe's ink. (See No. 2484.)
2725. Improved Vehicles for Water 2725. Improved Vehicles for Water Colors. Water colors, mixed with gelatine, and afterwards fixed by washing with a solution of alum, or; curd of milk, washed and pressed, then dried on fine net, and when required for use, mixed with water and the coloring matter.

which exhibit the first property in a marked paint.

2720. To Make Purple of Cassius. degree, as the oils of linseed, poppy, rape, and This is a vitrifiable pigment, which stains walnut, are called drying oils, and are used as glass and porcelain a beautiful red or purple vehicles for colors in painting. The dyhue. Its preparation is one of great nicety, ing property of oils is greatly increased by and is liable to fail even in the most experiboiling them, either alone or with litharge, enced hands. Mix together separate solutions sugar of lead, etc., when the product forms of 1 part crystallized protochloride of tin, and the boiled oil or drying oil of commerce. The litharge and sulphate of lead employed for this purpose, may be again used, after washing them in hot water, to remove adhering mucilage. When paints are mixed with raw oil, as is frequently the case in house painting, the drying quality is obtained by the addition of compositions called *dryers*. These are generally made from Japan varnish, sugar of lead, litharge, etc., and are necessary in such paints as are preferably prepared without boiled oil. 2727. Dark Colored Boiled Oil. Sim-

mer with frequent stirring, 1 gallon of linseed oil, with & pound powdered litharge, until a skin begins to form; then remove the scum, and when it has become cold and has settled, decant the clear portions. This is for house

2728. Pale Boiled Oil. Boil 1 quart linseed oil, and 2 ounces powdered white vitriol (sulphate of zinc), with 1 quart water, until the water has all evaporated; settle and decant as in the last receipt.

2729. Very Pale Drying Oil. Mix 2 precipitate is produced. Wash the precipitate ounces finely powdered litharge, or dry sulas quickly as possible by decantation, and dry phate of lead, with 1 pint pale linseed or nut oil; agitate frequently for 10 days, then set the bottle in the sun or in a warm place to set-

When clear, decant it.

2730. Colorless Drying Oil for Paint. Take 5 gallons water, heat it to the boiling made by dissolving 2 parts tin in a mixture point in a vessel holding 15 gallons; when of 1 part hydrochloric acid with 3 parts nitric about to boil add 5 gallons linseed oil and 1 acid; a little heat may be cautiously applied pound red lead. Keep it constantly boiling towards the end of this process, to prevent and stirred up for 2 hours over a slow fire. any protoxide of tin from remaining in the If not constantly stirred the lead will sink to the bottom and cause the oil to spatter. It Next dissolve 7 parts gold in an aqua-regia is then taken from the fire and left to settle, when it will be found that the oil is clear and colorless.

2731. Mulder's Colorless Drying Oil. of red lead; filter it, and expose it to the sunment the right color is obtained. Too little shine in large shallow vessels, with a glass

new the air.

2732. To Make Boiled Oil Clear and Bright. There is often a difficulty in obtainors. One measure of saturated solution of ing the oils bright after boiling or heating them borax, with 4 of linseed oil. The pigment with the lead solutions. The best way on a small scale is either to filter the boiled oil through coarse woolen filtering paper, or to expose it in a bottle for some time to the sun or in a warm place. In larger quantities, the oil may be filtered through Canton flannel

2733. Artists' Drying Oil. Mix nut or pale linseed oil with about an equal measure of snow or powdered ice, and keep it for 2

months at a freezing temperature

2734. Boiled Oil Specially Adapted for Zinc Paint. Mix I part binoxide of rying Oils and Dryers. manganese, in coarse powder, but not dusty, All the fixed oils have an attraction with 10 parts nut or linseed oil; keep it gently more or less powerful for oxygen; and, by heated and frequently stirred for about 30 exposure to the air, they either become hard hours, or until the oil begins to turn reddish. and resinous or sour and rancid. Those The oil thus prepared will also answer for any

2735. New Drying Oil without Boiling. Mix with old linseed oil (the older the lead. The dross that forms on melted lead better), 2 per cent. of its weight of manganese exposed to a current of air, roasted until it borate (this salt is readily prepared by precip- acquires a uniform yellow color. Used as a itating a solution of sulphate of manganese with pigment, and in glazing. (Cooley). a solution of borax, wash the precipitate, and dry it either at the ordinary temperature of the air or at 100°), and heat this mixture on a water-bath; or, if you have to work with large quantities, with a steam-bath to 100°, or at most 110°; you thus obtain a very excellent, light-colored, rapidly drying oil; by keeping the mixture stirred, that is to say, by always exposing fresh portions to air, the drying property of the oil is greatly promoted. The rapidity of the drying of the oil after it has been mixed with paint, on surfaces besmeared therewith, does not simply depend upon the drying property of the oil, but, in a very great measure, upon the state of the atmosphere-viz., whether dry or moist, hot or cold—the direct action of sunlight, and the state of the surfaces on which the paint is brought. Really gen-uine boiled linseed oil, if well prepared, leaves nothing to be desired as regards rapidity of drying, but it is retarded by various substances which are added in practice, among which, especially, oil of turpentine is injurious.

2736 Dryers for Dark-Colored Paints. This is prepared by grinding the best litharge to a paste with drying oil. A small portion is beaten up with the paint, when mixing with oil and turpentine for use

2737. Dryers for Light-Colored Sulphate of zinc, or sugar of lead, mixed with drying oil, and used in the same way as the litharge in the last receipt.

2738. Dryers for White Paint. Mix 1 pound each sulphate of zine and sugar of lead, with 2 pounds pure white (carbonate of) lead, and apply as in the last receipts.

2739. Patent Dryer. Mix the following ingredients to a paste with linseed oil: 15 pounds dry sulphate of zinc, 4 pounds sugar of lead, and 7 pounds litharge. The mixture should be passed 3 or 4 times through a paint When a tin of this is in use, the surface should be always smoothed down level, and

kept covered with a thin layer of linseed oil. 2740. Dryer for Zinc White. Mix together thoroughly 10 parts each sulphate of manganese, acetate of manganese, and sulphate of zinc, with 14% parts zinc white. An addition of 2 or 3 per cent. of this dryer to zinc white oil paint will make it dry hard.

To Make Japan Dryer. gallon linseed oil, put & pound gum shellac; Fround each litharge, burned umber, and red lead; and 6 ounces sugar of lead. Boil together for 4 hours, or until all the ingredients are dissolved. Remove from the fire and add 1 gallon spirits of turpentine.

2742. Cheap Japan Dryer. Mix together 4 gallons pure linseed oil; 4 pounds dered raw umber. Boil slowly for 2 hours, add by degrees 7½ pounds shellac, and boil ½ hour longer; when well mixed, add by degrees 1 pound powdered sulphate of zinc, and when doors and windows, to avoid a draught nearly cold mix in thoroughly 7 gallons spirits of turpentine.

2743. To Make Paint Dry Quickly. To make paint dry quickly use a large proportion of Japan varnish in mixing.

2744. Massicot. Yellow protoxide of

Jouse Painting. The following directions are obtained from a thoroughly practical source, and will be found useful both to the amateur and the workman.

2746. Priming. The same paint is used for the first coat in outside and inside work; it should be as thick as will work conveniently, and requires only litharge for dryers. The paint should not be laid on too thickly, and well worked in with the brush.

2747. Priming for Iron Work. must be oil color laid on a surface freed from rust. For paper and canvas, a coat of size takes the place of priming, as paint rots these materials.

2748. Puttying. This consists in filling up all nail-heads and cracks with putty, by a putty knife; and should always be done after priming.

Second Coat for Outside Work. 2749. Mix the paint with raw oil, as thick as it can be used freely. Cover the surface, work it across to even it, and finish longways with long, light sweeps of the brush.

2750. Third Coat for Outside Work. The paint should be mixed with oil, a little thinner than for the second coat; laid on very evenly, and not too thickly, and finished as smooth as possible.

2751. Second Coat for Inside Work. The paint for this coat should be mixed with raw oil and turpentine, about equal parts, and be as thick as will work freely; laid on thinly and well crossed and finished to prepare a smooth surface, with as few ridges as possible, for the next coat.

2752. Third Coat for Inside Work. Mix the paint thinner than for the last coat, using but little oil, and more turpentine; laid on thinly and well finished, so as to leave no brush marks

2753. Fourth Coat or Flatting for Inside Work. The paint is mixed with turpentine only, and thin enough to spread or flow even, before it sets; lay on evenly and quickly, brushing lengthways only, and finishing up as the work proceeds, as this paint sets quickly, and spots touched up afterwards are apt to be glossy.

2754. Drawn Flatting for a Fourth Coat. The oil in which the white lead or other paint is ground, is drawn out by mixing with turpentine, allowing the paint to settle, and then pouring off the liquid; repeating the operation with fresh turpentine till the oil each litharge and red lead; and 2 pounds pow- has been completely washed out. This makes a better color, without gloss, and easily flowing. As it sets very quickly it must be applied thickly, evenly, and quickly, with closed

> When to Apply Paint. Paint, to last long, should be put on early in winter or spring, when it is cold and no dust flying. Paint put on in cold weather forms a body or coat upon the surface of the wood that be

tool even, like slate.

paints containing both oil and turpentine, the gloss will be less as the proportion of oil is on the shade of color required. diminished. Paint requires more dryer in cold than in hot weather, but is more durable in outside work if applied in cold weather. Suceessive coats of paint should have at least a day intervene between them for drying. Dark colors should have a glossy finish. Before commencing to paint, the surface must be perfectly dry. The paint must be thoroughly mixed, both before commencing and during the progress of the work; if this is neglected, the heavy ingredients are apt to settle, leaving a larger proportion of oil and turpentine on the surface.

2757. Painter's Size. Stir a small quantity of litharge and red lead into some boiled oil; let it stand, shaking frequently until bleached; then bottle. Raw oil makes

a slower drying size.

2758. Best Painter's Size. Heat raw oil in a pan till it emits a black smoke; set it on fire, and, after burning for a few minutes, cover the pan over to put out the blaze; pour the oil while warm into a bottle in which some pulverized red lead and litharge have been introduced. Stand the bottle in a warm place for two weeks, shaking often. It will then be ready to decant and bottie.

2759. To Paint Zinc. A difficulty is often experienced in causing oil colors to adhere to sheet zine. Boettger recommends the employment of a mordant, so to speak, of the following composition: 1 part chloride of copper, 1 of nitrate of copper, and 1 of sal-ammoniac are to be dissolved in 64 parts of water, to which solution is to be added 1 part of zinc are to be brushed over with this liquid, which gives them a deep black color; in the dry, and to their now dirty gray surface a coat of any oil color will firmly adhere. Some sheets of zinc prepared in this way, and afterwards painted, have been found to withstand all the changes of winter and summer.

2760. Polish White. This is made by grinding dry zinc-white with white varnish, and affords a beautiful glossy finish, to be laid on after the second coat. A more perfect surface may be obtained by covering the second coat with several other coats of hard drying paint, mixed with turpentine, Japan and litharge; then rubbing down with pumice-stone, followed by a coat of polish white, and finished with a flow coat of white varnish containing a little zinc-white. Although this requires more time and trouble, the result will fully compensate for it. It is necessary to remark that when the last coat is to be glossy, the previous coat must be flat or dead; and a flat coat for finishing should be preceded by a somewhat glossy coat.

2761. To Mix Oil Colors. In mixing In the following table of the combinations of using any of it. Let the first coat dry before colors required to produce a required tint, the second coat is put on.

comes hard and resists weather, or an edged the first named color is the principal ingreol even, like slate.

dient, and the others follow in the order of 2756. General Directions for House their importance. Thus, in mixing a lime-Painting. Oil paint dries with a gloss, turstone tint, white is the principal ingredient, pentine makes a dead surface; and, in using and red the color of which least is needed, &c. The exact proportions of each depending

2762. Table of Compound Colors, Showing the Simple Colors which Produce them.

Buff......White, Yellow Ochre, Red Claret Red, Umber, Black
Copper Red, Yellow, Black
Dove White, Vermilion, Blue, Yellow
Drab White, Yellow Ochre, Red, Black Flesh...... White, Yellow Ochre, Vermilion Freestone. Red, Black, Yellow Ochre, White French Gray.... White, Prussian Blue, Lake Limestone, White, Yellow Ochre, Black, Red Olive......Yellow, Blue, Black, White Orange Yellow, Red
Peach White, Vermilion Rose White, Madder Lake Sandstone .. White, Yellow Ochre, Black, Red Snuff......Yellow, Vandyke Brown Violet...Red, Blue, White. (See No. 2761.)

2763. To Prepare Whitewashed Walls for Painting. If there should be any cracks in the plastering, and the wash be sound around the cracks, plaster of Paris is commercial hydrochloric acid. The sheets of the best thing to fill them with, as it hardens quickly, does not shrink, and leaves the surface level with the wall. If the plaster of course of from 12 to 24 hours they become Paris sets before it can be worked, wet it with vinegar. The stronger the acid, the slower it will set. If cracks be filled with putty, and the wall be painted in gloss color, the streaks of putty are very apt to be flat (no gloss), and if painted in flat color, the streaks are quite sure to have a gloss. These streaks are quite sure to have a streak of course, will spoil the beauty of the work, but do not affect its durability. filled with plaster of Paris the reversion of gloss never appears, if done as directed below. If the cracks be only in the wash, the latter is loosening from the wall; and if it has not begun to scale, it soon will, and all attempts to fasten it on and paint it will be total loss. If it be loose enough to scrape off, scrape the wall, taking care not to gouge into the original wall. If not loose enough, let it alone until it is. If the wash be thin, solid, and even, it can be painted to look and wear well. When the surface is lumpy, rub the lumps off with a sandstone, or a brick. After a wall has been prepared, as in either of above cases, or if a wall that has never been washed is to different colored paints to produce any desired tint, it is best to have the principal ingredient ounces glue to 1 gallon water). (See No. thick, and add to it the other paints thinner. 2815.) Be sure the glue is all dissolved before When the second coat of glue size (see No. | indifferent which of the oils above mentioned 2763) is dry, paint as follows: Mix the first coat of paint in the proportion of 1 gallon raw linseed oil to 15 pounds white lead, ground in oil, and 1 gill of dryer. Second coat: 1 gallon raw linseed oil, 25 pounds white lead ground in oil and 1 gill dryer. (The lead of the Spanish white he correlated that it ground in oil, and i gill dryer. (The lead should be the best.) Then finish either in work with one good coat of priming. Shade all the coats of paint, as near as you can, to third and fourth coats the same as the first, that is, about the same thickness for a gloss finish, and a little thinner for a flat finish.

Flexible Paint for Canvas. solution while hot with 140 pounds good oil the air.

linseed oil, with sufficient litharge as drier; thin for use with well-boiled linseed oil.

Work. Add to the black paint, made according to the last receipt, sufficient yellow ochre to make the shade of green required. This is preferable for garden work, to the bright green paint generally used, as it does not fade.

Paint for Iron Work. There is 2768. no production for iron work so efficacious as well boiled linseed oil, properly laid on. iron should be first well cleaned and freed from all rust and dirt; the oil should be of should be painted over with this, but the oil must be laid on as bare as possible, and on this fact depends in a great measure the success of the application; for if there be too thick a coat of oil put upon the work, it will skin over, be liable to blister, and scarcely ever get hard; but if iron be painted with three coats of oil, and only so much put on each brushing, we will guarantee that the same will preserve the iron from the atmosphere necessary, we prefer burnt umber to any other pigment as a stain; it is a good hard dryer, and has many other good properties, and mixes well with the oil without injuring it.
2769. Painting in Milk. In conse-

quence of the injury which has often resulted clay, is to be added to the above proporto sick and weakly persons from the smell of tions of the other ingredients. common paint, the following method of paint-ingredients being mingled, the mi ing with milk has been adopted by some workmen, which, for the interior of buildings, besides being as free as distemper from any offensive odor, is said to be nearly equal to oil-painting in body and durability. gallon skimmed milk, 6 ounces lime newly slacked, 4 ounces poppy, linseed, or nut oil, and 3 pounds Spanish white. Put the lime ingredients a binding or petrifying quality. into an earthen vessel or clean bucket, and This paint should always be applied in a hot having poured on it a sufficient quantity of state, and in very cold weather precautions milk to make it about the thickness of cream, are necessary to keep it from freezing. Three add the oil in small quantities at a time, stir-ring the mixture with a wooden spatula. Sufficient. Any color may be obtained by Then put in the rest of the milk, and after- adding the usual pigments to the composition.

2764. To Paint Whitewashed Walls. wards the Spanish white. It is, in general, putting in the Spanish white, be careful that it is finely powdered and strewed gently over gloss or flat color, the same as if it were wood the surface of the mixture. It then, by degrees, imbibes the liquid and sinks to the bottom. Milk skinmed in summer is often the color you wish to finish in. Mix the found to be curdled; but this is of no consequence in the present preparation, as its combining with the lime soon restores it to its fluid state. But it must on no account be sour; because in that ease it would, by uni-Dissolve 2½ pounds good yellow soap, cut in ting with the lime, form an earthy salt, which slices, in 1½ gallons boiling water; grind the could not resist any degree of dampness in

paint.

2770. To Make Paint without Oil or
2766. Durable Black Paint for OutLead. Whiting, 5 pounds; skimmed milk,
Door Work. Grind powdered charcoal in 2 quarts; fresh slacked lime, 2 ounces. Put the lime into a stone-ware vessel, pour upon it a sufficient quantity of the milk to make a Green Paint for Out-Door mixture resembling cream; the balance of ld to the black paint, made active milk is then to be added; and lastly the whiting is to be crumbled upon the surface of the fluid, in which it gradually sinks. At this period it must be well stirred in, or ground as you would other paint, and it is fit for use. There may be added any coloring matter that suits the fancy, to be applied in the same man-ner as other paints, and in a few hours it will become perfectly dry. Another coat may then be added, and so on until the work is done. This paint is of great tenacity, bears rubbing the best quality, and well boiled, without with a coarse cloth, has little smell, even litharge or any dryer being added. The iron when wet, and when dry is inodorous. It when wet, and when dry is inodorous. It also possesses the merit of cheapness, the above quantity being sufficient for 57 yards.

2771. Paint for Old Weather-Boarding, or Boat Bottoms. Take 5 gallons boiled linseed oil, 4 gellons raw oil, 1 gallon benzine, and 80 pounds Rocky Mountain vermilion.

Fireproof Paint. Take a quan-2772. coat as can be made to cover it by hard tity of the best quicklime, and slack with water in a covered vessel; when the slacking is complete, water or skim milk, or a mixture for a much longer time than any other process of both, should be added to the lime, and of painting. If a dark coloring matter be mixed up to the consistency of cream; then there must be added, at the rate of 20 pounds alum, 15 pounds potash, and 1 bushel salt to every 100 gallons of creamy liquor. If the paint is required to be white, 6 pounds plaster of Paris, or the same quantity of fine white All these ingredients being mingled, the mixture must then be strained through a fine sieve, and afterwards ground in a color mill. When roofs are to be covered, or when crumbling brick walls are to be coated, fine white sand Take ½ is mixed with the paint, in the proportion newly of 1 pound sand to 10 gallons of paint; this nut oil, addition being made with a view of giving the does not mix readily, add more water. Flax greatest facility. (See No. 2786.) seed, having the nature of oil, is better than glue, and will not wash off as readily.

Paint for Boilers.

pure it will last.

2775. To Reduce Paint Skins to Oil. length of time, may be made fit for use again adding some soft-soap. by covering them with the sil-soda water and soaking them therein for a couple of days; removing hard putty from a window-sash, then heat them, adding oil to reduce the mixstrain.

Paint. Hay sprinkled with a little chloride lime and alkali will affect the wood and make of lime, and left for an hour in a closed room,

will remove the smell of new paint,

2777. To Kill Knots before Painting. lead; or gutta-percha dissolved in ether; will, method is to cover the knot with oil size, and lay a leaf of silver over it.

2778. To Kill Grease Spots Before with saltpetre, or very thin lime whitewash.

drying hard.

2779. To Make a Sticky Painted Surface Hard. Rub it well in, with a brush, with Japan and turpentine mixed together.

2780. To Prepare Plastered Walls for Painting. Plastered and hard finished walls must have a coating of glue size before paint-

(See No. 2815.)

the skins, cleanings and scrapings of the paint pots, and wipings out of the brushes; these, boiled up in oil, make a cheap and durable coating for outside work. (See No. 2775.)

To Remove Smalt from Old Signs. Spread over it, potash dissolved in water, and then scrape the smalt off. If the potash stands too long before scraping, it may soak into the wood; and paint afterwards put on will not dry well.

2783. To Remove Putty from Glass. Dip a small brush in nitric or muriatic acid, and with it paint over the dry putty that adheres to the broken glasses and frames of the windows. After an hour's interval the putty will have become so soft as to be easily removable.

2784. To Soften Putty in Window Frames. so that the glass may be taken out without fresh made.

2773. To Paint an Old House. Take breakage or cutting, take 1 pound American 3 gallons water and 1 pint flax seed; boil ½ pearlash, 3 pounds quick stone lime, slack the hour; take it off and add water enough to lime in water, then add the pearlash, and make 4 gallons; let it stand to settle; pour make the whole about the consistence of paint. off the water in a pail, and put in enough of Apply it to both sides of the glass, and let it Spanish white to make it as thick as white- remain for 12 hours, when the putty will be wash; then add ½ pint linseed oil; stir it so softened that the glass may be taken out of well and apply with a brush. If the whiting the frame without being cut, and with the

2785. To Remove Hard Putty. This may be effected with a paste of caustic potassa, The best prepared by mixing the caustic alkali, or even paint for boilers is asphaltum dissolved in carbonate of potash or soda, with equal parts spirits of turpentine over a gentle fire. Pul- of freshly burnt quicklime, which has preverize the asphaltum and dissolve as much viously been sprinkled with water, so as to as will be taken up by the turpentine. If cause it to fall into powder. This mixture is then made with water to a paste, and spread on the putty to be softened. Where one ap-Dissolve 1 pound sal-soda in 1 gallon rain plication is not sufficient, it is repeated. In water. The skins that dry upon the top of order to prevent the paste from drying too paint which has been left standing for any quickly, it is well to mix it with less water,

take a square piece of iron, make the same ture to a proper consistence for painting, and red-hot, and run it along the putty till it gets strain.

soft. The putty will peel off without injuring 2776. To Remove the Smell of New the wood-work. Concentrated lye made of

it rot quicker. (See No. 2784.)

2787. To Remove Paint from Cld To destroy paint on old doors, etc., Work. A mixture of glue size and red lead; or shellay the mixture in receipt No. 2784 over lac dissolved in alcohol and mixed with red the whole body of the work which is required to be cleaned, with an old brush (as it either of them, make a good coating for knots, will spoil a new one); let it remain for 12 or but will not stand the sunshine, which will 14 hours, when the paint can be easily scraped draw the pitch through the paint. The best off. These two receipts have been used by a

practical painter and glazier for years.

2788. To Remove Paint from Wood. Where it is necessary to remove paint entire-Painting. Wash over smoky or greasy parts ly, this is generally done by scraping; another way is to soften the paint by passing a If soap-suds are used, they must be washed flat flame over a portion of the surface at a off thoroughly, as they prevent the paint from time, and it can be scraped off easily while hot; but the method most recommended is to lay on a thick coating or plaster of fresh stacked lime mixed with soda; next day, wash it off with water, and it will remove the paint,

leaving the surface clean.

2789. To Remove Paint from Stone. A correspondent of the London Builder, having to clean a pulpit and sedilia in which the 2781. To Economize Paint. Save all carving and tracery were almost filled up with successive coats of paint, was informed that common washing-soda, dissolved in boiling water, and applied hot, would remove it. He found that 3 pounds of soda to a gallon of water, laid on with a common paint-brush, answered the purpose admirably, softening the paint in a short time, so that it was easily removed with a stiff scrubbing-brush; afterward, on adding a few ounces of potash to the solution, it softened more readily than with soda only. The stone in both cases was a fine freestone.

2790. To Soften Hard Putty. Break the putty in lumps of the size of a hen's egg, add a small portion of linseed oil, and water sufficient to cover the putty; boil this in an iron vessel for about 10 minutes, and stir it when hot. The cil will mix with the putty. To soften putty in window frames, Then pour the water off, and it will be like

Τo 2791. Buckets, etc.

with hot, strong lye. 2792. To Pencil or Point Brick Work. The upright as well as the horizontal lines should be drawn with a straight edge, as the least want of uniformity spoils the appearance in sufficient quantity to cover 5 inches deep, of the brick work. White lead mixed with turpentine, and thick enough to set firm, is the best for this purpose.

alsomine and Whitewash. The following receipts include the methods of preparing and applying white and other coatings on walls, etc., as well as the preparatory treatment of the surface to which they are to be applied, and other useful information.

2794. To Prepare Kalsomine. Kalsomine is composed of zinc white mixed with water and glue sizing. The surface to which it is applied must be clean and smooth. For ceilings, mix 1 pound glue with 15 pounds zinc; for walls, I pound glue with 15 pounds zinc. The glue, the night before its use, should be soaked in water, and in the morning liquefied on the fire. It is difficult to prepare or apply kalsomine; few painters can do so successfully. Paris white is often made use of for it, but it is not the genuine article. (See next receipt.) The kalsomining mixture may be colored to almost any required tint by

mixing appropriate coloring matter with it.

2795. To Kalsomine Walls. In case the wall of a large room, say 16 by 20 feet square, is to be kalsomined with two coats, it will require about 1 pound light-colored glue and 5 or 6 pounds Paris white. (See last re-ceipt.) Soak the glue over night, in a tin vessel containing about a quart of warm water. If the kalsomine is to be applied the next day, add a pint more of clean water to the glue, and set the tin vessel containing the glue into a kettle of boiling water over the fire, and continue to stir the glue until it is well dissolved a kettle of boiling water, the glue will not be coloring used. It is difficult to make rules, scorched. Then, after putting the Paris white into a large water pail, pour on hot water, and stir it until the liquid appears like thick milk. Now mingle the glue liquid with the whiting, stir it thoroughly, and apply it to the wall with a whitewash-brush, or with a large paintbrush. It is of little consequence what kind of an instrument is employed in laying on the kalsomine, provided the liquid is spread smoothly. Expensive brushes, made expressly for kalsomining, may be obtained at brush stores. But a good whitewash-brush, having long and thick hair, will do very well. In case the liquid is so thick that it will not flow from the brush so as to make smooth work, add a little more hot water. When applying face the kalsomine, stir it frequently. Dip the brush often, and only so deep in the liquid as to take as much as the hair will retain with- ter. The next day put it into a tin vessel out letting large drops fall to the floor If too with a quart of water, set the vessel in a much glue be added, the kalsomine cannot be kettle of water over a fire, keep it there till laid on smoothly, and will be liable to crack. It boils, and then stir until the glue is dissolv-

Clean Old Paint Cans, ing that cannot be brushed off with a broom

This can be thoroughly done or dry cloth. A thin coat will not crack. lye. 2796. Whitewash for Out-Door Use. Take a clean water-tight barrel, or other suitable cask, and put into it ½ bushel lime. Slack it by pouring boiling water over it, and stirring it briskly till thoroughly slacked. When slacking has been effected, dissolve in water and add 2 pounds sulphate of zinc and 1 of common salt. These will cause the wash to harden and prevent it from cracking, which gives an unseemly appearance to the work. If desirable, a beautiful cream color may be communicated to the above wash, by adding 3 pounds yellow ochre. This wash may be applied with a common whitewash-brush, and will be found much superior, both in appearance and durability, to common whitewash.

2797. Treasury Department White-wash. This receipt for whitewashing, sent out by the Lighthouse Board of the Treasury Department, has been found, by experience, to answer on wood, brick and stone, nearly as well as oil paint, and is much cheaper. Slack bushel unslacked lime with boiling water, keeping it covered during the process. Strain it, and add a peck of salt, dissolved in warm water; 3 pounds ground rice put in boiling water, and boiled to a thin paste; 1 pound powdered Spanish whiting, and a pound of clear glue, dissolved in warm water; mix these well together, and let the mixture stand for several days. Keep the wash thus pre-pared in a kettle or portable furnace, and, when used, put it on as hot as possible, with

painters' or whitewash-brushes.
2798. To Color Whitewash. matter may be put in and made of any shade. Spanish brown stirred in will make red pink, more or less deep according to the quantity. A delicate tinge of this is very pretty for inside walls. Finely pulverized common clay, well mixed with Spanish brown, make a reddish stone color. Yellow ochre stirred in makes yellow wash, but chrome goes further, and makes a color generally esteemed prettier. In all these cases the darkness of the shades and quite thin. If the glue pail be placed in of course is determined by the quantity of because tastes are different; it would be best to try experiments on a shingle and let it dry. Green must not be mixed with lime. The lime destroys the color, and the color has an effect on the whitewash, which makes it crack and peel. When walls have been badly smoked, and you wish to have them a clean white, it is well to squeeze indigo plertifully through a bag into the water you use, before it is stirred in the whole mixture.

2799. Zinc Whitewash. Mix oxide of factories, and at some drug and hardware zine with common size, and apply it with a whitewash-brush to the ceiling. After this, apply in the same manner a wash of chloride of zinc, which will combine with the oxide to form a smooth cement with a shining sur-

The aim should be to apply a thin layer of siz-led. Next put from 6 to 8 pounds Paris white

into another vessel, add hot water, and stir | wash-brush, wet the wall you wish to paper, until it has the appearance of milk of lime. Add the sizing, stir well, and apply in the orarticle), and is very highly recommended by those who have used it. Paris white is sulphate of baryta, and may be found at any drug or paint store.

soda (or potash) to every 5 parts of the white-

wash. (See No. 2816.)
2802. Whitewash for Outside Work. Take of good quicklime 1 a bushel, slack in the usual manner and add 1 pound common salt, 1 pound sulphate of zinc (white vitriol), is then applied the better.

2803. Whitewash for Fences or Out-Buildings. Slack the lime in boiling water, and to 3 gallons ordinary whitewash add 1 pint molasses and 1 pint table salt. Stir the mxiture frequently while putting it on. Two

thin coats are sufficient.

2804. To Mix Whitewash. Pour boiling water on unslacked lime, and stir it occai pint of salt and i ounce of indigo dissolved in water, or the same quantity of

method of cleaning and whitening smoked walls consists, in the first place, of rubbing off all the black, loose dirt upon them, by means of a broom, and then washing them down with a strong sodalye, which is to be afterward removed by means of water to which a little hydrochloric acid has been added. When the walls are dry a thin coating of lime, with the addition of a solution of alum, is to be applied. After this has become perfectly dry the walls are to be kalsomined or coated with a solution of glue and chalk.

2807. To Color, and Prevent Whitewash Rubbing Off. Alum is one of the best additions to make whitewash of lime which will not rub off. When powdered would not do for outside work exposed to much rain. Nothing is easier than to give it any desired color by small quantities of lampblack, brown sienna, ochre, or other coloring

2808. To Paper Whitewashed Walls. The following method is simple, sure, and in-expensive: Make flour starch as you would for starching calico clothes, and, with a white-the patterns match. No general directions

with the starch; let it dry; then, when you wish to apply the paper, wet the wall and dinary way, while still warm. Except on paper both with the starch, and apply the pavery dark and smoky walls and ceilings, a per. Walls have been papered in this way single coat is sufficient. It is nearly equal in that have been whitewashed 10 or even 20 brilliancy to zinc-white (a far more expensive years successively, and the paper has never article), and is very highly recommended by failed to stick. When you wish to re-paper those who have used it. Paris white is sulthe wall, with the brush wet the paper with clear water, and it will come off readily. (See No. 2811.)

2801. Fire-Proof Whitewash. Make ordinary whitewash and add 1 part silicate of move the green that gathers on bricks, pour over the bricks boiling water in which any vegetables (not greasy) have been boiled. Do this for a few days successively, and the green will disappear. For the red wash melt I ounce of glue in a gallon of water; while hot, put in a piece of alum the size of an egg, and 1 gallon sweet milk. The salt and the 1 pound Venetian red, and 1 pound Spanish white vitriol should be dissolved before they brown. Try a little on the bricks, let it dry, are added, when the whole should be thor- and if too light add more red and brown; if oughly mixed with sufficient water to give the too dark, put in more water. This receipt proper consistency. The sooner the mixture was contributed by a person who has used it for 20 years with perfect success.

Paper Hanging. In cities, this is either a trade by itself, or is carried on as an adjunct to the painter's trade. In rural districts, however, there are many sionally while it is slacking, as it will make housekeepers who do this work for them-the paste smoother. To 1 peck of lime add selves. The following receipts are given for

the guidance of housekeepers

2811. To Prepare a Wall for Paper-Prussian blue finely powdered; add water ing. A new unwhitewashed wall will abto make it the proper thickness to put on a sorb the paste so rapidly that, before drying, there will be left too little body of paste on 2805. To Keep Whitewash. Keep the lime covered with water and in a tub which has a cover, to prevent dust or dirt from falling in. If the water evaporates the lime is useless, but if kept covered it will be good as long as any remains.

2805. To Keep Whitewash. Keep the surface to hold the paper. A coating of good glue size, made by dissolving ½ pound of glue in a gallon of water (see No. 2815), or from falling in. If the water evaporates the lime is useless, but if kept covered it will be good as long as any remains.

2805. To Keep Whitewash. Keep the surface to hold the paper. A coating of good glue size, made by dissolving ½ pound to good glue in a gallon of water (see No. 2815), or from falling in. If the water evaporates the lime is useless, but if kept covered it will be good as long as any remains.

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2805. To Keep Whitewash. Keep the surface to hold the paper. A coating of good glue size, made by dissolving ½ pound of glue in a gallon of water (see No. 2815), or from falling in. If the water evaporates the lime is useless, but if kept covered it will be good as long as any remains.

2806. To Whiten Smoked Walls. A by the form of the surface to hold the paper. A coating of part of the surface to hold the paper. A coating of part of the surface to hold the paper. A coating of pound whiten in a gallon of water (see No. 2815), or from falling in. If the water evaporates the lime is useless, but if kept covered it will be good as long as any remains. brush, to remove every particle of loose lime from the surface; after which it should be thoroughly swept down with a broom, and coated with the glue size or thin paste. (See No. 2808.)

2812. Utensils for Paper Hanging. A long table of thin boards cleated together and placed on wooden horses, such as are used by carpenters, a pair of sharp shears with long blades, if possible—a whitewashbrush, a pail for paste, and a yard of cotton cloth, are the implements required. table or board platform should be level on its upper surface to facilitate the distribution of the paste. The latter should be free from lumps, and should be laid on as evenly as possible. It should be made of good sweet chalk is used glue water is also good, but Tye or wheat flour, beaten smooth in cold water before boiling, and should not be allowed to boil more than a minute or two, but should be raised to the boiling point slowly, being continually stirred till it is taken from the

fire. (See No. 2272.) 2813. To Prep To Prepare Paper for Hang-

can be given for this, but a little study at the | outset will often save cutting to waste, and other difficulties. In this matter, as in others, boiling water, yielding a fine, transparent, it is wise to "first be sure you are right, then semi-elastic varnish. When made according go ahead." As soon as the proper way to cut the paper is decided upon, a whole roll, or more, may be cut at once, and the pieces laid, printed side downwards, upon the table, weights being placed upon the ends to prevent The paste should then be applied curling. to the back of the uppermost piece, as expeditiously as possible, as the longer the time employed in this part of the operation, the more tender will the paper get, and the more difficult it will be to hang it properly. About one-quarter of the length should be turned up at the bottom of the strip before hanging; as, without this, the bottom is apt to stick to the wall before the upper part of the strip can be adjusted. If the paper is very thick, both ends must be folded over, so as to meet in the middle. Besides being more convenient for handling, this allows the paper to soften, without the paste getting dry.

2814. To Apply Paper to Walls. The upper end of the piece should then be taken by the corners, and the operator, stepping upon a bench or step-ladder, should barely stick the piece at the top, and in such a manner that the edge shall coincide with the piece previously hung; this can be done heat in a fire-proof melting-pot for 5 or 6 by sighting down the trimmed edge of the piece, while it is held in the hands. The steadily; as much heat is required as is ne-cloth should now be held in a loose bunch, cessary to melt common glass. The melted and the paper smoothed with it from top to bottom, care being taken to work out all air from under the paper, which, if not thoroughly done, will give it a very unsightly blistered appearance. If any air remains under a part that by pulverizing and exposing it to the air, of the strip after it has been hung, a hole it will absorb acidity, and by degrees the forpin, to allow of its escape. A soft flat whiskbrush (such as is used for brushing clothes) is matches, brush once down the centre of the strip as far as the paste is exposed. Then carefully unfold the bottom of the strip, brush down the centre, and smooth the whole by brushing from the centre to the edges, right and left, all the way down, finishing with one sweep down the trimmed edge, to ensure a perfect join. A moist cloth should be always from color. If the wall be uneven or crooked, as is often the case in old houses, it will be difficult to avoid wrinkles, but they can be mostly got rid of by cutting the paper and allowing the cut edges to lap over each other, in places where there would otherwise be a wrinkle. By following these directions the most inexperienced will be able to do a reasonably tidy piece of work, but of course a high degree of skill is only secured by practice.

To Make Glue Sizing. Break 2815. vessel with sufficient cold water to just cover in the foregoing receipts.

Coluble Glass. This is a combination of silica with an alkali, soluble in to Liemen's or Kuhlman's method, under increased pressure and heat, it is unaffected by cold water, and the object painted or covered by the same can only be deprived of its coating by undergoing the same heat and pressure as was required to prepare the original solution. Soluble glass prepared from potash is usually called silicate of potash; that from soda being silicate of soda. The most extensive use which is made, at present, of soluble glass produced after the other methods, is for the adulteration of soap; in fact, such a preparation is a kind of soap, in which the expensive fatty acids are replaced by the cheap silicie acid or sand; but it is a bad soap, very caustic, as the silicic acid but very imperfectly neutralizes the alkali. Another use of water glass is that of hardening cements, mortar. etc., so as to render them impermeable by water.

2817. Fuchs' Soluble Potash Glass. A mixture of 15 parts pulverized quartz, or pure quartz sand, 10 parts of well purified potash, and I part powdered charcoal, may be conveniently employed. These ingredients are to be well mixed and exposed to a strong hours, until the whole fuses uniformly and mass is then taken out by means of an iron spoon, and the melting-pot immediately refilled with a fresh quantity. (At this stage of the process it is said by another authority, must be pricked through the paper with a eign salts will, after frequent agitation and stirring, be completely separated, particularly after pouring over the mass some cold water, better for smoothing the paper than a cloth. which dissolves them, but not the soluble After the top is secured so that the pattern glass.) It is then broken up, pulverized, and dissolved in about 5 parts of boiling water, by introducing it in small portions into an iron vessel and constantly stirring the liquid, replacing the water as it evaporates, by adding hot water from time to time, and continuing to boil for 3 or 4 hours, until the whole is dissolved—a slimy deposit excepted—and until a pellicle begins to form on the surface of the at hand to keep the figures clean and free liquid, which indicates that the solution is in a state of great concentration; it disappears, however, when the liquid is stirred; and the boiling may then be continued for a short time, in order to obtain the solution in the proper state of concentration, when it has a specific gravity of from 1.24 to 1.25 (about 28° Baumé). In this state it is sufficiently liquid to be used in many operations; in some instances it will be necessary to dilute it with more or less water. When evaporated to a syrupy consistence, it can be employed with advantage in but few cases. Very frequently up the glue into small pieces, put it in a it is found contaminated with a little sulphide of potassium, and it becomes necessary to add it; let it soak over night, and in the morning a little oxide of copper or copper scales tothe glue will be soft enough to melt readily wards the end of the boiling, which liberates with a moderate heat, or in a water-bath. a small quantity of potash, but which renders Add water to reduce to the desired con- it rather more suitable for many practical pursistency. This must be applied as directed poses than otherwise. If it is desirable, however, to have a water-glass which is entirely

solved.

Fuchs' Soluble Soda Glass. 2818. a smaller proportion of soda is required. parts dry carbonate of soda, and 3 parts charcoal, may be employed. The mixture fuses

somewhat easier than potash glass. 2819. Buchner's Soluble Soda Glass. Take 100 parts quartz, 60 parts dry sulphate of soda, and 15 to 20 parts charcoal. This is is dissolved in an iron caldron under a pressure of 7 to 8 atmospheres of steam. Liebig when used as a paint. The soda washes out, has recommended infusorial earth in place of and leaves the silex in a pulverized condition, sand, on account of its being readily soluble so that it soon disappears. When, however, tity of boiling water, and then treated by 56 of potash or soda. ounces of dry slacked lime; this lye is concentrated by boiling down to 48° Baumé; in this boiling lye 120 ounces of the prepared infusorial earth are added by degrees, which are readily dissolved, leaving searcely any sediment. It has then to undergo several operations for making it suitable for use, such and separating any precipitate, which by conther be removed from the liquid. This clear liquid is then evaporated to the consistency of syrup; it forms a jelly slightly colored, in boiling water. with plaster of Paris, while the soda glass is

tate is formed, which, in a few days, is de-

affords no precipitate.

To Make Wood Incombustible. The application of soluble glass to wood ren-

ders it almost incombustible.

2822. Double Soluble Glass. A mixture of 3 parts by measure of concentrated soda glass, produce a double water-glass which will answer all practical purposes.

The following preparation is also recommended by Fuchs, as being much easier to fuse. Take 100 parts quartz, 28 parts purified potash, 22 parts neutral dry carbonate of soda, and 6 parts powdered charcoal.

neutral, it requires to be boiled with freshly- 2823. Soluble Glass for Stereo-Chroprecipitated silica as long as any silica is dis- mic Painting. Soluble glass for the use of stereo-chromic painting is obtained by fusing 3 parts of pure carbonate of soda and 2 parts This is prepared in the same way as the potash, of powdered quartz, from which a concentrated glass (see No. 2817), with the exception that solution is prepared, 1 part of which is then a smaller proportion of soda is required. A added to 4 parts of a concentrated and fully mixture of 45 parts by weight of quartz, 23 saturated solution of potash glass solution, by which there is a more condensed amount of silica with the alkalies; this solution has been found to work well for paint. Siemens' patent for the manufacture of soluble glass consists in the production of a liquid quartz by digesting the sand or quartz in a steamsaid to be cheaper than that made with car-boiler tightly closed and at a temperature bonate of soda, and is prepared in the same corresponding to 4 or 5 atmospheres, with the By the addition of some copper common caustic alkalies, which are in this scales to the mixture the sulphur will be separated. Another method is proposed by distance the weight of silica to a thin liquid. Experisolving the fine silex in caustic soda lye. ence has taught that the soluble glass made Kuhlman employs the powdered flint, which in the old way, with an excess of alkali, canin caustic lye; and he proposes to use 120 a closed boiler is used, according to Kuhlman's parts of the earth to 75 parts of caustic soda, or Siemens' method, and a pressure of 7 or 8 from which 240 parts of silica jelly may be atmospheres, which corresponds with a temobtained. His mode is to calcine the earth so perature of some 120° above the boiling point as to become white, and passing it through a of water, the solvent qualities of the latter sieve. The lye he prepares from 75 ounces of are increased to such an extent as to enable it calcined soda, dissolved in 5 times the quanto dissolve a glass containing \frac{1}{2} to \frac{1}{2} the amount

To Dye Wood. Dyeing wood is mostly applied for giving color to veneers, while staining is more generally had reas treating again with lime-water, boiling it course to, to give the desired color to an article after it has been manufactured. In the one tinued boiling forms into balls, and which can case, the color should penetrate throughout, while in the latter the surface is all that is essential. After the veneers are cut, they should be allowed to lie in a trough of water for 4 or feels dry and not sticky, and is readily soluble 5 days before being put into the copper; as The difference between the water brings out abundance of slimy matpotash and soda soluble glass is not material; ter, which, if not thus removed, would prevent the first may be preferred in whitewashing the wood taking a good color. After this purifying process, the veneers should be dried in more fluidly divisible.

2820. To Distinguish Potash and then ready for the copper. By this simple method, the color will strike much quicker, Soda Soluble Glass. By adding 1 volume method, the color will strike much quicker, of rectified alcohol to a concentrated solution and be of a brighter hue. It would also add of soluble potash glass, a gelatinous precipi- to the quality of the colors, if, after the veneers have boiled a few hours, they are taken posited at the bottom of the vessel in a solid out, dried in the air, and again immersed in mass. The addition of alcohol to soluble soda the coloring copper. Always dry veneers in glass converts it into a gelatinous mass, but the open air, for fire invariably injures the

colors. (See Nos. 2837, etc.) 2825. Fine Black Dye for Wood. Put 6 pounds chip logwood into the copper, with as many veneers as it will conveniently hold, without pressing too tight; fill it with water, and let it boil slowly for about 3 hours; then potash soluble glass, and 2 parts concentrated add 1 pound powdered verdigris, 1 pound copperas, and 4 ounces bruised nut-galls; fill the copper up with vinegar as the water evaporates; let it boil gently 2 hours each day till

the wood is dyed through.

2826. Fine Yellow Dye for Wood. Reduce 4 pounds of barberry root by sawing, to dust, which put in a copper or brass trough; through much sooner.

2827. Bright Yellow Dye for Wood. To every gallon of water necessary to cover Boil 2 pounds logwood, either in chips or powthe veneers, add 1 pound French berries; boil der, in 4 gallons water, with the veneers; after the veneers till the color has penetrated boiling till the color is well struck in, add by through; add some brightening liquid (see degrees vitriolated indigo (see No. 2829), till next receipt) to the infusion of the French the purple is of the shade required, which berries, and let the veneers remain for 2 or 3 may be known by trying it with a piece of hours, and the color will be very bright.

aquafortis, add 1 ounce gram tin, and a prece purple.

of sal-ammoniac the size of a walnut; set it purple.

2835. Orange Dye for Wood. Let the size of the methods the cork out, from time to time: in the course veneers be dyed by either of the methods of 2 or 3 days it will be fit for use. This will given for a fine deep yellow (see Nos. 2826 be found an admirable liquid to add to any and 2827), and while they are still wet and color, as it not only brightens it, but renders saturated with the dye, transfer them to the

2829. Fine Blue Dye for Wood. Into penetrates equally throughout. a clean glass bottle put I pound oil of vitriol, and 4 ounces best indigo pounded in a mortar Expose any quantity of old iron, or, what is (take care to set the bottle in a basin or earth- better, the borings of gun-barrels, &c., in any en glazed pan, as it will effervesce), put the convenient vessel, and from time to time veneers into a copper or stone trough; fill it sprinkle them with muriatic acid diluted in rather more than 1 with water, and add as 4 times its quantity of water, till they are much of the vitriol and indigo (stirring it very thickly covered with rust; then to every about) as will make a fine blue, which you 6 pounds add 1 gallon of water in which has may know by trying it with a piece of white been dissolved 2 ounces salt of tartar (carpaper or wood; let the veneers remain till the bonate of potassa); lay the veneers in the dye has struck through. The color will be copper, and cover them with this liquid; let much improved if the solution of indigo in it boil for 2 or 3 hours till well soaked, then vitriol be kept a few weeks before using it. to every gallon of liquor add 4 pound of The color will also strike better if the veneers green copperas, and keep the whole at a through, and left for a few hours to dry par-

Proceed as in either of the previous receipts to plied from Paris with veneers, colored throughproduce a yellow; but instead of adding out their mass, were necessitated by the late aquafortis or the brightening liquid, add as war to produce them themselves. Mr. Pusmuch vitriolated indigo (see last receipt) as cher states that experiments made in this will produce the desired color.

2831. Bright Red Dye for Wood. To 2 pounds genuine Brazil dust, add 4 gallons toached, until the veneers were soaked for 24 water: put in as many veneers as the liquor hours in a solution of caustic soda containing will cover; boil them for 3 hours; then add 2 10 per cent. of soda, and boiled therein for 1 ounces alum, and 2 ounces aquafortis, and hour; after washing them with sufficient wa-

then add a sufficient quantity of the brightening liquid (see No. 2828), till the color is of a the color; it must then, after dyeing, be dried satisfactory tint; keep the whole as warm as between sheets of paper and subjected to presyou can bear your finger in it, till the color sure to retain its shape. has sufficiently penetrated. The logwood 2838. To Dye Ve chips should be picked from all foreign substances with which it generally abounds, as hours in a hot decoction of logwood (1 part bark, dirt, &c.; and it is always best when logwood to 3 water), removing them after fresh cut, which may be known by its aping matter.

Rose Colored Dye for Wood. completely dyed black. duces a fine pink or rose-color on 2839. To Dye Veneers Yellow. Monier produces a fine pink or rose-color on wood of cellulose, especially that of the ivory solution of 1 part picric acid in 60 water, nut, by immersing it first in a solution of with the addition of so much ammonia as to

add 4 ounces turmeric and 4 gallons water, water, in which it remains for several hours, then put in as many white holly veneers as when it is placed in a bath of corrosive sublithe liquor will cover; boil them together for mate, 135 grains to the pint. When properly 3 hours, often turning them; when cool, add dyed it is washed and varnished over. We 2 ounces aquafortis, and the dye will strike should think that less poisonous materials might be found to answer the same purpose.

2834. Bright Purple Dye for Wood. paper; let it then boil for I hour, and keep the 2828. Liquid For Brightening and liquid in a milk-warm state till the color has Setting Colors. To every pint of strong penetrated the veneer. This method, when aquafortis, add 1 ounce grain tin, and a piece properly managed, will produce a brilliant

it less likely to fade from exposure to the air, bright red dye (see No. 2821), till the color

2836. Silver-Gray Dye for Wood.

be boiled in plain water till completely soaked moderate temperature till the dye has suffi-

ciently penetrated.
2837. To Dye Veneers. Some manutially, previous to immersing them in the dye. 2837. To Dye Veneers. Some manu-2830. Bright Green Dye for Wood. facturers of Germany, who had been supdirection gave in the beginning colors fixed only on the outside, while the inside was unkeep it lukewarm until it has struck through. ter to remove the alkali, they may be dyed 2832. Red Dye for Wood. To every throughout their mass. This treatment with pound of logwood chips, add 2 gallons water; put in the veneers, and boild as in the last; wood, whereby it becomes, in the moist state, elastic and leather-like, and ready to absorb

2838. To Dye Veneers Black. neers treated as in last receipt and left for 24 the lapse of that time, and, after drying them pearing of a bright red color; for if stale, it will look brown, and not yield so much coloring matter.

superficially, putting them into a hot solution of copperas (1 part copperas to 30 water), ing matter.

iodide of potassium, 12 ounces per pint of become perceptible to the smell, dyes veneers

by subsequent varnishing. Before dyeing,

given in No. 2837.

2840. To Dye Veneers Rose-Color. Coralline dissolved in hot water, to which a little caustic soda and one-fifth of its volume of soluble glass has been added, produces rose-colors of different shades, dependent on the amount of coralline taken. (See No.

2841. To Dye Veneers Silver-Gray. The only color which veneers will take up, without previous treatment of soda, is silvergray, produced by soaking them for a day in a solution of 1 part copperas to 100 parts water. peel; boil again, then strain, and add 1 pint

Stain Wood. Staining wood is altogether a different process from dyeing it, and requires no preparation generally speaking, its application differs very little from that of painting. When carefully done, and properly varnished, staining has a very beautiful appearance, and is much less

Use. Boil ½ pound chip logwood in 2 quarts water, add 1 ounce pearlash, and apply it hot the polish diminishes in brilliancy, it may be to the work with a brush. Then take 2 pound logwood, boil it as before in 2 quarts water, and add 1 ounce verdigris and 1 ounce green copperas; strain it off, put in 1 pound logwood in 4 quarts water, add a rusty steel filings; with this, go over the double handful of walnut-peel or shells; boil

work a second time.

2844. Take a solution of sulphate of iron (green it boiling hot. copperas), and wash the wood over with it 2 or 3 times; let it dry, and apply 2 or 3 coats dissolved in water (an onnee to a quart), of a strong hot decoction of logwood; wipe over the first stain. the wood, when dry, with a sponge and wa-

ter, and polish with linseed cil.

2845. To Stain Wood Light Mahogany Color. Brush over the surface with diluted nitrous acid, and when dry apply the 4 ounces; common soda, 1 ounce; spirit of

Color. Boil 1 pound madder and 2 ounces logwood in 1 gallon water; then brush the wood well over with the hot liquid. When

drachms pearlash in 1 quart water.

To Stain Mahogany Color. Pure Socotrine aloes, 1 ounce; dragon's blood, ½ ounce; rectified spirit, 1 pint; dissolve, and apply 2 or 3 coats to the surface of the wood; finish off with wax or oil tinged with alkanet. Or: Wash over the wood with when dry, with a brush dipped in the brightstrong aquafortis, and when dry, apply a coat ening liquid (see No. 2828), form red veins, in of the above varnish; polish as last. Or: imitation of the grain of rosewood, which of the above varnish; polish as last. Or: Logwood, 2 ounces; madder, 8 ounces; fustic, 1 ounce; water, 1 gallon; boil 2 hours, and

vellow, which color is not in the least affected quart; dry and polish as before. Or: Logwood, 1 part; water, 8 parts. Make a decocthe veneers require the preparatory treatment tion and apply it to the wood; when dry, give it 2 or 3 coats of the following varnish: dragon's blood, 1 part; spirits of wine, 20 parts. Mix.

2848. Beechwood Mahogany. Dissolve 2 ounces dragon's blood and 1 ounce aloes in 1 quart rectified spirit of wine, and apply it to the surface of the wood previously well polished. Or: Wash over the surface of the wood with aquafortis, and when thoroughly dry give it a coat of the above varnish. Or: Boil 1 pound logwood chips in 2 quarts water, and add 2 handfuls of walnut

good vinegar; apply as above.
2849. Artificial Mahogany. following method of giving any species of wood of a close grain the appearance of mahogany in texture, density, and polish, is said to be practiced in France with success. The surface is planed smooth, and the wood is before the stain be applied. In preparing the then rubbed with a solution of nitrous acid; stain, but little trouble is required; and, I ounce dragon's blood is dissolved in nearly then rubbed with a solution of nitrous acid; a pint of spirits of wine; this, and \(\frac{1}{8} \) ounce carbonate of soda, are then to be mixed together and filtered, and the liquid in this thin state is to be laid on with a soft brush. likely to meet with injury than japanning.

This process is to be repeated, and in a short 2843. Black Stain for Immediate interval afterwards the wood possesses the external appearance of mahogany. restored by the use of a little cold-drawn linseed oil.

2850. Fine Black Stain. Boil 1 it up again, take out the chips, add 1 pint To Stain Wood Like Ebony. best vinegar, and it will be fit for use; apply This will be improved by applying a hot solution of green copperas

2851. To Imitate Rosewood. Boil 1 pound logwood in 3 pints water till it is of a very dark red; add 1 ounce salt of tartar (carbonate of potassa). While boiling hot, stain the wood with 2 or 3 coats, taking care following, with a soft brush: dragon's blood, that it is nearly dry between each; then, with a stiff flat brush, such as is used by the paintwine, 3 pints. Let it stand in a warm place, ers for graining, form streaks with the black shake it frequently, and then strain. Repeat stain above named (see last receipt), which, the application until the proper color is if carefully executed, will be very nearly the appearance of dark rosewood; or, the black To Stain Dark Mahogany streaks may be put in with a camel's hair pencil, dipped in a solution of copperas and verdigris in a decoction of logwood. A handy brush for the purpose may be made out of a flat dry, go over the whole with a solution of 2 brush, such as is used for varnishing; cut the sharp points off, and make the edges irregular, by cutting out a few hairs here and there, and you will have a tool which will accurately imitate the grain.

To Imitate Rosewood. 2852. with the black stain (see No. 2850); and

will produce a beautiful effect.

New Stain for Wood. 2853. apply it several times to the wood boiling manganate of potassa is recommended as a hot; when dry, slightly brush it over with a rapid and excellent stain for wood. A solusolution of pearlash, 1 ounce, in water, 1 tion of it spread upon pear or cherry wood,

brown color, which, after careful washing, drying, and oiling, assumes a reddish tint upon

being polished.

Wood Brown. Dr. Stolzel adds another to the many receipts already given for staining wood of a brown color. First of all paint boiling 1 part of catechu (Cutch or Gambier) boards, bridges, and flutes, proceed as directed with 30 parts water and a little soda. This is in staining (see No. 2850); the wood, howallowed to dry in the air, and the wood is ever, ought to be either pear, apple, or boxthen painted over with another solution made of 1 part biehromate of potash and 30 parts water. By a little difference in the mode of treatment, and by varying the strength of the to ebony. solutions, various shades of color may be given with these materials, which will be permanent and tend to preserve the wood.

2855. To Darken Light Mahogany. When furniture is repaired, it frequently happens that the old wood cannot be matched, and therefore the work presents a patched appearance. To prevent this, wash the pieces introduced, with soap-lees, or dissolve quicklime in water, and use in the same manner; but be careful not to let either be too strong, or it will make the wood too dark; it is best, therefore, to use it rather weak at first, and, if not dark enough, repeat the process till the wood is sufficiently darkened.

2856. Red Stain for Bedsteads and Common Chairs. Archil will produce a very good stain of itself, when used cold; but if, after 1 or 2 coats being applied and suffered to get almost dry, it is brushed over with a hot bing it with a smooth piece of hard wood, it solution of pearlash in water, it will improve the color.

2857. To Improve the Color of any Stain. Mix in a bottle 1 ounce of nitric acid, 1 tea-spoonful muriatic acid, 2 ounce grain tin, and 2 ounces rain water. Mix it at least 2 days before using, and keep the bottle

well corked.

2858. To Stain Musical Instruments used for furniture; we therefore give the following receipts for preparing and applying those most commonly employed for such pur-

Fine Crimson Stain. 2859. an hour; strain it, and add 1 ounce cochineal; boil it again gently for 1 an hour, and it will for an hour, and pass over the work previous

to the red stain.

2860. Fine Green Stain. To 3 pints strongest vinegar, add 4 ounces best verdigris pounded fine, \(\frac{1}{2}\) ounce sap green, and \(\frac{1}{2}\) ounce indigo. Distilled vinegar, or verjuice, improves the color.

2861. Purple Stain. To 1 pound good chip logwood, put 3 quarts water; boil it well for an hour; then add 4 ounces pearlash, and

2 ounces pounded indigo.
2862. Fine Blue Stain. Into 1 pound phial put 4 ounces indigo, and proceed as premises adapted for the purpose.

above directed in dyeing purple.
2863. Bright Yellow Stain. need not be stained yellow, as a small piece of oil varnishes, one of the most important

for a few minutes, leaves a permanent dark of aloes put into the varnish will have the desired effect.

2864. Fine Black Stain. As a general thing, when black is required in musical in-2854. Stolzel's Method of Staining struments, it is produced by japanning; the work being well prepared with size and lampblack, apply the black japan (see No. 2322), after which, varnish and polish. But as a over the wood with a solution made by black stain is sometimes required for fingerwood; the latter is preferable; and if it be rubbed over, when dry, with a rag or flannel dipped in hot oil, it will give it a gloss equal

> 2865. To Stain Boxwood Brown. Hold the work to the fire, that it may receive a gentle warmth; then take aquafortis, and with a feather pass over the work until it changes to a fine brown (always keeping it near the fire); then oil and polish it.

> 2866. Cane Staining. By the following simple process, canes and similar sticks may be stained a rich brown: Dissolve a few grains sulphate of manganese in sufficient water to take it up; moisten the surface of the cane with it, and hold it over the fiame of a spirit lamp close enough to search it. By care, the whole surface may be brought to a uniform rich brown, or beautifully variegated by heating some parts more than others; thus varying the color from white to the deepest black. The color will appear dull at first; but, on oiling it with raw linseed oil, and rubwill be beautifully developed. Give the cane no other finish, unless it be another oiling some days after the first.

arnish. Varnishes may be conveniently divided into two kinds, viz., and Fancy Boxes. Fancy work necessitates spirit and oil varnishes. Concentrated alcohol the employment of brighter colors than those is used as the solvent in the former, and fixed or volatile oils, or mixtures of the two, for the latter. The specific gravity of alcohol for the purpose of making varnishes should not be greater than 0.820 (that is, not below about Boil 1 93 per cent). Camphor is often dissolved in pound good Brazil dust in 3 quarts water for it to increase its solvent powers. The oil of turpentine, which is the essential oil chiefly employed, should be pure and colorless. Pale be fit for use. If required of a more scarlet drying linseed oil is the fixed oil generally tint, boil & ounce saffron in 1 quart of water used for varnishes, but poppy and nut oil are also occasionally employed. Among the substances employed in the manufacture of varnishes are turpentine, copal, mastich, lac, elemi, sandarach, anime, and amber, to impart body and lustre; benzoin to impart scent; gamboge, turmeric, saffron, annotto, and Socotrine aloes, to give a yellow color; dragon's blood to give a red tinge; asphaltum to give a black color and body; caoutchouc to inpart body, toughness, and elasticity. Varnish constitutes a distinct branch of manufacture, and many of them can be advantageously oil of vitriol (sulphuric acid) in a clean glass or safely made only on the large scale on

2868. Preparation of Linseed Oil for Wood Making Oil Varnishes. In the manufacture

points is the use of good drying oil. Linseed | two-thirds filled. However, a piece of board of holding 150 gallons, and gradually heated on would only increase the mischief, to a gentle simmer for 2 hours, to expel moisperson who attends the varnish-pot best boiled or drying oil.

still further clarifying is deemed advisable, it is placed in a copper pan holding from 80 to 100 gallons, and heat gradually applied till the scum rises, after removing which the oil is allowed to boil for about 2 hours, when it is dosed with calcined magnesia, in the proportion of an ounce to every 4 gallons of oil, but added by degrees and with occasional stirrings. briskly for about an hour, and then, the furtill fit for use.

2870, Clarified Linseed Oil for Varcalcined white vitriol, and keep the oil at the above temperature for ½ hour; then remove clear oil, which should stand for a few weeks before it is used for varnish.

2871. Wilks' Refined Linseed Oil. In 236 gallons oil pour 6 pounds oil of vitriol, and stir them together for 3 hours; then add the oil into a copper boiler, with an equal are cold draw off the water, and let the oil stand to settle for a few weeks before using.

2872. Boiled Oil for Varnishes. Mix 100 gallons linseed oil and 7 pounds calcined white vitriol (sulphate of zine) in fine powder, in a clean copper boiler; heat it to 2855 Fahr., and keep it at that temperature for at least an hour, constantly stirring it; then allow it to cool; in 24 hours decant the clear portion, and in 3 or 4 weeks rack it for use.

Cautions Respecting the Making of Varnish. As heat in many cases is necessary to dissolve the gums used in making varnish, the best way, when practicable, is to use a sand-bath, which is simply placing the vessel containing the varnish, in another

oil for this purpose should be pale, limpid, sufficiently large to cover the top of the vesbrilliant, scarcely odorous, and mellow and sel should always be at hand in case the spirits sweet to the taste. 100 gallons of such oil should take fire; as also a wet wrapper, in are put into an iron or copper boiler capable case it should be spilled, as water itself thrown person who attends the varnish-pot should ture; the scum is then carefully removed, and have his hands covered with gloves, and, if 14 pounds scale litharge, 12 pounds red lead, and 8 pounds powdered umber (all carefully dried and free from moisture), are gradually sprinkled in; the whole is then kept well stirred, to prevent the dryers sinking to the stirred, to prevent the boiling is continued at a varnish, unless in large quantities, as there grantle best for 2 hours level to the first stirred. gentle heat, for 3 hours longer; the fire is are many stores where it may be had very next withdrawn, and, in 24 to 36 hours, the good, and at a fair price; but in the country, seum is carefully removed, and the clear oil where the freight is an object, and you candecanted from the bottom. This forms the not depend upon the genuineness of the article, est boiled or drying oil.

2869. Clarified Oil for Varnish. When mechanic how to make it; when it is availboiled oil is used for making varnish, and a able, it is best to purchase it. The varnish generally sold for varnishing furniture is white hard varnish.

il Varnishes. These, the most durable and lustrous of varnishes, are composed of a mixture of resin, oil, and spirit This being completed, the oil is again boiled of turpentine. The oils most frequently employed are linseed and walnut; the resins nace being drawn, allowed to cool. When chiefly used are copal and amber, and some the temperature is sufficiently reduced, it is other gums. The drying power of the oil havremoved to leaden cisterns, where it is stored ing been increased by litharge, red lead, or by sulphate of lead, and a judicious selection of copal having been made, it is necessary, acnishes. Heat in a copper boiler 50 gallons cording to Booth, to bear in mind the following of linseed oil to 280° Fahr.; add 2½ pounds of facts before proceeding to the manufacture of varnish: 1. That varnish is not a solution, but an intimate mixture of resin with boiled it from the fire, and in 24 hours decant the oil and spirit of turpentine. 2. That the resin must be completely fused previous to the addition of the boiled or prepared oil. 3. That the oil must be heated from 250° to 300°. 4. That the spirit of turpentine must be added gradually, and in a thin stream, while the 6 pounds fullers' earth, well mixed with 14 mixture of oil and resm is still hot. 5. That pounds hot lime, and stir for 3 hours. Put the varnish be made in dry weather, otherwise moisture is absorbed, and its transparency and quantity of water, and boil for 3 hours; then drying quality impaired. Of late years it has extinguish the fire, and when the materials been practically demonstrated that not only is there no necessity for boiling the oil and gum after incorporation, but that the produce is equally good if the turpentine be added just before the mixture becomes too cold to permit of a perfect amalgamation. In fact, it is now acknowledged that the oil need not be raised to a higher temperature than that at which the gum employed fuses, and that when the two are mixed the lowest possible degree of heat which will insure their incorporation, is sufficient to secure all the results desired. By this method a large quantity of the turpentine formerly lost in evaporation is saved, and there is, moreover, less risk of fire. The heating vessel must be of copper, of a capacity at least one-third more gallons than the mixture filled with sand and placed on the fire. This to be introduced into it, with a riveted and will generally be sufficient to prevent the not a soldered bottom. To promote the adspirits catching fire; but to avoid such an acmixture of the copal with the hot oil, the cocident (which not unfrequently happens), it pal-carefully selected and of nearly uniform will be best to take a vessel sufficiently large fusibility—is separately heated with continto prevent any danger of spilling its contents; luous stirring over a moderate charcoal fire indeed, the vessel should never be more than kept constantly supplied with fuel, without disturbing the kettle until the completion of the mixture with the oil. If the copal is melted in the hot oil, the resulting varnish is more 1 pint. Render the amber, placed in an iron colored and less drying. There is, however, pot, semi-liquid by heat; then add the oil, great care required in fusing the copal by it- mix, remove it from the fire, and, when cooled self; for if the heat is too much prolonged, a little, stir in the turpentine. Or: To the the resin becomes pitchy, and gives an inferior amber, melted as above, add 2 ounces of varnish. Constant stirring is requisite to prescheduc, and proceed as before. This varnish vent adhesion to the sides and bottom of the is rather dark, but remarkably tough. The vessel, and consequent scorching. The pieces first form is the best. It is used for the same of copal should be of uniform fusibility; the purposes as copal varnish, and forms an exdifferent varieties, therefore, should not be cellent article for covering wood, or any fused together, for that which melts first is other substance not of a white or very pale apt to scorch before the more refractory are color. It dries well, and is very hard and fused. If it is desired to mix different varied durable. ties, they should be fused separately and then mixed in fluid state. When the resin is thoroughly melted, the hot oil is to be ladled in gradually during constant stirring. To deterpint. Melt the amber, as before described, mine when sufficient oil has been added, a then add the asphaltum, previously mixed drop must be now and then taken out and with the cold oil, and afterwards heated very cooled upon a glass plate. If, on cooling, it is hot; mix well, remove the vessel from the limpid and wax-like, penetrable with the fire, and, when cooled a little, add the turpennail without eracking, the proportion of oil is tine, also made warm. Each of the above sufficient; if, however, it is hard and brittle, two varnishes should be reduced to a proper more oil is required. Some resins absorb consistence with more turpentine if it be more oil than others. The spirits of turpen-tine should be heated, and added in a thin stream to the oil and resin while still hot. Some manufacturers omit the whole or part Care must be taken not to add the turpentine of the asphaltum, and use the same quantity while the mixture is too hot, as too much of of clear black resin instead, in which case the the turpentine will be lost by evaporation; color is brought up by lampblack reduced to but if the mixture gets too cool it becomes an impalpable powder, or previously ground sticky, the addition of turpentine must be replaced over the fire made in this way lacks, however, that richand heated gradually up to 600°. Limpidity ness, brilliancy, and depth of blackness imis thus restored, and, upon removal from the fire, sufficient turpentine should be added to impart the proper consistence; but this extra

heating injures the quality of the varnish.

2875. Common Oil Varnish. Resin,
3 pounds; drying oil, ½ gallon; melt together, and add, when removed from the fire,
2 quarts warm oil of turpentine.

2876. Oil Copal Varnish. Pale hard copal, 2 pounds; fase, add hot drying oil, 1 to dry and harden quicke pint; boil as before directed, and thin with oil of turpentine, 3 pints, more or less, as found necessary. Very pale. Dries hard in 2882. Tough Amb 12 to 24 hours.

2877. Best Pale Carriage Varnish. Pale African copal, 8 pounds; fuse, and add clarified linseed oil, $2\frac{1}{2}$ gallons; boil till very stringy, then add dried copperas and litharge, of each 1 pound; boil as before directed, thin with oil of turpentine, 5½ gallous; mix while hot with the following varnish, and immediately strain the mixture into a covered vessel: Gum anime, 8 pounds; clarified linseed oil, 2½ gallons; dried sugar of lead and litharge, of each ‡ pound; boil as before, thin with oil of turpentine, 5½ gallons, and mix it while durable oil varnish is required. The paler hot with the last varnish as above directed. kind is superior to copal varnish, and is often Dries in 4 hours in summer and 6 in winter. Used for the wheels, springs, and carriage parts of coaches and other vehicles, and by house painters, decorators, &c., who want a strong, quick-drying, and durable varnish.

of turpentine, 5½ gallons.

2880. Black Amber Varnish. parted by asphaltum.
2881. Pale Amber Varnish. Amber,

pale and transparent, 6 pounds; fuse, add hot clarified linseed oil, 2 gallons; boil till it strings strongly, cool a little, and add oil of turpentine, 4 gallons. Pale as copal varnish; soon becomes very hard, and is the most durable of oil varnishes; but requires time before it is fit for polishing. When wanted to dry and harden quicker, drying oil may be substituted for linseed, or dryers may be

2882. Tough Amber Varnish. Amber, 1 pound; melt, add Scio turpentine, } pound; transparent white resin, 2 ounces; hot linseed oil, 1 pint; and afterwards sufficient oil of turpentine as above. Very tough,

2883. Hard Amber Varnish. Melted amber, 4 ounces; hot boiled oil, 1 quart; as

before.

2884. Very Pale Amber Varnish. Very pale and transparent amber, 4 ounces; clarified linseed oil and oil of turpentine, of each 1 pint; as before. Amber varnish is suited for all purposes where a very hard and mixed with the latter to increase its hardness and durability.

2885. Varnish for Waterproof Goods. tters, decorators, &c., who want a Let 4 pound of India-rubber, in small pieces, ck-drying, and durable varnish.

Ordinary Carriage Varnish.

add 2 pounds boiled oil, and let the whole Sorted gum anime, 8 pounds; clarified oil, 3 boil for 2 hours over a slow coal fire. When gallons; litharge, 5 ounces; dried and powdissolved, add again 6 pounds boiled linseed dered sugar of lead and white copperas, of oil and 1 pound litharge, and boil until an oreh 4 current heil and that the company of the company o each 4 ounces; boil as last, and thin with oil even liquid is obtained. It is applied warm, and forms a waterproof coating.

India-Rubber Oil Varnish. and 1 pound oil of turpentine. Dries well.
2887. India-Rubber Oil Varnish.

oil varnish, previously heated, and after part of Canada balsam is sometimes added for settling, 1 pound oil of turpentine, also the finer parts.

2898. Varnish for Frames for Hot into bottles. Dries slowly.

in 1 pound of rectified resin oil, and add 2 heat. This curious mixture is said to produce pounds linseed oil varnish, boiling hot. Very a pliable and transparent varnish. pounds linseed oil varnish, boiling hot. Vesuitable to prevent metals from oxidation.

2889. Varnish. In a wide-mouthed glass bottle, digest 2 ounces India-rubber in fine shavings, with 1 pound oil of turpentine, during 2 days, without shaking, then stir up with a wooden of this solution with 2 pounds of very white copal oil varnish, and 1½ pounds well boiled linseed oil; shake and digest in a sand-bath, until they have united in a good varnish. For morocco leather.

cold. Then heat again, slowly, add 1 pound as in the last receipt, thinning down with oil linseed oil varnish, heated, and filter.

2891. Flexible Varnish. Dissolve 1 pound of gum damar, and ½ pound Indiaturpentine, by means of a water-bath. Add 1 pound hot oil varnish and filter.

2892. Hair Varnish. Dissolve 1 part of clippings of pigs' bristles, or of horse-hair, in 10 parts of drying linseed oil by heat. Fibrous materials (cotton, flax, silk, &c.). imbued with the varnish and dried, are used as a substitute for hair-cloth.

African copal, and pour on it 4 pints hot add turpentine. Apply with an ordinary paint clarified linseed oil; in 3 or 4 minutes, if it brush. feels stringy, take it out of the building, where there is no fire near, and when it has cooled to 1500 mix in 3 gallons oil of turpentine of the same temperature, or sufficient to bring it to a due consistence.

Bessemer's Varnish for Me-2894. tallic Paint. This is made with 8 pounds copal, 2½ gallons drying oil, and 25 gallons oil of turpentine. These are made into a varnish nearly as directed for Cabinet Varnish (see No. 2893); and afterwards mixed with a gallon of slacked lime and left for 3 The clear portion is then days to settle. drawn off, and 5 parts of varnish mixed with 4 parts of bronze powder.

2895. Mahogany Varnish. Sorted gum anime, 8 pounds; clarified oil, 3 gallons; each 1 pound; boil till it strings well, then cool a little, thin with oil of turpentine, $5\frac{1}{2}$ gallons, and strain.

2896. Italian Varnish. Boil Scio tur-Take 4 ounces India-rubber in fine shavings, dissolve in a covered jar by means of a sandbath, in 2 pounds of crude benzole, and then clear white resin, of each 6 ounces; oil of mix with 4 pounds hot linseed oil varnish, turpentine, 1 quart, dissolved. Used for prints.

engravings, &c.
2897. Varnish for Printers' Ink. Cut up 1 pound India-rubber into small pieces every 10 pounds clarified linseed oil add 5 and diffuse in 1 pound sulphuric ether, which pounds clear black resin, and 1 pound oil of is done by digestion in a glass flask on a turpentine. It is then ready for mixing with sand-bath. Then add 1 pound pale linseed lampblack or other coloring matter. A twelfth

Beds. Mix 4 ounces pulverized white cheese, 2888. Gutta-Percha Oil Varnish. 2 ounces slacked lime, and 4 ounces boiled lin-Clean ‡ pound gutta-percha in warm water seed oil. Mix, and add 4 ounces each whites from adhering impurities, dry well, dissolve and yolks of eggs, and liquefy the mixture by

2899. Brunswick Black. Champagnat's India-Rubber asphaltum, 45 pounds; drying oil, 6 gallons; In a wide-mouthed glass bottle, and litharge, 6 pounds. Boil for 2 hours, then and manage, o pounds. Bon for 2 nours, then add dark gum-amber (fused), 8 pounds; hot linseed oil, 2 gallons. Boil for 2 hours longer, or until a little of the mass, when cooled, may be rolled into pills. Then withdraw the spatula. Add another pound oil of turpen-tine, and digest, with frequent agitation, heat, and afterwards thin down with 25 gal-until all is dissolved. Then mix 1½ pounds lons oil of turpentine. Used for iron-work,

2900. Black Varnish for Iron-Work. Asphaltum, 48 pounds, fuse; add boiled oil, 10 gallons; red lead and litharge, of each 7 pounds; dried and powdered white copperas, 2890. Flexible Varnish. Melt 1 pound 3 pounds. Boil for 2 hours; then add dark of resin, and add gradually ½ pound India-rubber in very fine shavings, and stir until oil, 2 gallons; boil for two hours, proceeding of turpentine, 30 gallons. Used for the same purposes as Brunswick black.

2901. Colored Oil Varnishes. Oil varrubber in very small pieces, in 1 pound oil of nishes are colored by grinding with them the most transparent colors, as distilled verdigris for green, &c. Spirit varnishes are also colored with dragon's blood, gamboge, &c. (See No. 2867.)

2902. Varnish for Grates. pounds common asphaltum, fused in an iron pot, add 1 pint hot boiled linseed oil; mix well and boil for some time. When partially cooled 2893. Cabinet Varnish. Fuse 7 pounds add 2 quarts oil of turpentine. If too thick,

Spirit Varnishes. The spirit employed for making spirit varnishes should not be less than 95 per cent. In preparing and using them, they should be kept at a distance from a candle or other flame. Respecting the gums (resins) employed, it may be useful to mention that shellae is rendered more soluble by being powdered and exposed for a long time to the air (see No. 2006); sandarach gives hardness to varnishes; mastich gives a gloss to a solution of other gums; benzoin still more, but its color is objectionable; anime readily dissolves, but renders the varnish long in drying; copal and amber are scarcely soluble in spirit, but are litharge and powdered dried sugar of lead, of rendered partially so by other gums, and also by being previously fused by heat. (See No. 2867.) Shellae gives a durable varnish, objectionable only on account of its color, which

(See No. 1723, &c.) In the preparation of and, after shaking the mixture and letting it spirit varnishes, care should be taken to pre-stand for a few hours longer, a thoroughly vent the evaporation of the alcohol as much good copal varnish is obtained. as possible, and also to preserve the portion that evaporates. On the small scale, spirit This is merely clear pale resin dissolved in varnishes are best made by maceration in close bottles. In order to prevent the agglutination of the resin, it is often advantageously mixed with clear silicious sand, or pounded glass, by which the surface is much increased, and the solvent power of the menstruum promoted. The tendency of a spirit varnish to chill or give a rough surface may be destroyed by adding to the varnish a little gum sandarach, oil of lavender or concentrated ammonia.

2904. To Dissolve Copal in Spirit.

dissolving in alcohol.

2905. Copal Varnish. Take 1 ounce copal and ½ an ounce shellac; powder them well, and put them into a bottle or jar containing 1 quart spirits of wine. Place the mixture in a warm place, and shake it occasionally, until the gums are completely dissolved; and, when strained, the varnish will be fit for use. The above is the simplest, and therefore the most usual method of making common copal varnish; but it may be prepared in a variety of ways, where particular uses may be required.

2906. To Dissolve Gum Shellac. Everybody who has ever to deal with bleached gum shellac knows the difficulties and the loss of time attending its solution. To obviate this, the gum is broken into small pieces and macerated in a stoppered bottle with ether; after swelling up sufficiently, the excess of ether is poured off, when it will dissolve quite

readily in alcohol. (See No. 2903.)
2907. Copal Varnish. Take 3 ounces copal, melt by a gentle heat, and drop it into water (see No. 2904); then dry it and powder it fine. Place a bottle containing 1 pint oil copal, 7½ ounces; camphor, 1 ounce; alcohol of turpentine in a water-bath, and add the of 95 per cent., 1 quart; dissolve, then add powdered copal to the turpentine in small portions at a time; in a few days decant the clear. Dries slowly, but is very pale and durable, and is used for pictures, &c. In making this varnish, it frequently happens that the gum will not melt as readily as it ought, which, in general, is owing to the turpentine not being sufficiently rectified; but, when that is good, it will always succeed. It is best also to let the turpentine be exposed for some time in the sun, in a corked bottle, that the watery particles may be gradually dissipated. The bottle should not be stopped quite tight.

290**8**. Copal Varnish, according to Professor Boettger should be made by first dissolving 1 part by weight of camphor, in 12 parts ether; when the camphor is dissolved, 4 parts best copal resin, previously reduced to an impalpable powder, are added to the ethereal camphor solution placed in a wellstoppered bottle. As soon as the copal appears to be partly dissolved, and has become swollen, 4 parts strong alcohol, or methylated | pulverizing 1 ounce sandarach, 1 ounce mas-

may be rendered paler by charcoal. (Beasley.) | spirits, and ‡ part oil of turpentine are added,

2909. Common Turpentine Varnish. oil of turpentine; usually 5 pounds resin to 7

pounds of turpentine.

2910. Crystal Varnish. Picked mastich, 4 ounces; rectified spirit, 1 pint; animal charcoal, 1 ounce. Digest and filter.

2911. Mastich Picture Varnish. Very pale and picked gum mastich, 5 pounds; glass pounded as small as barley, and well washed and dried, 21 pounds; rectified turpentine, 2 gallons; put them into a clean 4 gallon stone or tin bottle, bung down securely, Take the copal and expose it in a vessel and keep rolling it backwards and forwards formed like a cullender to the front of a fire, pretty smartly on a counter or any other solid and receive the drops of melted gum in a place, for at least 4 hours; when, if the gum basin of cold water; then dry them well in a is all dissolved, the varnish may be decanted, temperature of about 95° Fahr. By treating strained through muslin into another bottle, copal in this way it acquires the property of and allowed to settle. It should be kept for 6 or 9 months before use, as it thereby gets both tougher and clearer. Very fine.

2912. Mastich Varnish. Mastich, 8 pounds; turpentine, 4 gallons; dissolve by a gentie heat, and add pale turpentine varnish, 2

gallon.

2913. Best Mastich Varnish. Gum mastich, 6 ounces; oil of turpentine 1 quart; dissolve. Mastich varnish is used for pictures, &c.; when good, it is tough, hard, brilliant, and colorless.

2914. Varnish for Paintings. Take mastich, 6 ounces; pure turpentine, ½ ounce; camphor, 2 drachms; spirits of turpentine, 19 ounces; add first the camphor to the turpentine; the mixture is made in a water-bath: when the solution is effected, add the mastich and the spirits of turpentine near the end of the operation; filter through a cotton cloth. 2915. Tingry's Essence Varnish.

Mastich in powder, 12 ounces; pure turpentine, 1½ ounces; camphor, ½ ounce; powdered glass, 5 ounces; rectified oil of turpentine, 1

quart. 2916. White Toy Varnish. mastich, 2 ounces; Venice turpentine, 1 ounce; dissolve and strain. Very white, drying, and capable of being polished when hard. Used for toys.

2917. White Varnish. Sandarach, 8 ounces; mastich, 2 ounces; Canada balsam, 4 ounces; alcohol, 1 quart. Used on paper,

wood, or linen.

2918. Best White Hard Varnish. Rectified spirits of wine, 1 quart; gum sandarach, 10 ounces; gum mastich, 2 ounces; gum anime, ½ ounce, dissolve these in a clean can, or bottle, in a warm place, frequently shaking When the gum is dissolved, strain it through a lawn sieve, and it is fit for use.

2919. Mordant, or Transfer Varnish. Mastich in tears, 6½ ounces; resin, 12½ ounces; pale Venice turpentine (genuine) and sandarach, of each 25 ounces; alcohol, 5 pints; dissolve as before. Used for fixing engravings or lithographs on wood, and for gilding, silvering, &c. (See No. 2928.)

2920. Map Varnish is prepared by

2935.

warm gently, and shake together till dissolved. that every part is covered; when dry, the varnish is brushed over it.

of 1 part easter oil to 32 parts colledion, makes the benzole. a good varnish; it dries rapidly and does not 2930. penetrate the paper. This yarnish will do graphs. very well for coating maps, lists, labels, etc., ounce chloroform. (Sec No. 2929.) and it will keep for years. If, after a repeated 2931. Brilliant Amber Spirit Vared coating, white spots should appear, moist-nish. Fused amber. 4 ounces; sandarach stantiv

2923. Varnish to Imitate the Chinese. wine. Shake the bottle from time to time, and set it over some hot embers to mix for 24 through a fine cloth, and throw away what tate by chlorine, and dissolve in rectified remains upon it. Let it settle for 24 hours; spirit. (See Nos. 2933 to 2935.) separate gently the clear part in the upper part of the bottle, and put into another phial; coatings.

2924. Varnish for Drawings and Lithographs. Take of dextrine, 2 parts; alcohol, ½ part; water, 2 parts. These should be prepared previously with 2 or 3 coats of thin starch or rice boiled and strained through

a cloth. (See No. 2927.)

To Purify Dextrine. gives a method for rendering dextrine pure, or at least freer from foreign odor and taste. For this purpose he dissolves 10 parts of good dextrine, with stirring, in 18 of cold distilled water, allows the mixture to stand for some once and a half to twice its volume of alcohol fortius (see No. 1439); after some hours the liquor is separated from the pasty mass, which ty of water, and spread on glass or porcelain to dry at a temperature not exceeding 140°

Le Blond's Varnish. Keep 4 pounds balsam of copaiba warm in a sand or water bath, and add 16 ounces copal (previ-

2927. De Sylvestre's Dextrine Var-

but people are apt to think they fail, from the quantity of alcohol. Add 11 drachms oil of

tich, 4 ounce elemi, dissolving them in \(\frac{1}{2}\) ounce circumstance that it is only partially soluble. of Venice turpentine, and adding to it a solu- Take some broken amber, reduce to a coarse tion of 4 ounces shellac, and 3 ounces oil of powder, and place in a bottle with rather more layender, in 12 ounces alcohol. (See No. than enough chloroform to cover them well; shake often, and in a few days, by pouring a 2921. Canada Varnish. Clear balsam drop or two of the clear liquid on a glass plate. of Canada, 4 ounces; camphene, 8 ounces; a varnish of good body, which gives a strong glaze, may be obtained. Or an amber varnish For maps, drawings, &c., they are first sized may be made as follows: Take of amber, 3 over with a solution of isinglass, taking care ounces; benzole, 50 ounces; heat the amber in a closed vessel to a temperature of about 570° Fahr. When it begins to soften and 2922. Collodion Varnish. The addition swell, emitting white fumes, then dissolve in

Amber Varnish for Photo-Dissolve 3 to 4 grains amber in 1

en them with ether, and they will vanish in- and mastich, of each 4 ounces; highly rectified spirit, 1 quart. Expose to the heat of a sandbath, with occasional agitation, till dissolved. Put 4 ounces powdered gum-lac, with a piece (The amber is fused in a close copper vessel, of camphor about the size of a hazelnut, into having a funnel-shaped projection, which a strong bottle, with 1 pound good spirits of passes through the bottom of the furnace by which the vessel is heated.)

2932. Hare's Colorless Varnish for hours, if it be in winter; in summer time it **Photographs**. Dissolve shellae by heat in may be exposed to the sun. Pass the whole 8 parts of water and 1 of pearlash. Precipi-

spirit. (See Nos. 2933 to 2935.)

2933. Bookbinders' and Colorless

Varnish. Mr. A. Schmidt gives the followthe remains will serve for the first layers or ing directions for making these and several other beautiful varnishes: For 1 pound good shellac take 4 ounces crystallized carbonate of soda, and 11 gallons water; put the whole in a clean iron or copper vessel of double the capacity, and, under constant stirring, bring it to boiling over a slow fire. The shellac will dissolve, and, if it is intended to make colorless French varnish (see No. 2935), the solution has to be run through a woolen cloth. For brown bookbinders' varnish, or a colorless varnish for maps, photographs, etc., the solution has to boil for about an hour longer, but only simmering, and then to cool very slowly days, decants and strains it from the sediment, without stirring; better let it stand over The clear liquid is then to be mixed with night, and let the fire go out under it. In the morning a wax-like substance will be found on the surface of the solution, and the other impurities of the shellac as a deposit on the is then once more dissolved in a small quanti- bottom of the vessel. The solution is likewise to be run through a woolen cloth and then to be filtered. (See No. 2934.) To make a transparent brown varnish—bookbinders' varnish—this filtered solution has to be precipitated with diluted sulphuric acid (1 part acid to 20 parts water), the precipitate collected on a ously fused and coarsely powdered), by single coarse muslin cloth, and washed out with cold ounces, daily, and stir it frequently. When dissolved add a little Chio turpentine. (See No. 24.) Then fill a stone or wooden vessel with boiling water, and throw the precipitate in it; it will directly soften and stick tonish. Dextrine, 2 parts; water, 6 parts: tate in it; it will directly soften and stick torectified spirit, 1 part. (See No. 2924.)
2928. Transfer Varnish. For transhands, doubled up, melted, and drawn out till ferring and fixing engravings or lithographs it assumes a fine silky lustre, then drawn out on wood, and for gilding, silvering, etc. Dissolve 4 ounces mastich (in tears), and 4 ounces sandarach, in 1½ pints rectified spirit; add the Bookbinders' Varnish, dissolve 1 part ½ pint pure Canada balsam. (See No. 2919.) of the precipitate in 2½ parts 95 per cent. al-2929. To Dissolve Amber. There is cohol. To make the Colorless Varnish, no difficulty in dissolving amber in chloroform, dissolve 1 part of the precipitate in the same

lavender to each pint. The colorless varnish will look like whey, but more transparent.

filter for shellac, take a small wooden keg, re-lequal parts, and mix thoroughly. Give the move the top and bottom, and fasten to one articles 2 coats of size before varnishing side a piece of muslin; on the muslin bring 2939. Varnish for Card-Work, Basabout 4 inches fine, washed sand, and on top kets, &c. Take black, red, or any other of the sand a layer of clean straw; then colored sealing-wax, according to fancy; pour the solution into the filter and let it break it into small pieces, and add enough run through. Should the first portion run rectified or methylated spirit to cover it; let through be not perfectly clear, like red French the vessel stand near the fire for 2 days until some clean water on the filter to wash the re-

maining solution out.

2935. French Transparent Colorless work, card work, baskets, &c. arnish. To make white French transparent 2940. Water Lac V Varnish. To make white French transparent colorless varnish for maps, the solution shellac, 5 ounces; borax, 1 ounce; water. 1 (see No. 2933) has to be bleached. pound good English chloride of lime, dissolve an excellent vehicle for water colors, inks, it in 14 pounds cold water, triturating the &c.; when dry it is waterproof. lumps well; let it subside, and decant the clear fluid; add 7 pounds of water to the residue, and, when subsided, add the clear liquor to the other; precipitate this liquor with a solution of carbonate of soda, let the carbonate of lime settle, and decant the clear chloride of these in copal varnish thinned with turpenting the settle, and decant the clear chloride of these in copal varnish thinned with turpenting the settle, and decant the clear chloride of these in copal varnish thinned with turpenting the settle and the clear chloride of the settle and the c sumes a greenish color and a smell of chlorine to the solution to be bleached, under constant stirring, till all the color is gone. French polish will look like milk. Then precipitate with dilute sulphuric acid, exactly as the solution for bookbinders' varnish, and treat the precipitate in the same manner, in hot water. (See No. 2933.) All iron must be carefully avoided as soon as the chlorine liquor is addmediately to the paper, but the latter should first receive a coat of boiled and strained starch.

2936. porphyry slab; next grind it with a muller to can be removed entire. of more spirit as required; put the paste into attached to transparent objects, a marble mortar, make an emulsion with $3\frac{1}{2}$ 2943. Aniline Black V a marble mortar, make an emulsion with $3\frac{1}{2}$ 2943. Aniline Black Varnish. An pints gradually added, and strain through aniline black varnish, of recent Parisian muslin. Used as a varnish for paintings; production, is the following: Dissolve 62 when dry, a hot iron is passed over it, or heat drachms avoirdupois of aniline blue, 12 is otherwise evenly applied, so as to fuse it, drachms of fuchsine, and 4½ drachms of and render it transparent; when quite cold it | naphthaline yellow, in 1 quart alcohol. The is polished with a clean linen cloth. The most whole is dissolved by agitation in less than 12 protective of all varnishes. Many ancient hours. One application renders an object paintings owe their freshness at the present ebony black; the varnish can be filtered, and day to this varnish.

2938. Varnish for Paper Hangings, Maps, Prints, &c. Take of genuine pale 2934. Filter for Shellac. To make a Canada balsam and rectified oil of turpentine,

wine, it has to be brought back to the filter, it is quite dissolved. Give the article 2 coats When nothing more will run through, pour of size before varnishing. The size is made by dissolving parchment cuttings in boiling water. This is a most useful varnish for fret-

The pint; digest at nearly the boiling point, until bleaching fluid is made as follows, and the dissolved; then strain. Equal to the more proportions are for 1 pound of shellac: Take 1 costly spirit varnish for many purposes; it is

soda; wash the sediment out with water, and tine. A thorough grinding of this mixture add the clear liquid to the former, put it in a must be made for the purpose of intimately high stone jar, and give it a rotary motion incorporating the ingredients, as otherwise it with a wooden stick, pouring in at the same will not be transparent. A preponderance of time very diluted sulphuric acid, till it as-chromate of potash gives a yellowish shade chromate of potash gives a yellowish shade to the green, and a deficiency increases the is perceptible. Then add some of this liquid amount of blue. This varnish, thus colored, produces a very striking effect in japanned goods, paper-hangings, etc., and can be made very cheaply.

2942. Aniline Transparent Var-The aniline colors are particularly nishes. well adapted for the manufacture of transparent lacs, which possess great intensity even avoided as soon as the chlorine liquor is add in very thin films, and are hence very suitaed. Dissolve 1 pint of the above in 3 pints of ble for coloring glass or mica. The process 95 per cent. alcohol, and do not add any oil recommended by F. Springmuhl is to preof lavender, as in No. 2933. For photographs pare separately an alcoholic solution of this solution is too strong; 1 part of bleached bleached shellae or sandarch, and a concenshellae to 6 parts alcohol will answer. For trated alcoholic solution of the coloring materials and the same of the coloring materials and the same of the maps the solution should not be applied im- ter, which last is added to the lac before using it; the glass or mica to be coated being slightly warmed. Colored films of great beauty may also be obtained, according to Springmuhl, Wax Varnish, or Milk of from colored solutions of gun cotton in ether, Wax. Pure white wax, 1 pound; melt the coloring matter being here dissolved in with as gentle a heat as possible, and warm alcohol and ether. The collodion film has its spirit of wine (90 per cent.), 1 pint; mix per-lelasticity greatly increased by the addition of feetly, and pour the liquid out upon a cold some turpentine oil; and when applied cold, The colored films a perfectly smooth paste, with the addition may now be cut into any pattern, and again

will never deposit afterwards. 2937. Wax Varnish for Furniture. Wax, 3 ounces; oil of turpentine, 1 quart; Prints and Pictures. Dilute ‡ pound dissolve by a gentle heat. Used for furniture. Venice turpentine with a gill, or thereabouts, the former; so that it is brought to the con- bon. This dries as soon as laid on. sistence of milk. Lay 1 coat of this on the shine like glass. If it is not satisfactory, lay

on another coat.

To Make the Design of a 2945. Print Appear in Gold. After having laid on both sides of the print one coat of the varnish described in No. 2944, in order to make it transparent, let it dry a little while; then, before it is quite dry, lay some gold in leaves on the wrong side of the print, pressing it gently on with a cotton pad. By these means, all parts where these leaves have been laid will appear like massive gold on the When this is all thoroughly dry, right side. lay on the right side of it one coat of the varnish described above, and it will then be as good as any crown glass. A pasteboard may be put behind the print, to support it better in its frame.

2946. Clear Gutta-Percha Solution. Cut gutta-percha into thin strips and put it in makes a thick paste. This paste is then small globules appear on the surface. Then placed in very hot water, and kneaded with strain through a wire sieve. the fingers. After considerable manipulation the gutta percha loses much of its color, and nisher's Amalgam. Melt 4 ounces grain tin if this process is repeated, becomes very nearly colorless, having only a pale straw tint. A chloroform solution may then be made of it very fine with white of egg or varnish, and any strength, which is useful for many purposes-when thin, as a substitute for court

Varnish. Rubber does not dissolve easily enough to give a varnish by simply placing it in a bottle with the solvent. Sulphuric it must be pure rectified ether, and not the perfectly dry, must be rubbed with a bur-mixture of ether and alcohol which is sold for nisher to render it smooth and glossy. ether in many drug stores. It also must be with hot benzole (from coal tar, not benzine from petroleum), it swells to 30 times its former bulk; and if then triturated with a rubber and gutta-percha when hot. turpentine was used in the solutions or var-

of spirits of wine. If too thick, a little more cut small, in 1 pint of either chloroform, sulof the latter; if not enough, a little more of phuric ether (washed), or bisulphuret of car-

2949. India-Rubber Varnish. Digest right side of the print, and, when dry, it will in a closed vessel, at a gentle heat, 1 ounce India-rubber shavings in 1 pint of rectified mineral naphtha, cr benzole; then strain it. This dries very badly, and never gets perfectly hard.

2950. Tough India-Rubber Varnish. Dissolve by heat I ounce India-rubber in I quart of drying oil. This dries very tough in

about 48 hours.

2951. Flexible Varnish. Boil 3 ounces dried white copperas, 3 ounces sugar of lead, and 8 ounces litharge, in 1 gallon linseed oil; stir constantly until it strings well, then cool slowly and decant the clear portion. If too thick, thin with quick-drying linseed oil.

2952. Colpin's India-Rubber Varnish. India-rubber in small pieces, washed and dried, are fused for 3 hours in a close vessel, on a gradually heated sand-bath. On removing from the sand-bath, open the vessel and stir for 10 minutes, then close again, and rea glass bottle, and add as much chloroform as peat the fusion on the following day, until

Metallic Varnish, or Var-2953. (see Index) with 1 ounce bismuth; add 1 ounce quicksilver, and stirtill cold; then grind apply this metallic varnish to the figure to be

coated.

2947. Solvents for India-Rubber bronzed, is made by dissolving 1 ounce of and Gutta-Percha to Make Flexible shellac and 1 or 2 drachms of dissolving varnish. Rubber does not dissolve in a quart of alcohol, and filtering the solution through blotting paper into a bottle, which must be kept closely corked. This ether is one of its regular solvents, but then varnish, being laid on the barrel, and become

2955. Submarine Varnish. Resin. 2 pure rubber, and not the sulphur-vulcanized parts; galipot, 2 parts; essence of turpentine, article. The pure rubber must be cut into 40 parts. Melt the above, and add, in the small pieces, soaked in the ether in a warm form of very fine powder, and well mixed, place for about 24 hours until they are swollen sulphide of copper, 18 parts; regulus of antiup, and then it must be kneaded in a mortar. mony, 2 parts. This varnish is said to proIn such a way rubber varnishes may be made tect wood from worms, and to prevent the ad-In such a way rubber varnishes may be made tect wood from worms, and to prevent the actom of ships. It also preserves iron from ox-

2956. Varnish for Iron. The following pestle, and pressed through a sieve, it affords is a method given by M. Weiszkopf, of proa homogeneous varnish, which being applied ducing upon iron a durable black shining varby a flat edge of metal or wood to cloth, pre-nish: Take oil of turpentine, add to it, drop pares it for forming waterproof cloth. Chloro- by drop, and while stirring, strong sulphuric form and the bisulphuret of carbon dissolve acid, until a syrupy precipitate is quite formed, India-rubber and gutta-percha in the cold. and no more of it is produced on further ad-Turpentine disintegrates and dissolves India- dition of a drop of acid. The liquid is now The repeatedly washed away with water, every fixed oils also readily dissolve them with the time renewed after a good stirring, until the aid of heat. When India-rubber remains water does not exhibit any more acid reaction sticky after working it, it is a proof that the on being tested with blue litmus paper. The temperature was too high, or that too much precipitate is next brought upon a cloth filter, and, after all the water has run off, the syrupy nishes; turpentine rubber varnish has natu- mass is fit for use. This thickish deposit is rally a tendency to dry sticky; benzole or the painted over the iron with a brush; if it hap-fixed eils are better. (See No. 2248.) pens to be too stiff, it is previously diluted 2948. Flexible Varnish for Balloons, with some oil of turpentine. Immediately oc. Digest cold, 11 ounces India-rubber, after the iron has been so painted, the paint is burnt in by a gentle heat, and, after cool-| water; if it soaks into the paper, it is too ing, the black surface is rubbed over with a piece of woolen stuff dipped in, and moistened with linseed oil. According to Weiszkopf, this varnish is not a simple covering of the surface, but it is chemically combined with the metal, and does not, therefore, wear or peel off the iron, as is the case with other

paints and varnishes.

2957. Brilliant French Varnish for oots and Shoes. Take \(\frac{3}{4}\) of a pint spirits Boots and Shoes. of wine; 5 pints white wine; 1 pound powdered gum senegal; 6 ounces loaf sugar; 2 ounces powdered galls; 4 ounces green copperas. Dissolve the sugar and gum in the When dissolved, strain; then put it on a slow fire, being careful not to let it boil. In this state put in the galls, copperas, and the alcohol, stirring it well for five minutes. Then remove from the fire, and, when nearly cool, strain through flannel, and bottle for use. It is applied with a pencil brush. If not sufficiently black, a little sulphate of iron, and half a pint of a strong decoction of log-wood, may be added, with 16 ounce pearl-

2958. Varnish for Fastening the Leather on Top Rollers in Factories. Dissolve 23 ounces of gum-arabic in water and a like amount of isinglass dissolved in brandy, and it is fit for use.

2959. Varnish for Engraving on Glass. Wax, 1 ounce; mastich, ½ ounce; as-Varnish for Engraving on

phaltum, 1 ounce; turpentine, 1 drachm.

2960. Etching Varnishes. White wax, 2 ounces; asphaltum, 2 ounces. Melt the wax in a clean pipkin, add the asphaltum in powder, and boil to a proper consistence. Pour it into warm water, and form it into balls, which must be kneaded, and put into taffeta for use. Or: white wax, 2 ounces; Burgundy pitch, ½ ounce; black pitch, ½ ounce. Melt together, and add by degrees 2 ounces powdered asphaltum, and boil it till a drop cooled on a plate becomes brittle.

2961. Etching Fluid for Copper.

Aquafortis, 2 ounces; water, 5 ounces. Mix.

2962. Callot's Eau Forte for Fine
Touches. Dissolve 4 parts each of verdigris, alum, sea salt, and sal ammoniae, in 8 parts vinegar; add 16 parts water, boil for a minute, and let it cool.

2963. Etching Fluid for Steel. Iodine, 1 ounce; iron filings, ½ drachm; water, 4 ounces. Digest till the iron is dissolved. Or: pyroligneous acid, 4 parts by measure; alcohol, 1 part. Mix, and add 1 part double aquafortis (specific gravity 1.28). Apply it from 1½ to 15 minutes.

2964. To Make Colored Prints Resemble Oil Paintings. Take of Canada balsam, 1 ounce; spirit of turpentine, 2 ounces; mix them together. Before this composition is applied, the drawing or print should be sized with a solution of isinglass in water, and, when dry, the varnish should be applied with a camel's-hair brush.

To Varnish Drawings, or any **2965.** Kind of Paper or Card Work. Dissolve 1 ounce best isinglass in about 1 pint water, by simmering it over the fire; strain it and the inside of the cask is fired, so as to through fine muslin, and keep it for use. Try remove the spirit and leave only the lining of the size on a piece of paper moderately warm. charcoal and shellac; it is then coated again

thin, and needs more isinglass; it should merely dull the surface. Then give the drawing 2 or 3 coats, letting it dry between each, being careful (particularly in the first coat) to bear very lightly on the brush (which should be a flat camel's-hair), from which the size should flow freely; otherwise, the drawing may be damaged. Then take the best mastich varnish, and with it give at least 3 coats. This is the method used by many eminent artists, and is found superior to any that has been tried.

2966. Varnish for Shoes. Put 1/2 pound gum shellac, broken up in small pieces, into a quart bottle or jug, cover it with alcohol, cork it tight, and put it on a shelf in a warm place; shake it well several times a day, then add a piece of camphor as large as a hen's egg, shake it well, and in a few hours shake it again and add tounce lampblack. If the alcohol is good it will all be dissolved in 2 days; then shake and use. If it gets too thick, add alcohol, pour out 2 or 3 tea-spoonfuls in a saucer, and apply it with a small paint brush. If the materials are all good it will dry in about 5 minutes, giving a gloss equal to patent leather, and will be removed only by wearing it off. The advantage of this preparation over others is, it does not strike into the leather and make it hard, but remains on the surface, and yet excludes the water almost perfectly. The same preparation is admirable for harness, and does not

lampblack preparations. 2967. Varnish for Harness. Take 95 per cent. alcohol, 1 gallon; white pine turpentine, 1½ pounds; gum shellac, 1½ pounds; Venice turpentine, 1 gill. Let these stand in a jug in the sun or by a stove until the gums are dissolved, then add sweet oil, 1 gill; and lampblack, 2 ounces; rub the lampblack first with a little of the varnish. This varnish is better than the old style, from the fact that its polish is as good, and it does not crack when the harness is twisted or knocked about.

soil when touched, as is usually the case with

2968. Flexible Japan Black for Leather. Burnt umber, 8 ounces; true asphaltum, 3 or 4 ounces; boiled linseed oil, 1 gallon; grind the umber with a little of the oil; add it to the asphaltum, previously dissolved in a small quantity of the oil by heat; mix, add the remainder of the oil; boil, cool, and thin with a sufficient quantity of oil of turpentine.

Inflexible Japan Black for 2969. Leather. Shellac, 1 ounce; wood raphtha, 4 ounces; lampblack to color; dissolve. 2970. Varnish or Enamel for Coating

the Insides of Casks. A new application of charcoal has recently been made in England for the manufacture of a permanent enamel, or varnish for coating the insides of casks. The charcoal, which is made from the wood of Salix Alba (white willow), is reduced to a very fine powder, and mixed with proper proportions of shellae and methylated spirit. When ready for use it is laid on with a brush, If it glistens, it is too thick, and requires more and fired a second time, after which it is

allowed to stand a short time before being regular coat. This must be done as quickly some of our principal brewers.

varnishes to various surfaces. This requires experience and care, both in the

manner of applying them.

Varnishing. Mix, with good whiting, such

2973. Finishing Walnut. For filling walnut wood, there are many compounds in use, several of them under patents; that: same time produces a fine finish, is the most simple of them all, being nothing but fine rye tine, ground fine in a paint mill, and slightly

colored with burnt umber.

2974. To Varnish Walnut Furniture. In dressing over old furniture, the first thing soda and water, to remove all effects of grease from sweaty hands, which will prevent varnish from flowing freely or hardening well. If the work requires refilling, rve flour, wheat flour, corn starch, or Paris white, ground fine of shellae should be laid on and rubbed Some use white wax reduced in turpentine; but what is better is a compound of equal parts, by weight, of whiting, plaster of Paris, pumice stone, and litharge, to which may be added a little French yellow, asphaltum, vandyke brown, and terra di Sienna. Mix with rubbed bright with the palm of the hand. 1 part Japan, 2 of boiled oil, and 3 of turpen2977. To Keep Brushes in Or minutes, then rub off clean. Let it harden 2 or 3 days, then rub smooth, and, if required, bristles. repeat the process. When the filling is satis-brushes of fine bristles; lac varnishe factory, finish with linseed oil, put on with a flowed on with camel's-hair brushes. any fine fabric.

2975.

used. This composition is said to form a as possible; and yet not quickly enough to perfect enamel, and, while it prevents any cause the varnish to foam or bubble as it chance of leakage, it preserves the casks in an leaves the brush, always taking care not to extraordinary manner. It answers admirably pass the brush twice over the same place, if it for beer and acids, and is largely adopted by can possibly be avoided. Let it stand to dry in a moderately warm place, that the varnish may not chill. Varnish must always be applied in a moderately warm room, where the air is dry and free from dust; and care must be taken never to apply a second coat until arnishing. The art of applying the former one has become quite dry. It requires practice to find out how much varnish to take in the brush. Enough must be left selection of appropriate varnishes, and in the on an upright surface to ensure a perfect coating; but too much will settle downwards To Finish Walnut Wood for before it sets and make unsightly ridges as it dries. On a horizontal surface, a trifle more colors as will produce as near as possible the varnish can be applied than on an upright color of the wood to be filled. This mixture one, but not much more; as a too thick coatvarnish can be applied than on an upright to be dry. Then give the wood a good coat ing, even if it cannot run, will dry neither soft rag or other soft substance, rub this in (which you will prove by pressing your well. Wipe off all superfluous material. Let dry thoroughly, and varnish. This mode is hard enough); then, with the first three far superior to sizing. of oil, and sprinkle the mixture over the work hard nor smooth. After giving the work hard enough); then, with the first three fingers of the hand, rub the varnish until it chafes, and proceed over that part of the work you mean to polish, in order to take out all the streaks or partial lumps made by the which discolors the wood the least, and at the brush; then give it another coat, and let it stand a day or two to harden. The best simple of them all, being nothing but fine rye vessel for holding varnish is sold at color flour mixed with boiled oil, Japan and turpenshops, called a varnish pan. It is constructed of tin, with a false bottom; the interval between the two bottoms is filled with sand, which, being heated over the fire, keeps the varnish fluid, and it flows more readily from to be done is to wash it over with lime, or the brush. There is a tin handle to it, and the false bottom slopes from one end to the other, which causes the varnish to run to one end. It has also a wire fixed across the top, to wipe the brush against.

2976. To Polish Varnished Surfaces. in oil and turpentine, will do; but 1 or 2 coats | To give the highest degree of lustre to varnish after it is laid on, as well as to remove the smooth before applying the varnish. Work marks of the brush, it undergoes the operation finished in oil, without varnish, should be of polishing. This is performed by first rubfilled with a harder substance than starch, bing it with very finely powdered pumice stone and water; afterwards, patiently, with an oiled rag and Tripoli until the required polish is produced. The surface is then cleaned off with soft linen cloths, cleared of all greasiness with powdered starch, and then

2977. To Keep Brushes in Order. tine. Grind fine in a mill. Lay the filling The brushes used for varnishing are either on with a brush, rub it in well, let it set 20 flat in tin, or round, tied firm to the handle, flat in tin, or round, tied firm to the handle, and made either of camel's-hair or very fine Oil varnishes are applied with brushes of fine bristles; lac varnishes are brush; wipe off, and rub to a polish with fine necessary to be very careful in cleaning them cotton; finish with a silk handkerchief, or after being used; for, if laid by with the var-When the furniture is nish in them, they are soon spoiled. Therecleaned and filled, proceed as directed in the fore, after using, wash them well in spirits of wine or turpentine, according to the nature of To Varnish Furniture. When the varnish; after which they may be washed the work is quite clean, fill up all knots or out with hot water and soap, when they will blemishes with cement of the same color, be as good as new, and last a great while See that the brush is clean, and free from with care. The spirits that are used for loose hairs; then dip it in the varnish, stroke cleaning may be used to mix with varnish for it along the wire raised across the top of the the more common purposes, or the brushes varnish pot, and give the work a thin and may be cleaned merely with boiling water containing a little washing soda, and strong stone, free from stony particles, and cut the

yellow soap.

To Restore Furniture. the best preparation for cleaning picture the grain will be much smoother, and will not frames and restoring furniture, especially that raise so much. Repeat the process, and the disfigured surface, but restores wood to its original color, and leaves a lustre upon the surface. Put on with a woolen cloth, and when dry, rub with woolen.

olishing. The beauty of cabinetwork depends upon the care with which it is finished. Some clean off with give a dingy shade to all light-colored woods. This should, therefore, be a previous care. Again, some workmen polish with rotten stone, others with putty-powder, and others with common whiting and water; but Tripoli will be found to answer the best.

2980. To Polish Varnish is certainly a tedious process, and considered by many as a matter of difficulty. Put 2 ounces powdered 2985. Tripoli into an earthen pot or basin, with niture. water sufficient to cover it; then, with a piece gar, put a handful of common salt and a of fine fiannel four times doubled, laid over a table-spoonful of muriatic acid into it, and piece of cork rubber, proceed to polish the varnish, always wetting it well with the bottle, and warmed when wanted for use. Tripoli and water. It will be known when the Having previously washed the furniture with process is complete by wiping a part of the soft hot water, to get the dirt off, wash it carework with a sponge, and observing whether fully with the above mixture; then polish, there is a fair and even gloss. Clean off with a bit of mutton-suet and fine flour. Be careful not to rub the work too hard, or longer than is necessary to make the face perfectly

smooth and even.

The French Method of Polish-**298**1. ing. With a piece of fine pumice-stone, and water, pass regularly over the work with the grain until the rising of the grain is down; then, with powdered Tripoli and boiled linseed oil, polish the work to a bright face. niture; several applications will be necessary This will be a very superior polish, but it re-

quires considerable time.

To Polish Brass Ornaments 2982. Inlaid in Wood. The brass-work must first be filed very even with a smooth file; then, having mixed some very finely pow-dered Tripoli with linseed oil, polish the work with a rubber made from a piece of old hat or felt, as you would polish varnish, until the monia water; mix thoroughly. Shake when desired effect is produced. If the work be used, and apply with a sponge lightly. This ebony, or black rosewood, take some elder- is an excellent article, especially where the coal, powdered very fine, and apply it dry after you have done with the Tripoli. It will increase the beauty of the polish.

other Porous Wood. After scraping and and put the wax to the turpentine; let it sand-papering in the usual manner, take a stand 24 hours; then boil the soap in 1 gill sponge and well wet the surface, to raise the water, and add to the wax and turpentine. grain; then, with a piece of fine pumice- This has been highly recommended.

way of the fibres, rub the wood in the direc-An tion of the grain, keeping it moist with water. experienced cabinet-maker informs us that Let the work dry; then wet it again, and somewhat marred or scratched, is a mixture surface will become perfectly smooth, and the of three parts of linseed oil and one part texture of the wood much hardened. If this spirits of turpentine. It not only covers the does not succeed to satisfaction, the surface may be improved by using the pumice-stone with cold-drawn linseed oil, proceeding in the same manner as with water. This will be found to give a most beautiful as well as a durable face to the work, which may then be polished or varnished.

2984. To Clean and Finish Mahogany Work. Scrape and sand-paper the work as smooth as possible; go over every part with a brush dipped in furniture oil, and let it remain all night; have ready the powder of the scraping and rubbing with glass paper. This finest red brick, which tie up in a cotton should be done in all cases; but it is not stocking, and sift equally over the work the enough, particularly where the grain is at all soft. A good glass-paper also is essential. (See No. 1933.) A polish should then be added. But, unless the varnish for cabit thas a good gloss. If not sufficient, or if the be added. But, unless the varnish for cabit has a good gloss. If not sufficient, or if the inet-work be very clear and bright, it will grain appears at all rough, repeat the process. Be careful not to put too much of the brick-dust, as it should not be rubbed dry, but rather as a paste upon the cloth. When the surface is perfectly smooth, clean it off with a rubber of carpet and fine mahogany saw dust. This process will give a good This process will give a good saw-dust. gloss, and make a surface that will improve by wear.

2985. To Clean and Polish Old Fur-Take a quart of stale beer or vineboil it for 15 minutes; it may be kept in a according to the directions, with any of the

foregoing polishes.

2986. Mixture for Cleaning Furniture. Cold-drawn linseed oil, 1 quart; spirit of wine, and vinegar, ½ pint each; butter (terchloride) of antimony, 2 ounces; spirit of turpentine, ½ pint. This mixture requires to be well shaken before it is used. A little of it is then to be poured upon a rubber, which must be well applied to the surface of the furfor new furniture, or for such as had previously been French polished or rubbed with bees' wax

2987. Furniture Polish. Dissolve 4 ounces best shellae in 2 pints 95 per cent. alcohol; add to this 2 pints linseed oil, and 1 pint spirits of turpentine; when mixed, add 4 ounces sulphuric ether, and 4 ounces am-

varnish has become old and tarnished.
2988. Polishing Paste. Take 3 ounces white wax, & ounce Castile soap, 1 gill tur-To Clean Soft Mahogany or pentine. Shave the wax and soap very fine

the alkanet may be omitted.

superior composition for soft and light ma-

wax over a moderate fire, in a very clean ves- of considerable time in the operation. sel, and, when it is quite melted, add 4 ounces the wood, brings out the color of it, causes by bound with thread, to prevent it from unthe wax to adhere better, and produces a lustre, coiling when it is used. equal to that of varnish, without being subject to any of its inconveniences. The polish may be renewed at any time by rubbing it with a piece of fine cork.

French Polishing. of rubbing it on the surface of the wood, is of tion may be poured off into another bottle for comparatively modern date. To put on a use. Various receipts for the French polish hard face, which shall not be so liable to have been published, in which ingredients are scratch as varnish, and yet appear equally inserted that are insoluble in spirits of wine, fine, the French polish was introduced. Below and therefore useless; and others contain inwe give a full direction of the process, and gredients that are soluble in water, so as to

compositions necessary.

2994. To French Polish. The varnish being prepared (shellac), the article to be ilic spirit). (See No. 2999.)
polished being finished off as smoothly as possible with glass paper, and the rubber shellac, 3 pounds; mastich, 6 ounces; 90 per possible with glass paper, and the rubber shellae, 3 pounds; mastich, 6 ounces; 90 being made as directed below, proceed to the cent alcohol, 3 quarts. (See next receipt.) operation as follows:-The varnish, in a narrow-necked bottle, is to be applied to the middle of the flat face of the rubber, by laying the rubber on the mouth of the bottle and rubber is then to be enclosed in a soft linen polish is used without filtering. cloth, doubled, the rest of the cloth being gathered up at the back of the rubber to form over its surface uniformly in small circular corked; place them near a warm stove, and

2989. Furniture Polish. Bees' wax, 2 strokes, until the varnish becomes dry, or pound; alkanet root, 2 ounce; melt together nearly so; again charge the rubber as before in a pipkin until the former is well colored. with varnish (omitting the oil), and repeat Then add linseed oil, and spirits of turpentine, the rubbing, until three coats are laid on, of each ½ gill; strain through a piece of coarse when a little oil may be applied to the rubber, and two coats more given to it. Proceed in 2990. Furniture Paste. Turpentine, 1 this way until the varnish has acquired some pint; alkanet root, \frac{1}{2} ounce; digest until sufthickness; then wet the inside of the linen ficiently colored, then add bees' wax, scraped cloth, before applying the varnish, with alcosmall, 4 ounces; put the vessel into hot wa- hol, or wood naphtha, and rub quickly, lightly, ter and stir until dissolved. If wanted pale, and uniformly, the whole surface. Lastly, wet the linen cloth with a little oil and 2991. Composition for Soft or Light alcohol without varnish and rub as before till Mahogany. Boil together cold-drawn lin- dry. Each coat is to be rubbed until the rag seed oil, and as much alkanet root as it will appears dry; and too much varnish must not cover, and to every pint of oil add 1 ounce of be put on the rag at a time. Be also very the best rose pink. When all the color is exparticular in letting the rags be very clean tracted, strain it off, and to every pint add $\frac{1}{2}$ and soft, as the polish depends, in a great gill spirits of turpentine. This will be a very measure, on the care taken in keeping it clean and free from dust during the operation. If the work be porous, or the grain coarse, it To Wax Furniture. In waxing, will be necessary to give it a coat of clear size it is of great importance to make the coating previous to commencing with the polish; and, as thin as possible, in order that the veins of when dry, gently go over it with very fine previous to commencing with the polish; and, the wood may be distinctly seen. The follow- glass paper. The size will fill up the pores, ing preparation is the best for performing this and prevent the waste of the polish, by being operation: Put 2 ounces white and yellow absorbed into the wood, and be also a saving

2995. To Make a French Polish ubber. Roll up a strip of thick woolen best spirits of turpentine. Stir the whole Rubber. Roll up a strip of thick woolen until it is entirely cool, and you will have a cloth which has been torn off, so as to form a pomade fit for waxing furniture, which must soft elastic edge. It should form a coil, from be rubbed over it according to the usual 1 to 3 mehes in diameter, according to the method. The oil soon penetrates the pores of size of the work. This rubber is to be secure-

2996. Best French Polish. Shellac, 3 parts; gum mastich, 1 part; gum sandarach, 1 part; spirits of wine, 40 parts; the mastich and sandarach must first be dissolved in the spirits of wine, and then the shellac; the process may be performed by putting them into a bottle loosely corked, and placing it in a vessel of water heated to a little below 173° The Fahr., or the boiling point of spirits of wine, method of varnishing furniture by means until the solution be effected; the clear solualso the various preparations of the different render the mixture more easily injured.

2997. Common French Polish. A solution of shellac in wood naphtha, (pyrox-

2999. Sandarach French Polish. Shellac, 2 pounds; mastich and sandarach (both in powder), of each 1 ounce; copal varnish, 12 ounces; alcohol, 1 gallon. All the shaking up the varnish once, as by this means above are made in the cold by frequently stirthe rubber will imbibe the proper quantity to ring or shaking the ingredients together in a varnish a considerable extent of surface. The well-closed bottle or other vessel. French

3000. True French Polish. To 1 pint spirits of wine add 1 ounce each gum copal a handle. Moisten the face of the linen with and sandarach, and 1 ounce shellac. Let a little raw linseed oil, applied with the finger the gums be well bruised, and sifted through to the middle of it. Place the work opposite a piece of muslin. Put the spirits and the the light, pass the rubber quickly and lightly gums together in a vessel that can be closely

frequently shake them. In 2 or 3 days they places, the pressure in rubbing may be inwill be dissolved. Strain the mixture through creased. a piece of muslin, and keep it tight corked for

quantity gum lac, and 1 ounce gum sandarach; put these ingredients into a stone bottle near must be laid on warm, and if the work can be a fire, frequently shaking it; when the vari- warmed also, it will be so much the better;

ous gums are dissolved it is fit for use. at any radio. French Polish. Take 2 ounces avoided. wood naphtha, ½ ounce best shellac, 1 drachm gum benzoin; crush the gums, mix them with Dark Dead Smooth Surface. with a drop of spirits of wine on a clean rub- desired to bring out the grain still more, ber, which will extract the oil.

3003. ish. Wood may be stained or grained any the asphaltum mixture, as it will dry very color or design, by mixing it with the polish, slowly. When the oil is dry the wood can be or dipping the rubber in the color (finely polished with the following: Shellac varnish, powdered), at the time you apply the polish, of the usual consistency, 2 parts; boiled oil, (See No. 3002.) To produce a red, dip the 1 part. Shake it well before using. Apply cotton into dragon's blood (finely powdered), it to the wood by putting a few drops on a immediately applying the polish; then cover eloth and rubbing briskly on the wood for a with the linen, and polish. For yellow, use the best chrome yellow. For blue, ultramarine blue, or indigo. For black, ivory or marine blue, or indigo. For black, ivory or line to the wood by putting a few drops on a cloth and rubbing briskly on the wood for a few moments. This polish works well on old the best chrome yellow.

3009. Polish for Turners' Work. as above, in irregular lines or marks, and in finishing it with a coat of clear polish.

3004. Water-Proof Polish. pint spirits of wine, 2 ounces gum-benzoin, declaration of the ounce gum sandarach, and declaration ounce gum bottle, and placed either in a sand-bath or in varnished. hot water till dissolved; then strain the mixture, and, after adding about 1 gill best clear poppy oil, shake it well up, and put it

by for use. 3005. Bright Polish. 1 pint spirits of wine to 2 ounces guin benzoin and 1 ounce gum-sandarach, put in a glass bottle corked, and placed in a sand-bath or hot water until you find all the gum dissolved, will make a beautiful clear polish for Tunbridgeware goods, tea-caddies, &c. It must be shaken from time to time, and, when all dissolved, strained through a fine muslin sieve, and bottled for use.

Prepared Spirits for Finishing 3006. Polish. This preparation is useful for finishing success of the work. Of this material there ing after any of the foregoing receipts, as it are several kinds manufactured—black, brown, adds to the lustre and durability, as well as removing every defect, of the other polishes; and it gives the surface a most brilliant appearance. Take 1 pint best rectified spirits by adding the necessary staining colors (which of wine, 2 drachms shellae, and 2 drachms do not affect the properties of the enamel), gum-benzoin. Put these ingredients in a solid body of color is formed, of the same bottle, and keep it in a warm place till the tint, or nearly so, as that with which the gum is all dissolved, shaking it frequently; when cold, add 2 tea-spoonfuls of the best clear white poppy oil; shake them well toclear white poppy oil; shake them well to- against the black or dark-colored filling. It gether, and it is fit for use. This preparation is evident that if work which has to be is used in the same manner as the foregoing finished white, or with very light tints of

3007. Strong Polish. To be used in the carved parts of cabinet-work with a brush. 3001. French Polish. To 1 pint spirits as in standards, pillars, claws, &c. Dissolve of wine add ½ ounce gum shellar, the same 2 ounces seed lac and 2 ounces white resin in 1 pint spirits of wine. This varnish or polish at any rate, moisture and dampness must be

3008. How to Give Black Walnut a the naphtha in a bottle; shake them frequent-phaltum, pulverize it, place it in a jar or ly till dissolved; it is then ready for use. This bottle, pour over it about twice its bulk of is the clear polish. Take a little cotton wool, turpentine or benzole, put it in a warm place, apply a little of the polish to it, cover it and shake it from time to time. When distightly with a linen rag, to which apply a solved, strain it and apply it to the wood with drop of linseed oil, to prevent it from sticking a cloth or stiff brush. If it should make too to the wood; use your rubber gently, polish-dark a stain, thin it with turpentine or bening from a centre in a circular manner; finish zole. This will dry in a few hours. If it is apply a mixture of boiled oil and turpentine: To Stain or Color French Pol- this is better than oil alone. Put no oil with

lampblack, &c. Graining is produced by Dissolve sandarach in spirits of wine in the touching or streaking the wood with the color, proportion of 1 ounce sandarach to ½ pint of spirits; next shave bees' wax, 1 ounce, and such shapes as the fancy may suggest, then dissolve it in a sufficient quantity of spirits of turpentine to make it into a paste; add the former mixture by degrees to it; then with a woolen cloth apply it to the work while it is † ounce gum sandarach, and ‡ ounce gum in motion in the lathe, and with a soft linen anime; these must be put into a stoppered rag polish it. It will appear as if highly bettle and placed either in a send better.

> This is a process for creating an artificial, glossy surface of any color on wood, very durable, and highly ornamental. It consists of three distinct, successive operations; first, the colored coating or surface; next, the preparation of the surface for polishing; and

finally, polishing. 3011. To Prepare the Filling-up Color for Enameling Wood. The fillingup color, which forms the body of the enamel. is of the greatest importance to the ultimate and yellow, for coach painters, japanners, and others; but for use in interior decoration it is preferable to use the white lead filling, as, a solid body of color is formed, of the same work is required to be finished, thus doing away with the objections which may be urged polishes; but, in order to remove all dull color, be filled up with dark-colored filling. scure or kill the dark color will be so many that there will be danger of the work becom- ing particles of sand or grit to get upon it. in rubbing, so that it is always the safest plan to try the enamel color before commencing anything important.

Wood. The color, being properly mixed, often causes much unnecessary labor, should be laid on the work in the ordinary scratch, caused by want of care and too n manner, using it rather freely. It may be as well to state here that no filling should be put upon new work without the same having had 2 or 3 coats of ordinary oil paint, nor on gives a foundation for the filling. Successive coats of the filling should now be laid on the work until there is a sufficient thickness to intervene between each coat, in order to allow it to harden in some degree. When a suffiber will, of course, depend upon the state of the work to be filled up), it should stand for to be done with a felt rubber, ground pumice stone, and water.

3013. To Prepare the Rubber for Enameling Wood. The felt used should be such as the sculptors use for polishing marble, which varies in thickness from \$ to \$\frac{1}{2}\$ an inch, and about 3 inches square. This should be fastened with resinous gum to square pieces of wood of the same size, but 1 inch thick, so as to give a good hold for the hand in using. These pieces of wood, covered with felt, may be made of any size or shape to fit molded surfaces or other inequalities.

3014. To Prepare the Pumice Stone for Enameling Wood. The pumice stone to be used should be of different degrees of fineness, and should be carefully selected, so as to be sure that it is free from any gritty substance. It is sold ready ground, but in situations where it cannot be conveniently got, it may be prepared from the lump, by grinding or crushing with a stone and muller, and then passed through fine sieves or mustexture the ground pumice may be produced of different degrees of fineness. Unless great care be exercised in this matter, it will be free from grit. Many workmen are careless; A clean damp channels or wash-leather will

the number of coats of paint required to ob- in this matter, and, when working, set down the felt on the step-ladder or floor, thus allow-

ing rough and uneven in parts. The white lead should be ground stiff in turpentine, and about one-fourth part of the ordinary white it is best to use a piece of soft lump pumice lead, ground in oil added to it, in order to stone to take off the rough parts. The work prevent the enamel cracking, which it has a should then be wet with a sponge; the felt tendency to do, except there be some little oil must first be soaked in water, then dipped mixed with it. A sufficient quantity of into the powdered pumice, and the work polishing copal or best carriage varnish should rubbed with it, keeping it moderately wet, now be added to bind it so that it will rub and rubbing with a circular motion, not down easily, which fact cannot be properly straight up and down and across, and with a ascertained except by actual trial, inasmuch light touch, using only just as much pressure as the drying properties of varnishes vary, as will cause the pumice to bite, which will and other causes influence the matter. If be very clearly felt while the hand is in methere be too much varnish in the stuff the tion. Care and patience are required to do work will be exceedingly difficult to cut this properly, for if the pressure be too great down, and if too little, it is apt to break up it forces the pumice into the body of the filling color, and scratches it instead of cutting or grinding it fairly down. No hurry will avail in doing this work, it must have its time; 3012. To Lay the Color on Enameled hurry only defeats the end in view, and scratch, caused by want of care and too much haste, will often throw the work back for days, and involve the cost and labor of refilling. In practice the purpose is best answered by using the pumice stone, the coarser kind old work without its having one coat. This first, then the medium, and finishing with the finest last. It will be found advantageous to let a day elapse between the rubbing, for when the surface is cut down the filling will cut down to a level surface. One day should in all cases be softer underneath, and if it be allowed to stand for a day, the newly exposed surface gets harder, and of course rubs down cient number of coats are put on (which num- better. The pumice stone should be well washed off the work occasionally, in order to see what progress is being made, and if it re-2 or 3 weeks, until it is thoroughly hard; it quire more rubbing or not. If, after the first will then be ready for cutting down, which is rubbing, the surface be found not sufficiently filled up, it may have one or more additional coats of filling before much labor has been spent upon it.

3016. To Polish the Filling. When sufficiently rubbed down with the pumice stone—that is to say, when it has been cut down to a fine, level, and uniform surface, (see No. 3015), the work should stand for a day or two to harden. It will now depend entirely upon the werk, as to whether it must be polished upon the filling, or whether it will have to be varnished and polished. If the filling be of the right color, and of one uniform tint, it is best to be finished in this state. because it will have a surface and texture which cannot be got by any other means. Finished in this state it has all the uniformity of surface and evidence of finish, without that appearance of varnish which is so objectionable. After it has stood a day or two, the work must be polished in this way: Take a clean felt and rotten stone, either in oil or water, and with this rub the work as lin; by using these of different degrees of before, until the polish begins to appear; then take a boss (i. c. a ball of cotton wool in-closed in fine silk), put the rotten stone upon this and keep rubbing with the circular mofound that particles of grit will be mixed with tion until the polish is uniform and equal all it, which make deep scratches on the work, over. The rotten stone must now be carefully thus causing endless trouble and annoyance, cleaned off; if it be in oil, clean off with fine besides spoiling the work. The greatest care flour; if in water, with sponge and washis also required in keeping the felt clean and leather and water, taking care not to scratch

now be required, which must be held in the stove, and any cracks or other imperfections, left hand, leaving the right perfectly at liberty. Now use the ball of the right hand, press gently upon the panel, and draw it forwards the japanning is commenced. or towards you. If this be done properly, it will bring up a clear polish upon the work. The hand should be kept slightly damp by drawing it across the leather almost every time the hand is drawn forward. If this be done effectually, a rustling sound will be produced while the hand is in motion; if this be so, the polish will be sure to follow. The polish thus produced on the filling alone will have a beautiful soft appearance; but if the work has to be finished with a brilliant lustre, and to a high degree of polish, proceed as fol-

3017. To Finish Wood with a Brilliant Polish. After being cut down with the numice and felt as directed in No 3015, the filling has to be coated with two or more coats of the lest polishing copal varnish, having a quantity of the best tube flake white; this should be mixed with the varnish in sufficient quantity to form a creamy mixture, with which the work must be coated-one, two, or three coats, as may be desirable. should stand for 3 or 4 weeks, until it becomes hard; for the harder it is the better it will polish. It must then be cut down with felt and the finest ground pumice stone in water, and polished with the rotten stone, as before described. By this means a bright and brilliant polish may be obtained, of a very enduring nature. The same process will of course answer for all varnished imitations of woods and marbles, and all work which will admit to be bent somewhat. of the application of oil varnishes.

apanning is a kind of varnishing or lacquering, practiced in perfection by the Japanese, whence the name. The only difference between varnishing and japanning is that after the application of every coat of color or varnish, the object so varnished is placed in an oven or chamber called a stove, at as high a temperature as can safely be employed without injuring the articles or causing the varnish to blister or run.

3019. To Prepare Metal for Japanning. Metal requires no other preparation than cleaning with turpentine, to free it from grease or oil, unless the latter should happen to be linseed oil, in which case the cleaning is generally dispensed with, and the articles are placed in the stove and heated until the oil is baked quite hard.

3020. To Prepare Wood for Japan-Wood that is intended to be used for the best japanned work, requires to be thoroughly dried before it is made up, otherwise it will be subject to all the evils of shrinking. warping, and splitting, when exposed to the heat of the stove. To avoid these evils, the wood, after having been well seasoned in the palpable powder before mixing with the varusual manner, by exposure to the air, is sawn out nearly to the required forms, and baked for several days in the japanner's stove, the apply the color first as a paint, and varnish heat of which is gradually increased; and the afterwards with the above transparent japan. wood is afterwards worked up into chairs, Previous to varnishing a painted surface, it tables, trays, and similar articles, which are afterwards again exposed to the heat of the stone, &c., as directed in No. 1486.

that may be thus rendered apparent, are carefully stopped with putty or white lead before

3021. To Prepare the Ground for Japanning. For black japanned work, the ground is first prepared with a coating of black, made by mixing dross ivory black to a proper consistence with dark colored anime varnish, as this gives a blacker surface than could be produced by japan alone. If the surface is required to be polished, five or six coats of japan are necessary to give sufficient body to prevent the japan from being rubbed through in polishing

3022. To Make Black Japan Varnish. Melt together 50 pounds Naples asphaltum and 8 pounds dark gum anime, and boil for 2 hours in 12 gallons linseed oil; then melt 10 pounds dark gum amber, and boil it with 2 gallons linseed oil; add this to the other, with a sufficient quantity of dryers, and boil for 2 hours longer, or until a little of the mass. when cooled, may be rolled into pills; then withdraw the heat, and afterwards thin down with 30 gallons oil of turpentine. This is excellent for either wood or metals.

3023. Flexible Black Japan Varnish. A good black japan is made of burnt umber 4 ounces; true asphaltum, 2 ounces; and boiled oil, 2 quarts. Dissolve the asphaltum at first in a little oil, using a moderate heat; then add the umber, ground in oil, and lastly, the rest of the oil, and incorporate thoroughly. Thin with turpentine. It is a flexible japan, and may be used on metal work which requires

3024. Colored Japan. For colored works no japan is used, but they are painted with ordinary painters' colors, ground with linseed oil or turpentine, and mixed with anime varnish; and the work is dried in the oven in the same manner as the black japan. To protect the colors, and give brilliancy and durability to the surface, the work is afterwards varnished with copal or anime varnish, made without dryers. 2 or 3 coats of varnish suffice for ordinary works, and 5 or 6 for the best works that are polished. Very pale varnish is of course required for light colors. Ornamental devices are painted on the objects in the usual manner, after the general color of the ground has been laid on. The colors are dried in the stove, and the work is finally varnished and polished just the same as plain colors, but more carefully.

3025. Transparent Japan Varnish. Oil turpentine, 8 ounces; oil lavender, 6 ounces; camphor, 1 drachm; bruised copal, 2 ounces; dissolve. Tsed for tin, &c. Quick drying copal varnian is usually substituted.

3026. To Color Japan Varnish. The

above is a transparent japan, but by the following modifications any or all of the various colors may be made from it. It is indispensable that the colors be ground to an imnish, and should then be thoroughly ground with the varnish, otherwise it is preferable to

3027. To Color Japan Blue. Indigo and Prussian blue, both finely pulverized, of each 1 ounce; spirits of turpentine, 1 pint.
Mix well and strain. Or use verditer glazed with Prussian blue or smalt; mix with the varnish in No. 3025.

3028. To Color Japan Red. Vermilion makes a fine scarlet, but its appearance in japanned work is much improved by glazing it with a thin coat of lake, or even rose pink.
Or: Take spirits of turpentine, i pint; add strain. Add to the transparent varnish (see

No. 3025) to suit the fancy.

3029. To Color Japan Yellow. 3039. Ground for Chinese Japan. King's yellow, turpeth mineral (subsulphate Mix any quantity of the finest whiting to the of mercury), and Dutch pink, all form very bright yellows, and the latter is very cheap. Seed lac varnish assimilates with yellow very turmeric in the varnish which covers the ground. Or: Take 1 ounce of pulverized root of curcuma and stir of it into 1 pint of the transparent varnish (see No. 3025) until the

3030 To Color Japan Green. Distilled verdigris laid on a ground of leaf gold produces the brightest of all greens; other mineral and Prussian blue, or Dutch pink and verdigris. Mix with varnish. (See Nos. 3025)

and 1421.)

3031. To Color Japan Orange. Mix a little red with yellow until the desired color is obtained; and add to transparent japan.

(See No. 3025.) 3032. To Color Japan White. White grounds are obtained with greater difficulty than any other. One of the best is prepared by grinding up flock-white, or zinc-white, with to of its weight of starch, and drying it; using the mastich varnish for common uses; and that of the best copal for the finest.

3033. To Color Japan Pink. Mix sufficient red (see No. 2028) with transparent varnish (see No. 2025) to give the desired tint

of pink.

3034. To Color Japan Purple. Mix red and blue together, and add to the varnish.

(See No. 3025.)

3035. To Color Japan Violet. A violet japan may be obtained by mixing purple (see No. 3034), and white (see No. 3032), with transparent japan (see No. 3025.)

brown japanned works, the clear japan alone is used as the ground, or umber is mixed with the japan to give the required tint, and the work is afterwards dried in the oven, in the

same manner as black japan.

3037. To Japan Old Tea-Trays. First clean them thoroughly with soap and water and a little rotten-stone; then dry them by wiping and exposure at the fire. brush to the denuded parts, after which set adopted. the tea-tray in an oven, at a heat of 212° to 3043. To Japan Work-Boxes and 300°, until the varnish is dry. Two coats Fancy Articles. There is a very presty will make it equal to new.

India Japanning. The great peculiarity in the Indian method is the embossing, or raising the figures, &c., above the surface or ground, and the metallic or bronze-like hue of the several designs; the grotesque appearance of the several ornaments, whether figures, landscapes, or whatever other designs they are embellished with, being so totally different from every principle of perspective, and so opposite to every idea Or: Take spirits of turpentine, 1 pint; add we have of correct drawing. Nothing but cochineal, 1 ounce; let stand 15 hours, and the study of Chinese models themselves will enable the workmen to imitate, with any degree of precision, their several characteristics.

consistency of paint, with isinglass size; lay on your wood 2 or 3 coats, observing to put it on evenly and smoothly, and not too thick; well; and when they are required very bright, let it dry; then rub it gently with a soft rag an improvement may be effected by infusing and water till the surface is quite level and turmeric in the varnish which covers the polished; if a small portion of honey is added to the mixture, it will render it less liable to crack or peel off. If the ground is to be black, which is most usual, give it a coat or color pleases you; let stand a few hours, and two of the black japan mentioned in the common method of japanning (see No. 3022), and it is prepared for the figures, &c.

3040. Plaster Ground for Chinese Japan. Mix fine plaster of Paris with sizo greens may be formed by mixing King's yel-not too thick, and apply it quickly, for it soon low and bright Prussian blue, or turpeth gets hard. Two coats, in most instances, will be sufficient. After it is quite dry, polish it with fine glass paper, and rub it with a wet soft cloth; then give it 2 or 3 coats of drying linseed oil, or as much as it will scak up.

When dry, it is ready for japanning.
3041. To Trace Designs on the Having drawn the figures on a Ground. piece of white paper either with ink or pencil, rub the back of it with fine chalk or whiting, and shake all the loose powder off; lay it on the ground, and trace or go over every part of the outline with the end of a blunt bodkin, it is then tempered, like the other colors, or other similar instrument; you will then have a sketch in faint outline on your ground. Then proceed to put in the figures, &c., with

any desired color, or bronze them.
3042. To Raise Figures on the 3042. Work. Prepare a mixture of whiting and size (some prefer the whites of eggs), of a consistency to flow freely from the pencil, the hairs of which must be rather long. Begin with a figure, or other part—but do not do too much at a time-and trace the outline correctly, with a free hand; then take a piece of stick pointed at the end, dip it into the composition, and fill up the inside of the out-3036. To Color Japan Brown. For line. Continue to put more of the mixture own japanned works, the clear japan alone on till it is raised sufficiently above the surface. Let it get quite dry, and then polish it with a small camel's-hair pencil and clean water, so as to make it perfectly smooth and level. Care must be taken in this process, that the composition is not too thin, or it will spread beyond the bounds of the outline, but just so thick as to drop from the stick. Some them by wiping and exposure at the fire. mix with the whiting a portion of flake-white, Now get some good copal varnish, mix with or dry white-lead. This is an improvement, it some bronze powder, and apply with a and for very particular work should be

To Japan Work-Boxes and method of ornamenting beares, cabinets, do.,

pattern, and then pricking in those parts which shall appear as the ground, either black or any color at fancy. This is a very 3046. To Lacquer Brass Work. If pose with white lead in powder, or flake do not let it remain too long. white, to give it a body—but not too thick, (or other color as may be required), in very fine powder, with parchment or isinglass size, gone over with the stopping-out mixture, will come off, leaving the black or other color suitable to the work. perfect. It will then appear as if the work had been pricked in, but much sharper, and will, if carefully done, have a beautiful effect. You have now nothing more to do than var-10 coats of varnish, so that it will bear pol- dissolved, it is fit for use. ishing

3044. Sealing-Wax Varnish. fancy work, this has of late years been much ounces powdered gamboge, 3½ ounces powused, and, if well applied and the wax good, dered gum-sandarach, 2 pound shellae, and 2 will be a very good imitation of India japan. The method of making the varnish or japan dissolved, and strained, add 1 pint of turpenis very easy, being simply reducing the wax to a coarse powder, and pouring the best spirits of wine on it in a bottle, and letting it gradually dissolve without heat, shaking the amber, 2 ounces; gamboge, 2 ounces; extract bottle occasionally till it is all dissolved. A 2 ounce stick of the best wax will be enough gon's blood, 60 grains; oriental saffron, 36 for ‡ pint of spirits. Much depends on the grains; pounded glass, 4 ounces; pure alcogoodness of the sealing-wax, and the color of hol, 36 ounces. The seed-lac, amber, gamthe varnish may be varied by using differently colored wax. The finest vermilion seally colored wax. The finest vermilion seal-ing-wax makes the best varnish, the other mixed with the pounded glass. Over this colors not flowing quite as well; white seal-mixture is poured the tineture formed by ining-wax is very apt to clot when drying. As fusing the saffron and the extract of sandal this varnish dries very quickly, it should not be made until it is wanted for use.

appearance of gold. As they are wanted of different depths and shades of color, it is best ounces; turmeric, 1 ounce; dragon's blood, i

so that the figures appear of the color of the to keep a concentrated solution of each colorwood, and the ground black or colored; this, ing ingredient ready, so that it may at any by many, is produced by first tracing out the time be added to produce any desired tint.

tedious process, and even when finished with the work is old, clean it first, according to the the greatest care, will not appear regular or directions hereafter given; but if new, it will well defined in the pattern. The following merely require to be freed from dust, and method will be found very expeditious, and rubbed with a piece of wash-leather, to make at the same time very correct; it is but little it as bright as possible. Put the work on a known, and, as such, will to the practical hot iron plate (or upon the top of the stove), japanner be the more acceptable. It may till it is moderately heated, but not too hot, also be applied to many other purposes than or it will blister the lacquer; then, according here alluded to. The following preparation to the color desired, take of the following is necessary, and may be termed the stopping preparations, and, making it warm, lay hold out mixture; it is made by dissolving the of the work with a pair of pincers or pliers, best white bees' wax in spirits of turpentine and with a soft brush apply the lacquer, being till it is of the consistency of varnish. Keep careful not to rub it on, but stroke the brush this mixture in a bottle, and, when wanted gently one way, and place the work on the for use, mix sufficient for your present pur- hot plate again till the varnish is hard; but Experience will best tell you when it should be removed. only so that it will flow freely from the brush. Some, indeed, do not place it on the stove or Having traced the design, go over those plate a second time. If it should not be quite parts which are to remain of the color of the covered, you may repeat it carefully; and, if wood, and let it dry; then mix ivory-black pains be taken with the lacquer, it will look equal to metal gilt.

3047. To Clean Old Brass Work for and go evenly and smoothly over every part Lacquering. Make a strong lye of wood-of the work. It will now appear wholly ashes, which may be strengthened by soapblack, or of whatever color that was mixed lees; put in the brass-work, and the lacquer with the size. Let the whole get thoroughly will soon come off; then have ready a mix-dry; then, with a stiff brush dipped in plain ture of aquafortis and water, sufficiently spirits of turpentine, rub the whole of the strong to take off the dirt; wash it afterwards work well, and those parts that have been in clean water, and lacquer it with such of the following compositions as may be most

To Make Gold Lacquer for 3048. Brass. Rectified spirits of wine, 1 pint; mix 1 pound of seed-lac, picked clean, and clear of all pieces (as upon that depends the nish the work, as usual, and polish it as beauty of the lacquer) with the spirits of directed in Nos. 2979, &c. To finish the work wine; keep them in a warm place, and shake in the manner of Indian japan, give it 8 or them repeatedly. When the seed-lac is quite

3049. Gold Lacquer. Put into a clean For four gallon tin, 1 pound ground turmeric, $1\frac{1}{2}$ tine varnish, well mixed.

of red sandal wood in water, 24 grains; draboge, and dragon's blood must be poundedwood in the alcohol for 24 hours. Metal articles that are to be covered with this varnish are heated, and, if they are of a kind to admit of it, are immersed in packets. The tint of the varnish may be varied in any degree reacquers. Lacquers are used upon quired, by altering the proportions of the colpolished metals and wood to impart the oring quantities according to circumstances.

3051. Deep Gold Lacquer. Seed inc. 3

gold colored.

3052. Dark Gold Colored Lacquer. Strongest alcohol, 4 ounces; Spanish annotto, 8 grains; powdered turmeric, 2 drachms; red saunders, 12 grains. Infuse and add shellac, etc., as to the pale tin lacquer (see No. 3058) and when dissolved add 30 drops of spirits of turpentine.

3053. Gold Lacquer. Ground turmeric, 1 pound; gamboge, 1½ ounces; gum sandarach, 3½ pounds; shellae & pound; all in powder; rectified spirit of wine, 2 gallons. Dissolve, strain, and add turpentine varnish, 1

should be heated slightly, and the lacquer applied by means of a soft camel's-hair brush.

3055. Pale Brass Lacquer. Take 2 gallons spirits of wine, 3 ounces cape aloes cut small, 1 pound fine pale shellac, 1 ounce gamboge cut small. Digest for a week,

shake frequently, decant and filter.

3056. Lacquer for Bronzed Dipped Work. A lacquer for bronzed dipped work may be made thus: Alcohol, 12 gallons; seedlac, 9 pounds; turmeric, 1 pound to the gallon; Spanish saffron, 4 ounces. The saffron may be omitted if the lacquer is to be very

light. **3057.** Lacquer for Tin Plate. Best alcohol, 8 ounces; turmeric, 4 drachms; hay saffron, 2 scruples; dragon's blood, 4 scruples; red saunders, 1 scruple; shellac, 1 ounce; gum sandarach, 2 drachms; gum mastich, 2 drachms; Canada balsam, 2 drachms; when dissolved, add spirits of tur-pentine, 80 drops.

3058. Pale Tin Lacquer. Strongest alcohol, 4 ounces; powdered turmeric, 2 drachms; hay saffron, 1 scruple; dragon's blood in powder, 2 scruples; red sanders, ½ scruple. Infuse this mixture in the cold for 48 hours, pour off the clear, and strain the rest; then add powdered shellac, 1 ounce; sandarach, 1 drachm; mastich, 1 drachm; Canada balsam, 1 drachm. Dissolve this in the cold by frequent agitation, laying the bottle on its side, to present a greater surface to the alcohol. When dissolved, add 40 drops of spirits of turpentine.

3059. Iron Lacquer. Take 12 parts amber, 12 parts turpentine, 2 parts resin, 2

turpentine.

3060. Red Lacquer. Take 2 gallons spirits of wine, 1 pound dragon's blood, 3 lacquer.

mix as the last.

3062. Lacquer for Philosophical Indarach, 4 ounces; gum elemi, 4 ounces; best coffee, until they present the desired lustrous dragon's blood, 2 ounces; terra merita. 14 black appearance.

ounce; alcohol, 1 pint. Digest for a week, ounces; oriental saffron, 4 grains; seed-lac, frequently shaking, decant and filter. Deep 2 ounces; pounded glass, 6 ounces; pure al-2 ounces; pounded glass, 6 ounces; pure al-cohol, forty ounces. The dragon's blood, gum clemi, seed-lac, and gamboge, are all pounded and mixed with the glass. Over them is poured the tincture obtained by infusing the saffron and terra merita in the alcohol for 24 hours. This tincture, before being poured over the dragon's blood, etc., should be strained through a piece of clean linen cloth, and strongly squeezed. If the dragon's blood gives too high a color, the quantity may be lessened according to circumstances. same is the case with the other coloring matters. In choosing the terra merita, select that which is sound and compact. This lac-3054. Brass Lacquer. Take 8 ounces shellac, 2 ounces sandarach, 2 ounces annotto, many cast or moulded articles used in ornational formula of the spirits of wine. The article to be lacquered of which would render it difficult, if not impossible, to polish in the ordinary manner.

3063. To Make Lacquer of Various

Tints. Put 4 ounces best gum gamboge into 32 ounces spirits of turpentine; 4 ounces dragon's blood into the same quantity of spirits of turpentine as the gamboge, and 1 ounce annotto into 8 ounces of the same spirits. The 3 mixtures should be made in different vessels. They should then be kept for about two weeks in a warm place, and as much exposed to the sun as possible. At the end of that time they will be fit for use; and any desired tints may be obtained by making a composition from them, with such proportions of each liquor as the nature of the color

desired will point out.

3064. Durable and Lustrous Black Coating for Metals. The bottom of a cylindrical iron pot, which should be about 18 inches in height, is covered half an inch with powdered bituminous coal; a grate is then put in and the pot filled with the articles to be varnished. Articles of east iron, iron wire, brass, zinc, steel, tinned iron, &c., may be subjected to the same treatment. The cover is then put on and the pot heated over a coke fire under a well-drawing chimney. In the beginning the moisture only evaporates, but soon the coking commences, and deep brown vapors escape, which irritate the throat. When the bottom of the pot has been heated for 15 minutes to a dull red heat, the coal has been mostly converted into coke; the pot is then removed from the fire, and after standing 10 minutes opened for evaporation, all the articles will be found covered with the above described coating. This lacquer is not only parts asphaltum, 6 parts drying oil. Or, 3 a protection against oxidation of metals, but pounds asphaltum, 2 pound shellac, 1 gallon will stand also a considerable heat, only diswill stand also a considerable heat, only disappearing at beginning redness, and therefore its useful application for ovens and furnaces. The coating produced is thin, lustrous, and cannot easily be scratched. Fine iron ware pounds Spanish annotto, 41 pounds gum san-darach, 2 pints turpentine. Made as pale brass articles, such as sieves, are in this manner coated with remarkable evenness, which can-3061. Red Lacquer. Spanish annotto, 3061. Red Lacquer. Red Lacquer. Spanish annotto, 3061. Red Lacquer. Re this coating by heating them together with small pieces of bituminous coal in a cylindrical struments. Gamboge, 11 ounces; gum san-sheet iron drum like that used for reasting

and women expose boots and shoes during winter deprives leather of its vitality, rendering it liable to break and crack. Patent leather particularly is often destroyed in this When leather becomes so warm manner. as to give off the smell of leather, it is singed. Next to the singeing caused by fire heat, is the heat and dampness caused by the covering of rubber. Close rubber shoes destroy the strength of leather. The practice of washing harness in warm water and with soap is very damaging. If a coat of oil is put on immediately after washing, the damage is repaired. No harness is ever so soiled that a damp sponge will not remove the dirt; but, even when the sponge is applied, it is always. useful to add a slight coat of oil by the use of another sponge. All varnishes, and all blacking containing the properties of varnish should be avoided. Ignorant and indolent hostlers are apt to use such substances on their harness as will give the most immediate effect, and these, as a general thing, are most destructive to the leather.

3066. turns brown, which almost any leather will ing in the ordinary way, no brushes for polish-do after long exposure to the air, the harness ing being required. should be given a new coat of grain black. application of the grain black, oil and tallow leather flexible. Harness which is grained can/be cleaned with kerosene or spirits of turpentine.

3067. To Restore Softness to Leather. To restore the softness and pliancy of leather which has become hard by having been wet, apply neat's foot oil and rub it in. Castor oil is a good substitute for neat's foot oil for softening leather belts, boots and harness. But the best oil for harness, is 1 quart neat's foot in a suitable vessel with 5 pounds glycerine oli, 4 ounces beef's tallow, and 3 table-spoonfuls lampblack; add 4 ounces bees' wax for use in summer weather.

3068. To Restore the Lustre of Morocco. The lustre of Morocco is restored by a varnishing with the white of an egg. Apply

with a sponge.
3069. To Make Boots Waterproof. Beef tallow, 4 ounces; resin, 1 ounce; bees' wax, 1 ounce; melt together. Add, when cold, a quantity of neat's foot oil equal to the mass. Apply with a rag, warming the boots before a fire, to the soles as well as uppers, and rub in well with the hand. Two applications will make the boots thoroughly waterproof and still keep them soft. We, however, do not approve of such preparations, as the portions of the body, and any waterproof preparations applied to boots prevent the perspiration from escaping, and keep the feet ness. In the first place, subject the harness preserve their boots waterproof by this meth- lampblack and castor oil, warmed sufficientod, which, it is said, has been in use among them above 100 years.

The extreme heat to which most men say 130° or 140° Fahr. The readiest way to get pure paraffine is to take a piece of paraffine candle. Rub this solution on your boots about once a month; they can be blacked in the meantime. If the oil should make the leather too stiff, decrease the proportion of paraffine, and vice versa. A gentleman who has tried this says:—I have used this for 8 years past, and boots have lasted me two winters, the uppers always remaining soft, and never cracking. I have tried bees' wax, resin, tar, etc., but never found any other preparation half so good.

3071. Sportsmen's Waterproof Composition for Boots. Dissolve by heat 1 ounce pure bottle India-rubber shavings in 1 quart neat's foot oil, and add 2 ounces tallow. This makes a fine waterproof composition for boots, and is recommended to sportsmen.

3072. Polish for Patent Leather Goods. Take ½ pound molasses or sugar, 1 ounce gum-arabic, and 2 pounds ivory black; boil them well together, then let the vessel stand until quite cooled, and the contents are To Restore the Lustre of settled; after which, bottle off. This is an Leather. When harness loses its lustre and excellent reviver, and may be used as a black-

3073. Glycerine Composition for Before using this grain black, the grain surface should be well washed with potash wafound extensive application in tanning, as it ter until all the grease is killed, and after the has been discovered that it adds materially to the elasticity and strength of the leather. should be applied to the surface. This will Especially has it been found of great value in not only fasten the color, but make the protecting leather bands of machinery from cracking and drying. The partially tanned leather is immersed for considerable time in a bath of glycerine, by which the pores are filled and such an elasticity and softness is imparted that objects manufactured from it are much less liable to break. In order to prepare a neutral gutta-percha composition with glycerine, take 3 to 4 pounds lampblack, pound burnt bones (burnt ivory), cover up and 5 pounds common syrup, and stir well until the whole is intimately mixed and free from lumps. 4 or 5 ounces of gutta-percha, finely cut, are to be put into a kettle, and after melting must be mixed with 20 ounces of sweet oil and dissolved, and 2 ounces of stearine added. While still warm the guttapercha solution must be incorporated with the syrup and lampblack, and after this is done, 10 ounces of Senegal gum dissolved in 11 pounds of water is also added. In order to impart an agreeable odor to the mass a small quantity of rosemary or lavender oil may be introduced. In using, the glycerine gutta-percha paste must be diluted with 3 or 4 parts of water. It gives a fine lustre, and, as it contains no acid, it does not injure the feet generally perspire more than any other leather, but makes it soft and elastic and adds very much to its durability.

wet and cold. The New England fishermen to 1 or 2 coats (as the leather may need) of ly to make it penetrate the leather readily. Then make about 2 quarts of warm soap-suds, 3070. To Make Boots Water-Tight, and with a sponge wash the harness, When In a pint of best winter-strained lard oil, dis- dry, rub it over with a mixture of oil and tallow, equal parts, with sufficient lampblack to give it color; or, what is better, Prussian blue, which gives it a new and fresh look. This

gill of turpentine. Lay it on the harness with a sponge, and polish off with a brush.

which will take oil out without injury to the leather stand until more comes out, and apply again. This is the only thing that will take it out and not hurt the leather.

gallon train oil.

3079. leather a fine black surface, which, however, is apt to crack more or less

3080. Shoemakers' Black. A soluwith bark or other astringent matter, and to oil be perfectly killed, then add the beer and the edges of the soles etc., with a feather or vinegar.

Harness Liquid Blacking. very fine powder; gently evaporate until of a proper consistence when cold, stirring all the time. Keep in corked bottles.

3082. Harness Waterproof Paste Melt together 2 ounces mutton suet and 6 ounces bees' wax; add 6 ounces sugar candy, 2 ounces soft soap, 2½ ounces lampblack, and ½ ounce indigo in fine powder; when thoroughly mixed add 1 pint of oil of turpentine; put into pots or tins.

3083. Harness Waterproof Cake water; finish as in No. 3088. Blacking. Melt 1 pound bees wax, 1 ounce Prussian blue ground in 2 ounces linseed oil, 3 cwt.; crude molasses, 2 cwt.; linseed oil, 4 pound ivory black, 3 onnces oil of turpen- 3 gallons; oil of vitriol, 20 pounds; sufficient tine and 1 ounce copal varnish; mix well to water to finish as in No. 3088. gether and form into cakes whilst warm.

blackings will injure the leather.

3 oot and Shoe Blacking.
The manipulations required for paste and liquid blacking are the same, the differcompound should be applied sparingly and ence in the two being the quantity of liquid well rubbed in, which can be quickly done added. Thus, by diluting paste blacking and will leave a smooth and clean surface. with water or beer bottoms, it may be con-3075. Harness Polish. Take 2 ounces verted into liquid blacking of a similar quality, mutton suct, 6 ounces bees' wax, 6 ounces and, by using less fluid matter, the ingredients powdered sugar candy, 2 ounces soft soap, and of liquid blacking will produce paste blacking.

1 ounce indigo or lampblack. Dissolve the One thing must, however, be observed, and soap in 1 pint of water; then add the other that is, that the ivory-black used for liquid ingredients; melt and mix together; add a blacking must be reduced to a much finer powder than for paste blacking, as, if this be not attended too, it will settle to the bottom, 3076. To Clean Leather. Uncolored and be with difficulty diffused again through leather may be cleaned by applying a solution, the liquid. For those persons who do not of oxalic acid with a sponge. Dissolve in like the use of blacking containing oil of warm water. 3077. To Take Oil Out of Leather. either for paste or liquid, may be adopted. Use strong (F. F. F.) aqua ammonia, The vitriol, however, greatly contributes to promote the shining properties of the blackleather. It must be used 2 or 3 times in ing, and in small quantities is not so injurious order to get it all out. First use it and let the to the leather as has been falsely represented, as it wholly unites itself to the lime of the phosphate contained in the ivery-black, and is thus partly neutralized. This is the reason 3078. Dubbing for Leather. Mix 2 why lampblack should never be employed pounds black resin, 1 pound tallow with 1 for blacking, as it has no earthy base to absorb or neutralize the acid, which would then Jet for Harness and Boots. prove very hurtful to the leather. Oil of Dissolve 3 sticks of the best black sealing-vitriol is now employed in the manufacture of wax in \(\frac{1}{2}\) pint spirits of wine; keep in a all the most celebrated shining blackings. glass bottle, and shake well previous to use. The addition of white of eggs, isinglass, gum-Applied with a soft sponge. This gives the arabic, and similar articles to blacking, always proves injurious, as they tend to stiffen the leather and to make it crack.

3087. Liquid Blacking. Ivory-black, tion of green copperas (sulphate of iron) in in fine powder, 1 pound; molasses, 2 pound; about 12 times its weight in water. It is sweet oil, 2 ounces; beer and vinegar, of each used to black leather which has been tanned 1 pint. Rub together the first three until the

3088. Fine Liquid Blacking. Ivoryblack and molasses, of each 1 pound; sweet Dissolve by heat, 4 ounces glue or gelatine oil and oil of vitriol, of each ‡ pound. Mix and 3 ounces gum arabic in ‡ pint water; add the first three as before, then gradually add 7 ounces molasses and 5 ounces ivory black in the vitriol, diluted with thrice its weight of water; mix well, and let it stand for 3 hours, when it may be reduced to a proper consistence with water or sour beer.

3089. Liquid Jet Blacking. black and molasses, of each 1 pound; oil of vitriol, 1 ounce; sweet oil, 2 ounces; sour beer, 1 pint; finish as last receipt.

3090. Good Liquid Blacking. Ivoryblack, 7 pounds; molasses, 6 pounds; sweet oil, 1 pound; oil of vitriol, ½ pound; sufficient

3091. Liquid Blacking. Ivory-black, 3 cwt.; crude molasses, 2 cwt.; linseed oil,

Bryant and James' Patent 3092. 3084. Harness Waterproof Blacking. Liquid Blacking. 18 ounces caoutchouc Mix the same ingredients as in the last receipt, and while hot add 4 ounces soft soap rape oil. To this solution 60 pounds of fine and 6 ounces more oil of turpentine; put the ivory-black and 45 pounds molasses are to be paste into pots or tins. None of the above added, along with 1 pound finely ground gum-arabic, previously dissolved in 20 gallons 3085. To Apply Harness Blacking, vinegar. These mixed ingredients are to be Spread a very little of the blacking evenly on finely triturated in a paint-mill till the nuxthe sarface of the leather, and polish by genture becomes perfectly smooth. To this tle friction with a brush or an old handker varnish 12 pounds sulphuric acid are to be chief. Paste blacking is thinned with water. now added in small successive quantities.

with powerful stirring for half an hour; at second mixture, while quite hot, is stirred ining is ready for use.

3093. Paste Blacking. Molasses, 1 pound; ivory-black, 1‡ pounds; sweet oil, 2 ounces; rub together as before (see No. 3088); then add a little lemon juice or strong vine-

Brilliant Paste Blacking. Ivory-black, 2 pounds; molasses, 1 pound; sufficient water, as before.

3095. Fine Paste Blacking. Ivory-black, 28 pounds; molasses, 21 pounds; common oil, I quart; oil of vitriol, 3 pounds;

sufficient water, as before.

Fine Oil Paste Blacking. 3096. Ivory-black, 3 cwt.; common molasses, 2 cwt.; linseed oil and vinegar bottoms, of each 3 gallons; oil of vitriol, 28 pounds;

sufficient water, mix as before

(if this cannot be obtained, then use 4 ounces 2 inches deep, 6 inches wide, and the length best tallow); gum-arabic, I ounce. Mix the of a super-royal sheet; boil in a brass or copoil and vitriol together, and let it stand 24 per pan any quantity of linseed and water hours; dissolve the gum in a cupful of warm until a thick mucilage is formed; strain it water; then add 3 table-spoonfuls of best into the trough, and let it cool; then grind vinegar; heat it and mix with the oil, &c., and then add the ivory-black, molasses, and in small beer. Forwhite of 2 eggs.

3098. Real Japan Paste Blacking. Take 3 ounces ivory-black, 2 ounces coarse sugar, 1 ounce sulphuric acid, 1 ounce muriatic acid, 1 lemon, 1 table-spoonful sweet oil, and 1 pint vinegar. First mix the ivoryblack and sweet oil together, then the lemon and sugar, with a little vinegar to qualify the blacking; then add the sulphuric and muriatic acids, and mix them all well together. The sugar, oil, and vinegar, prevent the acids from injuring the leather, and add to the

lustre of the blacking.
3099. Bryant and James' Patent Paste Blacking. In making the paste blacking, the patentees prescribe the same quantity of India-rubber oil, ivory-black, molasses, and gum-arabic as in their liquid blacking, the latter being dissolved in only 12 pounds vinegar. These ingredients are to be well mixed, and then ground together in a mill till they form a perfectly smooth paste. To this paste 12 pounds sulphuric acid are to be added in small quantities at a time, with powerful stirring, which is to be continued \frac{1}{2} hour after the last portion of the acid has been intro-

duced. Ready for use in 7 days.

3100. New Blacking. The lustrous qualities of blacking are frequently derived and destructive to leather. publishes a new formula, and claims severat advantages for it, to which we may add its cheapness and accessibility. 3 or 4 pounds marbling again.

vegetable black, 1½ pounds ivory-black, 5 3103. Blue Sprinkle for Bookbinders. vegetable black, 1½ pounds ivory-black, 5 pounds molasses, and 5 pounds glycerine, mixed thoroughly together. 6 ounces gutta- digo, powdered, 2 ounces. Mix in a bottle percha, cut in small pieces, are then melted, that will hold a quart, and place it in a waterand when fluid, 20 ounces olive oil are added, both to promote solution. For use, dilute a and subsequently, 2 ounces stearine. The little to the required color in a teacup.

the end of which time 3 pounds of finely- to the first; and then a further addition of ground gum-arabic are added; after which 10 ounces gum Senegal, dissolved in about 3 the stirring is repeated half an hour every quarts water, is added. This compound is day for 14 days longer, when the liquid black- the stock; for use, it should be diluted with about 3 times its quantity of warm water.

3101. Day and Martin's Blacking. According to Mr. W. C. Day, the method of making the famous "Day and Martin's Blacking" is as follows: Bone-black in a state of powder, is mixed with sperm oil until the two are thoroughly incorporated. Sugar or molasses is then mixed with a small portion olive oil and oil of vitriol, of each 1 pound; of vinegar and added to the mass. Oil of vitriol is next added, and when all effervescence has ceased, more vinegar is poured in until the mixture is of a proper consistency. This constitutes the liquid blacking of the above-named manufacturers.

Method of Marbling Books. This is performed by 3097. Oil Paste Blacking. Ivory-laying the color on the edges with a brush, black, 2 pounds; molasses, 4 or 5 ounces; or by means of a wooden trough and gumoil of vitriol, 2 ounces; tanners' oil, 5 ounces water as follows:—Provide a wooden trough, on a marble slab any of the following colors

Blue, Prussian blue or indigo.

Red, rose-pink, vermilion, or drop lake. Yellow, King's yellow, yellow ochre, &c.

White, flake white.

Black, ivory or burnt lampblack.

Brown, umber, burnt umber, vandyke brown, sienna, burnt sienna; black mixed with yellow and red, also makes brown.

Green, blue and yellow mixed. Orange, red and yellow mixed. Purple, red and blue mixed.

For each color you must have two cups, one for the color after grinding, the other to mix it with ox-gall, which must be used to thin the colors at discretion. If too much gall is used, the color will spread; when they keep their place on the surface of the trough, when moved with a quill, they are fit for use. All things being in readiness, the colors are successively sprinkled on the surface of the mucilage in the trough with a brush, and are waved or drawn about with a quill or stick, according to taste. When the design is thus formed, the book, tied tightly between cutting-boards of the same size, is lightly pressed with its edge on the surface of the liquid pattern, and then withdrawn and dried; the covers may be marbled in the same way, only letting the liquid colors run from ingredients which are most deleterious over them. The film of color in the trough Herr Artus may be as thin as possible, and if any remains after the marbling, it may be taken off by applying paper to it before you prepare for

Strong sulphuric acid, 8 ounces; Spanish in-

thereon.

3105.

black. Dilute with ale.

into a marble mortar 1 ounce pure honey and ent parts, which will have a fine effect when 1 book of gold leaf; rub them well together managed with care. Let it stand a few min-until they are very fine, add ½ pint of clear utes, then take off the water with a clean water, and mix them well together. When sponge. the water clears, pour it off, and put in more, with a little gum water, to the gold, and botgreen, blue, or purple, and lastly with the gold liquid, in small or large spots, very reguthe edges when dry, and cover them with paper to prevent the dust falling thereon. This sprinkle will have a most beautiful apwhen dry burnishing it with a dog's tooth.

3107.

with a clean sponge and water.

3108. Chinese Edge for Books. Color the edge with light liquid blue and dry; then take a sponge charged with vermilion, and dab on spots according to fancy; next throw on rice, and finish the edge with dark the intention of the marble is liquid blue. Color light blue on different as transparently as possible. parts of the edge with a sponge; do the same a bold sprinkle of dark blue. Burnish,

3109. Wax Marble for Leather Book-Covers, &c. This marbling must be boards, and finished on the head and foot. Take bees' wax and dissolve it over the fire in their feathers, and tie them together; dip the sheets damped as for printing, before quill-tops in the wax, and spot the edge, with marbling. Spirits of turpentine may be large and small spots; take a sponge charged sprinkled on the colors, which will make with blue, green, or red, and smear over the white spots. edge: when done, dash off the wax, and it will be marbled. stationery work, or for folios and quartos.

Leather Book-Covers. bark with water and a little powdered alum, a nest marbled appearance.

3104. Blue Marble for Books, &c. over a slow fire, until it is a good strong yel-Color the edges with King's yellow, and when low. Pour the liquid into a broad vessel, dry tie the book between boards. Throw on sufficiently large to contain the cover when blue spots in the gum trough, wave them extended. Before the liquid is cool, take the with the iron pin, and apply the edges dry cover, and lay the grain side flat on the Brown Color for Marbling or ceive the liquid; let it soak some time, and Sprinkling Books. Logwood chips, 1 part; then take it from the vessel. The book must annotto, 1 part; boil in water, 6 parts. If too be covered in the usual manner, and permitted light, add a piece of copperas about the size to dry from the fire. Glair the book; when of a pea. Or: Umber, any quantity. Grind dry, place it between the wands; take a it on a slab with ox-gall and a little lampon; dip a quill-top into the vinegar black, 3106. Gold Sprinkle for Books. Put with it touch the water on the cover in differ-

Green Egyptian Marble for 3111. till the honey is all extracted, and nothing remains but the gold. Mix 1 grain corrosive in a large vessel, as mentioned before, with sublimate in a tea-spoonful spirits of wine, Scott's liquid blue; when done, put it into a and when dissolved, put the same, together vessel of clear water for an hour. Take it out and press out the water, then cover the book. tle it close for use. The edges of the book Glair the cover; when dry, place it between may be sprinkled or colored very dark, with wands, and drop weak potash water from a green, blue, or purple, and lastly with the sponge thereon; dip the quill-top into the strong black, and touch the water with it. lar, shaking the bottle before using. Burnish This must be repeated till you have a good black. When dry, clear it with a sponge and

water.

Red Egyptian Marble for 3112. pearance on extra work; ladies may use it for ornamenting their fancy work, by putting it on with a pen or camel's hair brush, and dered alum and a few drops of solution of tin, till a good color is produced. Dip a piece Marble for Leather Book-Wash the cover and glair it, take a ascertain the color wanted. If too light, let sponge charged with water, having the book it boil till it is reduced to one half of the quanbetween wands, and drop the water from the tity; take it from the fire, add a few more sponge on the different parts of the cover; drops of the solution of tin, and pour it into a sprinkle very fine with vinegar black, then large vessel. Put the dry cover on the liquid, with brown, and lastly with vitriol water, and let it remain for a quarter of an hour, Observe to sprinkle on the colors immediately after each other, and to wash the cover over with a clean sponge and water.

then press out the water. Color it over with a sponge and the quercitron bark water, and cover the book. Glair the cover, place it between wands, dash on water with a brush, also potash water; and, lastly, finish it with the strong vinegar black, with the quill-top. Observe that too much black is not put on; the intention of the marble is to show the red

3113, Green Marble for Leather where there are vacancies with yellow and Brazil red; dry and dab on a little vermilion in spots; then throw on rice, and finish with color is prepared with the ox-gall, and ready for use, a few drops of sweet oil must be mixed therein, the color thrown on with a brush, in large spots, till the gum is perfectly done on the fore edge, before the back of the covered. The oil will make a light edge book is rounded, or becomes round, when in round each spot, and have a good effect. Blue, green, and brown may be also used separately in like manner. Sheets of paper may an earthen vessel; take quills stripped of be done, having a trough large enough, and

dash off the wax, and it This will be useful for low the edge; when dry, cut pieces of thick thread over the edge, which will fall on differ-3110. Yellow Egyptian Marble for ent parts irregularly; give it a fine dark sprin-Boil quercitron kle, and shake off the thread. This produces

Rice Marble, for Leather Book-Covers. Color the cover with spirits After the fore-edge of the book is cut, let it of wine and turmerie, then place on rice in a remain in the press, and throw on linseeds in regular manner; throw on a very fine sprinkle a regular manner; sprinkle the edge with any of copperas water till the cover is nearly dark color, till the white paper is covered, black, and let it remain till dry. The cover then shake off the seeds. Various colors may may be spotted with the red liquid or potash water, very freely, before the rice is thrown yellow or red before throwing on the seeds off the boards.

3116. Orange Color for Marbling or Sprinkling Books. Ground Brazil wood, 16 parts; annotto, 4 parts; alum, sugar, and thrown on the spaces between. gum-arabic, each 1 part; water, 70 parts. Boil,

strain, and bottle.

Tree Marble, for Leather ers. A marble in the form of 3117. Book-Covers. trees may be done by bending the boards a little on the centre, using the same method as the common marble, having the cover previously prepared. The end of a candle may be rubbed on different parts of the boards, which will form knots.

3118. Vinegar Black for Book-binders. Steep iron filings or rusty iron in good vinegar for two or three days, then

strain off the liquor.

3119. To Sprinkle Books. Take a stiff brush made of hogs' bristles, perfectly clean, dip it in the color; squeeze out the superfluous liquid; then rub a folding-stick across the brush, and a fine sprinkle will fall on the edge of the book, which should be previously screwed tight in the cutting-press. Repeat the operation until the color is thrown equally on every part of the leaves. The brush should be held in the left hand, and the stick in the right.

3120. Chinese Marble for Leather Book-Covers. Color the cover of the book dark brown, and when dry put it into the cutting-press, with the boards perfectly flat; mix whiting and water of a thick consistence and throw it on, in spots or streaks, some large and some small, which must remain till dry. Spot or sprinkle the cover with liquid blue, and lastly throw on large spots of liquid red. The colors must be dry before washing

off the whiting.

Orange Sprinkle for Books. Color the edge with King's yellow, mixed in weak gum-water, then sprinkle with vermilion

mixed in the same manner.

3122. Purple Sprinkle for Book-Logwood chips, 4 parts; powdered alum, 1 part; soft water, 24 parts. Boil until reduced to 16 parts, and bottle for use. Or: Brazil dust (fine), and mix it with

potash water for use.

work. Grind, on a marble slab, Prussian inches. The smooth side can be easily select-blue, with water, and a little brown soap, to ed, and upon that side the print should be a fine pliable consistence, that it may be made. Cut the paper into the sizes most thrown on with a small brush. Grind King's convenient for the style of picture desired, yellow in the same manner, with water and white soap. When green is intended for the ground color, grind it with brown soap, and King's yellow with white soap. Lake 16 ounces; chloride of ammonium or of may be used for a ground color, and Prussian sodium, 160 grains. Take enough of this to blue ground with white soap: brown umber cover a shellow dish of porcelain to the doubt with white soap. Any color of a light substance may be ground for marbling.

Spotted Marble for Books. 3124. yellow or red before throwing on the seeds and sprinkling with blue. The seeds will make a fine fancy edge when placed very thick on different parts, with a few slightly

3125. Brown Sprinkle for Leather Book-Covers. Pearlash or potash, 1 part;

soft water, 4 parts. Dissolve and strain.
3126. Red Sprinkle for Binders. Brazil wood (ground), 4 parts; alum, 1 part; vinegar, 4 parts; water, 4 parts. Boil until reduced to 7 parts, then add a small quantity of loaf-sugar and gum. Bottle for use.

3127. Black Sprinkle for Leather Book-Covers. Green copperas, 1 part; soft

water, hot, 6 parts. Dissolve.

hotography. Photography is based upon the law or principle that sunlight decomposes certain combinations of the salts of silver. For instance, if a piece of paper is first dipped into a solution of chloride of sodium (common table salt,) and then, when dried, floated on a solution of nitrate of silver, it will, upon being brought to the light, begin to darken, and finally assume an absolute black. It will be seen that if any opaque or semi-opaque body is interposed between the light and the paper, that portion which is so pretected from the action of the light remains white, and thus impresses upon the paper, in a negative condition, the form or figure of the article so used.

The entire matter embraced in Nos. 3128 to 3154 is contributed by the eminent photographer, Mr. Geo. G. Rockwood, of

New York.

3129. To Make a Photograph Without a Camera. The art of photography has many interesting and useful applications other than portraiture, one of the simplest and most beautiful of which we here present. It can be applied to the copying of laces, drawings, leaves, or anything of a transparent or translucent nature. It is proposed to first describe the manipulations, and then give the formulæ.

3130. Papier Saxe for Photography. The best is the papier saxe, an article made 3123. Soap Marble for Books. This expressly for photography, and may be obsist applicable for marbling stationery, book tained from any dealer in photographic madelges, or sheets of paper for ladies' fancy terials. It is sold in sheets about 18 by 22 weeks.

blue ground with white soap; brown umber cover a shallow dish of porcelain to the depth for a ground color, and flake-white ground of 1 inch or more, and then immerse the paper, one sheet at a time. When a half dozen are in, turn them all over, and take

separately to dry.

and will usually be adopted; but the most for the toning bath. artistic effects will be produced by the use of plain papier saxe. Paper, in either of these: forms, prepared with chloride (salt) will keep indefinitely.

3133. Silver Solution to Sensetize The weather being propinious for Paper. printing (a clear, bright sunlight is preferable), the salted or albumenized paper is taken into a darkened room to be rendered sensitive by the silver solution. Make about the same quantity of this as of the salting solution, by using, in the following proportions: Pure water, 1 ounce: nitrate of silver (in crystals), 60 grains. When thoroughly dissolved, pour the solution into a flat porcelain dish, and

carefully remove all bubbles, &c.

3134. To Make the Paper Sensitive. Having prepared the silver solution as above directed, take the paper by opposite corners, smooth side down if plain paper, glazed side if albumenized; lower one corner on to the dark room. It is best to proceed with the ing bath. printing as soon as the paper is dry. Additional brilliancy and sensitiveness is imparted to the paper by exposing it, after it is thore 15 grains. Dissolve this in 30 drachms of with the ammonia.

3135. the sun's rays. The paper will at once begin to darken, and in from 5 to 10 minutes, except under the leaf, be entirely black. If the It may be used, however, so soon as mixed, plates are now taken into a dark room and 3138. To Tone a Picture. The print

them out one by one, in the order in which the work and ascertain when the print is they were immersed, and hang them up sufficiently exposed to the action of the light.

The exposure should continue until the image 3132. Albumenized Paper for Pho- is much darker than intended when finished. tography. Albumenized paper, such as is as the after processes of toning and fixing used for ordinary portraiture in the galles, reduce or bleach the pictures very considerational salways ready prepared for silvering. This bly. As the prints are taken out of the frame, much the finest and sharpest in its result; put them away in the dark again, until ready



if albumenized; lower one corner on to the 3136. To Prepare a Picture for solution, and steadily lower the rest to the Toning and Fixing. It will now be surface of the solution, so that the air is com- necessary to tone and fix the picture, in order pletely driven out, and the entire surface ex- that the image be rendered permanent. The posed to the action of the silver. Be very first process is to soak the print in a dish of careful that the solution does not get on the clear water for a few minutes, and thus wash back of the paper. Plain paper (papier saxe) off the free nitrate of silver remaining upon should float 2 minutes; albumenized, 3 the surface of the paper. A half hour's soakminutes. Carefully raise the sheet from the ing, with one or two changes of the water, solution, and hang up to dry in a perfectly will effect this so that it is ready for the ton-

oughly dry, to the fumes of ammonia. This water, add a drop of hydrochloric acid, and may be done by hanging it up with a clip or preserve it as a stock solution in a bottle; pin in a close box, in which is a small dish mark this gold solution. Make in another containing aqua ammonia F.F.F. This fum-bottle a saturated solution of washing soda, ing process may be dispensed with, yet the also as a stock solution; mark it as such; prints are much more uniform when treated Soda solution. When the prints have been washed as before directed, and are ready for 3135. To Copy an Object. Having toning, mix 1 drachm of the gold solution prepared, in a dark room, a sheet of paper as with 1 ounce of water, according to formula. above, lay it upon a piece of glass; place Pour into a tray, and drop in a small piece of upon the glass a leaf as translucent as can be blue litmus paper; it will become red. Renfound, and then above it, to hold it in place, der the bath alkaline by adding from the soda another piece of glass, and at each corner a solution, drop by drop, until the paper begins clip, or a common spring clothes-pin. Now to change blue again. It is better to prepare expose the plates so arranged, leaf side up, to the toning bath during the day, while the printing is being done, as the bath seems to work with more smoothness and uniformity.

separated, the image of the leaf, with all its is now taken by two corners and immersed in delicate tracery and beautiful lines, will be the gold or toning bath. At first the print found upon the paper, white, with black back- will begin to bleach, and turn a warm red ground. It would be well to put under the color, which soon changes into a beautiful sensitive paper a few thicknesses of soft paper, warm black. Put in the prints one by one, or black cotton velvet. It serves as a pad or keeping them separated or constantly in gencushion, and tends to press the paper up into the motion, when the changes already spoken a closer contact with the inequalities of the of will occur. When a deep purple or warm leaf, lace, or object used as a negative or black is obtained, remove them to a basin of cliché. Small printing frames can be pur-clean water, and rinse them until all are toned, chased at a moderate sum, which will enable when they are ready for immersion in a fixing the experimenter to examine the progress of bath, to render them permanent,

Take water, 6 ounces: hyposulphite of soda, more energetically, but is a very dangerous This solution dissolves from the poison, and is not recommended. paper all of the chloride of silver that has not times, each time being dipped in clean water, the Photographic Negative or Clické. starch.

stood that daylight only is to be excluded; gas or candle light will do no harm. A window closely covered with yellow paper completely is good-indispensable in its place, but ex- the bottle, and the plate gently and slowly neatness. Handle the prints with the tips of your fingers, and always with deliberation dion side upwards, in the silver bath. (See and care. If the silver solution grows weak No. 3150.) If the plate is stopped in its deit—add a few grains of nitrate of silver. If across its face. In 3 to 5 minutes, depending by use it turns a dark wine color, and the upon temperature, etc., the plate is coated, heat. Prints will then tone in from 2 to 6 camera upon the object to be photographed undertoned they will present a warm brown the ground glass of the camera, until the color. A little experience will soon indicate image upon the ground glass. the precise amount of toning required.

then with a saturated solution of hyposul-laction of the image of light thrown upon it by

To Prepare a Fixing Bath, phite of soda. Cyanide of potassium acts

The Photographic Negative 3142, been acted upon by the light, but does not in- or Cliché. In number 3128 we have stajure the picture or image. The weal time ted the general principles of the photographic for leaving the print in this bath is about 15 art; that it was based upon the fact that minutes. If the print is held up to transmit-solar light decomposes certain combinations ted light before it is placed in this solution, it of the salts of silver; that in proportion or to will appear quite opaque and cloudy in what the extent that such sensitive surface is exshould be the clear parts of the picture, posed to the action of light, so is the depth of After the print has been in the bath the the stain or intensity of the image upon the proper time this will disappear, and the print prepared paper. Now if we should cut from have a clear, translucent effect. The print an opaque or black piece of paper, any form should now be washed in 2 or 3 waters, and or figure-anold fashioned sithouctte would be left to soak in a dish of water all night. In a familiar illustration—and place it upon the the morning it can be hung up to dry, and silvered paper, the precise image or form cut then mounted, as the taste of the experiment- in the paper would, upon removal, be found er may suggest. If the saving of time is an upon the paper; the paper remaining white object, the print, after coming from the fixing under the figure leaf or "theorem," while the bath, can be rinsed in water and passed parts exposed to the light have turned black. through a common clothes-wringer a few In place of this figure, science has given us when the print will be found to be perfectly negative is an image produced upon glass by washed. When properly fixed, as already a camera (an improved form of the old camdescribed, they are to be washed, and finally era obscura) and derives its name from the mounted on eard or bristol board. The best fact that the image is reversed or negative by paste for this purpose is common laundry transmitted light (looking through it), the lights appearing dark, and the dark parts 3140. Precautions to be Observed in light. The chemicals used to produce it are Making a Picture. When directions are also combinations of the salts of silver, but given to prepare and keep the sensitive paper are so sensitive to the action of light, that in a dark room, it should, of course, be under- they are decomposed instantaneously by exposure. The formulæ will follow a description of the process.

3143. To Make a Photographic filters the light of all actinic or chemical Negative. In a room illuminated only by a power, and consequently will do no harm, feeble gas or candle light, or by such daylight Be careful that not a drop of the fixing solu- as is filtered of its chemical power through tion gets into the gold or toning bath. After a sheet of yellow glass, a glass plate is carethe final process of fixing, take the greatest fully flowed with collodion. (See No. 3149.) care that the prints do not again come into When the plate has been evenly covered, the contact with the hyposulphite of soda. Soda excess is quickly but deliberately returned to ceedingly harmful out of its place. So keep swayed from side to side until the collodion is all the dishes and fingers free from it. In all set, or when the surface is tacky to the touch. of the manipulations, observe the most perfect. It is then placed on a dipper, and, with a by use—a mealy look to the prints indicates scent into the bath, a check or line will show paper is not white when dry, set the solution or, in other words, the chemicals in the colloin clear sunlight for a day or two and it will dion have united with the nitrate of silver, clear. Filter before using again. The soda forming the sensitive surface or coating. If (fixing) bath should not be used more than 2 not coated sufficiently the surface will appear or 3 times. Where prints are only occasion- greasy; in this case the plate must be returned ally made, a fresh bath should be made each to the bath until the film appears perfectly time of printing. The gold (toning) bath smooth. While this is being done it is supworks quicker when warmed to about blood posed that the operator has adjusted the minutes. Prints on plain paper will tone by focussing his lens. This is done by turn-quicker than on albumenized. If prints are ing the lens in and out, or from and towards ing the lens in and out, or from and towards appearance; if toned too much, a cold steel point is ascertained which gives the sharpest All being ready, the operator returns to the dark room 3141. To Remove Nitrate of Silver for his sensitive plate. This is placed in a An inevitable consequence of prac- "holder," and the ground glass being reticing this process will be stains on the hands moved, the holder is substituted in its place. and clothing from the nitrate of silver. The slide or cover to the bolder is now with-Moisten the spots with tincture of iodine, and drawn and the sensitive plate exposed to the

of the light that it can only be ascertained by

velopment.

This 3144. To Develop a Negative. is done by removing the plate from the hold-plates so prepared will keep indefinitely. er, and, holding the plate in a horizontal position, flowing it with the developing soluthe details of the drapery, if a portrait, apficiently strong and vigorous, it is "cleared" by placing the plate in the fixing bath, and formulæ. light is dissolved away, leaving the image nished.

precisely as with the collodion. (See No. 3143.) It should be again slightly warmed minutes, the negative is ready for use as de-

nishing, by re-development.

3146. To Re-develop a Negative. 1 ounce of the pyrogallic acid solution to which has been added 5 or 6 drops of the sil-

No. 3152.)

3147. Glass for Photography. portraiture and ordinary landscape photography, the best qualities of picture or window glass will suffice. There is an article known as photographic or negative glass, which is selected for the purpose and cut into the regular sizes used in the art, viz., stereoscopic, "quarter" size, "half" size, "four-four" &c., the latter being 6½×8½ inches and the other sizes fractional parts, as their names suggest. For microscopic and scientific experiments, plate glass would be preferable. A quality known as "three quarter white" plate, and only of the thickness of ordinary single thick window glass, has all the requisites for exact photography. When it is promagic lanterns or transparencies, plate glass is absolutely essential.

3148. To Prepare Glass for Photo-All new glass should be placed for

the lens. After an exposure of 15 to 60 sec- together. After the froth has subsided, filter onds, depending so much upon the intensity the solution through a clean sponge, two or three thicknesses of linen, or, still better, filexperience, the slide is replaced in the holder tering paper. The solution above named will and the plate taken to the dark room for de- coat more plates than an amateur would be likely to use. Use fresh eggs and a newly made solution whenever coating plates.

3149. Collodion for Photography. Collodion is the vehicle by which the photo-(See No. 3151.) If properly timed or graphic chemicals are united upon the surface exposed, the image begins to appear. When of the glass and the sensitive coating prothe details of the drapery, if a portrait, apduced. It is made by dissolving in equal or pear and the solution seems to have lost its nearly equal proportions of sulphuric ether power, the plate is thoroughly washed under and alcohol, gun cotton or pyroxyline together a stream of clean water. If the image is suf- with certain salts of potassium, cadmium, ammonium, &c., in proportions named in the Many formulæ are published for that portion of the film not acted upon by the this article to which great value is attached, some supposing that to its peculiar composiupon the glass. After a thorough washing tion belong the principal causes of failure or in water, the plate is put in a rack to dry, success. This is only in a degree true. Inafter which it is slightly warmed and var- ferior or carelessly prepared chemicals used in any stage of the process impair results. The 3145. To Varnish a Negative. The writer has fixed as a general principle in the varnish (see No. 3153) is flowed on and off preparation of collodion the proportion of 1 grain of the exciting salts (in each ounce of collodion), to every 10 grains of silver in the to prevent the varnish from chilling or bloom- bath. To illustrate: If the silver bath soluing. When dry, which will be in 5 to 10 tion is at 50°, or, more definitely, 50 grains of silver to each ounce of water, we would make scribed in Nos. 3135, &c., using the negative the collodion so as to contain in each ounce instead of the leaf. Should the image have of collodion 5 grains of the various salts of evidence of full exposure by the existence of cadmium, ammonium, &c.; or another way of all the proper detail, and yet want vigor or putting it, the bath should be ten times as intensity, this may be imparted, before var- strong as the collodion. The sensitizing salts should be selected with a special reference to the peculiarities of the light or subjects. It This is done by pouring upon the plate about can be made under one formula to cover almost all emergencies; yet special kinds of work for extremes of light or shadow can be ver solution designated for that purpose. (See improved by varying the combinations of the exciting or sensitizing salts. For portraiture For in a room of evenly diffused light the iodide of cadmium as the principal excitant gives

softness and delicacy to the image. Thus:

I. Take of sulphuric ether, 1 ounce; 95 per sold by dealers in photographic materials, cent. alcohol, 1 ounce; gun cotton, 6 grains; iodide of cadmium, 4 grains; bromide of cad-

mium, 2 grains.

II. Sulphuric ether, 1 ounce; alcohol, 1 ounce; gun cotton, 6 grains; iodide of cadmium, 2½ grains; bromide of potassium. 2½

grains.

These two formulæ give the utmost delicaey and transparency to the shadows, and work with rapidity, when preserving their proper relations to the silver bath solution, of which we speak in the proper place. If more brightness is desired to the image, instead of posed to print photographs upon glass, for the iodide of cadmium put the same quantity of iodide of ammonium. If still greater contrasts are required, use iodide of potassium in place of either the cadmium or potassium. The latter is favorable for copying engravings, a few minutes in a strong solution of com- maps, plans, &c., in which strong contrasts mercial nitrie acid (say 1 ounce nitric acid to of white and black are desirable. It is well 3 ounces water), and then thoroughly washed to prepare from all these formulæ and then in clean water. While wet, pour upon the modify results by mixing them together as glass a solution consisting of white of egg, 1 the subjects or light may demand. Farther ounce; water, 20 ounces; drain off into a combinations may be suggested; under a separate bottle, or clean, filter, and set up in a feeble light, or where there are large masses of rack to dry. The albumen and water solution, shadow, reduce the amount of the iodide salt before using, should be very thoroughly beaten one grain and increase the brounde one grain.

out the required quantity of alcohol, and to tion, and when the film has set perfectly, but it add the gun cotton and such of the exciting has not become completely dry, the pictures, salts as dissolve in alcohol, and lastly the which have previously been trimmed and ether. Shake until all are thoroughly dis- finished, are dipped rapidly into alcohol, and solved, and put aside over night to settle, applied without delay to the plates. The bottle for use. Such of the excitants as do smooth writing paper, and the operation of not dissolve in alcohol should be dissolved in mounting is proceeded with as soon as the as small a quantity of water as is possible and backs of the pictures have become white; or,

paper, and if slightly alkaline, or neutral, add applied and pressed upon the collodiou surthe paper. The best method is to add a few result drops of chemically pure nitric acid to an made ready for work at the same time.

3151. Developing Solution. For the stock solution take water, 16 ounces; sulphate of iron, 4 ounces. Dissolve and filter. When wanted for use, take stock solution, I ounce; water, 4 ounces; acetic acid

that the negative does not become too intense. and the glass. The latter should always be kept perfectly clean and free from any deposit from the re-developing solutions.

quality can always be secured at the dealers in photographic materials. In an emergency

almost require a chapter by themselves; a long and let it stand on a warm place until the experience convinces us that nine out of every supernatant liquid appears perfectly clear, ten failures occur from a want of care, the Add then a few drops more of the hydrochloric presence of dirt, negligence. One cannot be acid and iron solution, and observe whether a

Ordinary well polished glass plates are coated bottle has become partially filled in course of

In Combining the Ingredients, measure with normal collodion of the usual descrip-When clear, decant into the flowing or coating prints are pressed and rubbed down with added to the alcohol, &c., a little at a time, and in other words, as soon as the alcohol has quickly shaken.

The enribourd should be 3150. Silver Bath. Make a solution in allowed to remain in water for at least half an the proportion of 60 grains uitrate of silver to hour previously to its being employed for I ounce water. Test the solution with litmus mounting. The more rapidly the pictures are nifric acid to produce a faint red reaction to tace, the more beautiful will be the finished

3156. Photographic Impressions ounce of water, and add this solution to the With Fuchsine. A piece of linen goods silver bath a rery few drops at a time. Then colored with fachsine, and dried, was exposed coat a plate with collodion and let it remain to the light under a photographic negative, in the bath all night. The freshly made col- when the image of the plate became visible hodion can be used for this purpose, and thus on the goods, the picture looking greyish and both collodion and silver solution or both be faded where the lights were strongest. Still the picture was rather weak, and the goods This were souked for 2 days in a bath of sulphate of may be made in stock solution of the simple copper, when the picture was found to be sulphage of iron and water, and then reduced more developed. After several rinsings in in strength and made ready for use each day, water, and two days' exposure on the grass, the rest of the goods were bleached white, leaving the picture of a pure violet fint on a white background,

3157. Tapioca Paper. To prepare (No. 8), I onnee. The addition of about I tapioca paper, which is very useful for copyounce alcohol to the above formula often faci- ing photographs by artificial light, 200 litates the smooth flowing of the solution on grammes (6). Troy onness) of tapioca are the plate. It is particularly essential when soaked for 2 days in an equal weight of wathe bath has been in long use and is "satu-ter; 10 litres (about 21 pints) of water are rated" with other and alcohol from the plates. added, and afterwards, for every litre (quart) 3152. Re-developing Solution, for of liquid, 10 grammes (154 grains) iodide of adding vigor and in asity to the negative, is potassium, 30 grammes (463 grains) chloride of made of water, I ounce; pyrogallic acid, I potassium, I gramme (154 grains) bromide of grain; citric acid, I grain. Pour into a small potassium, are dissolved, and the whole beaker or cupping glass about I ounce of this boiled for 10 minutes, allowed to stand for a solution, and add, by means of a pipette, 5 or day, and decanted and filtered through fine 6 drops of a solution of 20 grains nitrate of linen. The paper is immersed, 12 or 20 sheets silver dissolved in 1 ounce water. Immediate time-or can be floated upon it-for 15 diately flow this solution over the plate, occa- to 20 minutes; it is then hung up to dry in a sionally returning the solution to the little dark room. If it has assumed a dark color, beaker glass. As soon as the solution begins that is of no consequence, as it disappears in to assume a wine color, it is acting with vigor, the silver bath. This is to be prepared in the on the negative and should be closely watched, proportion of 1 ounce nitrate of silver, 50 to 60 grains of citric acid in 30 ounces of water. When sufficiently dense, throw away the solu- The time of exposure varies from 10 seconds tion and thoroughly wash both the negative to 25 minutes, according to the picture to be copied and the actinic force of the light.

To Recover Gold and Silver 3158. Photographic Solutions. \mathbf{from} 3153. Negative Varnish of excellent silver and gold waste that result from photographic operations are best collected in a large bottle or jar, together with anything common shellac varnish, somewhat thinned else that might contain either of the two down with alcohol, and filtered through cotton, metals. When the bottle is nearly full, pour will answer the purpose. (Sec. No. 2935.) a little hydrochloric acid and a solution of will answer the purpose. (Sec No. 2935.)

3154. The Causes of Failure would green sulphate of iron (copperas) into it, over-nice, careful or cleanly—the best results fresh precipitate forms or not. Ly the latter always rewarding the most painstaking. 3155. To Enamel Cameo Pictures, a syphon, and reserve the residue. If the

may be diluted with a sufficient amount of mounting. water, and used. (See No. 3166.)

Drawings, Etc. Silvered albumen paper, ing formula for a preservative varnish which after being wash a may be conveniently is stated to be an entire protection against used for copying negatives as well as posi-fading: I drachm gum damar dissolved in 1 tives. It keeps for weeks, and becomes onnce benzole. 1 drachm paraffine, dissolved sensitive to light only after exposure to the in 1 ounce benzole. Mix 4 parts of the vapors of aqua ammonia, technically termed paraffine solution with 1 part of the damar smoking with ammonia. Dr. H. Vogel has solution. Photographic prints covered with greatly simplified the latter process by substitutes this yarnish are impermeable to water. A tuting for the liquid ammonia the powder of solution of the paraffine only will do; but it carbonate of ammonia. He thoroughly im- is better with the gum damar. pregnates a piece of felt or cloth with this powder, and lays it under the silvered sheet, Enamel. separated from it by a piece of blotting-paper, negatives or positives, may be taken on drawing on top, between two plates of glass, obtains a copy quite distinct in all its details. The copy obtained is, of course, in white lines upon black ground. Such photographs require to be treated with soda when intended for long preservation.

Photographic Glasses. Water, 1 pint; sulphuric acid, ½ ounce; bichromate potash, ounce. The glass plates, varnished or otherwise, are left, say 10 or 12 hours, or as rubbed dry with soft white paper. This preparation is by Mr. Carey Lea, of Philadelphia, and is said to be the best in use. It quickly of potassium.

3161. reduce the intensity of the negative. Mr. F. atmospheric conditions, and may consequently A. Wenderoth, of Philadelphia, states that if and aptly be called everlasting photographs. a thin solution of gum-arabic is applied to the negative after fixing and before drying, the varnish will not affect the intensity. This is a very simple and useful remedy. Mr. Wenfew years unless thus protected.

graphic Prints.

time with insoluble chloride of silver and cabinet prints, etc., simply by coating them metallic gold, place the residue on a filter, with a glutinous plain collodion, made as wash it with very dilute acid, and, lastly, follows: Alcohol, 3 ounces; ether, 4 ounces; with water. After drying, it is to be mixed pyroxyline, 42 grains. Dissolve and filter in with several times its weight of dry carbonate the usual manner. The prints are first cut of soda, the whole conveyed to a crucible, and to the proper size and floated on the reverse the latter heated to a bright red heat, and side upon clean water until they lie persectly kept there for about 10 minutes. After taking flat; then take one print at a time and place the crucible out of the fire, and allowing it to it on a piece of glass of the same size as itself, grow cold, it is broken, the button of the moist side downwards; it easily adheres to alloy of gold and silver cleaned, and heated in the glass. Let the excess of water drain off, a suitable vessel with dilute nitric acid, which and remove all moisture from the picture will dissolve all the silver, as nitrate of silver, surface; now coat it with the collodion and and leave the gold in a finely divided state, let it drain in the usual way, then dry it be-This is dissolved by nitro-hydrochloric acid fore the fire or in any manner which is most (aqua regia). It is hardly necessary to say convenient. This polish is not so flagrant on that, for photographic purposes, both solutions the one hand as the so-called enamel surface, must be evaporated in a water-bath until the nor so dead as an ordinary albumen print that excess of acid has been volatilized, when they has undergone all the operations up to the

> 3163. Preservation of Photographs. Simple Method of Copying H. Cooper, Jr., of England, gives the follow-

Everlasting Photographs on First-class photographs, either 3164. He places the silvered paper, with the sub-Duchemin's enamel (see No. 2402) without stratum of carbonate of ammonia and the collodion, by using bitumen, or citrate of iron, or perchloride of iron and tartaric acid, and, exposing it to the light of the window, or bichromate, or any other salt. A good solution for this purpose is, water, 100 parts by weight; gum, 4 parts; honey, 1 part; pulverized bichromate of potash, 3 parts. Filter the liquid, spread it over the enamel, and let it rest, after which, expose it to the 3160. Lea's Solution for Cleaning camera. Develop the image by brushing over it the fellowing powder: Oxide of cobalt, 180 parts by weight; black oxide of iron, 90 parts; red lead, 100 parts; sand, 30 parts. Decompose the bichromate by immersion in a much longer as desired, in this solution, and bath formed of water, 100 parts by weight; then rinsed in clean water, and wiped or hydrochloric acid, 5 parts. Wash it in clean water and dry it; and lastly, vitrefy the proof on a clean piece of east iron, the sarface of which has been previously chalked. One removes silver stains from the skin without minute will suffice for indelibly fixing and any of the attendant dangers of the cyanide glazing the photograph, which must be care-of potassium. glazing the photograph, which must be care-fully and slowly allowed to cool. Photo-Wenderoth's Photographic graphs on enamel of any size, taken in this Varnish. Nearly all photographic varnishes manner, are perfectly unalterable under all

3165. Searing's Process for Photographing on Wood for Engraving. The block on which the picture is to be made is first dampened with water, then whitened deroth also states that he has long practiced with enamel rubbed from the surface of good the covering of photographic paper prints enameled visiting cards. Rub gently, reupon both sides with collodion rarnish, and moving only the enamel, after which it is finds it a complete preservative of the picture. | brushed smooth with a moderately stiff brush, Nearly all photographs will fade away in a from right to left and up and down, making a smooth, even, and very thin surface. 3162. Collodion Varnish for Photo- this to dry, after which it is flowed with a A very effective and solution of albumen, made with the white of agreeable polish is communicated to card or 1 egg and 16 ounces of water, dried by heat

or allowed to dry spontaneously. Now coat and dried. It is then brushed over on one it with another albumen solution made as side (which should be marked near the edge) follows: White of 1 egg; water, 4 ounces; with the solution of nitrate of silver, and chloride of ammonia, 40 grains. Beat the dried at the fire. The stronger the solution, whole to a thick froth. Allow to subside, the more sensitive the paper. If the barytic then decant or filter through a fine sponge solution (see No. 3181) be used instead of placed in a glass funnel. Pour a sufficient common salt, richer shades of color are obquantity on one corner of the block to cover tained. A solution of 10 grains sal ammoniac it, when spread around with the aid of a \(\frac{1}{4} \) or in 1 ounce water gives a very sensitive paper. glass (using the edge). Allow the surplus A due proportion must be observed in the solution to drain back into the bottle. Dry this by a gentle heat. Next flow on, in the dark room, solution No. 3, prepared as follows: Ether, 1 ounce; alcohol, 1 ounce; 120 grains nitrate of silver to 1 ounce water, gun-cotton, 8 grains; nitrate of silver, 30 Or: 60 grains of the nitrate with 40 grains days, protected from the light. Again dry tion. (See No. 3181.) the block by gentle heat. It is now ready for exposure under the negative. A porcelain botanical and entomological specimens, &c. printing-frame, or any other suitable method. The salt solution to contain 25 grains salt to may be used to print it. After printing, I ounce water. The silver solution 90 grains solution No. 3 is removed from the surface of in 1 ounce water. the block by dissolving in ether and alcohol, assisted by rubbing gently with a soft sponge. The salt solution, 20 grains; the silver solu-The picture can now be touch and fixed in tion, 40 grains to 1 ounce. To fix the drawthe ordinary way, or fixed and toned at one ing on these papers, they must be first washed operation, by the hypo and gold bath. After in lukewarm water, then dipped twice in being allowed to dry, it is ready for the solution of hyposulphite of soda (1 ounce to 1 engraver.

To Recover Silver from Photo-3166. a photographic bath, or from the rejected pnotographs and clippings, is a most important measure of economy in the art. The bath should be filtered, and a solution of wash it in distilled water, drain, and dry it. common salt added; this precipitates chloride metallic zine, a strip of which being placed in the pulpy mass, will combine with the chloride, and leave the silver in a spongy nitrate of potassa and fuse in a crucible—the all that is required. silver is thus obtained in a button. The papers must be incinerated, the ashes collected and treated with nitric acid and heat; diluted with water, and filtered; it is now an impure solution of silver, to be treated in the same way as the bath. (See No. 3158.)
3167. To Clean off Collodion Pic-

nished or not.

3168. Paper for Photography. paper used for photography may be the finest satin post paper, of uniform texture, free from the maker's mark, specks, and all imperfections. The papers must be prepared by candle-light, and kept in the dark till used.

solution of nitrate of silver. In brushing eyanide of potassium. over the paper it must not be crossed. Its

silver and salt solutions, as follows:

grains; dissolve in as small a quantity of wa- muriate of ammonia, and 4 ounces water. ter as possible, and allow to settle for a few Or: 100 grains nitrate with the barytic solu-

Less sensitive, for copying engravings,

For copying lace-work, feathers, patterns, &c. pint), then in pure water, and dried.

3171. Todized Paper. Brush over the graphic Waste. To obtain the silver from paper on one side (which should be marked) with strong solution of nitrate of silver (100 grains to I ounce); then dip it in solution of iodide of potassium (25 grains to 1 ounce);

3172. Bromide Paper. Soak the paper of silver, which is to be collected on a filter, in solution of brounde of potassium (40 grains dried, and washed; then the metallic silver to 1 ounce); then brush it over with strong may be obtained from it by the action of solution of nitrate of silver, and dry in the

3173. Chromatype Paper. chrematype paper is prepared as follows: mass of a gray color; after washing, this may Soak the paper in the simple solution (see No. be dissolved in nitric acid and crystallized. 3182), and dry it at a brisk fire. To fix the Another process is to mix the chloride with drawing, careful immersion in warm water is It is not sufficiently The sensitive for the camera.

I of COMPOUND CHROMATYPE PAPER. Wash the paper with the compound solution (see No. 3182), and dry it. After the paper has been exposed to the sun with the article to be copied superposed upon it, it is washed ever in the dark with a solution of nitrate of tures. A tuft of cotton dipped in methylic silver of moderate strength. A vivid picture alcohol, and rubbed over the surface of the makes its appearance, which is sufficiently picture, will remove it entirely, whether var-fixed by washing in pure water. For copying engravings, &c. Another method is to brush writing paper over with a solution of 1 drachm of sulphate of copper in 1 ounce of water; and when dry, with a strong but not saturated solution of bichromate of potash.

3174. Cyanotype Paper. paper over with a solution of ammonio-citrate 3169. Simple Nitrated Paper. This of iron. Expose the paper in the usual way, is merely paper brushed over with a strong then wash it over with a solution of ferre-

3175. Crysotype Paper. Wash the paper with solution of ammonio-citrate of sensitiveness is increased by using spirits of paper with solution of ammonio-citrate of wine instead of water. This paper only iron, dry it, and afterwards brush it over with requires washing in water to fix the drawing. a solution of ferroeyanide of potassium. Dry 3170. Muriated Paper. The paper is it in a dark room. The image is brought out first soaked in solution of common salt, by brushing it over with a neutral solution of pressed with a linen cloth or blotting-paper, gold or of silver.

3176. Calotype Paper. The paper is poli. The plates are to be rubbed hard and water containing 20 grains nitrate of silver and edges with a clean hog's-hair brush. and 1 drachm glacial acetic acid, and dried in

3177. Instantaneous Positive Paper. Mix 6 drachms of a saturated solution of image, at first very feeble. is developed by hence termed electro-positive bodies. this solution; sulphate of iron, 15 grains; 3187. Assaying. The method of deglacial acetic acid, 25 grains; distilled water, termining the quantity of pure gold and silver 1 ounce. The deepening of tint must be in the alloys of these metals. This art re-

tive Printing.

potassium, 5 parts.
3180. Artificial Ivory for Photoslabs are to be removed, dried, and polished

like ivory (Mayall.)

3181. Barytic Photographic Solution.

Dissolve 35 grains chloride ef barium in 2 ounces distilled water.

3182. Chromate Photographic Solutions. Simple chromate solution is a saturated solution of bichromate of potash; a little sulphate of indigo being sometimes added to vary the color.

The compound chromate solution consists of 10 grains bichromate of potash, and 20 grains sulphate of copper, dissolved in 1 ounce distilled water.

3183. Hydriodate of Iron and Barysettled decant the clear liquor for use.

3184. Hardwich's Gold Toning Bath

saturated in 1 ounce water, containing 20 evenly with balls of cotton-wool dipped in grains iodide of potassium, and dried. Then the mixture. When dry, rub again with a made sensitive by soaking in 1 ounce distilled clean ball of cotton, and dust off the back

Metals. Metals are elementary or undecompounded bodies, which are bichloride of mercury with 1 pint distilled water. Float the paper on this solution in a distinguished by their weight, lustre, fusibility, flat dish. Dry it; take into a dark place lit power of conducting heat, electricity, &c. by a candle with a yellow glass, and render it (see Nos. 3349 to 3357 inclusive), and the sensitive by a solution of 38 grains nitrate of numerous compounds which they furnish by silver to 1 ounce water. To print, expose to combination with one another, and with other a perpendicular light from 2 to 10 seconds in bodies. When their solutions are decomposed summer, about 1 minute in winter; then by a galvanic current, the metals always apimmediately cover with a black cloth. The pear at the electro-negative surface, and are

watched, and arrested at the proper moment. quires great skill and experience in its per-Then wash, and fix with hyposulphite.

178. Albumenized Paper for Posiprecious metals is of the utmost importance. White of egg, and water, A downward draught furnace of any shape equal parts; iodide of potassium or chloride and size may be employed, provided it will of sodium, 5 grains to I ounce water (or bro- afford a sufficient heat, and allow the intromide of potassium, 20 grains). Coat the paper duction of the muffle. The muffle is a pot with this solution. Dry. Immerse in the made of clay, and furnished with an opening dark in bath of 120 grains nitrate of silver to at its end, to admit the introduction of the I ounce water. Dry again. This is exposed cupels, and to allow of inspection of the prowith the negative over it, for 10 to 15 minutes. cess. It is placed on the muffle-plate, by 3179. Prepared Wax Paper. Make which it is introduced into the furnace. The a strong size by digesting 25 parts gelatine, cupel is a sort of shallow crucible, made of 50 of linseed, and 150 of rice flour, in 2000 to bone sahes or burnt bones. At the British parts have the restricted for the color of the color of the selection o 3000 parts hot water. Filter through a cloth. mint the cupels are made of the calcined cores Take of this size, when cold, 1000 parts by of ox-horns. The powder is slightly moistenweight, and dissolve in it sugar of milk, 50 ed with water, and a circular steel mould is parts; iodide of potassium, 35; bromide of filled therewith, and after being pressed down tight, is finished off with a rammer, having a 3180. Artificial Ivory for Photo-convex face of polished steel, which is struck graphers. Sheets or tablets of gelatine or forcibly with a mallet, until the mass becomes glue are immersed in a solution of alumina. sufficiently hard and adherent. The cupel is When entirely penetrated by the alumina, the then carefully removed, and exposed in the then carefully removed, and exposed in the air to dry, which usually takes from 14 to 21 days. The muffle, with the cupels properly arranged, being placed in the furnace, the latter is filled up with charcoal, and lighted at the top by placing a few pieces, heated to whiteness, on last. When the cupels have been exposed for half an hour, and have become white by heat, the lead is put into them by means of a pair of tongs, and as soon as this becomes thoroughly red and circulating, as it is called, the metal to be assayed, wrapped in a small piece of paper, is added, and the fire kept up strongly until the metal enters the lead, and circulates well, when the heat may be slightly diminished, and so regulated tes Photographic Solution. Hydriodate that the assay shall appear convex and ardent, of barytes, 40 grains; water, 1 ounce; pure while the cupel is less red—that the undula-sulphate of iron, 5 grains; mix, filter, add a tions shall circulate in all directions, and that drop or two diluted sulphuric acid, and when the middle of the metal shall appear smooth, surrounded with a small circle of litharge, which is being continually absorbed by the for Positive Printing. Pure chloride of cupel. This treatment must be continued gold, 1 grain; hyposulphite of soda, 1 to 3 until the metal becomes bright and shining, grains; hydrochloric acid, 4 minims; water, 4 or is said to "lighten;" after which certain nnces.

3185. Mayall's Method of Cleaning flash across the globules, and undulate and Photographic Glasses. Shake up together cross each other, and the latter metal soon 30 parts alcohol, 10 parts strong liquid amafter appears very brilliant and clear, and at monia, 40 parts water, and 30 parts fine Trillength becomes fixed and solid. This is called

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the "brightening," and shows that the separa-! produced by using a lead solution thickened alloy. The preceding general description of the process of eupellation will render the following articles intelligible, without again entering into the minutize of the operation. An assay is thought to be good when the bead is of a round form, with its upper surface brilof various colors, and scales of litharge still remain on the cupel, and the metal adheres strongly to the latter, too little heat has been used, and the button still retains some lead. To remedy this, the heat should be raised, and a little powdered charcoal, or a few small is necessary that the lead employed in the process of capellation should be perfectly pure. It ought, therefore, to be procured by reducing refined litharge. (Cooley.)

3188. Puscher's Solution for Coloring This is a new method of giving of soda in 1 pound water, and add 12 ounces ing the stroke with aquafortis when red hot, acetate of lead dissolved in ½ pound of water. When this clear solution is heated to 190° to 210° Fahr., it decomposes slowly, and precipitates sulphide of lead in brown flocks. If metal is now immersed in it a part of the sulphide of lead is deposited thereon, and according to the length of time and consequent thickness of the deposited sulphide of lead, the various and beautiful lustre colors are produced. In 5 minutes there may be imparted to brass articles a color varying from a beautiful gold to a copper red; then carmine red; then dark, then light aniline blue, to a blue white, like sulphide of lead; and at last a reddish white, according to the length of time they remain in the solution used. The colors possess the most beautiful lustre, and if the articles to be colored have been previously thoroughly cleaned by means of acids and alkalies, they adhere so firmly that they may be operated upon by the polishing steel. To produce an even coloring, the articles to be colored must be evenly heated.

Iron treated with this solution takes a steel blue color; zine, a brown color; in the case of copper objects the first gold color does not appear; lead and zine are entirely indifferent.

f, instead of the acetate of lead, an equal weight of sulphuric acid be added to the hyposulphite of soda, and the process carried on as before, the brass is covered with a very beautiful red, which is followed by a green, and changes finally to a splendid brown with Quartation. green and red iris-glitter; this last is a very durable coating, and may find special attention in manufactures. (See No. 3313.) move the latter it undergoe Very beautiful marbleized designs can be of quartation and parting.

tion is ended. In conducting this process, all with gum tragacanth on brass which has the materials used must be accurately weight been heated to 210° Fahr., and afterwards ed, especially the weight of the alloy before treated by the usual solution of sulphide of cupellation, and the resulting button of pure lead. The solution may be used several metal. The difference gives the quantity of times, and is not liable to spontaneous change.

The most marked properties of ۹ old. metallic gold are its ductility, malleability, and insolubility in all menstrua, except liant, its lower one granular and dead-white, and aregia and aqueous chlorine, and its slight and when it separates readily from the cupel. When the surface of the bead is dull and flat, effic gravity of 13.3 to 17.7; pure gold, about it shows that too much heat has been employed; and if the metal be silver, some may have been lost in the process, by fuming or have been lost in the process, by fuming or by its yellow color, its insolubility in nitric absorption. When the bead is spongy, and acid and ready solution in nitronwriatio acid. absorption. When the bead is spongy, and acid, and ready solution in nitromuriatic acid (aqua regia), forming a yellow liquid that stains the skin purple.

3190. Assay of Gold by the Use of Touch-Stones. When it is desired to ascertain the fineness of small quantities of gold, as in jewelry, &c., touch-needles and pieces of paper, thrown into the cupel, until stones are employed. The former are made the metal again begins to circulate freely. It in sets, containing gold of different fineness and differently alloyed with copper and silver. Pieces of black pottery form excellent touch-stones. The mode of using them is to mark the stone with the sample under examination, and to compare its appearance, hard ness, &c., with that produced by one or more metals a durable colored coating, and can be of the needles. When the two are similar, executed quickly and cheaply. To prepare the quality is considered to be the same. the solution dissolve 11 ounces hyposulphite They are then further examined by moistenwhen the appearances resulting from oxida-tion, etc., differ according to the nature and

quantity of the alloy. 3191. Assay of Gold by Cupellation. This process is divided into five operations.

Cupellation. Either 6 or 12 grains of the alloy is the weight usually taken for the assay, to which is added 16 parts of lead for every 1 part of copper that it is presumed to contain, though considerably more lead may be used when the sample does not contain any silver; but if the reverse be the case, an excess of lead would tend to the loss of the latter metal, which ought not to be separated until the operation of parting. When silver is present an additional allowance of lead, equal to its weight, is made on that account. When, however, the quantity of silver is small, or is not required to be estimated, it becomes of little consequence what weight of lead is employed, so long as enough be used to carry off the base metals, at the same time that the quantity is not too large for the cupel. The sample is then submitted to cupellation. This process does not require so much care for gold as silver, as none of this metal is absorbed by the cupel, or lost by evaporation, and it will safely bear the highest heat of the furnace without injury. In other respects the operation may be conducted in exactly the same manner as for silver.

Quartation. After gold has passed the cupel, it may still retain either of the other perfect metals, particularly silver. To remove the latter it undergoes the operations Quartation is

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performed by adding 3 parts of silver to one: 3194. name. In this state nitric acid will dissolve ness. Used to make preparations of gold. out the silver, which brings us to the next: 3195. Liquid Gold. Agitate et

Parting. ted with half its weight of water; this being it leaves a coating of pure gold. poured off, another quantity of acid, of about 3585.) 1.26, and undiluted, may be employed. In second part of the operation of parting is per, holding it over a spirit lamp until the decalled the reprise. If the acid be used too sired color appears on them. strong it leaves the gold in a state of powder, otherwise the metal preserves its form Gold. A solution is made of 2 parts nitre, throughout the process of parting. It is next 1 part Roman alum, and 1 of sea salt. The carefully collected, washed, and dried.

heating it to redness in the muffle.

Weighing. The pure gold is next accurately weighed. This weight doubled (if 12) grains are under assay), or quadrupled (if 6 material to be well pounded separately in a alloy examined, without calculation. The loss of weight by cupellation gives the The amount of copper in the sample; that after It is then ready for the reception of the arparting, the amount of silver, deducting, of ticles to be colored, which must be not less course, the weight of silver used in the process, which is called the witness. the sample contains but very little gold, the dry method of assaving cannot be depended on, and chemical analysis must be had recourse to. (Cooley.)

stance, whether liquid or solid, especially where the quantity is small, is most easily obtained by chemical analysis. The gold is thrown down from its solution by adding a solution of protosulphate of iron; the precipitate, after being washed, dried and gently heated, may be weighed as pure gold.

If 100 grains of the substance or liquid under test be taken for examination, the weight in grains of the dried precipitate will give the percentage of gold contained in the

sample.

3193. To Obtain Gold Chemically Pure. Dissolve gold in nitromuriatic acid (a mixture of 1 part nitric acid with 2 parts muriatic scid, and called aqua regia); by adding to the gold solution a solution of proto-after Soldering. Boil the gold, after sol-sulphate of iron, the pure gold is precipitated dering, in diluted oil of vitriol; rinse in clean be thoroughly washed to free it from acid, and then dried. In this form it is ready to mix by fusion with other metals; or the powmelting in a crucible, with a charcoal fire, soiled gold therein, and it will become clean sprinkling occasionally into the crucible a and brilliant. little saltpetre and potash as a flux. The gold will form a button at the bottom.

Grain Gold. Cupelled gold, 1 of the cupelled sample, and fusing them to-gether, by which the gold is reduced to one stream into water; dissolve out the silver fourth of the mass, or even less; hence the with nitric acid, and heat the grains to red-

Agitate other operation. In many cases the operation of with a solution of terchloride of gold for some quartation is performed conjointly with that time, allow it to repose, and decant the sun. pernatant portion. Naphtha and essential The alloy of gold and silver oils possess the same property as ether, of formed by quartation is next hammered or taking gold from its solutions. This liquid rolled out into a thin strip or leaf, curled up was formerly held in great esteem as a corinto a spiral form, and submitted to the ac-dial medicine. It is now only employed for tion of nitric acid, specific gravity 1.3, dilu-, writing on steel, gilding, &c. As it dries, (See No.

3196. To Make Watch Hands Red. each case the acid should be boiled upon the Mix to a paste over a lamp, I ounce carmine, alloy for about a quarter of an hour. In the I ounce chloride of silver, and $\frac{1}{2}$ ounce tinners' first case the quantity of fluid should be about japan. Put some of the paste on the hands, 21 ounces, and in the second 11 ounces. The and lay them face upwards on a sheet of cop-

3197. French Method for Coloring jewels or articles of gold are kept in the solu-Annealing. The sample of pure gold has tion at a boiling point for from 15 to 25 minnow only to be annealed, which is done by jutes; and then washed in water. The surface putting it into a small porous crucible, and of the gold is dull, but perfectly uniform, and

ready for burnishing.

3198. To Color Gold. Take 1 part salt, 1 part alum, and 2 parts saltpetre; each grains), gives the number of carats fine of the mortar; put them into an iron pot with 1 pint water, and heat slowly over a fire; boil gently and stir with an iron rod until it rises. When the color by 18 carat wire, and kept in motion till the liquid begins to sink, then taken out and dipped in aquafortis pickle. The color liquid will rise again, and then another dip, and sometimes two, may be necessary to give 3192. Assay of Gold by Chemical the articles the proper color. This process of Analysis. The richness of gold in any sub-coloring is no more than taking from the surface the inferior metals, leaving a thin coating of pure gold; its application should not be too long continued, as it also dissolves a small portion of the gold.

3199. Gold Coloring Solution. Take 1 ounce nitrate of soda, and ½ ounce chloride of sodium, and dissolve in a slight excess of warm water, afterwards adding to the solu-tion about 5 drachms hydrochloric acid. The solution should be kept boiling while the

work is in it.

3200. To Clean Gold after it is Soldered. Put it through the same process as silver (see No. 3222), but, instead of alumwater, boil it in wine and sal-ammoniae

To Restore the Color of Gold 3201. in the form of a brown powder, which should water, polish with Tripoli mixed in oil (sweet oil is best), wash and gloss with crocus on a clean cloth.

3202. To Clean Gold. Dissolve a der can be reduced to solid metallic form by little muriate of ammonia in urine; boil your

> 3203. To Clean Gold Ornaments. Gold ornaments may also be thoroughly

cleaned by immersion for a few seconds in a latter violently agitated for a short time, when weak solution of ammonia. Then wash with the liquor will rapidly clear and enable it to

soap and water.

3204. Articles. high price, and hence, it may be inferred, is has been added, this will produce a fresh pre-well adapted for the purpose. He found it to cipitate, and the assay cannot then be deture of about 70 per cent. sesquioxide of iron or test liquor used, a tube graduated into (iron rust) and 30 per cent. sal-ammoniac. 100 parts, and holding 1000 grain may be To prepare it, protochloride of iron, obtained used instead, every division of which required by dissolving iron in hydrochloric acid, is to throw down the silver, will represent the treated with liquid ammonia until a precipitate is 0, is ready for use, and from being graduated collected on a filter, and, without washing, is downward the quantity poured out may at dried at such a temperature that the adhering once be read off. Generally speaking, howsal-ammoniae shall not be volatilized. The ever, measuring does not admit of the same protoxide of iron precipitate at first becomes accuracy as weighing. The termination of charged with sesquioxide.

Silver. This metal has a very white ver. Dissolve 54½ grains pure sea-salt (see color, a high degree of lustre, is exceed- No. 3209) in 22 ounces 320½ grains (avoirduingly malleable and ductile, and the best con- pois) distilled water. Filter and keep in a ductor of heat and electricity known. It is stoppered bottle for use, procured from its oreschiefly by amalgama- 3209. Pure Sea-Salt. tion and cupellation. Its specific gravity is for a few minutes, in a glass vessel, a solution 10.474, and melting-point 1873° Fahr., or of salt with a little pure bicarbonate of soda; bright redness. It is soluble in nitric acid, filter; add muriatic acid until the liquor be and in sulphuric acid by the aid of heat. Its neutral to litmus and turmeric paper; then surface is rapidly tarnished by sulphuretted evaporate and crystallize. hydrogen, and by the fumes of sulphur.

3203. Assay of Silver by Cupellation.

balance, which must be brought into an exact of lithar which covered the silver. If the state of equilibrium, and add the test solution silver that abstracted is not sufficiently pure, (see No. 3208) gradually and cautiously, until it is further refined in a reverberatory fundamental silver. gives the exact quantity of pure silver present absorbed by the ashes of the cupel. in 1000 parts of the sample. The addition of 3211. Test for Metallic Silver. The the test liquor to the solution requires the compounds of silver, mixed with carbonate of utmost exactness. After each addition the soda, and exposed on charcoal to the inner

be seen when the operation is concluded. We Polishing Powder for Gold must then, as a check, add a small quantity Dr. W. Hofman has analyzed a of a solution of nitrate of silver to the liquor polishing powder sold by gold workers in in the tabe, after having first carefully taken Germany, which always commands a very the weight. If too much of the test liquor be a very simple composition, being a mix-pended on. Instead of weighing the quantity the operation is clearly marked, when, on adding a minute quantity of the test liquor to the silver solution, no cloudiness occurs.

3208. Test Solution for Assaying Sil-

Boil together

3210. To Extract Silver from Lead. This is easily done in a small way by melting The assay pound (usually 12 or 20 grains for the mixed metals by a strong heat in the open silver) of the alloy for examination is accu- air. The lead will be converted into litharge, rately weighed, and then wrapped in a small and the silver will sink to the bottom of the piece of paper ready to undergo the process crucible. On a large scale, the silver is exof eupellation. (See No. 3191.) The quantity of lead used is not uniform, but depends on the nature of the alloy. It should be 13 lead into a reverberatory furnace of a particular construction. A shallow vessel, called a times the weight of the copper presumed to be present in the sample. This, however, cannot be accurately ascertained, though an reception of the nozzle of a bellows, through experienced a sayer is generally able to guess which air is forcibly driven. When the fire is very nearly the amount. If too much lead lighted and the lead is in a state of fusion be used, the button obtained by cupellation from the reverberation of the flame, the blast will be too small, owing to some of the silver from the bellows is made to play forcibly on being absorbed by the cupel; and if too little be used, the button will come out too large, oxide of lead or litharge is formed and driven from still containing some copper. The im- off to the side of the cupel opposite to the portance of justly proportioning the lead to mouth of the bellows, where a shallow aperthe quantity of copper present in the alloy, ture is made for it to pass over; another crust cannot be too much insisted on. (Cooley). of litharge is formed and driven off, and this 3207. Assay of Silver by Chemical is repeated until nearly all the lead has been Analysis. Dissolve 10 grains of the alloy scorified and blown aside. The complete grains of nitric acid, specific gravity separation of the lead is indicated by the ap-1.23, by the aid of heat; the solution being pear, as of a brilliant lustre on the convex made in a tall stoppered glass tube, furnished with a foot; then place it in a very delicat is seen and by the removal of the last crust the whole of the silver be thrown down; but the utmost care must be taken not to exceed this point. The number of grains now required to restore the equilibrium of the scales process is converted into litharge, and is gives the exact quantity of pure silver process.

stopper should be placed in the tube, and the flame of a blow-pipe, afford white, brilliant,

and ductile metallic globules, without any in a pan over the fire, when it will be ready incrustation of the charcoal. (See also As. for melting, with the usual fluxes, or re-solusaying.)

3212. and still moist chloride of silver in a bright and all others who need a reliable article.

less diluted. (See Nos. 3716, 3720, and 3721.) acid, and zinc. The silver is precipitated from the solution, after moderately diluting it, by common salt, and the chloride reduced as directed in Nos. 3214 and 3215.

To Purify and Reduce Silver. 3214. Silver, as used in the arts and coinage, is alloyed with a portion of copper. To purify it, dissolve the metal in nitric acid slightly diluted, and add common salt, which throws down the whole of the silver in the form of chloride. peatedly washed with distilled water, and placed in a zine cup; a little diluted sulphurie acid being added, the chloride is soon reduced. pure. In the absence of a zinc cup, a porcelain cup containing a zine plate may be used. The process is expedited by warming the cup. (Sec No. 3536.)

3215. To Purify and Reduce Silver. The quantity of ammonia need not be sufficient to dissolve the chloride. mixture for a day, then wash the silver thor-

Granulated zine must then be added to the may be produced by a slightly warm solution chloride, and stirred through the mass. The of sulphuret of potassium or sodium. (Dr. finer the zine has been granulated, the more Ellsner.) rapid will be the reduction. Dilute sulphurie acid must also be added, and the whole stirred until the reduction is complete, which will be known by the entire disappearance of the strong platinum is easily prepared: Take 1 part nitric acid, and 2 parts hydrochloric (muriatic) the chlorine is liberated from the silver, which required. takes its metallic form, as above stated, in the acid; after all action has ceased, the solution tree. Very brilliant and beautiful.
of zinc must be decanted, or drawn off with a 3222. To Clean Silver after it is Solof zine must be decanted, or drawn off with a syphon, and the silver washed until free from dered. Make it just red hot, and let it cool; by pressure, or the simple application of heat vessel, and it will be as clean as when new.

tion with nitric acid. This process is rapid To Obtain Pure Silver. Pure and easy; is not subject to loss; it will yield, silver is obtained by placing a copper rod in a in the terms of trade, pure silver, of a quality solution of nitrate of silver, digesting the from 994 to 998 thousandths fine, and is thereprecipitate in caustic ammonia, and washing fore well adapted to the preparation of pure with water; or by boiling recently precipitated nitrate of silver for the use of photographers

iron vessel along with water. (See No. 3536.)

3213. Solvent for Silver. Nitrosolve it in slightly diluted nitrie acid, and sulphuric acid. Dissolve 1 part nitre in 10 precipitate it with slips of bright copper; parts oil of vitriol. Used for dissolving the wash the powder in spirits, and dry it. Or: silver from plated goods, &c. It dissolves An exceedingly fine silver dust may be obsilver at a temperature below 200°, and tained by boiling recently precipitated chloride scarcely acts upon copper, lead, and iron, unof silver with water acidulated with sulphuric

> 3218. To Frost Polished Silver. To produce a frosted surface on polished silver, use cyanide of potassium with a brush. The silver should not be handled during the process, but held with pliers made of lance-wood or boxwood. The proportion should be 1 ounce dissolved in a pint of water. It is

very poisonous.

3219. To Oxidize Silver. beautiful effect is produced upon the surface To reduce it into a metallic state several of silver articles, technically termed oxidizing, methods are used. The chloride must be re-which gives the surface an appearance of polished steel. This can be easily effected by taking a little chloride of platinum, prepared as described in the next receipt, heating the The silver, when thoroughly washed, is quite solution and applying it to the silver when an oxidized surface is required, and allowing the solution to dry upon the silver. The darkness of the color produced varies according to the strength of the platinum solution, from a light steel gray to nearly black. The effect of Proceed as above, and digest the washed this process, when combined with what is chloride with pure copper and ammonia, termed dead work, is very pretty, and may be not be suffication to medals, giving scope for the Leave the exercise of taste. The high appreciation in which ornaments in oxidized silver are now Or: Boil the washed and moist held, render a notice of the process followed chloride in solution of pure potash, adding a interesting. There are two distinct shades in little sugar; when washed it is quite pure.

3216. Peale's Method of Obtaining brownish tint, and the other by sulphur, Pure Silver from its Solutions. By which has a blueish-black tint. To produce adding in excess, a saturated solution of common salt to the solution of nitrate of silver, article with a solution of sal-ammoniac; a the metal is thrown down, as an insoluble much more beautiful tint may, however, be salt, the chloride of silver. The precipitate obtained by employing a solution composed must then be carefully washed until it is en-tirely freed from the presence of nitric acid. ammoniae in vinegar The fine black tint

white chloride, and its conversion into a grey acid; mix together and add a little platinum; powder. A new set of affinities takes place keep the whole at or near a boiling heat; the with great rapidity in this combination, and metal is then dissolved, forming the solution

3221. To Make a Silver Tree. Disappearance of a grey powder. The zine, solve 20 grains nitrate of silver in 1 fluid ounce having been added in excess, must now be of water in a phial, and add $\frac{1}{2}$ drachm pure removed by the addition of dilute sulphuric mercury. Arrange the zine as for the lead

acidulous matter, after which it may be dried then boil it in alum water, in an earthen

SILVER

Belgian Burnishing Powder. pipe clay, 2 ounces white lead, 2 ounce mag-

jeweler's rouge.

3224. To Protect Silver-Ware from Tarnishing. with sulphur compounds, especially where ware and wash it, using an old nail-brush or gas is burned, is very great. Silversmiths tooth-brush for the purpose, may thank one of their confraternity—Mr. 3231. To Clean Sil did not answer. He tried some other soluthe expedient of coating his goods over with a thin coating of collodion, which he found brass door-knobs, &c. to answer perfectly. No more loss of silver, warms the articles to be coated, and then with Canton flannel. (See next receipt.) paints them over carefully with a thinnish says, it is not advisable to do them over more than once. Silver goods, he tells us, protected ly black in a few months.

from the air in box-wood sawdust, which will hue. also dry them after being washed. The tarnish on silver-ware is most often due to sulphur. A gentleman who wears a silver watch finds the rubber ring which holds together his ferry

nishing.

3226. To Clean Silver. Immerse for half an hour the silver article into a solution of soda, 8 ounces muriate of ammonia, 4 ouncer liquid ammonia, and 4 ounces eyanide of potassium; but, as the latter substance is leather. This gives silver a beautiful white poisonous, it can be dispensed with if necessary. The article, being taken out of the solution, is washed, and rubbed with a wash

leather. 3227. To Clean Silver Plate. Fill a large saucepan with water; put into it 1 ounce carbonate of potash and ‡ pound whiting. Now put in all the spoons, forks, and be completely eradicated by making a little small plate, and boil them for 20 minutes; after which take the saucepan off the fire and allow the liquor to become cold; then take A soft brush must be used to clean the embossed and engraved parts.

3228. Plate Boiling Powder. and alum. A little of this powder, added to silver till the stain disappears.

to it a silvery whiteness.

3229. Plate Cleaning Powder. For A burnishing powder in use in Belgium is cleaning silver and plated articles, &c. Mix 1 composed of 1 pound fine chalk, 3 ounces pound jeweler's rouge with 2 pound prepared chalk. Or: 1 pound levigated putty powder, nesia (carbonate), and the same quantity of 2 pound burnt hartshorn, 1 pound prepared chalk, and 1 ounce rose-pink.

Protect Silver-Ware from 3230. To Clean Silver. To clean sil-The loss of silver which re-ver, mix 2 tea-spoonfuls of ammonia in a sults from the impregnation of our atmosphere quart of hot soap-suds. Put in the silver-

To Clean Silver and Silver Strolberger, of Munich—for a happy thought. Plated Articles. Boil 1 ounce finely pow-He seems to have tried various plans to save dered and calcined hartshorn in 1 quart water, his silver, if possible. He covered his goods and while on the fire, insert the articles, as with a clear white varnish, but found that it many as the vessel will hold; leave them in soon turned yellow in the window, and spoiled a short time, then take them out, and dry the look of his wares. Then he tried water-them over a fire; when all the articles have glass (solution of silicate of potash), but this been thus treated, put into the solution clean woolen rags; when they are saturated, hang tions, to no purpose; but at last he hit upon them up to dry. These will be excellent for polishing the silver, as well as for cleaning

3232. To Preserve the Polish on and no longer incessant labor in keeping it. Silver. Wash it twice a week (if in daily clean. The plan he adopts is this: He first use) with soft soap and hot water, and polish

3233. To Clean Silver Ornaments. collodion diluted with alcohol, using a wide Boil them in soft soap and water for five soft brush for the purpose. Generally, he minutes; then put them in a basin with the same hot soap and water, and scrub them gently with a very soft brush while hot; then in this way, have been exposed in his window rinse and dry with a linen rag. Heat a piece more than a year, and are as bright as ever, of common unglazed earthenware, or a piece while others unprotected have become perfect- of brick or tile in the fire; take it off, and place the ornaments upon it for the purpose 3225. To Prevent Coins and Small of drying them, and causing every particle of Ornaments from Tarnishing. All orna moisture to evaporate; as the moisture, ments, whether gold or silver, can be kept which otherwise would remain on the silver, from tarnishing if they are carefully covered will cause it to tarnish, or assume a greenish

3234. To Clean Silver. Moisten some finely powdered whiting or Paris white with spirits of hartshorn, rub the silver into that it is tarnished from the sulphur fumes of it, let it dry, then rub it off with a soft cloth and polish it with chamois leather. Some tickets. Sulphur fumes enough get into the kinds of silver soap keep silver looking nicely, air to account for all ordinary cases of tar- but many of them are chemical compounds that injure the silver.

3235. To Clean Silver Plate. Whiting finely powdered and moistened with a made of 1 gallon water, 1 pound hyposulphite little sweet oil is excellent to clean silver. Let the mixture dry on, then rub it off with a soft linen cloth and polish with chamois appearance, and if well done the silver will

keep clean a long time.

3236. To Remove Ink Stains from The tops and other portions of silver inkstands frequently become deeply discolored with ink, which is difficult to remove by ordinary means. It may, however, chloride of lime into a paste with water, and

rubbing it upon the stains.
3237. To Remove Dark Stains from each piece out and polish with soft leather. Silver. A certain remedy for the most inveterate stains that are sometimes to be seen on teaspoons and other silver ware, is to pour Mix a little sulphuric acid into a saucer, wet with equal parts of cream of tartar, common salt, it a soft linen rag, and rub it on the blackened Then coat the water in which silver-plate is boiled, gives the articles with whiting finely powd red and sifted, and mixed with whiskey or spirits of soft buckskin.

Spoons.

3239. To Clean Gold, Silver, and Copper Coin for Numismatic Collections, accurate results Make a weak solution of cyanide of potassium and bathe the coin in it for 2 or 3 seconds, then per. Copper may be separated from lead by immediately wash it with a very fine brush, in adding sulphuric acid to the nitric solution, longer that the time specified, otherwise they of copper may be thrown down as before. may have , frosted appearance. (See No. 2167.) As the evanide of potassium is a very the operator not to use it unless his hands are sulphuret of copper, which may be dissolved entirely free from scratches. This solution in nitric acid, and treated as in last receipt. may also be used for cleaning fine copper coins, but care must be taken not to use the Digest in nitric acid: the copper will be disfor cleaning silver, or a coating of the latter peroxide. metal may be the consequence. (See Nos. 3224 and 3225.)

green oxide. To remove this they should be solves the copper and leaves the silver unsteeped for 10 minutes in a solution of ammonia, then immersed in water and wiped

rag.

oxygen, sulphur, acids, and other minerals, flux and in the organic kingdom, in the ashes of plants, and in the blood of animals. The solution of sulphate of copper is heated to the iron and copper, found in Cornwall and other per is then separated from the adherent zinc parts of the world. Copper is only prepared by diluted sulphuric acid, and dried by expofrom its ores on the large scale. The copper sure to a moderate temperature. pyrites are first roasted, and then smelted, by which process coarse metal is produced; this Powder. ductile. It has a specific gravity of 8.8 to agitated with some granulated zinc. ous compounds, all of which are more or less Exposure to a damp atmosphere poisonous. produces on its surface a green colored oxide, known as verdigris. Copper may be readily alloyed with other metals, except iron and lead, with which it unites with difficulty.

3241. Test for the Quantity of Copper in a Compound. The quantity of copper

wine. When the whiting has dried on, and potassa, after which it must be carefully rested a quarter of an hour or more, wipe it collected, washed, dried, ignited, and weighed. with a silk handkerchief, and polish with a This will give the quantity of the oxide from which its equivalent of metallic copper may To Remove Egg Stains from be calculated; every 5 parts of the former To remove the stains on spoons, being nearly equal to 4 of the latter; or, more caused by using them for boiled eggs, take a accurately, every 39.7 parts are equal to 31.7 little common salt moist between the thumb of pure metallic copper. Copper may also be and finger, and briskly rub the stain, which will soon disappear. Then wash. immersing a piece of polished steel into the solution; but this method will not give very

3242. To Separate Lead from Copsoap-suds; rinse in clean cold water, and dry and evaporating to dryness, when water in boxwood saw dust. This receipt is partic- digested on the residuum will dissolve out ularly good for fine proof coins. Be careful the sulphate of copper, but leave the sulphate not to let the coins remain in the solution of lead behind. From this solution the oxide

3243. To Separate Zinc from Copper. Copper may be separated from zinc by suldeadly poison, great care must be taken by phuretted hydrogen, which will throw down a

3244. To Separate Tin from Copper. mixture that has previously been employed solved, but the tin will remain in an insoluble

3245.To Separate Silver from Copper. Digest, in a state of filings or powder, Silver coins are often covered with a dense in a solution of chloride of zinc, which dis-

changed.

3246. To Separate Copper from its with a soft towel; if necessary, a fresh Alloys. Copper may be separated in absoquantity of the solution may be applied. lute purity from antimony, arsenic, bismuth, Copper coin may be cleaned by immersing in lead, iron, &c., as it exists in bell-metal, brass, pure sweet oil and wiping dry with a soft bronze, and other commercial alloys, by fusing, for about half an hour, in a crucible, 10 parts of the metal with I part each of copper scales (black oxide), and bottle glass. The pure copper is found at the bottom of opper. This metal is found in the the crucible, whilst the other metals or impurimetallic state, and in combination with ties are either volatilized or dissolved in the

copper of commerce is principally prepared boiling-point, and precipitated with sublimafrom copper pyrites, a mixed sulphuret of ted zinc. (See No. 30.) The precipitated cop-

3248. Reduction of Copper in Fine M. Schiff gives the following prois again submitted to calcination and smelt-cess for obtaining copper in a state of fine ing, when fine metal is obtained. It after-division: A saturated solution of sulphate of wards undergoes the process of refining and copper, together with some crystals of the toughening. This metal is malleable and salt, are introduced into a bottle or flask, and 8.9, fuses at about 2000° Fahr., and volatilizes zinc displaces the copper from its solution, at higher temperatures. It is easily soluble fresh sulphate dissolving as the action goes in nitric acid, and is attacked more or less on, until the whole is exhausted. Heat is rapidly by acids in general. It forms numer-disengaged during the operation. The precipitated copper must be washed and dried as rapidly as possible, to prevent oxidation.

3249. Feather-Shot Copper. Melted copper, poured in a small stream into cold water. It forms small pieces, with a feathered edge, hence the name. It is used to make

solution of copper.

3250. Welding Copper. A compound present in any compound may be estimated of 358 parts phosphate of soda and 124 parts by throwing it down from its solution by pure boracic acid is prepared, and is used when the LEAD. 299

red color, and the latter is at once hammered. A hammer of wood is recommended for this purpose, as the metal is liable to soften at a high heat; and the hammer should be used cautiously. All scale and carbonaceous matter must be removed from the surface of the copper, as the success of the welding depends on the formation of an easily fusible phosphate of copper, which would be reduced to a phosphide by the presence of carbon.

Copper and Other Metals. means of preventing corrosion of metals is to dip the articles first into a very dilute nitric acid, immerse them afterwards in linseed oil, and allow the excess of oil to drain off. By this process metals are effectually prevented

from rust or exidation.

To Clean Coppers and Tins. 3252. These are cleaned with a mixture of rotten stone, soft soap, and oil of turpentine, mixed to the consistency of stiff putty. The stone should be powdered very fine and sifted; and rubbed over the metal; then rub off briskly, with dry clean rag or leather, and a beautiful polish will be obtained. When tins are much blackened by the fire they should be scoured with soap, water, and fine sand.

ead. Lead is only prepared on the large scale. It is usually extracted from galena, a natural sulphuret of lead, by roasting the ore in a reverberatory furnace, and afterwards smelting it along with coal and lime. Its specific gravity, in a state of absolute purity, is 11.38 to 11.44, but ordinary lead seldom exceeds 11.35. It melts at about 612° Fahr. and when very slowly cooled, crystallizes in octohedrons. It is malleable and ductile, but devoid of elasticity. Lead is not dissolved by muriatic, sulphuric, or the vegetable acids, unless by free contact with air, and then very slowly: but nitric acid rapidly oxidizes it, forming a solution of ni-trate of lead. Pure water, put into a leaden vessel, and exposed to the air, soon corrodes river and spring water exert no such influence, the carbonates and sulphates in such water destroying its solvent power. Lead out the metal free from scoria, by raking may be alloyed with most metals, except latter back with a piece of green wood. those which differ greatly from it in specific gravity and melting point. It has a strong affinity for gold and silver, and is therefore employed to separate those metals, by cupellation, from other metals and minerals.

3254. Cautions on the Use of Lead for Cisterns, &c. Ordinary water, which abounds in mineral salts, may be safely kept in leaden cisterns; but distilled and rain water, and water that contains scarcely any saline matter, speedily corrode, and dissolve

metal is at a dull red heat; the heat is then metal. When, however, leaden cisterns have increased till the metal becomes of a cherry iron or zinc fastenings or braces, a galvanic action is set up, the preservative power of saline matter ceases, and the water speedily becomes contaminated with lead. Water containing free carbonic acid also acts on lead; and this is the reason why the water of some springs, kept in leaden disterns, or raised by leaden pumps, possesses unwholesome properties. Free carbonic acid is evolved during the fermentation or decay of vegetable matter, aide by the presence of carbon.

and hence the propriety of preventing the 3251. To Prevent the Corrosion of leaves of trees falling into water-cisterns The best formed of lead.

To Test the Richness of Lead 3255. Ores. Lead ores, or galena, may be tested in different ways. The wet way is as follows: Digest 100 grains of the ore in sufficient nitric acid diluted with a little water, apply heat to expel any excess of acid, and largely dilute the remainder with distilled water. add dilute hydrochloric acid, by drops, as long as it occasions a precipitate, and filter the whole, after being moderately heated, upon a small paper filter. Treat the filtered quantity of the mixture may be made liquid with a stream of sulphuretted hydrosufficient to last for a long while. The gen; collect the black precipitate, wash it, articles should first be washed with hot water, to remove grease. Then a little of the above mixture, mixed with water, should be sulphuric acid dropped in it, evaporate the precipitate to dryness, the excess of sulphuric acid being expelled by a rather strong heat applied towards the end. The dry mass should be washed, dried, and exposed to slight ignition in a porcelain crucible. The resulting dry sulphate is equal to .68 per cent. of its weight in lead.

3256. To Find the Percentage of Lead in Lead Ores. This can be done by applying the test in the wet way (see No. 3255), and multiplying the weight of the product obtained in grains by .68. It may also be found in the dry way, as follows: Plunge a conical wrought iron crucible into a blast furnace, raised to as high a heat as possible; when the crucible has become of a dull red heat, introduce into it 1000 grains galena (lead ore) reduced to powder, and stir it gently with a piece of stiff iron wire flattened at the end. This wire must never be suffered to get red hot. To prevent the ore from adhering, after 3 or 4 minutes, cover up the crucible; and when at a full cherry-red heat, add 2 or 3 spoonfuls of reducing flux (see No. 3464), and bring to a full white heat; in 12 to 15 minutes, after having scraped down the scoria, etc., from the sides of the crucible, it, and dissolves the newly-formed oxide; but into the melted mass, the crucible should be removed from the fire, and the contents tilted into a small brass mould, observing to run out the metal free from scoria, by raking the scoria is then reheated in the crucible with 1/2 spoonful of flux, and this second reduction added to the first. The weight in grains of the metal obtained, divided by 10, gives the percentage of metallic lead in the sample of ore.

3257. To Make a Lead Tree. Dissolve I ounce sugar of lead (acetate of lead) in 11/2 pints distilled water; add a few drops of acetic acid; place the liquid in a clear white glass bottle and suspend a piece of zinc in it a portion of lead, when kept in vessels of that by means of a fine thread secured to the cork.

large scale. It is obtained by smelting the ore along with coke and a flux (either limestone or clay). The crude iron thus obtained is run into moulds, and then constitutes cast iron or pig iron. By the subse-admit of a high polish, giving quent process of refining, (puddling, welding.) pearance of the finest bronze. it is converted into soft iron or wrought iron. The properties and uses of iron are too well known to require description. Its applica-tions in almost every branch of human industry are almost infinite. It is remarkably ductile, and possesses great tenacity, but it is: mits of being tempered to almost any degree of hardness or elasticity. Metallic iron is as possible.

3263. To Blue Gun Barrels. Apply

3263. To being attracted by the magand sulphuric acids, with solution of hydrogen gas, recognized by its inflammability; and the solution exhibits the usual reactions of protoxide of iron. (Cooley.) Iron does not alloy easily with other metals, principally on account of its high melting point. It is easily attacked by acids, and requires protection from the air, to prevent oxidization or rust-

3259. To Estimate the Percentage of Iron in Gres. Prepare a crucible of refractory clay by pressing into it successive layers of mois and powdered charcoal until full and solid; clear out a cavity by removing the central portion. Take 200 grains of the powdered ore, and mix it with the same weight of dry slacked lime, and 50 grains charcoal; if necessary a litte carbonate of soda may be used with very refractory ores; introduce this mixture into the crucible and lute it up. Expose the crucible to a moderate heat until the contents of the crucible are dry, then apply, and maintain for half an hour the full heat of a blast furnace. Then remove the crucible, tap it steadily on the edge of the furnace, so as to bring the metallie portion of its contents together at the bottom; and, when cool, break the crucible open. The iron will be found in a clean button at the bottom of the slag. Clean the iron with a scratch brush, and weigh it. Its weight, divided by 2, will give the percentage of richness of the ore under examination.

3260. To Distinguish Wrought and Cast Iron from Steel. Elsner produces a bright surface by polishing or filing, and applies a drop of nitric acid, which is allowed to remain there for one or two minutes, and is then washed off with water. The spot will then look a pale ashy gray on wrought iron, a brownish black on steel, a deep black on cast iron. It is the carbon present in various proportions which produces the difference in appearance.

3261. To Impart to Cast Iron the Appearance of Bronze. The article to be so treated is first cleaned with great care, and then coated with a uniform film of some vegetable oil; this done, it is exposed in a furnace to the action of a high temperature,

Iron is only prepared on the to carbonize the oil. In this way the cast iron absorbs oxygen at the moment the oil is decomposed, and there is formed at the surface a thin coat of brown oxide, which adberes very strongly to the metal, and will admit of a high polish, giving it quite the ap-

3262. Brown Tint for Iron and Steel. Dissolve in 4 parts of water, 2 parts crystallized chloride of iron, 2 parts chloride of antimony, and I part gallic acid, and apply the solution with a sponge or cloth to the article, and dry it in the air. Repeat this any number less malleable than many of the other metals, of times according the depth of color which Its specific gravity is 7.788, and melts at about 2700° Fabr. It is the hardest of all of the malleable and ductile metals, and when boiled linseed oil. The metal thus receives combined with carbon or silica (steel), ad a brown tint and resists moisture. The mits of being tempered to almost any degree chloride of antimony should be as little acid

net; by being dissolved by dilute muriatic nitric acid and let it eat into the iron a little; then the latter will be covered with a thin film of oxide. Clean the barrel, oil, and bur-

3264. To Ornament Gun Barrels. A very pretty appearance is given to gun barrels by treating them with dilute nitric acid and vinegar, to which has been added sulphate of copper. The metallic copper is deposited irregularly over the iron surface. Wash, oil, and rub well with a hard brush.

3265. Iron Filings. The only way to obtain them pure, is to act on a piece of soft

iron with a file.

3266. To Remove Rust from Iron. We have never seen any iron so badly scaled or incrusted with oxide, that it could not be cleaned with a solution of 1 part sulphuric acid in 10 parts water. Paradoxical as it may seem, strong sulphuric acid will not attack iron with anything like the energy of a solution of the same. On withdrawing the articles from the acid solution they should be dipped in a bath of hot lime water, and held there till they become so heated that they will dry immediately when taken out. Then, if they are rubbed with dry bran or sawdust, there will be an almost chemically clean surface left, to which zine will adhere readily.

3267. To Keep Polished Iron Work Bright. Common resin melted with a little gallipoli oil and spirits of turpentine has been found to answer very well for preserving polished iron work bright. The proportions should be such as to form a coating which will adhere firmly, not chip off, and yet admit of being easily detached by cautious scra-

ping

3268. To Protect Iron from Oxidization. Among the many processes and preparations for preserving iron from the action of the atmosphere, the following will be found the most efficient in all cases where galvanization is impracticable; and, being unaffected by sea water, it is especially appli-cable to the bottoms of iron ships, and marine work generally: Sulphur, 17 pounds; caustio potash lye of 35° Baumé, 5 pounds; and copper filings, 1 pound. To be heated until the copper and sulphur dissolve. Heat, in another vessel, tallow, 750 pounds, and turpentine, 150 pounds, until the tallow is liquefied. The which, however, must not be strong enough | compositions are to be mixed and stirred

together while hot, and may be laid on to the red heat, about 2000° Fahr., is obtained and iron, in the same way as paint.

A mastic or covering for this purpose, proposafter being covered with 2 coats of this mastic, for finer instruments, several varieties of finer the good effects of it have been thoroughly steel are required. (Makins). proved.

Railings. Every one must have noticed the former metal. The reason for this is, that to a welding heat, and welded together under the oxygen of the atmosphere keeps up a a tilt hammer. The binding ring is then regalvanic action between the two metals, moved; and, after reheating, the mass is ence would be inverted; the whole of its steel is called double-shear steel. (Makins.) action would fall on the zine; the one remaining uninjured, the other nearly so. Paint formed of the oxide of zinc, for the same reason preserves iron exposed to the atmosphere infinitely better than the ordinary paint composed of the oxide of lead.

Brass. Cast iron, zinc, and brass surfaces can be scoured with great economy of labor, time and material, by using either glycerine, stearine, naphthaline, or creosote, mixed with

dilute sulphurie acid.

3272. To Clean Steel and Iron. Make 1 ounce soft soap and 2 ounces emery into a paste; rub it on the article with wash-leather whole 1 and it will have a brilliant polish. Kerosene moulds. oil will also clean steel.

The addition of a small quanteel. tity of carbon greatly increases the hardness and tenacity of iron, and converts it into The amount of carbon to be added. should be just that which will produce the maximum of hardness and toughness, without rendering it brittle; ordinary steel contains about 1 per cent. of carbon; hard steel 1.6 to

3274. To Convert Iron into Steel. This is usually done by the process of cement-ation, producing what is termed blistered Make a box of sheet iron, fill it with sand, steel. At the bottom of a trough about 2 feet and subject it to a great heat. The articles square and 14 feet long, usually formed of to be blued must be finished and well polished. fire clay, is placed a layer, about 2 inches thick, of a cement composed of 10 parts charcoal and 1 part ashes and common salt; upon this is laid a tier of thin iron bars about 1 inci. apart; between and over them, a layer of cement is spread, then a second row of bars, and so on, alternately, until the trough is in fixing a clean piece of wrought iron, brought nearly full; lastly a layer of cement covered to a welding heat, in the centre of a mould, with moist sand and a close cover of fire-tiles, so as to exclude the air. The trough is ex- to envelop the iron; and then forging the posed to the heat of a coal fire, until a full mass into the shape required.

kept we steadily for about 7 days. A hole is 3269. To Protect Iron from Rust, left in the end of the trough, to allow of a bar being drawn out for examination. When a ed by M. Zeni, is as follows: Mix 80 parts bar, on being withdrawn and broken, has acpounded brick, passed through a silk sieve, quired a crystalline texture, the metal is alwith 20 parts litharge; the whole is then lowed to cool down gradually, some days rubbed up by the muller with linseed oil, so being allowed for this, and the charge, when as to form a thick paint, which may be diluted cool, withdrawn from the trough. The bars with spirits of turpentine. Before it is ap-will be found covered with large blisters, plied the iron should be well cleaned. From hence the name of the process, and increased an experience of 2 years upon locks exposed about Tion in weight. The steel is now sufficiently needed to be about the process of the process. to the air, and watered daily with salt water, ciently good for files and coarser tools, but

3275. To Make Shear-Steel. This is 3270. To Prevent the Decay of Iron produced by cutting up bars of blistered steel, ailings. Every one must have noticed the into lengths of 30 inches, and binding them destructive combination of lead and iron, in bundles of 8 or 9 by a ring of steel, a rod from railings being fixed in stone with the being fixed for a handle. These are brought This waste may be prevented by substituting forged solid, and extended into a bar. In zine for lead, in which case the galvanic influcases where this operation is repeated, the

3276. To Make Cast-Steel. Cast-steel is the best variety for all fine cutting tools. This is a mixture of scraps of different varieties of blistered steel, collected together in a good refractory clay crucible; upon this a cover is luted, and it is exposed to an intense 3271. To Scour Cast Iron, Zinc, or heat in a blast furnace for 3 or 4 hours. The contents are then run into moulds. After being subjected to the blows of a tilt-hammer, the east steel is ready for use. (Makins).

3277. Steel Made from Iron Scraps. Take iron scraps in small pieces, put 40 pounds in a crucible, with 8 ounces charcoal, and 4 ounces black oxide of manganese; expose the whole 1½ hours to a high heat, and run into

3278. To Blue Steel. The mode employed in blueing steel is merely to subject it to heat. The dark blue is produced at a temperature of 600°, the full blue at 500°, and the blue at 550°. The steel must be finely polished on its surface, and then exposed to a uniform degree of heat. Accordingly, there are three ways of coloring: first, by a flame producing no soot, as spirit of wine; secondly, by a hot plate of iron; and thirdly, by wood ashes. As a very regular degree of heat is necessary, wood ashes for fine work bear the preference. The work must be covered over 1.7 per cent. The percentage of carbon in with them, and carefully watched; when the English steel is estimated by Berthier to be color is sufficiently heightened, the work is 1.87. It melts at about 2500° Fahr. perfect. This color is occasionally taken off with a very dilute muriatic acid.

> Immerse the articles in the sand, keeping watch of them until they are of the right color, when they should be taken out, and im-

mersed in oil.

3280. To Make Edge-Tools from Cast-Steel and Iron. This method consists and then pouring in melted steel, so as entirely

3281. To Remove Scale from Steel, surface is obtained: then damp the surface

with sand and a stiff brush,

Take 1½ pounds borax, ½ pound sal-ammoniae, 1 pound prussiate of potash, 1 ounce resin. Pound the above fine, add a gill each of water Color or Blue. and alcohol. Put in an iron kettle, and boil steel acquires a pale straw color at 4600 until it becomes a paste. Do not boil too Fahr., and a uniform deep blue at 5800 Fahr.

of the steel. Heat to and keep at a red heat for from 2 to 4 hours. Do not disturb the box until cold.

3284. Engraving Mixture for Writing on Steel. Sulphate of copper, I ounce, soft soap and write with a clean hard pen, without a slit, dipped in the mixture.

3285. Tempering Tools. The steel is generally first hardened by heating it to a cherry red, and then plunging it into cold water. Afterward the temper is drawn by moderately heating the steel again. Different degrees of hardness are required for different purposes.

For very pale straw color, 430°, for lancets. A shade of darker yellow, 450°, for razors

and surgical instruments.

Darker straw yellow, 470°, for pen-knives, Still darker yellow, 490°, chisel for cutting iron.

Brown yellow, 500°, axes and plane-irons. Yellow, slightly tinged with purple, 520°,

table-knives and watch-springs.

3286. To Temper Drills. Heat the best steel to a cherry red, and hammer until nearly cold, forming the end into the requisite flattened shape, then heat it again to a cherry red, and plunge it into a lump of resin or into quicksilver. A solution of cyanide of po-tassium in rain water is sometimes used for the tempering plunge bath, but it is not as good as quicksilver or resin.

3287. To Temper Gravers. These may be tempered in the same way as drills; or the red hot instrument may be pressed into a piece of lead, in which a hole about 1 an inch deep has been cut to receive the graver; the lead melting around and enclosing it will give it an excellent temper.

To Temper Spiral Springs. Heat to a cherry red in a charcoal fire, and harden in oil. To temper, blaze off the oil 3 times, the same as for flat springs.

out the cuttings on one side, until a bright of times on each side of the magnet. If the

Scale may be removed from steel articles by with a little oil, and lay the tile on a piece of pickling in water with a little sulphuric acid red-hot iron, bright side upwards. In about in it, and when the scale is loosened, brushing a minute the bright surface will begin to turn yellow; and when the yellow has deepened 3282. To Restore Burnt Cast-Steel, to about the color of straw, plunge in cold

3290. To Make Polished Steel Straw The surface of polished

long, or it will become hard on cooling.

3291. To Temper Mill Picks. After 3283. To Anneal Steel. For a small quanworking the steel carefully, prepare a bath 3291. To Temper Mill Picks. After tity. Heat the steel to a cherry rod in a char- of lead heated to the boiling point, which will coal fire, then bury it in sawdust, in an iron be indicated by a slight agitation of the surbex, covering the sawdust with ashes. Let face. In it place the end of the pick to the it stay until cold. For a larger quantity, and depth of 11 inches, until heated to the temwhen it is required to be very soft, pack the perature of the lead, then plunge immediately steel with cast-iron (lathe or planer) chips in in clear cold water. The temper will be just an iron box, as follows: Having at least ½ or right, if the bath is at the temperature required in depth of chips in the bottom of box, put in a layer of steel, then more chips to fill mill picks are: First, get good steel. Second, spaces between the steel, and also the tor t work it at a low heat; most blacksmiths ininch space between the sides of box and steel, jure steel by overheating. Third, heat for then more steel; and, lastly, at least 1 inch tempering without direct exposure to the fire. in depth of chips, we'l rammed down on top The lead bath acts merely as protection against the heat, which is almost always too great to temper well.

3292. Bath for Hardening Mill Picks. Take 2 gallons rain water, 1 ounce corrosive sublimate, 1 of sal-ammoniac, 1 of saltpetre, sal-ammoniac, & ounce; pulverize separately, 11 pints rock salt. The picks should be heatadding a little vermilion to color it, and mix ed to a cherry red, and cooled in the bath. with 12 ounces vinegar. Rub the steel with The salt gives hardness, and the other ingredients toughness to the steel; and they will not break, if they are left without drawing the

temper.

3293. Composition for Tempering Cast-Steel Mill Picks. To 3 gallors of water, add 3 ounces each nitric acid, spirits of hartshorn, sulphate of zine, sal-ammoniae, and alum; 6 ounces salt, with a double handful of hoof-parings: the steel to be heated a

dark cherry red. It must be kept corked tight to prevent evaporation.

3294. Tempering Steel. Mr. N. P. Ames, late of Chicopee, Mass., after expending steel. ing much time and money in experiments, found that the most successful means of tempering swords and cutlasses that would stand the United States Government test, was by heating in a charcoal fire, hardening in pure spring water, and drawing the temper in

charcoal flame. (See No. 3285.)

3295. To Straighten Hardened Steel. To straighten a piece of steel already hardened and tempered, heat it lightly, not enough to draw the temper, and you may straighten it on an anvil with a hammer, if really not dead cold. It is best, however, to straighten it between the centres of a lathe, if a turned article, or on a block of wood with a mallet. Warm, it yields readily to the blows of the

mallet, but cold, it would break like glass.
3296. To Restore the Power of Horseshoe Magnets. To restore horseshoe magnets that have lost their power from disuse, proceed as with new ones. Place the poles of the magnet to be charged, against the poles of another, making opposite poles meet. Then draw a piece of soft iron, placed mes, the same as for flat springs.

3289. To Temper Old Files. Grind from the poles to the bend. Do this a number

STEEL. 303

and is considered one of the best.

3297. Case-Hardening is the operation of giving a surface of steel to pieces of iron, ing Steel. Articles manufactured of steel by which they are rendered capable of receiv- for the purposes of cutting, are, almost withing great external hardness, while the interior out an exception, taken from the forger to the portion retains all the toughness of good hardener without undergoing any interme-wrought-iron. This is accomplished by heat-diate process; and such is the accustomed ing the iron in contact with animal carbon, in routine, that the mischief arising has escaped close vessels. George Ede says:—The articles observation. The act of forging produces a intended to be case-hardened are put into the strong scale or coating, which is spread over box with animal carbon, and the box made the whole of the blade; this scale or coating air-tight by luting it with clay. They are is unequal in substance, varying in proportion then placed in the fire and kept at a light red to the degree of heat communicated to the heat for any length of time, according to the box and its contents have been heated quite through, the hardness will scarcely be the thickness of a half dime; in an hour, double; and so forth, till the desired depth is acquired. The box is then taken from the fire, and the contents emptied into pure cold water. They can then be taken out of the water and dried the blade from the anvii, let it be passed imare then ready for polishing. Case-hardening remove the whole of the scale or coating and is a superficial conversion of iron into steel, the razor will then be properly prepared to It is not always merely for economy that iron undergo the operation of hardening with adis ease-hardened, but for a multitude of things it is preferable to steel, and answers the purpose better. Delicate articles, to keep from blistering while heating, may be dipped into a powder of burnt leather, or bones, or other coaly arimal matter.

3298. To Case-Harden with Charcoal. The goods, finished in every respect but polwith animal or vegetable charcoal, and ce- of fire mented at a red heat, for a period varying way.

operated on.

3299. Moxon's Method of Case-Hardening. Cow's horn or hoof is to be baked turing of edge steel instruments. or thoroughly dried, and pulverized, in order that more may be got into the box with the of Iron. same purpose. To this add an equal quantity of bay salt; mix them with stale chamberlye, or white wine vinegar; cover the iron with this mixture, and bed it in the same in the hearth of the forge to dry and harden; then put it into the fire, and blow till the lump has a blood-red heat, and no higher, lest the mixture be burnt too much. the iron out, and immerse it in water.

3300. To Case-Harden. Make a paste with a concentrated solution of prussiate of potash and loam, and coat the iron therewith; then expose it to a strong red heat, and when

into cold water.

3301. To Case-Harden Polished Iron. The iron, previously polished and finished, is to be heated to a bright red and rubbed or ed and dissipated, plunge the article into cold proper temper. When the process of case-hardening has been well conducted, the surface of the Barrels on the Sea-Shore. It is said that metal proves sufficiently hard to resist a file, an ointment made of corrosive sublimate and The last two plans are a great improvement lard will prove an effectual protection against upon the common method. By the application the rusting of gun-barrels on the sea-shore.

magnet is of good steel, this produces a max-'tion of the prussiate, as in the last receipt, imum power. It is the method of Jacobi, any part of a piece of iron may be case-hardened, without interfering with the rest.

3302. Improved Process of Hardensteel in forging; it is almost : penetrable to depth required. In half an hour after the the action of water when increased for the purpose of hardening. Hence it is that different degrees of hardness prevail in nearly every razor manufactured; this is evidently a positive defect; and so long as it continues to exist, great difference of temper must exist likewise. Instead, therefere of hardening (to keep them from rusting), by riddling them mediately from the hands of the forger to the in a sieve with some dry saw-dust; and they grinder; a slight application of the stone will vantage. It is plain that steel in this state heats in the fire with greater regularity, and that, when immersed, becomes equally hard from one extremity to the other. To this may be added, that, as the lowest possible heat at which steel becomes hard is indubitably the best, the mode here recommended will be found the only one by which the process of ishing, are put into an iron box, and covered hardening can be effected with a less portion of fire than is, or can be, required in any other These observations are decisive, and with the size and description of the articles will, in all probability, tend to establish in general use what cannot but be regarded as a very important improvement in the manufac-

3303. To Case-Harden Small Articles Fuse together, in an iron vessel articles. Or bones reduced to dust answer the or crucible, 1 part prussiate of potash and 10 parts common salt, and allow the article to remain in the liquid 30 minutes, then put them

in cold water and they will be case-hardened. 3304. To Clean a Shot Gun. loam, or enclose it in an iron box; lay it on clean tow around the cleaning rod; then take a bucket of tepid water-soap suds if procura-ble—and run the rod up and down the barrel briskly until the water is quite black. Change Take the water until it runs quite clear through the nipple; pour clean tepid water down paste the barrel, and rub dry with fresh clean tow; run a little sweet oil on tow down the barrel for use. To clean the stock, rub it with lin-seed oil. If boiling hot water is used the it has fallen to a dull red, plunge the whole barrel will dry sooner, and no fear need be apprehended of its injuring the temper of a fine gun. Some sportsmen use boiling vinegar, but we cannot recommend this method. The reason hot water does not injure the gun, sprinkled over with prussiate of potash. As is that boiling water is only 212° Fahr., and soon as the prussiate appears to be decompost the gun was heated to 450° to give it its

3305. Grease for Anointing Gun-

3306. from Rust. of iron and steel from oxidation. The par-colorless. affine should be warmed, rubbed on, and Comme then wiped off with a woolen rag. It will tained from the native sulpharet (zinc blende) not change the color, whether bright or blue, or carbonate (calamine), by roasting those and will protect the surface better than any

2 gallons neats' foot oil, and 1 gallon rape oil. tion that passes over contains cadmium and Melt together until thoroughly dissolved and arsenic, and is indicated by what is technically mixed, and color with a small portion of rose called the brown blaze; but when the metallic pink; oil of thyme or other perfuming matter may be added. When cold the composition is to be rubbed on the surface of bright steel, iron, brass, or other metal, requiring protection from rust.

To Remove Rust from Steel. Rust may be removed from steel by immersing the article in kerosene oil for a few days. from metal but by getting below it, or renewing the surface. Where it is not deep-scated, emery paper will do, but if long standing the goods must be refinished.

3309. New Mode of Removing Rust. Plunge the article in a bath of 1 pint hydrochloric (muriatic) acid diluted with 1 quart water. Leave it there 24 hours; then take it out and rub well with a scrubbing-brush. The oxide will come off like dirt under the action of soap. Should any still remain, as is likely. in the corroded parts, return the metal to the bath for a few hours more, and repeat the scrubbing. The metal will present the appearance of dull lead. It must then be well to give iron the effect of blue steel, zinc bewashed in plain water several times, and thoroughly dried before a fire. Lastly, a have mingled with the rust, it will be neces-sary to remove it by a hot solution of soda before submitting the metal to the acid. This last attacks the rust alone, without injuring finally, of an iridescent brown color. Zing all-important, as, after the process, the metal a precipitate of brown sulphuret of copper; will absorb oxygen from the atmosphere freely but if boiled in a solution containing both if any trace of the acid be allowed to remain.

inc. Zinc is a blueish white metal, having a specific gravity of 6.8 to 7.2; tough when cold, ductile and malleable at from 250° to 300° Fahr., brittle and easily pulverized at 500°; fuses at 773°, and subvessels. It is scarcely affected by exposure vessels. It is scarcely affected by exposure Its specific gravity is 7.29 to 7.31. This metto air and moisture; hence its general use in al is decomposed by nitric, sulphuric, and the arts for the manufacture of vessels of muriatic acids; and may be combined and capacity, tubing, &c., that require lightness alloyed with most of the useful metals. and durability. Acids, even diluted, attack occurs in nature in the state of the oxide, zine rapidly. It is also soluble in caustic sometimes as sulphuret (tin pyrites.) alkalies. Heated to whiteness, 941° Fahr., in contact with the air, it burns with great of tin-stone, associated with copper ore, in

To Protect Polished Steel (flowers of zinc). It is very soluble in dilute Nothing is equal to pure sulphuric and muriatic acid, with the evoluparaffine for preserving the polished surface tion of hydrogen gas. The salts of zinc are

Commercial zine is never pure, and is obores, and distilling them along with carbonaceous matter in a covered earthen crucible, 3307. To Protect Polished Metal having its bottom connected with an iron from Rust. Take 10 pounds gutta-percha, tube which terminates over a vessel of water 20 pounds mutton suct. 30 pounds beef suct, situated beneath the furnace. The first porsituated beneath the furnace. The first porvapor begins to burn with a blueish white flame, or the blue blaze commences, the volatilized metal is collected. Zinc may be alloyed with most of the metals. (Cooley.)

3311. Purification of Zinc. Granulate zine by melting, and pouring it, while very hot, into a deep vessel filled with water. Place the granulated zinc in a Hessian crucible, in The rust will become so much loosened that alternate layers, with one-fourth its weight it may easily be rubbed off. By this simple of nitre, with an excess of nitre at the top. method badly rusted knives and forks may be Cover the crucible, and secure the lid; then made to present a tolerable appearance, but apply heat. When deflagration takes place, for new goods there is no way to remove rust remove from the fire, separate the dross, and run the zinc into an ingot mould. It is quite

> 3312. To Granulate Zinc. Granulated zinc is obtained by pouring the molten metal into a warm mortar and triturating vigorously, with an iron pestle, until it solidifies. (See No. 3311.)

To Color Metals. Make a solu-3313. tion of 4 ounces hyposulphite of soda in 11 pints of water, and add a solution of 1 ounce acetate of lead in the same quantity of water. Articles to be colored are placed in the mixcomes bronze, and copper or brass becomes successively yellowish red, scarlet, deep blue, little rubbing with oil and fine emery powder blueish white, and finally white with a tinge will restore the polish. Should oil or grease of rose. This solution has no effect on lead the steel; but the washing in plain water is does not color in this solution, it throws down lead and copper, it becomes covered with a black crust, which may be improved by a thin coating of wax. (See No. 3188.)

This metal approaches silver in ۹in. whiteness and lustre. When pure, it is very malleable; is harder than lead; melts limes unchanged at a white heat, in close at 442° Fahr., and volatilizes at a white heat. alloyed with most of the useful metals. occurs in nature in the state of the oxide, and Cornwall, England, it is found under the name brilliancy, and is converted into oxide, the slate or granite rocks; and as an alluvial

deposit (stream tin) in the beds of rivers. | stream, from a height of about 3 feet, into the A pure article of tin comes from Banca. The cold water. metal is obtained from the ore, first reduced to powder in stamping mills, washed to reexpel arsenic and sulphur; it is then deoxidized or reduced by smelting with about by its found in Wales), and a little slacked lime; it is next refined by liquation (see No. 21), followed by a second smelting of the purer portion; it is then while in a state of fusion, stirred with billets of green wood, allowed to settle, and cast into moulds. The product is lized Tin. A method of ornamenting the peculiar crackling noise when bent; in this manner pure tin foil may be distinguished from the so-called tin foil in general use, the acid solution. The appearance varies which consists of lead with a tin surface only.

3315. Tests for the Purity of Tin.

It is almost entirely dissolved by hydrochloric (chloride) of tin. If it contains arsenic, brownish-black flocks will be separated dur-1.16, first in the cold, and afterwards with heat, until all the tin is precipitated in an insoluble peroxide; the decanted acid solu-tion from pure tin leaves no residuum on evaporation. If there be a residuum, and dilution with water occasions a heavy white white precipitate, the tin contained lead. If a phial containing the above solution. red prussiate of potash gives a blue precipitate, it contained iron; and if the clear liquid leaves a residuum on evaporation, it contained

Grain Tin. This is made from The blocks are heated until they block tin. become brittle, and then allowed to fall from a considerable height, by which they are broken into small fragments, which constitute grain tin, or tin in tears.

3317. Tin Powder or Filings. Melt grain tin (see No. 3316) in an iron vessel, pour it in an earthen-ware mortar heated a little above its melting point, and triturate briskly as the metal cools; lastly, sift the product, and repeat the process with what remains in filing and rasping.

3318. Powdered Tin. Take Cornish grain tin; melt it, and pour it into a wooden box, well rubbed on the inside with whiting or chalk; close the cover, and continue shaking it violently until the tin is reduced to powder; then wash it in clean water, and dry it immediately.

To Make Feathered Tin. state of minute subdivision, which permits it to be much more rapidly dissolved in acids. Procure an iron ladie having a capacity of and furnishing pale green solutions. Nickel about 12 fluid ounces, and a wooden or stone- is found present in meteoric iron, and is ware vessel containing 2 or 3 gallons of cold strongly magnetic, but loses this property water. About 1 pound of pure bar tin, free when heated to 350° Fahr. It is chiefly from lead, is to be cut into pieces of about 2 employed in the manufacture of German silinches in length, and melted in the ladle. ver. Sulphate of nickel is used medicinally, When melted, pour the tin in a very small with soothing and soporific effects.

The ladle should be moved around in a small circle, when pouring, for if the whole of the melted tin strikes the water move earthy matter, and then roasted to at one point, it will cool in lumps, and reexpel arsenic and sulphur; it is then deoxipreserved in wooden boxes, the bottoms of weight of powdered culm (a kind of coal which are perforated with small holes; or, what is better, kept in unglazed stoneware flower-pots. Solutions of tin containing iron or copper, or their salts, are unfit for dyeing bright reds. (See Nos. 107, &c.)

termed refined or block-tin. Tin produces a surface of tin plate by acids. The plates are washed with an alkaline solution, then in water, heated, and sponged or sprinkled with with the degree of heat and the nature and strength of the acids employed. The plates, after the application of the acids, are plunged acid, yielding a colorless solution of muriate into water, slightly acidulated, dried, and covered with white or colored varnishes. The following are some of the acid mixtures used: ing the solution, and arseniuretted hydrogen nitro-muriatic acid, in different degrees of dievolved. The presence of other metals in tin lution; sulphuric acid, with 5 parts of water, may be detected by treating the muriate of 1 part of sulphuric acid, 2 of muriatic acid, tin solution with nitric acid, specific gravity and 8 of water; a strong solution of nitric 1.16, first in the cold, and afterwards with acid; 1 part nitric acid, 2 sulphuric, and 18

of water. A solution of potash is also used.
3321. Frosted Tin. A frosted appearance may be given to sheet tin by a wash of bichloride of tin.

3322. To Make a Tin Tree. Dissolve precipitate, the tin contained bismuth. If, 3 drachms muriate (chloride) of tin in 1 pint after dilution, the addition of a solution of distilled water, adding 10 or 15 drops nitric sulphate of ammonia or of soda produces a acid; and suspend a small rod of clean zinc in

Vickel. A white, hard, malleable, magnetic metal, capable of receiving the lustre of silver. Its specific gravity, when hammered, is about 8.82. Nickel is very infusible. Muriatic and sulphuric acid act on it with difficulty unless mixed with nitric acid, but it is freely soluble in the latter. Nickel does not oxidize or tarnish at the ordinary temperature. It alloys well with copper, tin, zinc, etc. It is obtained as follows: Roast the powdered ore first by itself and then with charcoal powder, till all the arsenic the sieve. Powdered tin is also prepared by is expelled, and a garlic odor ceases to be evolved; mix the residuum with 3 parts sulphur and 1 part potash; melt in a crucible with a gentle heat, cool, edulcorate with water, dissolve in sulphuric acid mixed with a little nitric acid, precipitate with carbonate of pot-ash, wash, dry, mix the precipitate with powdered charcoal, and reduce it by heat. For chemical purposes pure nickel is best obtained by moderately heating its oxalate in object of feathering is to bring the tin into a a covered crucible, lined with charcoal. The salts of nickel in the anhydrous state are for the most part yellow; when hydrated, green,

This is a heavy liquid metal, possessing a nearly silver-white color, and a brilliant metallic lustre. The principal sources of this metal at the present time are the mines of Idria in Carniola, and Almaden in Spain, where it exists under the form of cinnabar, from which the pure metal is obtained by distilling that ore with lime or iron filings in iron retorts, by which the sulphur it contains is seized and retained, while the mercury rises in the state of vapor, and is condensed in suitable receivers. Its specific gravity, when pure, is 13.5; it solidifies at -39° (39° below zero) Fahr., and when solid is ductile, malleable, and tenacious; boils at 662° Fahr., but volatilizes slowly at the ordinary temperature of the atmosphere, and when mixed with water at from 140° to 160°, it is volatilized in considerable quantities. It unites with oxygen, forming two oxides; and with chlorine, forming calomel and corrosive sublimate; with the metals it forms amalgams, combining, however, with difficulty with iron, nickel, platinum, and some other less important metals. Its oxides form salts with the acids. The only acids that act on metallic mercury are the sulphuric and nitric; but for this purpose the former must be heated.

3325. Test for the Purity of Mercury. Metallic mercury may be known by its volatility; and when in a finely divided or pulverulent state, by the microscope, or by staining a piece of copper white when rubbed on it, or when heated beneath it. It is totally dissipated by heat, and dissolved by diluted nitric acid, but is insoluble in boiling muriatic acid. The acid poured off, and allowed to cool, is neither colored, nor yields a precipitate with sulphuretted hydrogen. A globule moved about on a sheet of paper yields no trail; pure sulphuric acid agitated with it (in the cold) evaporates when heated, without

leaving any residuum.

as imported, is usually very pure. It may be prepared for medical purposes by putting 6 parts into a retort and distilling off 4 parts. The whole of the mercury may, however, be safely drawn over. The product is to be agitated and boiled with 2 fluid drachms hydrochloric acid and 1 fluid ounce water for each pound of the metal; then washed with pure water, and dried by heat. A strong earthenware or iron retort, with a low neck or tube dipping into a basin of water, may be used fo. this purpose.

3327. To Purify Mercury. One of the quickest and best means of purifying mercury is to agitate it with a concentrated solution of nitrate of mercury, at a heat of 104° Fahr., then wasn it with distilled water, and dry by passing several times through clean dry

chamois leather.

3328. To Purify Mercury. Distill equal parts of mercury and iron filings in an iron retort, into a vessel containing water.

3329. To Purify Mercury. The following simple method of purifying quicksilver is by Lr. Miller: Put the quicksilver into a bottle capable of containing 4 times its quantity, add a little powdered loaf sugar, and stopper the bottle; shake it vigorously succeeded in imparting to them a bright, white

This is a heavy liquid metal, possess-early silver-white color, and a brilliant clustre. The principal sources of this at the present time are the mines of Idria miola, and Almaden in Spain, where it ander the form of cinnabar, from which re metal is obtained by distilling that believe or iron filipse in iron retorts by

luminum. This is the metallic base of alumina, which is the plastic principle of certain kinds of clay. The color of aluminum is white, inclining to blue; it is very malleable, and ductile. Its specific gravity is only about 2.60; its melting point not less than 1000° Fahr. It is the most sonorous of all metals. It is thus obtained:—Make a thick paste of alumina, powdered charcoal, sugar, and oil, and heat it in a covered crucible until all the organic matter is destroyed; then transfer the product to a porcelain tube, and connect the one end with another tube containing dried chloride of calcium, and the other end with a small tubulated receiver. Then expose the porcelain tube to the heat of a small oblong furnace, and, having connected the chloride of calcium tube with a vessel disengaging chlorine, pass the gas through the apparatus, at the same time raising the heat of the tube to redness. In 1 or 2 hours, or as soon as the tube becomes choked, the whole must be allowed to cool, and taken to pieces, and the sesquichloride of aluminum thus formed collected. Then place 9 or 10 pieces of potassium, of about the size of peas, in a platina crucible, and upon them an equal number of similar pieces of the sesquichloride of alumina, formed as above; the cover is now to be put on and secured in its place with a wire, and the heat of a spirit lamp cautiously applied, until the spontaneous incandescence of the matter ceases. When cold, throw the crucible into a large vessel of cold water, agitate and collect the gray powder deposited, and again wash it well and dry it. This gray powder consists of small metallic scales, resembling platina. It is not acted on by cold water, but is dissolved by the alkalies and some of the acids. Heated to redness, it catches fire and burns with great rapidity in the air, and in oxygen gas, with intense brilliancy. The powder, blown upon the flame of a candle, displays an immense number of innomed points of great splendor.

3:31. To Polish Aluminum. The relevances generally employed for polishing aluminum are of no utility. Mouray recommends the use of an emulsion of equal parts of rum and olive oil, made by shaking these liquids together in a bottle. When the burnishing stone is used, the peculiar black streaks first appearing should not cause vexation, since they do not injure the metal in the least, and may be removed with a woolen rag. The objects in question may also be brightened in potash lye, in which case, however, care must be taken not to make use of too strong a lye. For cleaning purposes, benzole has been found best. Objects of aluminum can be electroplated without the least difficulty, and Mouray succeeded in importing to them a bright, white

surprising.

3332. To Frost Aluminum. metal is plunged into a solution of caustic potash. The surface, becoming frosted, does not tarnish on exposure to the air.

latinum — also called platina—is the heaviest substance but one (see No. 47) known, having a specific gravity of fully 21, which may be raised to about 21.5 by hammering. It is whiter than iron, harder than silver, infusible in the hottest furnace, and melts only before the compound blowpipe at a heat of about 3080° Fahr. On this account it is valuable for making capsules &c., intended to resist strong heat. Platinum muriatic acid (aqua regia), though with more difficulty than gold. Spongy and powdered platinum possess the remarkable property of America, but is also found in the Ural Mountains of Russia, in Ceylon, and a few other places. Platitum, when alloyed with silver, is soluble in mtric acid; the pure metal is dissolved by aqua regia, and is more or less attacked by caustic alkali, nitre, phosphorus, power of absorbing oxygen, and again impart- in an apartment. (See No. 1741.) ing it to combustible substances, and thus causing their exidation. In this way alcohol and pyroxilic spirit may be converted into acetic and formic acids, &c. (See No. 1741,

also Acetic Acid.) (Cooley.)
3334. To Purify Platinum. The native alloy (crude platinum) is acted upon, as far as possible, with nitro-muriatic acid, containing an excess of muriatic acid, and slightly diluted with water. The solution is precipitated by the addition of sal-ammoniac, which throws down nearly the whole of the platinum in the state of an ammonio-chloride, which is washed with a little cold water, crystals. spongy metallic platinum. This is made into a thin uniform paste with water, pressed in a render the mass sufficiently solid to bear handwhiteness, and hammered or pressed in the antimony itself. heated state: after this treatment it may be rolled into plates or worked into any desired

shape. (Cooley).

3335. Platinated Asbestos. Dip asbestos in a solution of chloride of platinum, and heat it to redness. It causes the inflam-

sponge platinum.

hydrochlorate of ammonia in proof spirit; the re-dissolved precipitate gives a yellow cr add the one solution to the other as long as a orange-yellow precipitate on the addition of

lustre in passing them successively through a precipitate falls; this is collected, and, while weak bath of hydrofluoric acid and aqua fortis. still moist, formed into little balls or pieces, The effect thus obtained is said to be really which are then dried, and gradually heated to redness

3337. Spongy Platinum. Dissolve platinum, by the aid of heat, in a mixture of three parts nitric and 5 parts muriatic acid, avoiding great excess of acid. To this solution add a strong solution of muriate of ammonia; collect the resulting precipitate on a filter, and, when nearly dry, form it into a mass of the shape desired for the sponge. Heat this to whiteness on charcoal, with a blow-pipe or otherwise, and the platinum remains in the spongy state. Its characteristic properties may be restored, when lost, by

simply heating it to redness.

3338. Platinum-Black. Platina Mohr. This is platinum in a finely divided state, and is obtained thus:-Add to a solution of bichloride of platinum, an excess of carbonate etc., intended to resist strong heat. Platinum of soda, and a quantity of sugar. Boil until undergoes no change by exposure to air and the precipitate which forms becomes, after a registure or the strongest heat of a smith! moisture, or the strongest heat of a smith's little while, perfectly black, and the supernatorge, and is not attacked by any of the pure tant liquid colorless; filter the powder, wash, acids, but is dissolved by chlorine and nitrois by melting platina ore with twice its weight of zinc, powdering, digesting first in dilute sulphuric acid, and next in dilute nitue acid, to causing the union of oxygen and hydrogen remove the zinc, assisting the action of the gases. It is chiefly imported from South menstruum by heat; it is then digested in potash lye, and lastly in pure water, after which it is carefully dried. Platinum-black possesses the property of condensing gases. more especially oxygen, into its pores, and afterwards yielding it to various oxidizable substances. If some of it be mixed with al-&c., with heat. Platinum is precipitated from cohol into a paste, and spread on a watch its solutions by deoxidizing substances under glass, pure acetic acid is given off, and affords glass, pure acetic acid is given off, and affords the form of a black powder, which has the a ready means of diffusing the odor of vinegar

Antimony. This is a bluish-white, lustrous, semi-crystalline, extremely brittle metal, of about 6.7 specific gravity; imparts brittleness to alloys; inflammable at high temperature; melts just under redness, 810° Fahr., fumes, boils, and volatilizes at a white heat, and when suddenly exposed to the air, inflames and is converted into teroxide of antimony, which is deposited in beautiful Antimony dissolves in hot hydried, and heated to redness; the product is drochloric acid, forming terchloride of antimony; nitric acid converts it into antimonic acid. This metal is obtained principally from brass mould, to squeeze out the water and France and Germany. Gold, when exposed to the vapors of antimony, loses its ductility ling. It is then dried, carefully heated to and malleability, and becomes as brittle as

3340. Tests for Antimony. An acid solution of antimony gives, in combination with sulphuretted hydrogen, an orange-red precipitate, sparingly soluble in ammonia, but readily soluble in pure potassa and alka-line sulphurets. Hydrosulphuret of ammonia mation of hydrogen in the same manner as throws down from the acid solution an orange-red precipitate, readily soluble in ex-3336. Spongy Platinum. Dissolve cess of the precipitant, if the latter contain separately crude bichloride of platinum, and sulphur in excess; and the liquor containing while those from the carbonate are only solu- ted. (Makins.)

ble on the application of heat.

3341. To Estimate the Purity of Antimony. Treat pulverized antimony with nitric acid; this oxidizes the antimony, and leaves it in an insoluble state, whilst it dissolves the other metals. Collect the oxide on a filter, wash, dry, ignite, and weigh it. This weight, multiplied by .843, gives the weight of pure metal in the sample examined. If this has been previously weighed, the percentage of pure metal is easily arrived at.
3342. To Obtain Metallic Antimony.

Mix together 16 parts sulphuret of antimony and 6 parts cream of tartar, both in powder; put the mixture, in small quantities at a time, into a vessel heated to redness; when reaction ceases, fuse the mass, and, after 15 minutes,

slag. The product is nearly pure. Or: Equal parts of protoxide of antimony and bitartrate of potassa (cream of tartar); mix and fuse as above, and pour the metal

into small conical moulds.

Or: 8 parts sulphuret of antimony, 6 parts above.

Or: 2 parts sulphuret of antimony and 1 part iron filings; calcine at a strong heat in a

covered crucible.

3343. To Obtain Commercial Antimony. Fuse together 100 parts sulphuret of antimony, 40 parts metallic iron, and 40 parts dry crude sulphate of soda. This produces from 60 to 65 parts of antimony, besides the scoriæ or ash, which is also valuable.

Bismuth. This metal is precipally prepared in Germany, and as imcopper. It is a crystalline metal, very brittle, of a reddish white color; melts at about 500° fumes form crystalline scales (flowers of bisthe air, and has a specific gravity of about 9.8. The addition of bismuth to other metals levery generally subsides, and the lower lowers their melting point in an extraordinary manner, making it a useful ingredient in from the upper. This may be in a great the composition of type-metal and solders. (See No. 3499, etc.)

3345. To Purify Bismuth. Dissolve water, and a white powder (sub-nitrate of bis-muth) will be precipitated. Collect the precipitate and digest it for a time in a little caustic

an acid. Ammonia, and potassa, and their acid; add caustic potash in excess, and the carbonates (excepting in solutions of tartar oxides of bismuth and lead will be precipitated, emetic) give a bulky white precipitate; that but the lead oxide will be at once re-dissolved from ammonia being insoluble in excess of the by the alkali. The oxide of bismuth can then precipitant; that from potassa readily so; be separated by filtration, washed, and igni-

lloys. Combinations of the metals with each other obtained by fusion. When mercury is one of the component metals, the compound is termed an amalgam. (See No. 3532.) Most of the metals unite with each other by fusion or amalgamation, and acquire new properties. Thus: copper alloyed with zinc, becomes brass, and possesses a different density, hardness, and color to either of its constituents. No general rules for the manufacture of alloys applicable to each can be given; but it may be remarked that, in uniting metals differing greatly in their meltpour it out and separate the metal from the ing points, the least fusible should be melted first, and the others added, one at a time, in their order of fusibility, the most fusible metal being the last to be added; also that, before the addition of each succeeding metal, the temperature of the already fused mass should be reduced to the lowest point at which cream of tartar, and 3 parts nitre. Treated as it will remain fluid, or as near as possible to the fusing point of the metal to be next introduced, so that it may not evaporate or be oxidized, and thus cause the compound to be imperfect. This is a general rule, to be applied in most cases; but there are exceptions. For instance: gold will easily dissolve in melted tin; and platinum in many metals. If platinum were first melted, and zinc, for instance, added, the temperature necessary to obtain the fusion of platinum would be sufficient to volatilize the zinc. The mixture is usually effected under a flux, or some material that will prevent evaporation and exposure to the atmosphere. Thus: in melting lead and tin together, in fermin; solder, resin or tallow is thrown upon the surface; in tinning copported, generally contains both arsenic and per, the surface is rubbed with sal-ammoniac; and in combining some metals, powdered charcoal is used for the same purpose. (See Fahr., volatilizes at a strong heat, and the No. 3470.) As we have already said, most of the alloys are prepared by simply fusing the muth). It burns when strongly heated in metals together; but if there be a considerable difference in their specific gravities, the heavit solidifies, but this is not always convenient. Thus, in stereotype plates, which are cast vercrude bismuth in nitric acid, and concentrate tically, the upper side usually contains more the solution by evaporation. Then pour the antimony than the other. As a general rule, clear solution into a large bulk of distilled the substances (elements) of nature unite together in fixed and definite atomic proportions, thereby forming new compounds. Metals unite with non-metallic bodies, and obey potash to dissolve away any arsenious acids the same general law; but metals, when that may be present; next wash and dry the united with metals, appear to form an excepsub-nitrate; heat it with about $\frac{1}{10}$ its weight tion, though much doubt exists on the subject. They seem to mix in any proportion, and are pure bismuth will be found at the bottom of thereby modified, possessing thereafter propthe crucible. (Makins.)

3346. To Separate Bismuth from commerce and art. These compounds, being Lead. Dissolve the mixed metal in nitric considered at present non-chemical bodies, are classed together under the French term of alloys. Alloys are generally more fusible than the least fusible of the component metals; but are often harder and more brittle than the least fusible than the least fusible than the least fusible of the component metals; but are often harder and more brittle than the least fusible than the least fusi

3348. 2. ble of the Principal Alloys of Copper. This table of the alloys of copper is from Dr. Ure. The bronze for statues is the composition used by Keller Brothers, the celebrated of ass founders.

	Copper.	Zine.	Tin,	Nickel.	Antimony	Lead.
Antique bronze sword	87.000		13.000		[
" springs	97.000	! !	3.000		: !	
Breaze for statues	91.400	5.530	1.709			1.370
for medals		ŀ	10.000		!	2.0.0
" for cannon			10.000	İ	1	
" for cymbals			22.000			
" for gilding	82.257	17.481	9.238] }	0.024
" ""		16.500	9.500	{ -	1 1	1.000
Speculum metal			34,000			2.000
Brass for sheet	84.700	15.300			[
Gilding metal		26.270				
Prince's metal.		25.000		i		
44 44	50.000	50.000	j		1	
Dutch metal		15.300		[
English wire	1	29.260	0.170		i l	0.280
Mosaic gold		34.000		i		01,000
Gun metal for bearings, stocks, &c	90.300	9.670	0.030		 	
Muntz's metal	60.000	40.000	1	i]	
Good yellow brass	66.000	34.000	1		ļ	
Babbitt's metal for bushing			83,400	į	8.300	
Bell metal for large belis	80.000	!	20.000		0,500	
Britannia metal	1.000	2.900	81.000		16.000	
Nickel silver, English	60.000	17.800	LIUCY	22.200	10.000	
Nickel silver, English	50.000	13.600		19.300	!	
German silver	50.000	25.000		25.000	1	
Pinchbeck	80.200	20.000		A-7,1000		

3349. Properties of Metals. The metals form part of the elements of nature, are undecompounded bodies, and distinguished from the other elements by their lustre, weight, &c.

3351. Line have formed tallic lustre."
3352. Wing character

3350. Table Showing, in their Order, the Comparative Properties of Metals.

Order of Malle- ability.	Order of Ductility.	Order of Brittle- ness.
Gold, Silver, Copper, Tin, Cadmium, Platinum, Lead, Zinc, Iron, Nickel, Palladium, Fotsssium,	Gold, Silver, Platinum, Iron, Copper, Zinc, Tin, Lead, Nickel, Palladium, Cadmium,	Antimony, Arsenic, Bismuth, Chromium, Cobalt, Manganese, Molybdenum, Tellurium, Titanium. Tungsten, Uranium, Rhodium.
Ord wof Tenacit	Order of H Conductin Power.	leat Order of Elec-
Iron, 1,00 Coppor, 55 Platinum, 49 Silver, 34 Gold, 27 Zine, 19 Tin, 6 Lead, 5	9 Platinum 4 Silver, 9 Copper, 3 Irol 9 Zinc, 3 Tin,	Copper, Gold, Silver, Zinc, Platinum, Irou, Tin, Lead, Mercury,

3351. Lustre is so characteristic as to have formed the common expression "metallic lustre."

3352. Weight is also a rough distinguishing characteristic.

3353. Fusibility is a property common to all metals. Before some metals are rendered fluid by heat, they become pasty; such is an indication of malleability. The following table gives the degrees (Fahr.) of heat at which metals fuse:

Tin.	4420
Bismuth	4970
Lead	
Zine	7730
Antimony	8100
Silver.	1 8730
Copper	1 9960
Gold	2.0160
Iron (Cast)	2.7860
Nickel	9 8009 (ahar
Nickel	3 0000 (about

3354. Malleability, or the property of being beaten out into thin plates without cracking or breaking, is common to several metals.

3355. Ductility is also a property found in some metals. It is allied to malleability, and often confounded with it. It is the property of being drawn into wire

erty of being drawn into wire.

3356. Tenacity, or the resistance of being pulled asunder by the force of tension, varies exceedingly in metals.

Lead,
Mercury,
Potassium

3357. Brittleness, resulting from hardness, is a property also met with; and where the brittleness is not extreme, hardness is in favor where subjected to compression.

3358. How to Make Brass. This useful alloy of copper and zinc is now generally made by plunging the copper in slips into the lead. zinc melted in the usual manner. The former metal rapidly combines with the fluid mass, and the addition is continued until an alloy is formed somewhat difficult of fusion, when the remainder of the copper is at once added. The brass thus formed is broken into pieces and remelted under charcoal, and a proper adwill be seen that the larger the proportion of copper, 15 parts zinc, and 6 parts tin. copper, the darker the color, the greater the and lead toughens it and renders it fitter for working. An application of these principles shape will serve as a guide for the metals and proportions to be used to produce a brass of cherry red, and plunge it into water. any description required.

3379. To Cover Brass with Beautiful any description required.

Fine Light Yellow Brass.

Melt together 2 parts copper and 1 part zinc.

3360. Bright Yellow Malleable Melt together 7 parts copper and Brass. 3 parts zinc.

3361. Deep Yellow Malleable Brass. Melt together 4 parts copper and 1 part zinc. Brass Malleable whilst Hot.

Melt together 3 parts copper and 2 parts zinc. 3363. Red Brass. Melt together 5 parts copper and 1 part zinc. As much as 10

3364. Brass for Buttons. parts, and zinc 5 parts. This is the Birming-

ham platin.

3365. Pale Brass for Buttons, &c. Melt together 16 parts fine light yellow brass (see No. 3359), 2 parts zinc, and 1 part tin.

3366. Common Pale Brass. Melt tolead, and 2 parts tin.

3367. Fine Pale Brass for Castings. Melt together 15 parts copper, 9 parts zinc, and 4 parts tin. This is rather brittle.

together 90 parts copper, 7 parts zinc, 2 parts producing the beautiful dead black so much tin, and 1 part lead. The color will be still admired in optical instruments, and which deeper by using 2 parts less of zinc, and 1 part was so long kept a secret by the French.

more each of copper and tin.

3381. To Frost Watch Movements.

parts lead, and 1 part tin.

3370. Red Brass for Gilding. Melt together 82 parts copper, 18 parts zinc, 3 parts tin, and 1 part lead.

parts zinc, and 1 part tin. Used for ordinary to gild or silver-plate if desired. brazing.

and 2 parts lead.

3373. Red Brass for Turning. Melt together 65 parts copper, 33 parts zinc, 2 parts

3374. Red Brass for Wire. Melt together 72 parts copper and 28 parts zinc, properly annealed.

3375. Pale Brass for Wire. Melt together 64 parts copper, 34 parts zinc, and 2

parts lead.

To Make Brass which Ex-3376. dition of either zine or copper made to bring pands by Heat Equally with Iron. It is it up to the color and quality desired. Small difficult to make a permanent joint between quantities of brass may be made by melting brass and iron, on account of their unequal the copper and zine separately, pouring them together and stirring vigorously. (See Copper Flux. No. 3470.) It is then poured into moulds of granite. Before being submitted pansion by heat so nearly similar to that of to the rolling press for reduction to thin iron, as to allow of a union between them, plates, it has to undergo the operation of which, for all practical purposes, is permannealing. In the receipts which follow, it nent. This consists of a mixture of 79 parts

3377. To Harden Brass. density, and, to a certain extent, the toughtempered or hardened by rolling or hammerness, of the alloy. Zinc lessens the weight ing; consequently, if any object is to be made and color. Tin gives it hardness and grain, of tempered brass, the hardening must be done before working it into the required

3378. To Soften Brass. Heat it to a

Lustre Colors. Dissolve 1 ounce cream of tartar in 1 quart boiling water; then add 1 ounce protochloride of tin dissolved in 4 ounces cold water. Next heat the whole to boiling, and decant the clear solution from a trifling precipitate, and pour, under continual stirring, into a solution of 3 ounces hyposulphate of soda in 1 pint water, then heat again to boiling, and filter from the separated sulphur. This solution produces on brass the various lustre colors, depending on the length parts of copper to 1 part zine may be used, the color being a deeper red for every additional part of copper employed.

of time during which the articles are allowed to remain in it. The colors at first will be light to dark gold yellow, passing through all Copper, 8 the tints of red to an iridescent brown. A similar series of colors is produced by sulphide of copper and lead, which, however, are not remarkable for their stability; whether this defect will be obviated by the use of the tin solution, experience and time alone can show.
3380. To Put a Black Finish on Brass

gether 25 parts copper, 20 parts zinc, 3 parts Instruments. Make a strong solution of nitrate of silver in one dish, and of nitrate of copper in another. Mix the two together, and plunge the brass in it. Now heat the ad 4 parts tin. This is rather brittle.

3368. Dark Brass for Castings. Melt blackness is obtained. This is the method of producing the beautiful dead black so much

3369. Pale Brass for Gilding. Melt Mix together 1 ounce each muriatic acid, nitogether copper, 64 parts; 32 parts zinc, 3 tric acid, and common salt; immerse the article, as far as it is to be frosted, in the mixture for a short time; then immerse it, so as just to cover it, in sour beer, and scour it under the beer with a brush made of fine brass wire 3371. Brass for Solder. Melt together (a scratch brush); wash it in water, and after-12 parts fine yellow brass (see No. 3359), 6 wards in alcohol. The surface is then ready

3382. To Color Brass. Although no 3372. Pale Brass for Turning. Melt alloy presents a more agreeable appearance together 98 parts fine brass (see No. 3359), to the eye than brass when it is in a high state of polish, yet the facility with which it

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tarnishes has rendered it necessary to color or | spots and patches, the operation must be bronze it, especially in those instances where repeated until the desired effect is produced. its use exposes it to the liability of being frequently handled. The following receipts are from a reliable German source, and are said

Nos. 3771, \$c.)
3383. To Give Brass an Orange Tint. An orange tint, inclining to gold, is produced very soon tarnish, and consequently require by first polishing the brass and then plunging more frequent cleaning. A strong lye of roche-it for a few seconds into a neutral solution of alum and water will also improve brass. A crystallized acetate of copper, care being taken that the solution is completely destitute of all free acid, and possesses a warm tempera-

3384. Dipped into a bath of copper, the brass being first polished, as in last receipt, the resulting

tint is a gravish green.

3385. To Color Brass Violet. A beautiful violet is obtained by immersing the polished brass for a single instant in a solution of chloride of antimony, and rubbing it with a Brass. A mixture of muriatic acid and stick covered with cotton. The temperature alum dissolved in water imparts a golden of the brass at the time the operation is in color to brass articles that are steeped in it for progress has a great influence upon the beauty | a few seconds. and delicacy of the tint; in this instance it should be heated to a degree so as just to be soap, 2 ounces; rotten-stone, 4 ounces; beat tolerable to the touch.

3386. To Give Brass a Moiré Appearance. A moiré appearance, vastly superior to that usually seen, is produced by boiling the object in a solution of sulphate of the first and last are best applied with a little copper. According to the proportions observed between the zinc and the copper in the turpentine, or sweet oil. Both require friccomposition of the brass, so will the tints obtained vary. In many instances it requires the employment of a slight degree of friction, which is also singularly enhanced by dropping a few iron nails into the bath.

3387. Black Lacquer for Brass. instruments consists in first polishing the object with Tripoli, then washing it with a 2 parts chloride of gold, and, after allowing this wash to remain for nearly a quarter of An excess of acid increases the intensity of

By another method copper turnings are dissolved in nitric acid until the acid is saturated; the objects are cleaned, immersed in the solu-tion, and subsequently heated moderately over a charcoal fire. This process must be repeated in order to produce a black color, as

Look. Much pains are taken to give brass objects an English look. For this purpose they are first heated to redness, and then dipped in a weak solution of sulphuric acid, and immediately wash it thoroughly with rain Afterwards they are immersed in dilute nitrie acid, thoroughly washed in water, and dried in sawdust. To effect a uniformity in the as new. color they are plunged into a bath consisting of 2 parts nitric acid and 1 part rain water, Rub some bichromate of potassa fine, pour where they are suffered to remain for several over it about twice the bulk of sulphuric acid,

3389. To Clear " ss. Brass and copper are best cleane ...th sweet oil and Tripoli, powdered bat' orick, rotten stone, or red to possess a high degree of permanence. (See brick-dust, subbed on with fiannel and polish-Nos. 3771, &c.) make brass and copper very bright, but they solution of oxalic acid rubbed over tarnished brass with a cotton rag, soon removes the tarnish, rendering the metal bright. The acid must be washed off with water, and the brass To Color Brass Grey-Green. rubbed with whitening in powder and soft leather. When acids are employed for removing the oxide from brass, the metal must be thoroughly washed afterwards, or it will tarnish in a few minutes after being exposed to the air.

3390. To Give a Golden Color to rass. A mixture of muriatic acid and

them to a paste. Or: Rotten stone made into a paste with sweet oil. Or: Rotten-stone. 4 ounces; oxalic acid, 1 ounce; sweet oil, 11 ounces; turpentine enough to make a paste. tion with soft leather.

3392. To Clean Brass Inlaid Work. Mix Tripoli and linseed oil, and dip into it a with a resinous or waxy varnish, to bring out rubber made of a piece of an old hat, with the wavy appearance characteristic of moiré, which polish the work and rub off with clean soft leather. If the wood be ebony or rosewood, polish it with a little finely powdered elder ashes; or make a paste of rotten-stone, There are two methods of procuring a black a little starch, sweet oil, and oxalic acid, lacquer upon the surface of brass. The one mixed with water. The ornaments of a French usually employed for optical and scientific clock are, however, best cleaned with breadcrumb, carefully rubbed, so as not to spoil the wood-work. Ormolu candlesticks, lamps, mixture composed of 1 part nitrate of tin and land branches, may be cleaned with soap and water. They will bear more cleaning than lacquered articles, which are spoiled by frean hour, wiping it off with a linen cloth, quent rubbing, or by acids or strong alkalies.

Solutions to Clean Brass. 3393, Finely powdered sal-ammoniae; water to moisten. Or: Roche alum, 1 part; water, 16 parts. Mix. The articles to be cleaned must be made warm, then rubbed with either of the above mixtures and finished with fine Tripoli. This process will give them the brilliancy of

gold. the first trial only gives a deep green, and the finishing touch is to polish with clive oil.

3394. Solution for Cleaning Brass the finishing touch is to polish with clive oil.

3388. To Give Brass an English acid, 4 ounce nitric acid, 1 drachm saltpetre, and I ounce rain water, and allow the solution to repose a few hours. Pass the article to be cleaned rapidly through the solution, water. Dry in sawdust. This process will make old and discolored chains look as good

3395. To Clean Very Dirty Brass. minutes. Should the color not be free from and mix this with an equal quantity of water.

3396. color given to them, by two simple processes. ples. The first is to beat sal-ammoniae med a may powder, then to moisten it with soft water, rubbing it on the ornaments, which must be afterwards rubbed dry with bran and whiting. Very fine. Or: nickel, 25 parts; zine, 20 afterwards rubbed dry with bran and whiting. parts; copper, 60 parts. Used for rolling.

3411. German Silver for Castings. The first is to beat sal-ammoniac into a fine these processes will give to brass the brilliancy sheet iron.

strongly resembles gold in appearance, and Chinese sample.

maximum of hardness.

3399. Coin Gold. Melt together with alloy more malleable, though not so white. Itvetre and sal-ammoniac, 22 grains pure 3414. Chinese White Copper. This saltpetre and sal-ammoniac, 22 grains pure gold with 2 grains of pure copper. The later consists of 30 parts copper, 36 parts nickel, American coin is alloyed with 2 grains of a mixture of 1 part silver and 2 parts copper.

3415. Pakfong, or White Copper

3400. To Make Eighteen Carat Gold.

3401. To Make Sixteen Carat Gold. Sixteen parts pure gold are mixed with $5\frac{1}{2}$ parts copper, and $2\frac{1}{2}$ parts silver. Or: 17 parts coin gold, 5 parts copper, and 2 parts silver.

3402. To Make Twelve Carat Gold. Coin gold, 75 parts; further alloyed with 40 parts copper, and 22 parts silver, make a com-bination of good appearance, which stands

acid tests well.

3403. To Make Four Carat Gold. good useful metal for cheap rings, &c., which will not blacken the finger, is made by mixing 4 parts gold with 2 parts silver, and 18

parts copper.
3404. To Make Green Gold. Pure gold, 19 parts, and 5 parts pure silver, combine to form an alloy of a beautiful green shade, very effective for foliated designs in jewelry

3405. Pivots for Artificial Teeth. An alloy of platinum and silver is used for

this purpose.

3406. Chaudet's Springs for Artificial Teeth. Equal parts of copper, silver, and palladium.

3407. Hard Silver. An alloy of 5 parts pression. silver and 1 part copper forms the hardest alloy of these metals.

3408. French Coin Silver. This consists of 9 parts silver and 1 part copper.

German Silver. This is a wellknown alloy, the finer varieties of which and finish are desirable.

Wash immediately in plenty of water, wipe nearly equal silver in whiteness and susceptiit, and rub perfectly dry, and polish with pow-bility of receiving a high polish, while they dered rotten-stone. By this method the surpass it in hardness and durability. The dirtiest brass may be made immediately mixture of the metals is effected in the same way as is given for making alloys. (See No. To Give Brass Ornaments a 3347.) The receipts here given are from the Fine Color. Brass ornaments, when not highest authorities, or are the results of gilt or lacquered, may be cleansed, and a fine actual analysis of the finest commercial sam-

3410. German Silver for Rolling.

roche alum boiled to a strong lye, in the Nickel and zinc, each 20 parts; copper, 60 proportion of 1 ounce to 1 pint; when dry, parts; lead, 3 parts. For congs. Or, to it must be rubbed with fine Tripoli. Either of either of the above add 2 to 3 parts.

of gold.

3397. Counterfeit Gold. Fuse together 8 parts platinum, 5 parts pure copper, 2 parts parts; iron, 2½ parts. This resembles the pure zinc, 4 parts tin, and 3 parts pure lead, genuine German silver made from the ore using saltpetre, sal-ammoniac, and powdered of Hildburghausen, as well as Pakfong, as charcoal as fluxes. This compound metal analyzed by Dr. Fyfe, and is equal to the best

resists many of the tests used for gold.

3413. Pelouze's German Silver.

3398. Hard Gold. A mixture of 7 parts Equal parts of copper and nickel. Said to be gold and I part copper appears to afford the superior to any of the alloys containing zinc. 2 parts of copper to 1 part of nickel make the

The copper used for alloying gold must be from China. This is composed of 41 parts pure, otherwise the mixture will be brittle. copper, 32 parts nickel, 2½ parts iron, and 24½. copper, 32 parts nickel, 24 parts iron, and 244 parts zinc. The Chinese Paktong is said to Pure gold, 18 parts, is alloyed with 4 parts be prepared from native ore. 10 10 pure copper and 2 parts silver. Or: 19½ white, takes a high polish, very sonorous, malleable both cold and at a dull red heat, and may be rolled into leaves or drawn into wire

> This is 3416. White Spoon Metal. the alloy sold as German plate. Melt together 55 parts copper, 24 parts nickel, 16 parts zine, 3 parts tin, and 2 parts iron. This

is a useful alloy.

3417. Britannia Metal. Plate brass, 4 ounces; tin, 4 ounces; when fused add ounces each of bismuth and antimony. This composition is added at discretion to melted tin

To Clean Britannia Ware. 3418. Britannia ware should be first washed with a woolen cloth and sweet oil, then washed in water and suds, and rubbed with soft leather and whiting. Thus treated, it will retain its and whiting. beauty to the last. Britannia ware may also be cleaned in the same way as copper, in No. 3252

3419. Type Metal. Lead, 3 parts; antimony, 1 part; melted together. Small types are usually made of a harder composition than large ones. A good stereotype metal is said to be made of lead, 9 parts; antimony, 2 parts; bismuth, 1 part. This alloy expands as it cools, and consequently brings out a fine im-

Bismuth and Lead. 3420. parts to bismuth, 1 part, gives an alloy which dilates powerfully at the time of cooling. This property makes it extremely suitable to all castings in which the greatest sharpness

8421. Tin and Zinc. Tin and zinc, of worked still easier. If alloyed with small each 1 part, is almost as tenacious as brass, and melts at 900° Fahrenheit.

3422. Pewter. Tin, 100 parts; antimony, 8 parts; copper, 4 parts; and bismuth, 1 part, constitute the compound commonly called

Alloys of Steel. Steel is successfully alloyed with other metals, improving its qualities for some purposes. $\frac{1}{500}$ part of silver adds iramensely to the hardness of steel, and part of platiyet increases its tenacity. 1 num, though not forming so hard an alloy as the silver and steel, gives a very great degree of toughness. Rhodium, palladium, iridium, and osmium make steel very hard, but their use, from their cost, is confined mainly to the experimental laboratory. Platinum, in its malleable state, may be cut with a knife; but with steel it forms an alloy not to be touched with a file.

Iron, Copper, and Zinc. An al-3424. loy consisting of 10 parts east iron, 10 copper, and 80 zinc, does not adhere to the mould in casting, and it is of a beautiful lustre when filed and polished. The least fusible metals are melted first, and the zinc last, in making

3425. Ormolu, or Mosaic Gold. Copper and zinc, equal parts; melt together at the lowest possible temperature at which copper will fuse, and stir so as to produce a perfect admixture of the metals; then add gradually, small portions of zinc at a time, until the alloy acquires the proper color, which is perfectly white, while in the melted state. It must This alloy should contain from 52 to 55 per cent. of zinc.

3426. White Metal. Lead, 10 ounces; bismuth, 6 ounces; and antimony, 4 drachms; or, 2 pounds autimony, 8 ounces brass, and 10

ounces tin.

3427. French Alloy for Forks and Spoons. This is a beautiful white metal, very hard, and taking a fine polish. It is composed of 69.8 parts of copper, 19.8 parts

nickel, 5.5 of zine, and 4.7 of cadmium.
3428. French Silver. The new French silver is apparently an improvement on the be applicable to all the purposes to which ordinary commercial silver is applicable. It is composed of copper, 56 per cent., nickel, 40.64, tungsten, 2.0, aluminum, 0.56. It is a white, ductile, malleable, tenacious, sonorous alloy; its specific g avity is nine-tenths that of silver, its metallic lustre superior to that of silver, and its fusibility less, probably on account

of the tungsten it contains

3429. The Alloys of Aluminum. We have to distinguish between alloys in which the aluminum predominates and such ones in which the other metals outweigh the latter. Those impart to the aluminum new properties. Iron and copper do not act injuriously if the admixture is not considerable. In regard to toughness, the union of 7 per cent. of much as 10 per cent. of copper, and when whole well stirred for 30 minutes, so as to containing only half as much, it may be produce a perfect mixture. when the tin is

quantities of zinc, tin, gold, or silver, the metal is rendered hard and more brilliant, but remains ductile. Especially recommended is the alloy consisting of 97 per cent. of alum-inum, and 3 per cent of zinc. The alloy with 7 per cent. of tin can be worked well, but does not take a very fine polish, and cannot be cast, since a more fusible alloy with a large proportion of tin is separated. Aluminum and lead do not unite. The composition with 3 per cent. of silver and 97 of aluminum possesses a beautiful color, and in equal parts they yield an alloy of the hardness of bronze. The union of 99 per cent. of aluminum and 1 of gold is, though hard, still ductile; its color is that of green gold. With 10 per cent. of gold, the composition is rendered crystalline. In combining aluminum with copper, the latter must be melted first, and the former added gradually in small portions at a time. A combination of 10 parts aluminum and 90 parts copper produces a fine aluminum bronze, which, however, is brittle after the first mixing; it increases in strength and tenacity only after successive fusions, but with the loss, each time, of a little aluminum. This bronze may be forged at a dull red heat without presenting flaws or cracks. Like ecoper, it is rendered more ductile by being heated and plunged into cold water.

Copper and Aluminum for The most important alloy of 3430. Journals. aluminum is that composed of 90 per cent. of copper and 10 per cent. of aluminum. It possesses a pale gold color, a hardness surpassing then be at once cast into figured moulds. that of bronze, is susceptible of taking a fine polish, and is easier forged than soft iron. This alloy has found a ready market, and, if less costly, would replace red and yellow brass. Its hardness and tenacity render it peculiarly adapted for the journals and bearings of machinery. Christofle, of Paris, who uses it for a journal for a polishing disk, found that it lasted six times longer than or-dinary journals—that is, 18 months. There were 2200 revolutions made per minute. It is further stated, on good authority, that a journal of this new bronze, which was employed for the axle of a sewing machine, makold-fashioned German silver, and it is stated to ing 240 revolutions per minute, did excellent service for 1 year without indicating the least deficiency. Journals of ordinary bronze do not, as is well known, last over 5 months. When more than 10 per cent. of aluminum enters into the composition of the bronze, the alloy gradually becomes weaker and less malleable, and at length so brittle that it is easily

pounded in a mortar. 3431. Oroide, or Artificial Gold. This material is manufactured largely in the United States into imitation fewelry and other articles, scarcely distinguishable from gold, except by the inferior gravity; and it is a matter of surprise to almost any one to learn that it does not contain a single grain of the pre-cious metal. It is made by taking 100 parts of pure copper, 17 of pure tin, 6 of magnesia, 9 iron can scarcely be distinguished from pure of tartar of commerce, 3.6 of sal-ammoniac, aluminum. Both metals easily combine with each other. Commercial aluminum mostly melted, and the other substances (excepting contains iron; it remains ductile with as the tin) added, a little at a time, and the

brilliancy so long as when tin is employed.

·3432. Talmi Gold. A beautiful gold-colored alloy, sold under the above name, gives, on analysis: copper, 86.4; zinc, 12.2; tin, 1.1; iron, 0.3. The presence of the iron

was probably accidental.

3433. Yellow Dipping Metal. Melt of copper. This alloy is almost of the color,

etc., of gold coin. 3434. Alloy Alloy of the Standard Measure used by Government. This is composed of copper, 576 parts; tin, 59; yellow brass (22 copper to 1 of zinc), 48 parts.

3435. Dentists' Tin Alloys for Moulds. fastened, are fashioned to fit exactly to the and die, east from a plaster model of the This compound is much harder than tin, melts at a lower heat, shrinks little, or practically for the first swaging, this alloy is particularly the point of congelation, the plaster cast may crystallization.

3436. highly useful alloy, where toughness as well amount of antimony and copper should be to as hardness is essential: tin, 16 parts; antimony, 1 part; zinc, 1 part. This alloy is much harder than the preceding die metal, and equals it in tenacity, being suited for any 2 antimony, 1 copper; or, 12 tin, and equals it in tenacity, being suited for any 2 antimony, 1 copper. For taking counter-kind of die; it requires a higher temperature dies or moulds from dies of the last named to melt it, but, it melts some than tin or alloys a suitable metal dusible at about 3800 to melt it, but it melts sooner than tin, or alloys, a suitable metal, fusible at about 380°

thrown in and stirred round until melted. | than the mould-metal mentioned in the pre-The crucible is then covered, and the fusion ceding receipt, from a matrix of which a die kept up for 25 minutes, and the scum taken may be taken by it with safety. It affords, off, when the substance is ready for use. It in sand, a perfect die, does not shrink, and, is malleable and ductile, and can be worked whether poured into a sand or metal mould, in any form, even into leaves like gold. The comes out with a smooth, bright face. It is alloy may also be made by substituting gran- the best combination of these three metals ulated zinc for tin, but it will not retain its for the purpose. But when dies are made of it from sand moulds, and a more fusible metal is needed for taking counter-dies or moulds from them, it may be had by a combination of 5 parts lead, 2 bismuth, and 1 tin; or, 5 parts lead, 3 to 4 bismuth, and 1 tin afford a still more fusible compound, although harder.

Copper Alloys for Dentists' 3437. together 2 parts brass, 1 part copper, with a Moulds. A very hard and most valuable little old brass, and 1 ounce tin to every pound alloy for general use may be had by a mixture of tin, 12 parts; antimony, 2 parts; copper, 1 part. It is not much inferior to zine in hardness, casts without sensible shrinkage, and makes a perfect and very handsome die, bright and smooth. It is less fusible than the hard tin die metal in last receipt, but may be used for taking dies from the mould-metal The gold plates on which artificial teeth are mentioned in No. 3435; but, as it melts at nearly the same temperature, this requires month by being hammered between a mould care. It will be found of value in connection with lead moulds made by dipping. (See No. 3435.) It is rather brittle for dies for partial mouth. The plaster model is obtained from 3430.) It is rather prictic for these are liable a mould of wax, pressed while soft into the sets representing the teeth, as these are liable to broade or removing from the matrix; but it cavities of the mouth, and allowed to harden. to break on removing from the matrix; but it Duplicate moulds and dies are necessary, at is abundantly strong enough for swaging purdifferent stages of the hammering, in order to poses. In combining these metals (which obtain a perfectly fitting plate. The necessimal may be done in an ordinary charcoal furnace, sary characteristics of the metals used for the as it is by no means necessary to raise the moulds and dies are fusibility, hardness, or heat to the melting point of copper), place toughness, and, especially for the moulds, a the copper in a crucible and bring it to a red freedom from shrinkage in cooling. The heat, then pour in the tin and antimony, metal usually employed for the dies consists melted, and cover the whole with charcoal of 8 parts tin, 1 part lead, and 1 part bismuth. dust, to prevent oxidation. The copper will soon liquely, or dissolve, as it were, combining perfectly with the other metals, without furmone, in casting; is tough and strong. It ther elevation of temperature. To guard melts at about 330° Fahr. Although gener-better against volatilization of antimony, ally a harder and less fusible metal is used which takes place at a high red heat, it is well enough to add to the copper but half the convenient for taking duplicate dies for finish- tin at first, and when these are combined, add ing. Its tenacity adapts it for cases of partial the antimony, and then the remaining tin. sets representing the teeth. The mould or This also enables one to conduct the second counter-die metal is made by adding to 1 part | melting in a larger crucible, or, indeed, in an of this mixture 6 parts of lead. The result is iron ladle. It is best to let the melted mass harder than lead, and does not yield like it cool down some, before pouring it from the under the blow, presenting a resistance suffi-cient to drive the plate up well against the die. Its shrinkage is but slight; it melts at antimony and zinc increases the hardness of from 450° to 460°. It is designed for use the metal, but with a tendency to imperfect when the dipping process is resorted to. This castings. If tin be used in larger quantity, consists in pouring the melted metal into an appropriately shaped vessel or mould, and pressing the plaster model into the metal and antimony, in respect to each other, may before the moment of congelation. If used at be somewhat varied, without material modification of the qualities of the compound; but, be employed without previous baking; other- for the best results, the sum of these two metwise it should be baked to expel its water of als should hold to the quantity of tin employed the ratio of about 1 to 8. For fluidity. Hard Tin Alleys for Dentists' an excess of antimony over copper appears to The following formula affords a be requisite. For non-shrinkage, the joint

part bismuth, and not over 100 part tin. It reduced to a dull red, to prevent oxidation; is wonderful how small a quantity of tin then add the remainder of the metal as above. serves to improve the alloys of lead and bismuth, giving them a white, clear lustre, preventing oxidation, promoting fusibility—in on the surface of the metal. The above composition is in the surface of the metal. The above composition is in the surface of the metal. short, producing almost a new metal.

3438. Cadmium Alloys for Dentists' Moulds. By the use of cadmium we may produce still harder alloys than any of the preceding, possessing in an equal degree every other desirable quality. Thus, 10 parts of tin, 1 part of antimony, 1 of copper, and 1 of cadmium, produce a compound which has about the hardness of zinc: it casts perfectly, and is nearly all that could be desired, except that, like the copper die metals, it is rather brittle for certain castings. (See No. 3437.) Substituted for copper in these connections, cadmium appears to confer greater hardness and toughness, and, up to a certain point, promotes fusibility. 9 parts of tin, 1 part of antimony, and I part cadmium, furnish a very hard and tough metal of a compact, homegeneous structure, which casts without shrinkage, forming a perfect die with a smooth, bright face. It melts at about the melting point of tin. In the employment of cadmium, care must be taken not to subject it to a heat high enough to volatilize it. To avoid this danger, it is best to unite the other metals first, and then add the cadmium at a heat barely sufficient to melt it. The great objection to this metal is its expensiveness.

3439. Alloy of Nickel and Copper. A mixture of 1 part nickel and 2 parts copper produces a grayish-white metal, tenacious,

ductile, and moderately fusible.

3440. Alloys of Platinum and Copper. A compound of 1 part platinum and 4 parts copper is of a yellow-pink color, hard, ductile, and susceptible of a fine polish.

An alloy of 3 parts platinum and 2 parts

is made of 55 to 60 parts copper, 30 to 40

parts tin, and 10 to 15 parts zinc.

3442. Red Tombac. Put into a crucible 5½ pounds copper; when fused add ½ pound zine; these metals will combine, form-

3443. White Tombac. When copper is combined with arsenic, by melting them together in a close crucible, and covering the surface with common salt, to prevent oxida-

tion, a white brittle alloy is formed.

3444. Speculum Metal for Telescopes. Melt 7 pounds of copper, and when fused add 3 pounds zinc and 4 pounds tin. These metals will combine to form a beautiful alloy of great lustre, and of a light yellow color, fitted to be made into specula for telescopes. Mr. Mudge used only copper and grain tin, in the proportion of 2 pounds of the former to 141 ounces of the latter.

3445. Babbitt's Anti-Attrition Metal. Melt 4 pounds copper, add by degrees 12 pounds best quality Banca tin, 8 pounds regulus of antimony, and 12 pounds more tin

Fahr., is had by a mixture of 3 parts lead, 1 of tin have been added, the heat should be position is called hardening. For lining the boxes, take 1 pound of this hardening and melt it with 2 pounds of Banca tin, which produces the lining metal for use. Thus, the proportions for lining metal are 4 pounds copper, 8 pounds regulus of antimony, and 96 pounds Banca tin.

3446. Gongs and Cymbals. The secret method employed by the Chinese for working the hard brittle bronze used for making gongs and cymbals, seems to be solved by the fact that the bronze of which these instruments are made, consisting of copper alloyed with about 20 per cent. of tin, and almost as brittle as glass at ordinary temperatures, becomes as malleable as soft iron, if worked at a dull red heat. This discovery was recently made in Paris, by M.M. Julien and Champion, the

result of experiments at the Paris Mint. 3447. Phosphorus Bronzes. A 3447. Phosphorus Bronzes. A great advance has lately been made in the construction of bronzes, by the addition of a small percentage of phosphorus, although the precise function of this substance has not been hitherto well understood. According to Levi and Kunzel, however, one cause of the inferiority in bronze consists in the constant presence of traces of tin in the state of an oxide, which acts mechanically by separating the molecules of the alloy, thus interposing a substance which in itself has no tenacity. The addition of phosphorus reduces this oxide, and renders the alloy much more perfect, improving its color its tenacity, and all its physical properties. The grain of its fracture resembles more that of steel, its elasticity is much augmented, and its resistcopper is nearly white, very hard, and brittle ance to pressure sometimes more than 3441. French Bell Metal. The metal doubled. Its durability is greater, and, when used in France for hand-bells, clock bells &c., melted, it is of greater fluidity, and fills the mould in its finest details.

3448. Fontainemoreau's Bronzes. There is a kind of bronze known as Fontainemoreau's bronze, in which zinc predominates. It is said to answer well for chill moulding, ing an alloy of a reddish color, but possessing that is, for pouring in metal moulds, by which more lustre than copper, and also greater durability.

The crystalline nature of the zinc is entirely changed by the addition of a small proportion of copper, iron, &c. The alloy is hard, close-grained, and resembles steel. Moreover, it is easier to file than either zinc or copper. The following table presents the proportions in

use:

Zinc.	Copper.	Cast Iron.	Lead.
90	8	1	1
91	8	0	1
92 92	8	0	0
92	7	1	0
97	$2\frac{1}{2}$	1	0
97	3	0	0
991	0	1	0
$99\frac{1}{2}$	1	0	Ô

3449. Use of Petroleum in Turning while the composition is in a melted state. Metals. A bronze composed of seven parts After the copper is melted and 4 or 5 pounds of copper, 4 of zinc, and 1 of tin, has been

this desirable end.

oiled twice a year; and the fourth was left rapidly oxidiz when placed in water. untouched. The first looked beautifully; 3459. Table of Alloys of Tin and the third, which had been oiled twice a year. Lead and their Melting Heats. was passable; the second looked dead; and the fourth was dull and black.

Engestroom Tutania. 3451. together 4 parts copper, 8 parts regulus of antimony, and I part bismuth. When added to 100 parts of tin, this compound will be

ready for use.

3452. Tutenag. Melt together 8 parts of copper, 5 parts of zine, and 3 parts of

3453. Kustitien's Metal for Tinning. To I pound of malleable iron, at a white heat, add 5 ounces regulus of antimony, and 24 pounds of the purest Molucca tin. This alloy polishes without the blue tint, and is free from lead or arsenic

3454. Expansion Metal. Melt together 9 parts of lead, 2 parts of antimony, and 1

part bismuth.

3455. Fluid Alloy of Sodium and Potassium. If 4 parts sodium are mixed with 2½ potassium, the alloy will have exactly the appearance and consistency of mercury, remaining liquid at the ordinary temperature of the air.

3456. Fusible Alloys. Bismuth, 8 parts; lead, 5 parts; tin, 3 parts; melt together. Melts below 212° Fahr. Or: Bismuth, 2 parts; lead, 5 parts; tin, 3 parts. Melts in boiling water. Or: Lead, 3 parts; tin, 2 parts; bismuth, 5 parts; mix. Melts at 197° Fahr. The above are used to make toy-spoons, to surprise children by their melting in hot tea or coffee; and to form pencils for writing on asses' skin, or paper prepared by rubbing burnt hartshorn into it. The last may be employed as an anatomical injection, by adding (after removing it from the fire), 1 part quicksilver (warm). Liquid

at 172°; solid at 140° Fahr.

3457. Wood's Patent Fusible Metal melts between 150° and 160° Fahr. It consists of 3 parts cadmium, 4 tin, 8 lead, and 15 bismuth. It has a brilliant metallic lustre,

and does not tarnish readily.

3458. The Most Fusible Alloy. There is an alloy of bismuth, tin, and lead, which, from its very low melting point, is called fusible metal. (See No. 3457). Dr. Von Hauer has found, however, that the addition of cadmium to the alloys of the above mentioned metals reduces their melting point still lower. An alloy of 4 volumes cadmium, with 5 and mix thoroughly.

found to be so hard as to be difficult to work, volumes each tin, lead, and bismuth, is quite and yet of considerable value in certain ways liquid at 150° Fahr. In parts by weight, the when worked. Various methods have been above would be 224 parts cadmium, 517½ attempted, aiming at effecting a ready work-lead, 295 tin, and 1050 bismuth. (See No. ing of this alloy and M. Bechstein has recent- 52). An alloy of 3 volumes of cadmium ly, by soaking the alloy in petroleum, attained with 4 each of tin, lead, and bismuth, fuses at this desirable end.

153½ Fahr, and an alloy of 1 equivalent of 3450. To Clean Bronze. It was ob- cadmium with two equivalents each of these served in Berlin that those parts of a bronze three other metals, at 155½, which is also statue which were much handled by the the fusing point of an alloy of 1 part each of all public retained a good surface, and this led to the four metals. Dr. von Hauer made these the conclusion that fat had something to do alloys by fusing their ingredients in a covered with it. An experiment was therefore tried porcelain crucible at the lowest practicable for some years with four bronzes. One, says temperature. They all become pasty at lower our authority—Chambers' Journal—was coattemperatures than those given above; the ed every day with oil, and wiped with a cloth; temperatures quoted are those at which the another was washed every day with water; alloys are perfectly fluid. It should be added the third was similarly washed, but was that, unfortunately, all these alloys very

		•	
Tin.	Lead.	Bismuth.	Fahr.
1	25	0	558°
1	10	. 0 :	541
1	5	. 0	511
1	3	0	482
1	$\frac{3}{2}$	0	441
ï	1	0	370
	ì	Ŏ	334
$\frac{1}{2}$ $\frac{1}{2}$	i i	0	340
3	i	0	356
4	· 1	0	365
$\dot{\bar{5}}$. î	ŏ	378
$\check{6}$	i	ů i	381
4	4	1	320
3	$\frac{1}{3}$	1 1	310
$\overset{\circ}{2}$	2	1	292
ĩ	ĩ	1 1	254
1	2	$\frac{1}{2}$	236
5	3		202
3		3 8	
<u> </u>	<u>. 5</u>	<u> </u>	197

stances of easy fusibility, which are added to others more refractory, to promote their fusion. Various fluxes are given in other portions of this work (see Soldering and Enamels), but the principal fluxes are the following:

3461. Black Flux. Cream of tartar, 2 parts; nitre, 1 part; powder, mix, and deflagrate by small quantities at a time, in a red hot crucible. This is merely carbonate of potash, mixed with charcoal in a finely-divided state. It is used for smelting metallic ores, and exercises a reducing action, as well as promoting the fusion. (See No. 11.)

3462. White, or Cornish Refining

Flux. Cream of tartar and nitre, equal parts;

deflagrate as last.

3463. Morveau's Reducing Flux. Powdered glass (free from lead), 8 parts; calcined borax and charcoal, each 1 part; all in fine powder, and triturated together thor-

oughly. Used as black flux. (See No. 3461.) 3464. Flux for Reducing Lead Ore.

3465. Cornish Reducing Flux. Crude add 1 ounce sal-ammoniac to each pound of tartar, 10 parts; nitre, 4 parts; borax, 3 parts. the liquid. Mix as the last.

3466. Crude Flux. Same as black flux, (see No. 3461), omitting the deflagration. Used for reducing. (See No. 26.)

3467. Liebig's Flux. Carbonate of soda (dry, see No. 2065), and eyanide of potassium, 1 part each. Used for reducing arsenious acid.

3468. Fresenius' Flux. Carbonate of potassa (dry), (see No. 2065), 3 parts; eyand and add some conide of potassium, 1 part. For the arsenical rate of ammonia. compounds.

3469. Christison's Flux for Arsenic. Carbonate of soda, (crystallized). 8 parts; charcoal (in fine powder), 1 part; mixture is

gradually to be heated to redness.

3476. Flux for Copper. Sal-enixum (the refuse from aquafortis), to be obtained at most of the chemical works at a trifling cost, is strongly recommended by Larkin as a general flux for copper foundings, particularly where large masses of copper have to be melted prior to adding the tin and zinc. Nothing is equal to it. This, with charcoal, surpasses everything else.

3471. Various Fluxes. Borax, tartar, nitre, sal-ammoniac, common salt, limestone, glass, fluorspar, resin, and several other substances are used as fluxes in fusing metals, and soldering. On the large scale crude tartar is employed. (See No. 3472.)

Soldering and Welding. Soldering is the art of uniting the surfaces of metals by partial fusion, and the insertion of an alloy between the edges, which is called solder, it being more fusible than the metals which it unites. Solders are distindifficulty of fusion. Hard solders usually melt only at a red heat, but soft solders fuse at lower temperatures. In order to join metals, it is obvious that a solder must be used that melts at a lower temperature than the metals to be joined; but it may also be necessary that it approach as nearly as possible to them in point of hardness; and occasionally, as is especially the case with jewelry, similarity of color is an object. The heat requisite for soldering small articles, such as jewelry, etc., is usually obtained by employing a common blowpipe; as by its use a sudden heat may be concentrated on a small Where a larger surface has to be heated, the flame of a spirit lamp is used. For brazing, or uniting larger objects with hard solder, a furnace, or, if necessary, a forge, may be employed. In working tin plates, the solder is applied and fused by a heated copper tool called a soldering-iron. The surthis, as well as to counteract the oxidization which most metals undergo when heated, a flux is used (see No. 347°), which neutralizes or removes these otherwise serious impediments, securing a firm joint.

pieces of zinc until all bubbling ceases; some dered; the method is given in No. 3515.

3474. Neutral Soldering Fluid. Dissolve zinc in muriatic acid as above, then warm the solution and add sufficient oxide or carbonate of tin in powder to neutralize it. This prevents the fluid from corroding the seams

3475. Soldering Liquid. Soldering liquid is made by taking hydrochloric acid, 3475. † pint; granulated tin, 1; ounce; dissolve and add some common solder and hydrochlo-

3476. Flux for Soldering. For common purposes powdered resin is generally used. Stearic acid, obtained from the candle factories, makes a good flux for fine tin work.

3477. Flux for Soldering Iron or teel. Dissolve chloride of zinc in alcohol. Steel. 3478. Flux for Soldering Steel. This answers perfectly when the fracture is an old one. To a saturated solution of zinc in 1 pint muriatic acid, add 4 ounces pulverized sal-ammoniac; boil it for 10 minutes; put it, when cold, in a well corked bottle. The boil-

ing must be done in a copper vessel.

3479. Soft Soldering. The solder is an alloy of 2 parts tin to 1 part lead, fusible at 340° Fahr.; or, for cheapness, the proportion is sometimes 3 to 2, fusible at 334°. This substance is applied with a hot copper tool called a soldering-iron, or by blowpipe flame. Heat, however, causes the edges of the metal to oxidize; therefore the edges are covered with a substance having a strong attraction for exygen, and disposing the metal to unite to the solder at a low temperature. Such substances are called fluxes, and are chiefly borax, resin, sal-ammoniac, muriate of zinc,

Venice turpentine, tallow, or oil. 3480. Flux for Soldering Brass. For brass or other similar alloy, resin, sal-ammoguished as hard and soft, according to their niac, and muriate of zinc are the proper fluxes. Should the work be heavy and thick, the soldering requires to be done over a charcoal fire in order to keep the tool heated within proper limits. It is as well to tin the surfaces before soldering; in some cases simply dip-ping into a pot of melted solder effects the purpose, but the dip must be done instantly to be effective.

3481. Flux for Soldering Zinc. is difficult to solder, from the fact that it is apt to withdre the tin from the soldering bolt, zinc and copper having a stronger affinity for each other than tin and copper. The proper flux is muriate of zinc, made by lissolving small bits of zinc or zinc drops in muriatic acid mixed with an equal bulk of

3482. Flux for Soldering Tin and Lead. Tin and lead require resin or oil as the flux.

Flux for Soldering Pewter. 3483. faces of parts to be joined by soldering must Pewter requires a flux of oil, and may, in adbe perfectly clean; and in order to ensure dition to the soldering iron process, be soldered by a current of heated air.

3484. Flux for Soldering Britannia Metal. Britannia metal should have muriate of zinc for a flux, and be soldered by the blowpipe.

3473. To Make Soldering Fluid for Soft Solder Iron. Iron requires the surfaces to be tinned over before being sol-

moistening them with soldering fluid (see No. 3473), lay a small piece of solder over the joint and apply heat, either over a spirit flame, or by means of the blowpipe, as the case may be. The heat should be withdrawn at the moment of fusion, otherwise the solder may become brittle.

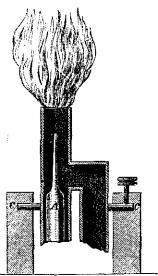
faces. Where two smooth surfaces are to be joined, moisten the surfaces with soldering Where two smooth surfaces are to be fluid (see No. 3473), and lay a piece of tin foil between them, press them together closely, and apply heat sufficient to fuse the tin foil.

3488. Hard Soldering or Brazing. The alloy used in hard soldering is generally made of equal parts of copper and zinc; much of the zinc, however, is lost in the process, so that the real proportion is not equal parts. The alloy is heated over a charcoal fire, and broken to granulations in an iron mortar. A different proportion is used for soldering copper and iron, viz.: 3 zine to 1 copper. commercial name is "spelter solder."

3489. Flux for Spelter Solder. The flux employed for spelter solder is borax, which can either be used separately, or mixed, by rubbing to a cream, or mixed with the

solder in a very little water.

3490. To Hard Solder. When the work is cleaned, bound, fluxed, and speltered, the whole is subjected to a clear charcoal or coke fire; or, what is now becoming far more general, convenient, cleanly, and manageable, a bellows blowpipe. The air passes from a bellows propelled by the foot through A (See Engraving.) The gas passes through B,



and the flame can be directed to any point, on account of its being hinged at C C. flame can be extended by using several stands, or by constructing several burners on one stand. The heat is much greater than from charcoal, can be regulated at pleasure, and kept at the same temperature for any given time. In the process of hard soldering, the tough brass (see No. 3358) with borax mixed water should be driven off by gentle heat; the fusion of the flux soon follows; a glassy substance appears after the froth, which, in 3511. its turn, is replaced by the alloy in red liquid better than the usual brass solder, for uniting

3486. To Soft Solder Small Articles. form; the blue flame from the ignited zine Join together the parts to be soldered, first informs the operator that the solder now fuses, so that, as soon as the work is flushed with solder, it must be withdrawn, allowed to set, and cooled in water.

3491. To Make Scider. The mixture of the metals is performed by melting them together in the same manner as for alloys (see No. 3347), with the aid of a flux. The 3487. To Soft Solder Smooth Sur- metals employed should be pure, especially silver, as silver coin makes the solder too hard.

3492. Solder for Gold. Take 12 parts pure gold, 2 parts pure silver, and 2 parts

copper.

3493. Solder for Silver. Take 5 parts pure silver—not silver coin—6 parts brass, and 2 parts zinc. Or, 2 parts silver, 1 part common pins. This is an easy flowing solder.

Use a gas jet to solder with.

3494. Hard Solder. Take 2 parts copper and 1 part zinc. Or, equal parts of copper

and zinc. (See No. 3488.)

3495. Solder for Silver. Take 19 parts fine silver, 1 part copper, and 10 parts hrass

3496. Silver Solder. Melt together 24 parts, by weight, silver coin, and 5 parts copper; after cooling a little, drop into the mixture 4 parts zinc, then heat again.

3497. Fine Silver Solder. Melt in a

clean crucible, 19 parts pure silver, 10 parts brass, and 1 part copper; add a small piece of borax as a flux

3498. Solder for Copper. Same as hard soldering. (See No. 3488.)

3499. Solder for Tin. Take 4 parts pewter, 1 part tin, and 1 part bismuth. Use powdered resin when soldering.

3500. Fine Soft Solder. Take 2 parts tin and 1 part lead. Used for soldering tin plates, and tinning copper. Add resin as a

flux when melting.

3501. Very Soft Solder. Equal parts of tin, lead, and bismuth.

3502. Solder for Pewter. Take 2 parts tin, 1 part each of lead and bismuth.

3503. Glaziers' Solder. Take 3 parts lead and 1 part tin. This melts at 500° Fabr. 3504. Solder Fusible in Boiling Water. Take 1 part tin, 1 part lead, and 2 parts bismuth.

3505. Plumbers' Solder. Take 1 part bismuth, 5 parts lead, and 3 parts tin.

3506. Solder for Lead. Take 2 parts lead and I part tin. This is good, if, when a small quantity is poured on a table, little bright spots rise as it cools. When soldering with this, use powdered resin.

3507. Brass Solder. Take 12 parts brass, 6 parts zinc, and 1 part tin.

3508. Strong Brass Solder. Take 3 parts brass and 1 part zinc.

3509. To Solder Fine Brass Work. Wet the parts with a strong solution of salammoniac, apply tin foil between them, and heat no more than is necessary to fuse the

3510. To Solder Iron. Apply good with water to the consistence of cream. (See

3511. Solder for Joining Steel. This is

cast-steel, &c., as it fuses at a lower tempera- | pends upon the nature of the object. In ture; and, being whiter in appearance, renders order to quicken its fusion on the metal, a the seams less observable. Take 19 parts, by mixture of 3 parts balsam of copaiba and 1 weight, fine silver; 1 part copper, and 2 parts | part Venice turpentine is made use of; otherbrass; melt them under a coat of charcoal

3512. Brass Solder for Brazing Iron als. together-cover it with pulverized borax, dissolved in water, that it may incorporate with piece must be then exposed to the fire withbrass is seen to rua.

3513. To Solder Ferrules for Tool Handles, &c. Take the ferrule, lap round the jointing a small piece of brass wire, then just wet the ferrule, scatter ground borax on fill up the joining, and form a perfect solder. It may afterwards be turned in the lathe.

3514. To Tin Iron for Soldering, &c. then add ‡ its bulk of soft water. Iron, however rusty, will be cleansed by this solution, and receive from it a sufficient coating of

3515. To Solder Grey Gast-Iron. First dip the castings in alcohol, after which, sprinkle muriate of ammonia (sal-ammoniae) over the surface to be soldered. Then hold the casting over a charcoal fire till the salammoniae begins to smoke, then dip it into melted tin (not solder). This prepares the in the ordinary way

67 parts copper and 33 parts zinc. Or: 60 parts copper and 40 parts zine.

3517. Hard Soller for Copper or Brass. Take 13 parts copper and 1 part zinc. Or: 7 copper, 3 zinc and 2 tin.

3518. Solder for Brass in General. Take 4 parts of scraps of the metal to be soldered, and 1 part zinc.

3519. To Make Solder-Drops. Melt about & inch in diameter, from a height of 2 placed under the hammer. or 3 inches, into cold water; taking care that the solder, at the time of pouring, is no hotter than is just necessary for fluidity.

3520. Aluminum Solder. Mouray employs five different solders, being different then added in 3 or 4 portions; when the whole is melted, it is stirred with an iron rod. The zine gradually stirred into the mass, and the whole poured into ingot shaped moulds, pregiven in the following proportions are by fire weight.

1.—80 parts zinc, 8 parts copper, 12 parts aluminum. 2.—85 " 3.—88 "

The To Solder Aluminum.

wise the operation is performed in exactly the same manner as in the brazing of other met-The aluminum solder is spread without or Steel. Thin plates of brass are to be delay on the previously heated surfaces to be melted between the pieces that are to be join-fastened together. In heating, the blue gas ed. If the work be very fine—as when two flame or the turpentine blast lamp is emleaves of a broken saw are to be brazed ployed. The more and oftener the solder is spread over the surface, the better it is.

3522. Aluminum Solder. If soft solsome brass powder which is added to it; the der is fused with one-half, one-fourth, or oneeighth of its weight of zine amalgam (to be out touching the coals, and heated till the made by dissolving zine in mercury, see No. 3539), a more or less hard and easily-fusible solder is obtained, which may be used to solder aluminum to itself or to other metals.

3523. Welding Powder for Iron and Steel. For welding iron and steel a compothe joining, put it on the end of a wire, and sition has lately been patented in Belgium, hold it in the fire till the brass fuses. It will consisting of iron filings, 40 parts; borax, 20 parts; balsam of copaiba, or some other resinous oil, 2; and sal-ammoniae, 3 parts. They are mixed, heated, and pulverized. The pro-Drop zinc shavings into muriatic (hydrocess of welding is much the same as usual. chloric) acid, until it will dissolve no more; The surfaces to be welded are powdered with The surfaces to be welded are powdered with the composition, and then brought to a cherry-red heat, at which the powder melts, when the portions to be united are taken from zinc for solder to adhere to. (See No. 3642.) the fire and joined. If the pieces to be welded are too large to be both introduced at the same time into the forge, one can be first heated with the welding powder to a cherry-red heat, and the others afterwards to a white heat, after which the welding may be effected.

3524. Welding Composition for Cast Steel. Take borax, 10 parts; sal-ammoniac, metal for soldering, which can then be done 1 part; grind or pound them roughly together, the ordinary way.

3516. Solder for Iron. Fuse together taking care to continue the heat until all spame has disappeared from the surface. When the liquid appears clear, the composition is ready to be poured out to cool and concrete; afterwards, being ground to a fine powder, it is ready for use. To use this com-position, the steel to be welded is first raised to a bright yellow heat, it is then dipped among the welding powder, and again placed in the fire, until it attains the same the solder, and pour it in a steady stream of degree of heat as before; it is then ready to be

3525. Welding Powder. For iron or steel, or both together, calcine and pulverize together 100 parts iron or steel filings, 10 salammoniac, 6 borax, 5 balsam copaiba. One of the pieces is to be heated red, carefully proportions of zinc, copper, and aluminum. cleaned of scale, the composition is to be The copper is melted first, the aluminum is spread upon it, and the other piece applied at a white heat and welded with the hammer.

3526. Welding Composition. Fuse crucible is then withdrawn from the fire, the borax with 15 its weight sal-ammoniac, cool, pulverize, and mix with an equal weight of quicklime, when it is to be sprinkled on the viously wiped out with benzine. The parts red hot iron and the latter replaced in the

3527. Welding Composition. Take 15 parts bora", 2 of sal-ammoniae, and 2 of prussiate of potash. Being dissolved in water, the water should be gradually evaporated at a low temperature.

3528. Welding Composition. Mix 10 selection of either of the above solders de- parts borax with I part sal-ammoniac; fuse the mixture, and pour it on an iron plate, acid. Mexican coin is preferable, because it When cold, pulverize it, and mix it with an is purer. equal weight of quicklime, sprinkle it on iron heated to redness, and replace it in the fire. It may be welded below the usual heat.

3529. Compound for Welding Steel. The following composition is said to be superior to borax for welding steel. coarsely powdered borax with a thin paste of

nation seems to be a rational one.

3530. Antimonoid. A welding powder, named antimonoid, has been in use for some warmed, and the amalgam, rendered fluid by time past in Germany, and found to be of great efficiency. The formula for its prepara-tion has, until lately, been kept a secret; it consists of 4 parts iron turnings, 3 parts borax, 2 parts borate of iron, and 1 of water. 3531. Fluxes for Soldering and Weld-

Copper and brass..... Sal-ammoniac or chloride Lead.... Lead and tin pipes.....Resin and sweet oil.

malgams. Substances formed metal. Alloys containing quicksilver. Mercontact, forming amalgams. These are em-ployed for various purposes in the arts, as silvering, gilding, coating mirrors, &c.

apply a gentle heat, when the gold will dissolve; agitate the mixture for one minute a clean plate or stone slab. When cold it is

ready for use.

the gold behind. A much less proportion of usual arrangement fails. gold is often employed than the above, where larger surface. (See No. 3394.)

3535. Amalgam of Silver for Silvering Metals. Prepare in the same way as amalgam of gold, but substitute silver instead mercury, 1 zinc, and 1 tin. of gold. (See No. 3533.)

3542. Tin Amalga

Powder. The best process to obtain pure metal into the mercury. In this way hexagsilver in powder, is by adding copper to a onal crystalline formations have been obdilute solution of silver in nitric acid, until all served; there is always a decided contraction action ceases. The silver is precipitated in a in bulk. The hard amalgam of tin obtained fine powder. Before using the silver powder by passing the liquid amalgam through fine to prepare amalgam, it must be thoroughly leather, then drying, and afterwards rubbing washed until the water ceases to have any under water, forms one of the plastic cements

Dissolve a silver coin in slightly diluted nitric hardens much sooner.

(See No. 3213.)

3538. Amalgam for Silvering the Insides of Convex Mirrors, Globes, &c. Lead and tin, of each 2 ounces; bismuth, 2 ounces; mercury, 4 ounces. Add the mercury to the rest in a melted state and remove from the fire; mix well with an iron rod. This amalgam melts at a low heat, and Prussian blue; then let it dry. The combilis employed for silvering the insides of hollow glass vessels, globes, convex mirrors, &c. The glass, being well cleaned, is carefully heat, is then poured in, and the vessel turned round and round, so that the metal may be brought in contact with every part of the glass which it is desired to cover. At a certain temperature this amalgam readily adheres to glass. (See Nos. 3545, and 3614.)

3539. To Make Zinc Amalgam for Electrical Machines. Melt 2 ounces zinc in a ladle, remove from the fire, and stir into it 5 ounces mercury previously heated. Stir till cold, and then powder it. Keep it in a

tightly corked bottle.

3540. Improved Electric Amalgam. It is well known that a deposit of moisture greatly interferes with the action of electrical machines, experiments often wholly failing by mixing quicksilver with another from this cause, especially in the winter Alloys containing quicksilver. Mer-season. Mr. F. Dietlen, of Klagenfurt, has cury unites with most of the metals by mere devised a method by which he obviates this difficulty, consisting simply in a modification of the amalgamation of the rubber cushion. For this purpose he pours petroleum over 3533. Amalgam of Gold for Gilding Zine filings, and adds an equal quantity of Brass, Copper, &c. Place one part grain or leaf gold in a small iron saucepan or ladle, tates the process). The mixture is then perfectly clean, then add 8 parts mercury, and | brought, by working together in a mortar, to the condition of a homogeneous paste, and pressed between a double cloth. A soft mass with a smooth iron stirrer, and pour it out on is thus obtained, which, however, soon hardclean plate or stone slab. When cold it is ens; but which, being finely pulverized and mixed with a proper quantity of grease, is 3534. To Gild with Gold Amalgam. spread upon the rubber cushion. This makes For gilding brass, copper, &c. The metal to the surface quite glossy, and, when the glass be gilded is first rubbed over with a solution disk has previously been wiped with a piece of nitrate of mercury, and then covered with of cotton slightly impregnated with petroleum a very thin film of the amalgam. On heat or benzine, will develop electricity abund-being applied, the mercury volatilizes, leaving antly, even in damp localities where the

3541. Boettger's Amalgam for by increasing the quantity of the mercury, the mends a mixture of 2 parts (by weight) of precious metal may be extended over a puch precious metal may be extended over a much pure zinc, while melted, to be mixed with 1 part of mercury. This should be kept in pieces in a well-stoppered flask, and is said to be superior to the amalgam made of 2 parts

of gold. (See No. 3533.)

3536. To Obtain Pure Silver in tin forms readily by introducing the solid Amalgam of acid taste, or litmus paper is unchanged by it. (See Nos. 3212, Sec.) The silver in this form, besides being necessarily purer, amalgamates more readily with the quicksilver.

a little silver amalgam it is a less plastic mass a little silver amalgam it is a less plastic mass. 3537. To Make a Solution of Silver, and requires a little more mercury, but it

3543. Copper Amalgam. of proto-nitrate of mercury, and finally incorporating it under water in a mortar with the required quantity of mercury. This amalgam, like the hard amalgam of tin, has the property of being softened and rendered per to 7 of mercury

3544. Tin and Cadmium Amalgam. Similar properties to tin and copper amalgams belong to the compound amalgam of tin and cadmium, which are fused together in the proportion of 2 to 1 and mixed with warmed

The silver coating of glass Ornaments. beads and those large sized glass ornaments now in fashion, is produced by shaking within them an amalgam composed of 8 parts bismuth, 5 of lead, 3 of tin. and from 7 to 9 parts of mercury. (See No. 3538.) A mix mercury, when powdered, is used for painting as imitation silver bronces.

Amalgams of the Alkaline 3546. Metals. The amaigants of the alkaline metals are remarkable for their hardness, though the metals sodium and potassium themselves are quite soft at the ordinary temperature. One per cent. of sodium in mercury produces an amalgam which is liquid, but still quite thick, and 1 per cent. of potassium renders the mercury still more so. A very hard compound is that consisting of 200 parts of mercury, 10 of potassium, and 1 of sodium. By means of the alkaline amalgams, most other mercurial alloys may be produced, by introducing them into the solution of other metals. Zinc amalgam is likewise used for the purpose.

3547. Amalgam of Fusible Metal. Fusible metal forms an amalgam with $\frac{1}{16}$ of its weight of mercury, which fuses far below the boiling point of water; cadmium increases the fusibility still more. A mixed amalgam for injecting anatomical preparations, which is hard at ordinary temperature, but becomes soft at 150°, and fuses at 176° Fahr., consists of 20 parts of bismuth, 12 of lead, 7 of tin,

and 4 of mercury. (See Nos. 3456, &c.)
3548. Amalgam for Varnishing Plaster Casts. Melt together 1 part each mercury. When cool, pound the amalgam which may be laid on with a brush.

3549. Evans' Tooth Amalgam. Take in a porcelain crucible at a heat not exceeding 600° Fahr., and cast the alloy so as to off in vapor, when the crucible may be set

Copper latter is squeezed out through a piece of amalgam is best obtained by first precipitat chamois leather, and the amalgam at once ing metallic copper in a fine state of division applied to the tooth. (See No. 3550.) This from a solution of 3 ounces of blue vitriol in a cement is recommended by Mr. Evans as very quart of water mixed with an ounce of oil of durable and unobjectionable. Its color is vitriol, by means of clean wrought iron; intermediate between that of silver and tin, then, after washing it thoroughly with hot but it is said not to darken so readily as the water, moistening the powder with a solution simple amalgams of those metals. (See No. 3544.)

3550. Dentists' Amalgam, or Gold Stopping. The dentists, in preparing and using this, commonly proceed as follows: A little pure grain-gold is heated in a bright plastic by mere trituration with a pestle. iron ladle (or capsule), and enough pure The proportions are generally 3 parts of copmercury added to render it of a doughy consistence at the temperature of hot water. When it has become cold, the excess of mercury, if any, is removed by pressure in a piece of chamois leather. In using it, a little of the amalgam, as hot as can be borne, is kneaded in the hand, and at once pressed mercury in excess, which latter is removed into the cavity of the tooth, where it gradual-by pressure when cold. (See No. 3549.)

3545. Amalgam for Silvering Glass stopping, and is, perhaps, preferable to all others, except the diamond tooth cement (see Index) for filling up cracks and cavities in the enamel, particularly of the front teeth, on account of its color and the ease of its appli-

3551. Dentists' Amalgam of Silver ture of 2 parts each tin and bismuth and 1 of is used in the same way as the last; but its color is less natural, and is apt to be blackened by the sulphur in the secretions of the mouth and the food. (See No. 3535.)

3552. Dentists' Amalgams of Tin and Zinc are also employed as tooth cement, but are inferior in color to, darken sooner, and possess less durability, than that of silver

3553. Alloy for Filling Teeth. alloy, which is sold in commerce in the shape of large, almost white filings, shows upon analysis the following composition: Tin, 611; silver, 388; copper, 1. The alloy is to be amalgamated before use by warming it in a spoon with a little mercury. The combination takes also would be a special to the state of tion takes place rapidly, and the amalgam, while still warm, is pressed in a piece of soft leather, whereby the excess of mercury is removed. It is now far preferable to the celebrated copper amalgam, as it retains its white color in the mouth, while the other turns dark. The hardness is a little less than that

of the copper amalgam. (See No. 3542.)
3554. To Recover the Silver Alloy from Dentists' Amalgam. The silver alloy may be easily obtained from scraps of dentists' amalgam in the following manner: Provide 2 crucibles of different sizes, so that the smaller one, inverted, will rest a little way within the larger. Make a hole, about 1 inch tin and bismuth, and stir in thoroughly 1 part in diameter, in the bottom of the smaller, to provide a vent for the mercurial vapors. with white of egg, forming a metallic paint Place the pieces of amalgam in the larger crucible, invert the smaller one into it, lute them, and fasten them firmly together with of pure grain tin, 2 parts; cadmium and steel wire. Place the whole, as soon as the bees' wax, of each 1 part; melt them together luting is dry, into a blast furnace, and in a form a small ingot, which, when cold, must aside to cool, and the alloy will be found in a be reduced to filings. For use, a small button at the bottom. As some portion of quantity of these filings is formed into an the tin in the alloy has been lost in the operaamalgam with quicksilver, the excess of the tion, the button should be remelted in a clean

open crucible, with the addition of a little! 3561. To Clean and Polish Frames. pure tin. This will now be ready to make When the prepared frames are quite dry, again into amalgam as occasion requires.

seconds by immersion in this fluid.

coating various metals with other metallic deposits.

3557. Implements for Gilding on ochre. Wood. A sufficient quantity of leaf-gold. 356 lemon gold. The former is the best; the latter very useful, and may occasionally be intro-

duced for variety or effect.

wood, covered with rough calf-skin, stuffed water. with flannel several times doubled, with a border of parchment, about 4 inches deep at Grind a lump of tobacco pipe clay into a very about when placed on the cushion.

A gilding knife, with a straight and very smooth edge, sharp enough to cut the gold, but not sufficiently so to cut the cushion. It must be perfectly clean, or the gold leaf will Gilding.

adhere to it.

Several camel's-hair pencils of assorted sizes; and tips, made of a few long camel's hairs put between two cards, in the same manner as hairs are put into tin cases for brushes, thus making a flat brush with a very few hairs.

agate set in a long wooden handle.

3558. Burnished Gilding. of gilding is adapted for fine work, such as applying the gold. We shall endeavor to give the necessary instructions, in the following receipts, to those who wish to undertake this kind of work, it will not have sufficient body. and with care and practice they may perform the operation successfully.

Picture Frames and Other Wood Work requires some practice; but, with a little caufor Gilding. To ½ pound parchment shav-tion and attention, it may be easily performings, or cuttings of white leather, add 3 quarts ed. Turn the gold out of the book onto the off the fire, and strain it through a sieve. Be careful, in the boiling, to keep it well stirred,

and do not let it burn.

frames in every part: then mix a sufficient tal, and, with a long-haired camel's-hair pencil quantity of whiting with size, to the consistency of thick cream, with which go over every part of the frame 6 or 7 times, carefully letting each coat dry before proceeding with the gold from the cushion with the tip; the next; this will produce a white ground, drawing it over the forehead or cheek will the next; this will produce a white ground, drawing it over the forchead or cheek will nearly or quite 16 inch in thickness. The size damp it sufficiently to adhere to the gold, the whiting, should not be put on as hot as the first coat is by itself. It will be better to separate the dirty or coarse parts of the whiting by straining it through a sieve. its place on the work, and, gently breathing on it, it will adhere; but take care that the part to which it is applied is sufficiently wet; whiting by straining it through a sieve.

clean and polish them. To do this, wet a Ruhmkorf's Amalgamating small piece at a time, and, with a smooth, fine Fluid. Dissolve by heat 2 parts by weight piece of cloth, dipped in water, rub the part of mercury in 1 part aqua regia; when dissolved, add 10 parts hydrochloric acid. A those parts where the fingers will not enter, worn-out zine will be amaigamated in a few as the mouldings, &c., wind the wet cloth seconds by immersion in this fluid.

round a piece of wood, and by this means make the surface all equally smooth and even. Where there is carved work, &c., it will sometimes be necessary to bring the mouldings to their original sharpness by ilding, Silvering, &c. mouldings to their original sharpness by In this department we give processes for means of chisels, gouges, &c., as the preparagilding and silvering wood, metals, paper, and tion will be apt to fill up all the finer parts of glass; together with a number of receipts for the work, which must be thus restored. It is sometimes the practice, after polishing, to go over the work once with fine yellow or Roman

3562. To Make Gold Size for Frames. which is of two sorts-deep gold, and pale, or Grind fine sal-ammoniac well with a muller and stone; scrape into it a little beef suet, and grind all well together; after which mix in with a pallet knife a small proportion A gilder's cushion; an oblong piece of of parchment size with a double proportion of

3563. Gold Size for Picture Frames. one end, to prevent the air blowing the leaves stiff paste with thin size; add a small quantity of red ochre and fine black lead, ground very fine, and temper the whole with a small piece of tallow.

3564. To Prepare Picture Frames for Take a small cup or pipkin, into which put as much gold size as you judge sufficient for the work in hand; add parchment size till it will just flow from the brush; when quite hot, pass over your work with a very soft brush, taking care not to put the first coat too thick; let it dry, and repeat it two A burnisher, which is a crooked piece of or three times more, and, when quite dry, atte set in a long wooden handle.

3558. Burnished Gilding. This style any roughness. The work is now ready for The parchment size picture frames and other fancy furniture. should be of such a consistence, when cold, as the common jelly sold in the stores; for if too thick it will be apt to chip, and if too thin

3565. To Apply Gold Leaf to Picture Frames and Other Wood Work. This 3 3559. To Make Size for Preparing the most difficult part of the operation, and water, and boil it in a proper vessel till re-duced to nearly half the quantity; then take it gilding-knife under a leaf, bring it into a convenient part of the cushion for cutting it into the size of the pieces required; breathe gently on the centre of the leaf, and it will lay flat 3560. To Prepare or Whiten Picture on the cushion; then cut it to the proper size Frames or Wood Work. First, with the by sawing it gently with the knife till divided. above size alone, and boiling-hot, go over the Place the work in a position nearly horizondipped in water (or with a small quantity of brandy in the water), go over as much of it as the piece of gold is to cover; then take up must not be too thick, and, when mixed with which must then carefully be transferred to be apt to crack. Proceed in this manner by a with putty powder, till it is smooth as glass. so that the water may run underneath it.

is equally bright all over.

3567. parts of the work which look dull from not perfectly hard between each coat; after the being burnished, are now to be matted, the last coat of varnish it is finished by polishing, is, are to be made to look like dead gold; for first with Tripoli, applied with a soft cloth and if left in its natural state it will have a shing appearance, which must be thus rectified. the oil, and wiped dry. Grind some vermilion, or yellow ochre, very indexed and mix a very small portion either with cined red ochre with the best and oldest drythe parchment size or with the white of an ing oil, and mix with it a little oil of turpenture. egg, and with a very soft brush lay it even tine when used. When the work is to be and smooth on the parts intended to look gilded, first give it a coat of parchment size; dull; if well done, it will add greatly to the then apply the above size where requisite, beauty of the work. The work must be well either in patterns or letters, and let it remain, cleared of superfluous gold, by means of a soft till, by touching it with the finger, it feels brush (a hat brush answers the purpose well), previous to burnishing or matting.

3568. To Finish Gilding. It is now only necessary to touch the parts in the hollows with a composition made by grinding vermilion, gamboge, and red lead, very fine, with oil of turpentine, and applying it carefully with a small brush in the parts required, and inserting suitable bits of gold leaf with a camel's-hair brush. Sometimes the finishing Gold Leaf. is done by means of shell-gold, which is the find the following plan a good one to simplify best method; it should be diluted with gumarabic, and applied with a small brush.

3569. To Make Shell-Gold. Take any quantity of leaf-gold, and grind it, with a small portion of honey, to a fine powder; add a little gum-arabic and sugar candy, with a

in a shell to dry until wanted.

3570. Oil Gilding is that which is designed for out-door work, to stand the weather and Paper. The gold applied to the edges and wash, and is performed with oil and varnish. Where the object is to give a high nish. Where the object is to give a high rious ornamental purposes, namely, an exfinish, paint the work with a color composed tremely thin leaf. Before the case or cover of the finest white lead and yellow other, in of the book is quite finished, the volume is such proportions that the color shall be as near as possible to the color of the gold to be the fore-edge flat instead of concave. It is employed, mixed with oil (not boiled), and then placed in a press, with the exposed edge turpentine, till of the consistence of thin paint; this to be laid on evenly, and allowed with a piece of steel, and is coated with a to dry thoroughly, then repeat it for 5 or even mixture of red chalk and water. The gold is more coats, till it is perceived that the grain blown out from small books, and spread on a or roughness of the object to be gilt is entire-leather cushion, where it is cut to the proper or roughness of the object to be gilt is entireleather cushion, where it is cut to the proper ly hidden. When the last coat is dry it must size by a smooth-edged knife. A camel's-hair be rubbed perfectly smooth, first with pumice pencil is dipped into white of egg mixed with stone, and finished with a piece of woolen water, and with this the partially dry edge of cloth and finely pounded pumice; and lastly, the book is moistened; the gold is then taken

little at a time, and do not attempt to cover It must then be varnished over with fine lac too much at once. Be careful, in proceeding varnish several times, applying a slight degree with the work, if any flaws or cracks appear, of heat after each coat. This may be done to take a corresponding piece of gold, and apply it immediately; sometimes, also, it will has flowed smooth and even over the surface. be necessary, when the gold does not appear. When the last coat of varnish is quite hard it to adhere sufficiently, to draw a pencil quite must be polished; this is done by putting on filled with water close to the edge of the gold, a horse-hair glove, and rubbing the surface with this first, then with Tripoli, applied with 3566. To Burnish Gold. When the a piece of wet woolen cloth; and lastly, by work is co-ered with gold, set it by to dry; wet putty powder, first applied with woolen it will be ready to burnish in about eight or cloth, then with the bare hand, till it is as ten hours; but this will depend on the bright as glass. It must then be varnished warmth of the room or state of the air, over with a thin coat (the thinner the better) When it is ready, those parts which are to be of gold size, and when sufficiently dry the burnished must be dusted with a soft brush, gold is to be applied, beginning at the part and, wiping the burnisher with a piece of soft that is dryest. When gilt, it is to be allowed wash-leather (quite dry), begin to burnish to remain for two or three days, and then about an inch or two in length at a time, tak- brushed over lightly with a camel's-hair brush ing care not to lean too hard, but with a to remove superfluous gold. It is next to be gentle and quick motion apply the tool till it varnished with spirit varnish, applying heat as before, then varnished with copal varnish Matting, or Dead Gold. Those two or three times, allowing it to become

> just sticky; then apply the gold leaf, and dab it on with a piece of cotton; in about an hour wash off the superfluous gold with sponge and water, and when dry, varnish it with

copal varnish

3572. Water Size. Water size (for burnished gilding) is parchment size ground

with yellow ochre.

3573. To Prevent the Adhesion of Painters and decorators will a most troublesome part of their work: A small piece of ball liquorice, dissolved in water, applied with a flat camel's-hair brush to the place intended to be left ungilt, will prevent the leaf adhering. The solution must be weak. Made thick and gummy, it is very little water, and mix it well together; put it useful to protect ornamental parts of work that is to be repainted.

of books, &c., is in the same state as for vastruck fercibly against the back, so as to make minutes, take a burnisher formed of a very ly and evenly over a chafing dish of charcoal. smooth piece of hard stone (usually bloodstone), and rub the gold very foreibly, of pale oil varnish.

Which gives the gold a high degree of polish.

3582. To Gild Polished Metal. Polymer of the standard passed cautious particular and the surface passed cautious passed cautio

oven. Thus the gum is burnt, and the borax is vitrified, at the same time the gold is fixed thickness and tone is attained.

on the glass.

Monograms and names may thus be gilded

on glass or china.

3576. To Gild with Dutch Metal. The imitation of gold or silver leaf known as Dutch metal is much used for common purposes. The article to be gilded is prepared with a coating of oil size, on which the metal is laid. The sizing is not allowed to dry quite so long as for gold or silver leaf; the metal being laid on as soon as the size has set sufficiently not to smear. Metal is not handled with a gilding cushion and tip; but the books, with the metal in them, are cut into pieces of the requisite shape, with a pair of Gilding on Steel. of a roller covered with flannel, and finally brushed over the same as gold leaf, being overlap. White Dutch metal, nicely managed, and flowed over with shellac spirit varnish (colored with gamboge), makes a very good, cheap, and durable substitute for gold leaf.

3577. Grecian Gilding. Dissolve equal parts of sal-ammoniae and corrosive sublimate in nitric acid, and a solution of gold is to be made with the above mixture as a solvent; after slight concentration, the liquid is mediately becomes black, but, on being heat-

ed, exhibits a rich gilded surface.

The sur-3578. Japanners' Gilding. face is covered with oil size thinned with spirits of turpentine, and gold in powder (see No. 2517) is gently dabbed on with a puff

given, followed by a gentle heat in the stove.

3579. Leaf Gilding. This term is commonly applied to the gilding of paper, vellum, &c., by applying leaf gold to the surface previously prepared with a coating of gum water, size, or white of egg. It may be

burnished with an agate.

To Make Oil Gold Size. This 3580. is usually made from the sediment which which painters wash their brushes, thoroughly

ground and stained.

Oil Gilding. The surface is pre-3581. pared or primed with a coat of white lead in drying oil; then follow 2, 3, or 4 coats of calcined white lead ground in linseed oil and hours between each coat, which must be ether and gold is so strong as to overcome the carefully smoothed off with pumice-stone or obstacle of gravity, and it will hold the gold shave grass. The gold size (see No. 3580) is in solution. The ethereal solution may also next applied. When the gold size coat is be concentrated by gentle evaporation.

up on a tip brush, and applied to the moist-i sufficiently dry, the gold leaf is applied and ened edge, to which it instantly adheres, pressed on with a wad or soft brush. After When all the three edges have been gilt in a few days for hardening, a coat of spirit varthis way, and allowed to remain a very few nish is applied, and the surface passed cautious-

3575. Gilding on Glass. Mix powder- ished silver, copper, brass, &c., may be gilded gold (see No. 2517) with thick gum-arabic ed by the direct application of gold leaf to and powdered borax. With this trace the de- the surface heated to a bluish tint, pressing sign on the glass, and then bake it in a hot it on gently and carefully with the burnisher. oven. Thus the gum is burnt, and the borax This process is repeated until the proper Then it is polished with the burnisher and colored at the

stove.

3583. Gold Tracing on Metal. Writing or any device in gold may be made on polished steel or iron, by tracing on the surface with a camel-hair pencil, using an ethereal solution of gold. The ether evaporating leaves a coating of gold, which may then be polished. (See No. 3585.)

3584. Water Gilding. This process

involves several distinct operations, and can only be performed successfully by those who

have learned the art practically.

3585. Ethereal Solution of Gold for This process answers equally well for either gold or platina. Disshears or scissors, and the metal leaf laid on equally well for either gold or platina. Disthe sizing direct from the portions of the solve any quantity of gold or platina in nitrobook; after which it is pressed close by means muriatic acid (aqua regia), until no further effervescence is occasioned by the application brushed over the same as gold leaf, being of heat. (See No. 3588.) Evaporate the careful to brush with and not against the solution of gold or platina, thus formed, to dryness, in a gentle heat (it will then be freed from all excess of acid, which is essential), and redissolve the dry mass in as little water as possible; next take a separating funnel or pipette (see No. 0000), fill it about onefourth with the liquid, and the other three parts must be filled with the very best sulphuric ether. If this be rightly managed, the two liquids will not mix. Then place the applied to the surface of silver, which im- tube in a horizontal position, and gently turn it round with the finger and thumb. ether will very soon be impregnated with the gold or platina, which may be known by its changing its color; replace it in a perpendicular position, and let it rest for 24 hours, having first stopped up the upper orifice with of wash-leather. This gives the appearance a cork. The liquid will then be divided into of frosted gold. A coating of varnish is next two parts—the darkest coloring being underneath. To separate them, take out the cork and let the dark liquid flow out; when it has disappeared, stop the tube immediately with the cork, and what remains in the tube is fit for use, and may be called gilding liquid. Let it be put into a bottle, and tightly corked. The muriate of gold or platina, formed by digesting these metals in nitro-muriatic acid, must be entirely free from all excess of acid, collects at the bottom of the pot or dish in because it will otherwise act too forcibly on the steel, and cause the coating of gold to peel off. Pure gold must be employed; the ether must not be shaken with the muriate of gold, as is advised by some, for it will then be sure to contain acid; but if the two liquids be brought continually into contact by turpentine, with an interval of at least 24 the motion described, the affinity between

lancet, or razor; withdraw the instrument, will then be found covered with a beautiful parts coat of gold. The blade may be moistened with a clean rag, or a small piece of very dry sponge dipped into the ether, and the same effect will be produced. (See No. 3585.)

3587. Elkington's Patent, or Angloon wires, dipped into the gilding liquid (see No. 3588) boiling hot, and moved about therein, when, in from a few seconds to a minute, small articles. depending on the newness and strength of be deposited on them. By a little practice the time to withdraw the articles is readily known; the duration of the immersion required to produce any given effect gradually increases as the liquid weakens by use. When properly gilded, the articles are with-drawn from the solution of gold, washed in clean water, and dried; after which they undergo the usual operation of coloring, &c. A dead appearance is produced by the application to the articles of a weak solution of nitrate of mercury previously to the immersion; or the deadening may be given by applying a solution of the nitrate to the gilded old China. The following method is recomplying a solution of the nitrate to the gilded old China. surface and then expelling the mercury by heat.

Elkington's Patent Gilding Liquid. Fine gold, 5 onnces (troy); nitromuriatic acid (aqua regia), 52 ounces (avoirdupois); dissolve by heat, and continue the heat until red or yellow vapors cease to be evolved; decant the clear liquid into a suitable vessel; add distilled water, 4 gallons; pure bicarbonate of potassa, 20 pounds; and boil for 2 hours. The nitro-muriatic acid is made with pure nitric acid (specific gravity 14 ounces.

3589. Gilding by Immersion. Dissolve teroxide or terchloride of gold in a solution of pyrophosphate of soda, and dip the article to be gilt in it.

Gilding and Silvering by For these processes see Nos. 3590. Amalgams.

3591. Gold Plating Powder. Wash thoroughly 1 ounce chloride of gold; then add it to a solution of 2 ounces cyanide of potassium in a pint of clean rain water; is dissolved. Add 1 pound prepared Spanish whiting, expose to the air till dry, and then put away in a tight vessel for use.

3592. To Apply Gold Plating Powder. Make some gold plating powder into a paste with water, and rub it on the surface of the article with a piece of chamois skin or cotton flannel. The surface of the article should be thoroughly cleansed before applying the plating powder.

3593. Gilding Paste. Metallic surfaces are gilt by rubbing on the following mixture: Terchloride of gold, 36 parts; dis-

3586. To Gild Steel. Pour some of a solution of cyanide of potassium, 60 parts, the ethereal solution of gold into a wine-glass, in pure water, 80 parts; shake well, and set and dip into it the blade of a new penknife, by for 15 minutes, then filter. This liquid is thickened with a powder composed of preand allow the ether to evaporate; the blade pared chalk, 100 parts; cream of tartar, 5

3594. Fire Gilding. This was extensively done before the discovery of the art of electroplating. Many a piece of beautiful workmanship has come down to us from ancient Rome and Greece, gilded, and probably in the same way as we do it now, under the German Gilding. The articles, after being in the same way as we do it now, under the perfectly cleaned from scale or grease, and name of fire-gilding. It requires more gold, receiving a proper face, are to be suspended the coating being thicker, and is therefore more expensive; but it will last longer, and is the more convenient way for gilding coins and Clean the silver piece, by means of a brush and a little ammonia water, the liquid, the requisite coating of gold will until the surface is evenly bright and shows no tarnish. Take a small piece of gold and dissolve it in about 4 times its volume of metallic mercury, which will in a short time be accomplished and an amalgam formed. (See Nos. 3533 and 3534.) Put a little of this amalgam on a piece of dry cloth, and rub the silver piece with it on all sides; then place it on a clean stone in a furnace, and heat to the beginning of redness. After cooling it must be cleaned again with a brush and a little cream of tartar, when it will be found beauti-

mended for removing the remains of gilding from old china: Take soft water, 8 parts by measure; nitric acid, 8 parts; common salt, 4 parts; sal-ammoniac, 1 part. Let it boil, put the china into it, and rub with a stiff brush.

3596. Wernicke's Method of Gilding Glass. The following are the ingredients re-Wernicke's Method of Gilding quired: 1st. Solution of gold. Pure gold, free from silver, is dissolved in aqua regia, the solution evaporated, and the residue taken up with water, so that 120 cubic centimeters (1 gill) contain 1 gramme (15.4 grains) of 1.45), 21 ounces; pure muriatic acid (specific gold. 2d. Solution of sodic hydrate (which gravity 1.15), 17 ounces; and distilled water, need not be absolutely pure) of 1.06 specific gravity. 3d. Reducing liquid. 50 grammes (7711 grains) sulphuric acid (monohydrate), 40 grammes (617 grains) alcohol, 35 grammes (539 grains) water, and 50 grammes powdered manganic peroxide, are distilled into 50 grammes of water until the bulk of the latter is doubled-10 grammes (154 grains) canesugar, inverted by dissolving in 70 cubic centimeters (10 gill) water, and boiling with 1 gramme, (7½ grains) nitric acid of specific gravity 1.34. The distilled liquid, the inverted sugar, and 100 cubic centimeters ($\frac{84}{100}$ gill) shake well, and let it stand until the chloride alcohol are mixed together, and the mixture diluted to 500 cubic centimeters ($1\frac{1}{10}$ pints). In using these solutions, 1 volume of the sodic hydrate solution is mixed with 4 volumes of the gold solution, and to this mixture is added from 1.35 to 1.30 volume of the reducing liquid. The object to be gilded is placed on the top of the solution, having the surface intended to be coated turned downwards. The temperature of the bath should be below 140° Fahr.

3597. Boettger's Method of Gilding Glass. Boettger has modified Wernicke's process for throwing down gold on glass as solve in pure water, 36 parts, and mix with follows: He prepares the soda solution by

dissolving 6 grammes (92½ grains) caustic soda in 100 cubic centimeters (1800 gill) water; by dissolving 2 grammes (31 grains) common starch-sugar (glucose) in 24 grammes (370 by friction. They are grains) distilled water, and adding 24 cubic a little water, for use. centimeters (\frac{1}{3} gill) alcohol of \$90 per cent., 24 cubic centimeters aldehyde of .870 specific gravity: neutral solution of chloride of gold, amount deposited upon the glass being very small. The mirrors are to be well washed powder. and dried in the air. Where the baths are

3598. Upton's Gold Detergent. with prepared chalk. Quicklime, 1 ounce; sprinkle with a little hot water to slack it, then gradually add 1 pint boiling water, so as to form a milk; dissolve 2 ounces pearlash in 11 pints boiling water; mix the two solutions, cover up, agitate occasionally ior an hour, allow it to settle, decant the clear, put it into flat half-pint bottles, and cork them down well. It is used to clean into it. gilding, &c., either alone or diluted with water. It is applied with a soft sponge, and then washed off with clean water. It is essentially a weak solution of potassa, and may be extemporaneously prepared by diluting liquor of potassa with about 5 times its volume of water.

3599. Gruene's Method of Gilding and Silvering Silk. By a formula published by Gruene, for silvering or gilding silk, the silk is to be soaked with a 5 per cent. solution of iodide of potassium, and dried; then (in non-actinic light, see No. 3140), dipped in a 5 per cent. solution of nitrate of silver, containing a few drops of nitric acid, and well drained; next exposed for a few minutes to sunlight, and then dipped in a 2 per cent. solution of sulphate of iron. It immediately becomes gray, from reduction of metallie silver, and, after washing and drying, only requires burnishing in order to acquire the metallic lustre. By repeating this treatment, varied, however, by adding a little free iodine to the solution of iodide of potassium, the silver deposit becomes stronger. By laying the silvered silk in a very weak solution of chloride of dlers gold, the silver becomes chloride, and gold is deposited; and by then removing the chloride of silver by a solution of hyposulphite of soda, washing, drying, and burnishing, the appearorder to secure satisfactory results.

Silvering Powder. Employed **3600**. for silver coating dial plates, statuettes, and the reducing fluid, to be made when washed, other articles of copper, and covering the worn parts of plated goods, previously well cleaned, by friction. They are made into a paste with

3601. To Make Silvering Powder. Rub together to a fine powder 20 grains fine silver dust (see No. 3217), 30 grains alum, 1 I gramme (15.4 grains) of gold in 1,200 cubic drachm common salt, and 3 drachms cream of centimeters (21 pints) water. Four volumes tartar; 35 grains of nitrate of silver may be of the gold solution are mixed in a suitable substituted for the silver dust. Or: Dissolve vessel with one volume soda solution and 1.16 chloride of silver in a solution of hyposulphite volumes of the reducing liquid, and the liquid of soda, and make into a paste with levigated rapidly poured into the hollow glass globe to burnt hartshorn or bone dust; dry and powbe plated. Five minutes is sufficient to insure | der it. Or: mix 1 ounce silver dust, 4 ounces the deposit of a thin film of gold, but it is bet- each of common salt and sal-ammoniae, and ter to allow more time. Flat plates of glass tounce corrosive sublimate. In using the last, can be laid upon the surface of the liquid, as copper utensils are previously boiled with tarin the silvering process; the surfaces of the glass should be carefully cleaned with soda and alcohol, and not with acids. The greater Lastly: A good silvering powder may be part of the gold is thrown down in flocculi, made as follows: dissolve chloride of silver in and can be recovered for subsequent use-the a solution of hyposulphite of soda, and mix this with prepared bartshorn or other suitable

Novargent. This is said to con-3602. heated, the deposition of gold takes place sist of a solution of fresh precipitate chloride more rapidly, but not so fine; it is better to of silver in hyposulphite of soda (or, accordkeep the temperature below 140° Fahr; and ing to the Pharmaceutical Journal, of oxide to allow the metal coating to form slowly. of silver in cyanide of potassium), mixed

3603. Silvering Paste. Nitrate of silver. 1 part; cyanide of potassium (Liebig's), 3 parts; water sufficient to form a thick paste. Apply it with a rag. A bath for the same purpose is made by dissolving 100 parts of sulphite of soda, and 15 of nitrate of silver, in water, and dipping the article to be silvered

3604. Silvering Solution. Prepare a solution of 1 part cyanide of potassium in 6 parts water; add it to a concentrated aqueous solution of nitrate of silver (free from acid) until the precipitate is redissolved. Mix this solution with fine chalk, and apply after previous cleaning of the objects.

3605. Non-poisonous Silvering Fluid. Nitrate of silver, 80 parts; dissolve in distilled water, 36 parts; add sal-ammoniae, 40 parts; hyposulphite of soda, 160 parts; and lastly, whiting, 160 parts. Apply in the usual way.

3606. Silver Plating Fluid. Dissolve 1 ounce crystals of nitrate of silver in 12 ounces soft water. Then dissolve in the water 2 ounces cyanide of potassium. Shake the whole together and let it stand till it becomes clear. Have ready some half-ounce phials, and fill them half full of Paris white, or fine whiting, and then fill up the bottles with the liquid, and it is ready for use. does not increase the coating power; it only helps to clean the articles, and to save the silver fluid by half filling the bottles. This is the preparation commonly vended by ped-

3607. Silver Solution for Plating Copper, Brass, and German Silver. Cut into small pieces a twenty-five cent piece, and put it into an earthen vessel with 1 ounce ance of gilding is produced, if the deposit of nitric acid. Put the vessel into warm water, metal be sufficiently thick. The purest chemuncovered, until it dissolves. Add ½ gill of icals must be used in all gilding processes, in water and 1 tea-spoonful of fine salt, and let it settle. Drain off and repeat, adding water to

to the sediment, and 4 scruples cyanide of po-tassium. Put into the solution a piece of zine about 2 inches long, 1 wide, and $\frac{1}{8}$ in capillary attraction to draw it into the wood. ute, letting it rest on the zine. Wipe off with buckskin. The thickness of plate can be increased by repeating.

3608. Silvering Hooks and Eyes. patent has been granted in Bavaria, for the following method of silvering hooks and eyes made of iron ware. The articles are suspended in dilute sulphuric acid until the iron shows a clean bright surface. After rinsing in pure water, they are placed in a bath of a sulphate of soda, in which they quickly receive a coating of silver.

To Plate Common Copper 3609. Buttons. Mix 2 ounces chloride of silver, 1 ounce corrosive sublimate, 3 pounds table salt, and 3 pounds sulphate of zinc, with water, into a paste. The buttons are cleaned, smeared over with the mixture, and exposed to a moderate degree of heat, which is afterwards raised has united with the silver from the corrosive The silvered surface is then (See Nos. 3615, &c.) sublimate.

cleaned and burnished.

3610. Simple Process for Silvering. This is an improved process for silvering copper, brass, and other alloys, by means of a somore durable character taking place. and may be used repeatedly for the same purpose. Metallic iron may be coated with conper in the same manner, by substituting for over this copper deposit a coating of silver may be applied.

3611. Cold Silvering. Mix 1 part with water and dipped into the powder. 1 part precipitated silver powder, mixed with 2 parts each cream of tartar and common salt, washed in hot water slightly alkalized, and

then wiped dry.

the sediment until the acid taste is all out of Next procure a weak solution of nitrate of the water. Add finally about 1 piut of water silver, place it in a flat dish or saucer; the face thickness. After cleaning, immerse the article This operation being performed, a small porto be plated in the solution about half a min-tion of the solution of phosphorus must be placed in a capsule or watch-glass, and this a dry cloth and repeat once. Polish with placed on a sand-bath, that it may gradually evaporate. The wood must now be held with its surface over the vapor, and an immediate change takes place; the nitrate of silver is decomposed, and gives place to metallic silver. When the material to be acted on is not very large, fasten it to the top of a bell-glass receiver with a bit of pitch or cement, and place

is over the capsule on the sand-bath; the sphorus vapor is by this means equally mixed solution of sulphate of zinc, sulphate of a nused, and not dissipated. A solution of copper and cyanide of potassium, and there phosphorus in sulphuric ether also answers; remain until they receive a bright coating of and a solution of gold (chloride) may be used. brass. Lastly, they are transferred to a bath This elegant process, as applied to wood and of nitrate of silver, cyanide of potassium and those substances which may be wetted with the solution of nitrate of silver, answers perfeetly; but it is obviously limited in its application to those substances which will absorb

an aqueous solution,

3613. Silvering Glass. Two distinct methods are adopted for this purpose. The one falsely called silvering, consists of the application of a layer of an amalgam of tin, or similar alloy, to the surface of the glass (see nearly to reduess, to expel the mercury which No. 3614), the other is a coating of real silver, precipitated from a solution of that metal.

To Silver Looking-Glasses. 3614. This is usually done by coating the glass with an amalgam. For this purpose a large, perfeetly flat stone table is provided; upon it is lution of silver in eyanide of potassium; the difference from the usual method consists in the use of zine-filings, with which the objects depth of $\frac{1}{2}$ inch with clean mercury. The are coated; when the silvering solution is applate of glass, perfectly cleansed from all plied, an immediate deposition of a much grease and impurity, is floated on to the mer-The cury carefully, so as to exclude all air bubbles. filings are easily removed by rinsing in water, It is then pressed down by loading it with weights in order to press out all the mercury which remains fluid, which is received in a gutter around the stone. After about 24 the silver a solution of copper in cyanide; and hours it is raised gently upon its edge, and in over this copper deposit a coating of silver a few weeks it is ready to frame. It is said to be desirable to have the lower end of the glass, from which the mercury was drained, chloride of silver with 3 parts pearlash, 1½ at the bottom of the frame. To convex and parts common salt, and 1 part whiting, and concave mirrors the amalgamated foil is aprub the mixture on the surface of brass or plied by means of accurately fitting plaster copper (previously well cleansed), by means moulds. The interior of globes is silvered by of a piece of soft leather or a cork moistened introducing a liquid amalgam, and turning about the globe till every part is covered with it. (See Nos. 3538 and 3545.)
3615. To Silver Glass. An easy and

may also be used in the same way. When economical process. Mix 90 parts by measure properly silvered, the metal should be well of a solution of Rochelle salts at 1.50 specific gravity, with 900 parts distilled water, and boil them in a flask; drop in carefully 20 parts 3612. Spencer's Method of Silvering of a solution of nitrate of silver specific grav-Wood. The first operation is to take strong ity 1.18, and boil again. This solution can alcohol or spirits of turpentine in a glass ves- be bottled and kept for any length of time. sel, and add to it a piece of phosphorus (a Another fluid has to be prepared by adding common corked phial will answer the pur-lammonia to a solution of nitrate of silver pose); the vessel must now be placed in hot until the precipitate is entirely dissolved; filwater for a few minutes, and occasionally tering and diluting 1 part of it with 100 parts shaken; by this means the alcohol will take of water. For use, put equal parts of the two about 3 per cent. of its bulk of phosphorus. preparations in a suitable vessel, clean the

the mixture until sufficiently coated. The deposited, in order to make it perfectly coating of silver should be protected with a smooth, and give closeness to the grain. To

coat of lac varnish.

Glass. Mr. Drayton mixes 1 ounce nitrate of silver, 3 ounces water, 1 ounce liquid am- preserve the coating of silver from sulphuramonia, and 3 ounces spirit of wine, and filters tion and rubbing, it is covered with a paint the solution after it has stood 3 or 4 hours. made with 1 pound of lead pigment, 1½ the solution after it has stood 3 or 4 hours. To every ounce of the solution he adds \frac{1}{4} ounce sugar (grape sugar if possible), dissolved in equal quantities of water and alcohol. result by depositing on the silver a coating of The surface to be silvered is covered with this galvano-plastic copper, but the advantages liquid at a temperature of 100° Fahr., maintained till the deposition of silver is complete. When quite dry, the coated surface is covered with mastic varnish. Other substances besides sugar occasion the deposition of silver Glass Surfaces. Make a solution of amfrom the ammoniacal solution; as oil of casmonio-nitrate of silver, of the strength of from the ammoniacal solution; as oil of cassia, oil of cloves, and other essential oils, aldehyde, &c. Unger recommends a strong alcoholic solution of tannin. He had accidentally mixed in a dish a small quantity of a thick alcoholic solution of tannin with an of Rochelle salts. equally small quantity of a strong solution of nitrate of silver; and in the course of a short time he found the dish coated with a thin, brilliant, and uniform layer of metallic silver. He directly repeated the experiment, and met with the same result again and again. He next proceeded to evaporate the liquid to dryness by placing the dish on the surface of warm sand. As soon as it was completely dry, the coating was found to be so fast on the porcelain that it required the point of a sharp penknife to scrape it off. He also succeeded in producing a brilliant metallic coating from a saturated solution of sulphate of copper by the same solution of tannin.

3617. Pettijean's Process of Silvering Glass. Two solutions are to be prepared. The first is composed of 26½ drachms nitrate of silver and 2 ounces aqua ammonia, dissolved in 1 pint of distilled water. After filtration this liquor is diluted with 16 times its volume of distilled water, and, drop by drop, a solution of 1161 grains of tartarie

acid is added.

The second is prepared in the same manner, but with a double quantity of tartaric acid.

As these solutions are rapidly reduced, prepare in the morning the liquors to be used during the day. Before silvering, the glass is ter. The components of the silver solution perfectly cleaned, first with chalk and a fine are: 140 parts of a solution containing 10 per 113° Fahr., an India-rubber roller dipped in distilled water is next passed over its surface, The deposit of silver commences in about 10 minutes, and is completed in about 15 minutes afterwards. The glass is then tilted up so as to allow the liquor to run off, and rinsed with water rather more than powder. It is then restored to its horizontal acid; the solution is then diluted to measure position and covered with solution No. 2. In a quarter of an hour the deposit is com-

glass well (see No. 3621), and immerse it in mains to polish and burnish the film of silver cover a three-feet square of glass requires 5 3616. Drayton's Process for Silvering pints of liquor. The deposit is, therefore, about 1½ drachms to every 9 square feet. To ounces of drying oil, and 5½ ounces of spirits of turpentine. Liebig has produced the same resulting from the greatest solidity of the deposit scarcely compensate for the practical

inconveniences of the process.

3618. To Silver Specula and Other three grains to the ounce. Render it very slightly turbid by excess of nitrate of silver, and then filter it. Just before using, add to each ounce of the foregoing solution 21 grains Having scrupulously cleaned the glass intended to be silvered (see No. 3621), place it in a convenient vessel about one inch from the bottom, supported on three little cones of white wax. glass plate may be suspended; but in that case there is more difficulty in avoiding vibration, the absence of which is essential to success. Expose to a northern light, or any other subdued light, and in about two hours the deposit of silver will be sufficiently thick. It must now be carefully removed, washed, and dried. When the surface next the glass is to be used as the reflector, the glass side should be cleaned by nitric acid if the state of its surface, after the silvering, so require; and the silvered side should receive a protecting coating of a good tough black varnish.

3619. Liebig's Process for Silvering Glass Mirrors. The process of silvering glass generally rests on the reduction of metallic silver from a solution by means of glucose or some other organic substance. By Liebig's method the deposit of silver is produced by the action of a mixture consisting of 50 parts by measure of a silver solution, and 10 parts of a reducing solution, this latter previously diluted with 250 to 300 parts wa cloth, then with a bung and a little of the cent. of nitrate of silver; 100 parts of a solufirst solution. It is then rubbed dry with a tion of nitrate of ammonia (free from chlorine) piece of chamois leather. (See No. 3621.) of 1.115 specific gravity (or a solution of sul-The glass, laid horizontally upon a table of phate of ammonia of specific gravity 1.105cast iron, at a perfect level, is heated (by 1.196;) lastly, 750 parts of caustic soda lye of means of a cast iron water-bath beneath) to specific gravity 1.050. In case sulphate of ammonia is used, its solution must be added to the silver solution, not as in the case of and then its surface is covered with No. 1 nitrate. The reducing solution consists of 1 part by measure of sugar liquor and 1 part of copper liquor.

The sugar liquor is prepared by dissolving 50 grammes (771½ grains) white sugar in water to a thin syrup, kept for 1 hour at a boillukewarm to carry away the non-adherent ing heat with 310 grammes (48 grains) tartaric

500 cubic centimeters ($1\frac{1}{10}$ pints).

The copper liquor consists of a solution of pleted. The next thing is to wash the plate $2\frac{8000}{1000}$ grammes (44 grains) dry tartrate of as before, and dry it, after which it only re- copper in water, by the aid of a caustic soda

dissolved; the whole is then diluted with then wetted entirely with dilute nitric acid, water to measure 500 cubic centimeters $(1\frac{1}{10})$

pints).

The glasses to be silvered, if for mirrors, are placed upright on their edge in the silvering tank and held together in pairs by clamps; when for optical purposes, they are held in a horizontal position, just touching the surface of the fluid. In cold seasons the temperature must be kept at 68° to 84° Fahr. quantity of silver necessary for a square yard

of surface is from 46 to 54 grains.

3620. Bird's Process for Silvering Mirrors or Specula. The mirror or speculum to be silvered is first cleaned (see No. 3621), and then suspended, face downwards. in a silver bath prepared thus: A large flat shallow vessel of glass or porcelain is provided, to contain the solution. 750 grains nitrate of silver are dissolved in 6 ounces distilled water, and to this is added pure liquid ammonia, drop by drop, until the precipitate which is thrown down is redissolved. 2 ounces caustic potash are dissolved in 50 ounces, by measure, of rain water; and 15 ounces of this solution are added to the ammoniacal solution, when a brown-black precipitate will be produced. Ammonia is again added, drop by drop, until this precipitate is just redissolved; and 29 cunces of distilled water are then added to the whole. To this mixture is again added, drop by drop, stirring with a glass rod, a strong solution of nitrate of silver, until a speculum, 1 part, by weight, of powdered milk sugar to 10 parts, by measure, of distilled water, must be prepared in a separate vessel, and filtered until a clear solution is obtained. Then, to 10 parts, by measure, of the silvering solution, must be added 1 part, by measure, of sufficient to silver a speculum 9 inches in diameter. To facilitate the suspending, a circuthe back of the speculum with marine glue or pitch, and three pins inserted at equal disintervene, that the speculum be not deeper in the liquid than half its thickness, and that a depth of 2 inches, at least, intervene between the face of the speculum and the bottom of the vessel. In 10 minutes after immersion a metallic film will be seen forming on the glass, and in an hour or two a compact silver coating will be laid over the whole surface. The speculum should remain in the bath for 4 hours, by which time the process is completed; it is then carefully removed, copiously washed with distilled water, and placed on its edge to dry. It is then ready for polishing. (See No. 3622.)

3621. To Clean the Surface of Glass for Silvering. As the success of the silvering process depends greatly on the glass surface being made chemically clean previous to immersion in the bath, the utmost pains must be taken to accomplish this object. The surfree from grit, which, when dry, is rubbed off glass which is under the surface of the liquid,

solution added by drops until the blue salt is with the purest cotton wool. The surface is and afterwards thoroughly washed with distilled water poured over it; and, last of all, the piece of coated glass is suspended in a flat vessel containing alcohol, where it remains until the bath is ready to receive it.

3622. To Polish a Silvered Surface on Glass. To accomplish this, rub the surface gently, first with a clean pad of fine cotton wool, and afterwards with a similar pad covered over with cotton velvet, which has been charged with fine rouge. The surface will, under this treatment, acquire a polish of intense brilliancy, quite free from any scratches.

To Silver Glass for the Reflec-3623. tors of Telescopes. The solutions employed are four in number, and they require some care in their first preparation; but once made they are always ready, and can be used with great rapidity and certainty for depositing a lustrous, mirror-like surface of silver on a piece of glass of any desired shape or curva-

Solution No. 1 is prepared by dissolving 1 part, by weight, of nitrate of silver, in 10 parts of distilled water.

Solution No. 2 consists of an aqueous solution of pure ammonia, having a density of 13.3° Baumé.

Solution No. 3 consists of 4 parts of pure caustic soda in 100 of distilled water.

Solution No. 4 is made by dissolving 121 parts of the best white loaf sugar in 100 parts precipitate, which does not redissolve, begins distilled water. To this add 1 part, by meato be formed. Previous to immersing the su s, of nitric acid, boil for 20 minutes, in order to invert or alter the molecular arrangement of the particles of the sugar, and then add water to increase the volume to 500 parts by measure, and finally add 50 parts alcohol.

These solutions will remain unchanged for a long time. When required for use, prepare the milk sugar solution, and, finally, 50 a silvering liquid by pouring into a flask 12 ounces of the compound solution will be parts, by measure, of the silver solution, No. 1; 8 parts, by measure, of the ammoniacal solution, No. 2; then 20 parts of the soda solular block of wood is very firmly cemented to tion, No. 3; and, lastly, add 60 parts of distilled water, in order to make up the volume to 100. If the proportions have been properly observed, the liquid so prepared will be pertances round the margin, to which strings observed, the liquid so prepared will be permay be fastened. On lowering it into the feetly clear, but will be rendered turbid by the bath, care must be taken that no air bubbles smallest addition of nitrate of silver solution. It must be allowed to remain without disturbance for 24 hours, to permit the floating particles to settle. The clear liquid decanted from the sediment will then be ready for use. The surface of the glass which has to be silvered must be well cleaned with a tuft of cotton and a few drops of nitric acid, and then washed with distilled water. (See No. 3621.) Drain it, and support it on the surface of the silvering bath, which is composed of the above described silvering liquid, with the addition of 10 or 11 its volume of the sugar solution, No. 4. The surface to be silvered, should, by preference, be at the upper part of the liquid, so that the silver may be deposited on it from below upward. There are two advantages in this—first, the deposit is finer and more even: and, second, there is no danger of floating particles of dust settling on the surface. is, however, scarcely necessary to say that face is first covered with thick whiting cream, silver will be deposited upon every part of the

vessel; so that, as a matter of economy, as moment of using. little as possible of the back of the glass

be produced. (See No. 3622.)

3624. To Repair the Silvering of receipts:

Looking-Glasses. The repairing of the silvering on the backs of looking-glasses has

Etc. When it is intended to silver silk, hitherto been considered a very difficult woolen, cotton, etc., commence by washing operation. A new and very simple method, the substance clean; this done, immerse it for however, has been described before the Poly- a moment in the saturated solution of gallie technic Society of Leipsic. It is as follows: acid; then withdraw it to plunge it for a Clean the bare portion of the glass by rubbing second in another solution composed of 20 it gently with fine cotton, taking care to reparts nitrate of silver to 1000 parts distilled move any trace of dust and grease. If this water. These alternate immersions are concleaning be not done very carefully, defects tinued, until the substance from being dark will appear around the place repaired. With becomes of a billiant tint; after that it is the point of your knife cut upon the back of another looking-glass around a portion of the the two liquors, Nos. 1 and 2. (See No. 3626.) silvering of the required form, but a little When it is completely silvered, it is withdrawn larger. Upon it place a small drop of merand boiled in a solution of salt of tartar (carcury; a drop the size of a pin's head will be bonate of potassa) in water, and there remains sufficient for a surface equal to the size of the nothing more to be done but a last washing nail. The mercury spreads immediately, pen-etrates the amalgam to where it was cut off 3628. To Silver Bone, Horn, Paper, with the knife, and the required piece may Etc. Bone, horn, wood, paper, etc., are silnow be lifted and removed to the place to be vered in the same way (see No. 3627) with repaired. This is the most difficult part of the this difference, however, that, in the place of diately, and the glass presents the same appearance as a new one.

Pour upon a sheet of tin foil about 3 drachms of quicksilver to the square foot of foil. Rub smartly with a piece of buckskin until the foil perfectly flat surface; put upon it sufficient weight to press it down tight; let it remain in this position a few hours. The foil will adhere to the glass.

Ceipt.

3630. To Silver Stucco and Pottery.

Stucco and pottery may be silvered by the same process as No. 3628, but before being

adhere to the glass.

3626. Process for Silvering Animal, Vegetable, or Mineral Substances. This process is founded upon the electro-chemical action exercised by certain liquors in which the objects to be silvered are plunged. The method of preparing these liquors is as fol-

mixture in 650 parts of distilled water; filter, upon them. (See Nos. 3618, δc .) When protect from the air as much as possible, and mirrors are to be silvered, the plates of glass

as well as upon the sides and bottom of the put in a closely stoppered bottle until the

Liquor No. 2. Dissolve 20 parts nitrate of should be exposed to the action of the liquid. silver in 20 parts solution of ammonia, and The action seems to be more rapid in the add to this solution 650 parts distilled water. light than in darkness. Under the influence When it is intended to operate, the two preof diffused light the liquid becomes yellow, ceding liquors are mixed in equal quantities, then brown, and in a few minutes the whole and, after having been well agitated, filtered. of the exposed surface of the glass will be As the solution of ammonia of commerce has covered with a fine deposit of silver. In not always the same degree of concentration, about a quarter of an hour the thickness of it would be better, perhaps, to dissolve the the metallic coating will be sufficient to bear nitrate of silver destined for the liquor No. 2, the subsequent operations without injury; it first in distilled water, then mix the solution must then be washed with plenty of water, with liquor No. 1, and then add ammonia in and rested by one corner on several thick-quantity only just sufficient to entirely clear nesses of blotting-paper to dry spoutareously. the mixture. The deposition of silver can be The surface will now be covered with a thin accelerated by the employment of heat; in whitish veil, which may be readily removed this case, the temperature depends upon the by gentle friction with chamois leather; it nature of the objects to be submitted to the may afterwards be polished with jewelers' operation. The method of employing the rouge, when a perfectly brilliant surface will above liquors in silvering the surfaces of different materials is given in the following six

operation. Then press lightly the renewed the alternate immersions above indicated, the portion with cotton; it hardens almost imme-cbjects to be silvered are operated upon with diately, and the glass presents the same ap-a brush or pencil dipped alternately in the gallic acid solution and in that of nitrate of 3625. To Repair a Damaged Mirror. Silver. The silvered surfaces are then washed with distilled water, dried by free air and heat.

3629. To Silver Leather. For leather becomes brilliant. Lay the glass upon a flat tanned with sumach, in the place of nitrate of table, face downwards; place the foil upon silver (see No. 3627) the chloride mixed with a the damaged portion of the glass; lay a sheet few drops of rosemary oil may be employed of paper over the foil, and place upon it a with advantage. The silvered surface is block of wood or a piece of marble with a then washed and dried as directed in last re-

> submitted to the operation they should be covered with a coat of stearine or varnish.

3631. To Silver Glass, Crystal, or Porcelain. To silver glass, crystal, or porcelain, commence by washing thoroughly (see No. 3621) the object with distilled water, and with alcohol, and then operate as has been Liquor No. 1.—Take 2 parts by weight of said with the mixture. (See No. 3626.) Obcaustic lime, 5 of sugar of milk or grape jects with a plane surface should be placed in sugar, 2 of gallic acid, and make of them a a horizontal position, and the liquor poured

them two and two face against face, in troughs subsequent scrubbing for ‡ hour with a wire of gutta percha, taking care to prevent all brush and sand, then washing in water until contact with the sides; then fill with the li- all traces of acid are removed. It is then quid. Precipitation of silver commences in a covered with zinc wire in spiral turns of quarter of an hour, and at the end of a few about 6 inches from each other, which also hours the operation is finished. coat the silvered surface with varnish.

chemical agents of low price.

3633. To Coat Copper Plates with

Brass. Expose the plates, heated sufficiently, to the fumes of zinc. Zinc boils and is vaporized by heating it to a white heat.

3634. To Coat the Inside of Copper Vessels with Brass. Dissolve 1 part zinc amalgam (see No. 3539) in 2 parts muriatic

placed in a bath made of 50 parts hydrochloride of copper, dissolved in 80 parts of the face is rubbed with a mixture of 4 parts salmuch longer time would be necessary.

ammoniac and 1 part each oxalic and acetic 3638. To Tin Iron Pots and other ammoniac and 1 part each oxalic and acetic

acids dissolved in 30 parts water.

3636. Graeger's Process for Covering Iron and Steel with Copper without a with fine chalk without injuring the deposit. the fluid, washed with water, and dried, The tin solution is prepared with 1 part crystallized chloride of tin, 2 parts water, and 2 parts bydrochloric acid. The copper solution in 10 parts water, to which add a solution and for various ornamental purposes.

3637. Weil's Process for Coating Iron with Copper. This process yields a coating of copper of great brightness and pounds rye meal; this mixture is boiled for strong cohesion. The object, whether of 30 minutes, and next filtered through cloth;

may be disposed in a vertical position; place containing 2 per cent. of muriatic acid, and When dry, serves as a means of suspension. The bath rish. | consists of a solution of 8 parts caustic soda 3632. To Silver the Metals. Com- in 100 parts water, of which 11 tarts are mence by cleaning them with nitric acid; mixed with 50 ounces Rochelle safts and 12½ rub them afterwards with a mixture of cyanounces sulphate of copper making a liquid of ide of potassium and powdered silver; then, a density equal to 195 Baumé. It retains its after washing with water, they are plunged activity as long as the copper is kept replaced, alternately into the liquors Nos. 1 and 2 (see and deposition from it proceeds with great No. 3626), until they appear sufficiently sil- regularity. The material of the vessel is vered. If working with iron, it should be best when made of wood, lined with guttafirst immersed in a solution of sulphate of percha, and covered with a wooden lid. When copper. The process which has been de the coating is of sufficient thickness, the obscribed presents above all others the advan- ject is removed from the bath, first washed tage of very solid results, and of employing with water slightly acidified with sulphuric acid, and then with pure water until the disappearance of all traces of acid; after this it passes into a drying room heated to 132° Fahr. The bronzing, when required, is obtained by a bath of sulphide of sodium, or by means of the same bath as above, somewhat modified, that is, by increasing the proportion of copper to a threefold, in which case the and; add 1 part argol (crude tartar), and add sufficient water to fill the vessel; then boil it in the vessel.

bath no longer deposits copper, but, to all appearances, bronze. By reducing the points of contact between the iron and wire, though 3635. To Deposit Copper upon Cast retaining the spinal tuning tu chloric acid, specific gravity 1.105, and 1 silver-white, pale yellow, golden yellow, carpart nitric acid; next, in a second bath, com- mine, green, brown, and dark bronze. As soon posed of 10 parts nitric acid, 10 parts of as the desired color is attained, the object is washed in warm water, and again dried at 132°. same hydrochloric acid as just alluded to Between each subsequent change of color is an The objects are rubbed with a woolen rag and interval of about 5 minutes. The reaction is a soft brush, next washed with water, and more decided when the alkaline reaction of again immersed until the desired thickness of the bath is stronger. For indoor work or copper is deposited. When it is desired to ornaments the time of immersion may vary give the appearance of bronze, the copper sur- from 3 to 72 hours; for outdoor objects a

Domestic Articles. The articles are cleaned with sand, and, if necessary, with acid, and put then in a bath, prepared with 1 ounce Battery. The objects are first well cleaned, cream of tartar, 1 ounce tin salt (protochloride and then painted over with a solution of of tin), 10 quarts water. This bath must be protochloride of tin, and immediately after-kept at a temperature of 190° Fahr., in a ward with an ammoniacal solution of sulphate stoneware or wooden tank. Bits of metallic of copper. The layer of copper thus produced adheres so firmly to the iron or steel, that the pieces. When the coat of tin is considered different objects can be rubbed and polished thick enough, the articles are taken out of

tion, with 1 part sulphate of copper, 16 parts of 2 parts of caustic soda i. 20 parts water; water, adding ammonia sufficient to redist the mixture becomes turbid, but this does not solve the precipitate first thrown down by it. affect the tinning operation, which is effected Zinc and galvanized iron can be treated, ac- by heating the objects to be tinned in this cording to Boettger, directly by the copper fluid, care being taken, at the same time, to solution, without using the tin salt. The place in the liquid a piece of perforated block above process may be found useful by gilders, tin plate, and to stir up the fluid during the The place in the liquid a piece of perforated block tinning with a rod of zinc.

cast or wrought iron, is freed from rust by to the clear but thickish liquid are added 233 immersion for from 5 to 10 minutes in water pounds pyrophosphate of soda, 372 pounds

should be sulphuric acid and water, but for same manner.

piece of sal-ammoniac, and sprinkle some of will be firmly attached. the sal-ammoniae in powder over it; then apply the tin and wipe it over evenly with a piece of tow.

3643. Cold Tinning. Rub pure tinfoil and quicksilver together until the amalgam becomes soft and fusible, clean the surface to be tinned with spirits of salt (hydrochloric acid), and, while moist, rub the amalgam on, and then evaporate the quicksilver

by heat.

oxide or rust. It must be carefully cleaned, left; it makes no difference whether the obof tinning. Zinc powder—the best is that preadded as will go on the point of a knife.

the tin solution, after which it is rubbed hard found thoroughly coated with zinc. at once. The tin salt is decomposed by the would become of great importance if the tinning could be made as thick as in the dry affinity for this metal. way, but this has not as yet been accom-

plished.

To Tin Copper Tubes. per tubes tinned inside in the following mandeposition of a coat of metallic tin.

protochloride of tin in crystals (so-called tin salt), 147½ pounds neutral protochloride of A thick coating may be obtained by preparing tin, 3½ to 4 ounces sulphuric acid; this liquid a tinning solution of zine dissolved in muriis placed in well made wooden troughts, and atic acid, making the solution as thick or serves more specially for the tinning of iron heavily charged with zine as possible, adding and steel wire (previously polished) for the a little sal-ammoniac. Clean the inside of use of carding machines. When, instead of the kettle, place it in a charcoal fire until a the two salts of tin just named, cyanide of piece of block tin placed inside melts, then silver and cyanide of potassium are taken, the rub the melted tin with some of the tunning iron is perfectly silvered.

3641. To Cleanse Iron for Tinning. solution, quickly on the copper surface, by means of a ball of oakum and a little pow-The metal must be cleansed by immersion in dered resin; the tin will readily adhere, an acid solution; for new metal, this solution Wrought iron and steel may be tinned in the

old metal, muriatic acid and water; next scour with sand, and cleanse well with water. the copper vessel with a solution of stannate 3642. To Tin Iron. First cleanse as of potassa mixed with tin borings, or boil above, then heat the article just hot enough with tin filings and caustic alkali or cream of to melt the tin, rub the surface over with a tartar. In a few minutes a layer of pure tin

3648. To Tin Cast Copper or Brass. Make a saturated solution of oxide of tin (tin putty), in potash lye; add to the solution some tin filings or shavings; make it as hot as possible; then introduce the brass or copper and it will be tinned in a few seconds.

3649. To Galvanize Iron. The difference between galvanized plates, so-called, and "sheet-tin," is, that the latter is sheet-iron covered with a thin coating of block-tin, while 3644. Stolba's Method of Tinning the former is sheet-iron covered with a thin Copper, Brass, and Iron in the Cold, and coating of zinc. To effect the latter result, without Apparatus. The object to be the iron plates are first immersed in a cleans-coated with tin must be entirely free from ing bath of equal parts of sulphuric or muriatic acid and water, used warm. (See No. and care be taken that no grease spots are 3266.) They are then scrubbed with emery or sand, to clean them thoroughly and detach ject be cleaned mechanically or chemically. all scales, if any are left; after which they are Two preparations are requisite for the purpose immersed in a preparing bath of equal parts of saturated solutions of chloride of zinc and pared artificially by melting zine and pouring chloride of ammonium, from which bath they it into an iron mortar. (See No. 3312.) It are directly transferred to the fluid metallic it into an iron mortar. (See No. 3312.) It are directly transferred to the fluid metallic can be easily pulverized immediately after bath, consisting of 20 chemical equivalents of solidification; it should be about as fine as zine to 1 of mercury; or, by weight, 640 writing sand. A solution of protochloride of pounds of zine to 106 of mercury, to which writing sand. A solution of protochloride of pounds of zinc to 103 of mercury, to which tin, containing 5 to 10 per cent., to which as are added from 5 to 6 ounces of sodium. As much pulverized cream of tartar must be soon as the iron has attained the temperature of this hot fluid bath, which is only 680° The object to be tinned is moistened with Fahr., it may be removed, and will then be with the zinc powder. The tinning appears must be taken not to leave the plates too long immersed in this bath, as its affinity for zinc, metallic tin being deposited. When the iron is such that they may become dissolved. object tinned is polished brass or copper, it This is the case with thin plates of wroughtappears as beautiful as if silvered, and retained its lustre for a long time. This method may be used in a laboratory to preserve iron, fore, to let the bath previously act on some wrought-iron, so that it dissolves a portion of wrought-iron, so that it dissolves a portion of appears as beautiful as if silvered, and retains iron, which, even when \frac{1}{8} inch thick, may be its lustre for a long time. This method may dissolved in a few seconds. It is safe, thereit, in order to satisfy its inconveniently great

3650. To Zinc or Galvanize Grey Iron Castings. Cleanse the articles in an ordinary chafing mill, which consists of a Wollweber recommends for still-worms cop- barrel revolving on its axis containing sand; when the sand is all removed, take them out ner: To a solution of Rochelle salts a solution and heat one by one, plunging, while hot, in a of salts of tin is added; a precipitate of stan-liquid composed as follows: 10 pounds hydronous tartrate is formed, which is washed and chloric acid, and sufficient sheet zine to make then dissolved in caustic lye. The copper a saturated solution. (See No. 3473.) In tube, which has first been rinsed with sul- making this solution, when the evolution of phuric acid and then washed, is then filled gas has ceased, add muriate, or preferably with the alkaline solution, warmed a little, sulphate of ammonia, 1 pound, and let it and touched with a tin rod, which causes the stand until dissolved. The castings should be so hot that when dipped into this solution, frost-work on a window pane. Next plunge and riused in water, after which they are them while hot, but perfectly dry, into a bath placed in the bath and remain there for 24 of melted zinc, previously skimming the oxide hours. on the surface away, and throwing thereon a rinsed in water and simply wiped off. The small amount of powdered sal-ammoniac. copper or brass covering has a very bright If the articles are very small, inclose them in look, as if polished, and adheres perfectly. a wrought-iron basket on a pole, and lower them into the metal. When this is done, shake off the superfluous metal, and cast them into a vessel of water to prevent them from

adhering when the zinc solidifies.

3651. To Zinc Copper or Brass Vesof zine, adding a quantity of zine turnings to

the solution

3652. Boettger's Process for Coating Copper and Brass with Zinc by a Wet Place zine in grains or powder in a non-metallic vessel, and cover the zinc with a concentrated solution of sal-ammoniac; warm to ebullition, and introduce into the ing Glass. mixture the objects of copper or of brass which it is desired to coat, after having properly cleansed them. After a few minutes, the object will be covered with a brilliant, firmly adhering deposit of zinc. (See No. 3312.)

3653. To granulate the zinc, a clean surface of cop-per may be coated with zinc by placing the muffle or over a Bunsen burner. two metals in contact in a solution of caustic soda or potash. (See Fig. I., No. 3665.) In Metal, and Brass. In order to obtain a the cold the deposit of zinc takes place slowly,

but at 100° it is effected rapidly.

3654. Purcher's Method of Coating Zinc with Iron. Dissolve 5 ounces pure sulphate of iron, and 3 ounces sal-ammoniac, in 5 pounds of boiling water, and immediately 1 or 2 minutes the loose black deposit is removed by brushing it off with water. The the difference that the objects, when taken out, are heated, without rinsing, over a pan of live coals as long as the ammoniacal vapors are evolved. When, after several immersions, the coating is considered thick enough, it is polished by brushing, and will ever afterward imparts a fine black lustre to the coated surfaces

3655. Process for Covering Articles of Zinc with Copper or Brass by One Immersion. To give zinc a coat of copper or brass for the purpose of a subsequent silvering or gilding, the following solutions are used: For copper alone, a solution of sulphate of copper, saturated at the common temperature, is mixed with a solution of cyanide of potassium, adding as much of the latter as is necessary to redissolve the precipitate thrown down at first. The prussic acid disengaged during this operation must be carried off by a draught or flue. When the mixture is clear, 10 or 3 of its volume of water of ammonia is added, and then diluted with water to a density of 8° Baumé. For brass, sulphate of copper and sulphate of zine are used in equal proportion, and prepared as before. 2 parts sulphate of zine and 1 of sulphate of copper give phate of zine and 1 of sulphate of copper give after several months' use in the laboratory.

and instantly removed, they will immediately ping, the articles of zinc are rubbed off thordry, leaving the surface crystallized like oughly with finely-powdered pumice-stone After that time they are again The thickness of the coat may be increased afterwards by the aid of a batter

3656. Dullo's Method of Platinizing This is recommended to prevent Glass. fusing of the thin end of a glass tube used for a blowpipe. In drawing out the end of sels. Boil the vessel in a solution of chloride the tube, leave the diameter slightly larger than is necessary; then roughen the narrow end with a fite. Dip in & solution of bichloride of platinum, containing 5 per cent. of the metal; remove excess of the drop, and heat cautiously till the glass acquires a me-

tallic appearance. Repeat this 4 or 5 times. 3657. Boettger's Method of Platinizing Glass. Pour rosemary oil upon the dry chloride of platinum in a porcelain dish, and knead it well until all parts are moistened; then rub this up with 5 times its weight of lavender oil, and leave the liquid a short time to clarify. The objects to be platinized are to To Coat Copper with Zinc. be thinly coated with the above preparation and afterwards heated for a few minutes in a

platinizing fluid capable of platinizing copper, vellow metal, and brass, add to a moderately concentrated solution of chloride of platinum. finely powdered carbonate of soda, until effervescence ceases; next some glucose, and afterwards just so much common salt as will cause immerse the objects to be treated. After from a whitish-colored precipitate. When it is desired to apply this mixture for platinizing, the objects to be treated are placed in a vessel principal effect of this operation is a perfect made of zinc and perforated with holes; the cleaning of the surface. The immersion in the hot iron solution is then repeated, with few seconds in the mixture thus described, which, just previous to using, should be heated to 140° Fahr. On being removed from the zinc vessel, the objects are to be washed with water and dried in sawdust.

3659. Stolba's Method of Nickel polished by brushing, and will ever afterward be a perfect protection against oxidation. It may be of porcelain, but preferably of copper is placed a concentrated solution of chloride of zinc, which is then diluted with from 1 to 2 volumes of water, and heated to boiling. If any precipitate separates, it is to be redissolved by adding a few drops of hydrochloric acid. As much powdered zine as can be taken on the point of a knile is thrown in, by which the vessel becomes covered internally with a coating of zinc. The nickel salt-for which purpose either the chloride or sulphate may be used—is then added until the liquid is distinctly green; and the articles to be plated, previously thoroughly cleaned, are introduced, together with some zinc fragments. The boiling is continued for 15 minutes, when the coating of nickel is completed, and the process is finished. The articles are well washed with water and cleaned with chalk. If a thicker

Flectrotyping. on objects, metallic or otherwise, by the agency of a current of galvanic electricity. ly derived from the 4th edition of Napier's Manual of Electro-Metallurgy.

3661. Solution of Copper for Electrotyping. Crush fine sulphate of copper in crystals, and expose to the air for some time. This oxidizes any iron that may be present. Stir the sulphate of copper into pure cold water, until the water will dissolve no more; then let it settle, and decant the clear solution; add to it about one-fourth its quantity!

of water, and it is ready for use.

3662. To Amalgamate Zinc. Immerse a plate or strip of zinc of the required size in diluted sulphuric acid, for a few moments; then rub quicksilver over the surface. ever the surface of the amalgamated zinc employed in a battery begins to blacken and lose its quicksilver coating, the zinc must be taken out of the acid cell and amalgamated

3663. To Keep the Zinc Plates of a Smee's Battery Constantly Amalgam- Figure 2. Zinc and copper, placed in dilute ated. The trouble of renewing the coating acid. and wires attached, which, when constantly acid. of amalgam on the zinc plates may be obviated by a very simple contrivance. Cover the first case. bottom of the cell with quicksilver, and let the zinc plates be long enough to dip into it. The silver plate must be a little shorter than sulphate of copper, etc., contained in a winethe zine plates, so that it will not touch the glass. mercury. By this arangement the zine plates by the action of the acid.

per position the negative electrodes or artimetal, which serve to complete the electric each their special excellence; but for electrocircuit, and whose decomposition serves to plating, Smee's battery is the one usually keep up the strength of the solution. The adopted. positive electrode must always be of the same metal as that which the solution contains.

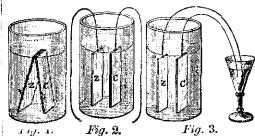
3665. The Principles of the Galvanic Battery Explained. If a piece of ordinary metallie zinc be put into dilute sulphuric acid, from its surface. If the zinc be taken out, and a little mercury be rubbed over its surface, an amalgamation takes place between the two metals, and the plate becomes of a beautithere is no action, for the mercury retains the zine with sufficient force to protect it from the acid. If a piece of copper be immersed along tery. This apparatus consists of a vessel with the zine, and the two metals be made to containing a mixture of about 15 or 20 (Morhydrogen is now seen to escape from the sur-lengthways underneath, to receive the edge of

This is a pro- face of the copper; this action will go on as d cess for depositing a coating of metal long as the two metals are kept in contact. Or if, instead of causing the two metals to touch, a wire be attached to each, and their Before entering into any description of the opposite ends are placed in a little dilute acid methods employed, it will be necessary to in another vessel, the same action will take give some indispensable preliminary direct place between the zine and copper as when tions, in order that the whole matter may be they were in contact; but in this instance, more clearly understood. The matter is mainvessel containing acid will undergo a change; the one attached to the zine will give off a quantity of hydrogen gas, while the one attached to the copper, supposing it to be

also copper, will rapidly dissolve.

Figure 1. Represents the zinc and copper, placed in dilute sulphuric acid, brought into contact; in this experiment, gas will be seen

escaping from the copper.



nected, will exhibit the same effects as in the

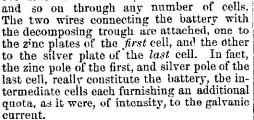
Figure 3. Shows the wires connected by means of a liquid, such as acid and water,

The copper and zinc, c and z, with the acid draw up the mercury as fast as it is worn off in the first vessel, figure 3, constitute a battery of one pair. The wine-glass in which the 3684. Decomposing Cell. This is a wires are placed, is termed the decomposing vessel of suitable shape and dimensions, containing the plating or electrotyping solution; vessel in which the process of electroplating and is usually furnished with appliances over is effected. The above description will give it for suspending and sustaining in their pro- a tolerably clear idea of the principles of a simple galvanic battery. Different kinds of cles to receive the metallic coating, and their batteries are only different modifications or corresponding positive electrodes, or plates of applications of the same principles, and have

3666. To Construct a Cheap Galvanic Battery. Take a gallon stone jar, and place a sheet-zinc cylinder therein, and inside that a porous cup (a porous flower-pot with a cork fitted in the hole will answer it is speedily acted upon by the acid, and after a fashion). Inside the porous cup place hydrogen gas is at the same time evolved a piece of sheet copper. Use a solution of common salt next the zinc, and a solution of sulphate of copper next the copper in the porous cup, if a strong current be desired. The liquids inside and outside the porous cup ful bright silver appearance. If the zine thus should stand at the same level. Dilute sulamalgamated be again put into the dilute acid, phuric acid (1 part acid to 10 water) makes a phuric acid (1 part acid to 10 water) makes a very constant, but weaker current.

touch each other, a particular influence is in- fit gives only 7) parts water to 1 part sulduced among the three elements, zinc, copper, phuric acid, provided with a strip of baked and acid; and the acid again acts upon the and varmshed wood, long enough to stand zinc as if no mercury was upon it, but the across the edge of the yessel, and grooved a silver plate, to which a short wire is at is sold), and pour into it a mixture of 21 parts secured by a selew clamp, the upper part of which is also fitted with a screw cap. The secure the wires connecting with the decomposing cell. The zinc plates must first be coated with amalgam (see No. 3662, also No. 3363); and the silver plate must be covered

with a coating of platina. (See No. 3670.) The arrangement of the parts will be seen in the cut. When two or more cells are used in combination, forming a compound battery, the silver plate of the first cell is connected by a wire with the zinc plates of the second; the silver plate of the second cell is connected with the zinc of the third cell; the silver of the third with the zinc of the fourth,



The wire connected with the zinc (or positive) plates is called the negative pole or cathode; and the wire connected to the silver (or negative) plate is called the positive pole or anode. The material used for connecting wires is usually copper, and should be clean and bright, and in order to insure perfection of contact, the ends of the wire may be amalgamated by dipping, first in a solution of nitrate of mercury, and then in metallie mercury.

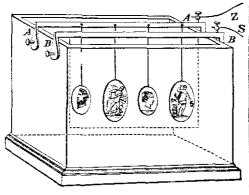
3668. Improved Liquid for the Galvanic Battery. Mr. Victor Barjon's new battery liquid is made by mixing a solution of bichromate of potash with a little lime, and with sulphuric acid. He puts 2 pounds bichromate of potash into a gallon of boiling water, and lets the solution cool down to 68°, and adds 2 ounces of lime. After stirring, he adds sulphuric acid until the gravity reaches 350 Baumé. Then, having stirred the whole, he lets it stand for 24 hours, when it is ready for use.

3669. Electrotyping by the Single Cell Process. This is an adaptation of Daniell's cell to the purposes of electrotyping, and dispenses with any separate decomposing cell; in fact it is a galvanic battery and a decomposing cell combined in one, and is useful, for small objects, from its simplicity. About fill a large jar (a preserve jar without any neck is best), with a solution of sulphate of copper (see No. 3661); insert in this a small tubular porous vessel of about the same height as the jar (these porous tubes can be length of the trough and rest on the upper found at any store where chemical apparatus edge at each end; the bars rest on dry

tached and connected through a hole in the water and 1 part sulphuric acid, until the wood with a screw cap on the upper side of diluted acid in the porous tube stands at the the wood. Two plates of zine are arranged, same level as the sulphate of copper solution one on each side of the strip of wood, and outside it. To one end of a piece of copper wire fasten a strip of amalgamated zinc (see No. 3662), which is to be inserted in the object of the screw caps is to receive and porous tube; to the other end of the wire attach the object to be electrotyped, properly prepared (see No. 3689), and place it in the copper solution, with its face parallel to the zinc plate, and about 2 an inch from the side of the porous tube. In about 24 hours the deposit of copper will be of about the thickness of a card, and may be taken off. When not in use, the zinc should be taken out, washed and dried; and when in use must on no account touch the bottom or any other part of the porous tube. It is a good plan to give the wire one twist round a stick of wood, laid across the top of the tube, so as to suspend and support the zine. A few crystals of sulphate of copper, enclosed in a piece of lawn or net, should be hung from the edge of the vessel just below the surface of the copper solution, to replace the copper that deposits on the object being electrotyped, and prevent the solution from becoming weaker.

To Coat Silver with Platina. 3670. This is effected by the one cell process, substituting for the sulphate of copper solution, water acidulated with sulphuric acid, and containing a little chloride of platinum. The silver is first roughened on the surface by applying strong nitric acid, and washed; it is then attached to the end of the wire leading from the zinc plate in the porous cell, and immersed in the platinum solution exactly as if it were a medal to be electrotyped, until the surface is covered with a dark and granular

deposit. 3671. Electrotyping with a Battery. For this purpose a Smee's battery (see No. 3667) is usually employed, in connection with a decomposing cell. (See No. 3664.) As the method for electrotyping, or coating with copper, is substantially the same as for other metals, a description of the first will suffice. The decomposing cell being charged with a solution of sulphate of copper (see No. 3661), the object, duly prepared (see No. 3689), to be electrotyped, is properly secured in position, and connected with the cathode or wire leading from the zinc plates of the battery. the anode or wire leading from the silver plate, a positive electrode, consisting of a piece of the same metal as the solution contains (in this case, copper), is attached, and immersed in the solution, face to face with the object to be electrotyped; as the copper from the solution is precipitated on the object, the piece of copper is dissolved, and thus keeps up the strength of the solution. Any number of objects may be electrotyped in the same decomposing cell, provided that each is connected with the zinc pole of the battery, and hangs facing a positive electrode. The usual arrangement for this purpose consists of a water-tight trough of suitable size and shape (usually oblong), to contain the copper or other metallic solution, and is provided with metal bars, long enough to reach the varnished blocks of wood, and are laid part of one side of the coin. With care, any numberallel to each other at a distance of 3 or more ber of duplicates may be taken from this inches apart, according as the space between mould, if it be properly coated. them is required. Plates of copper of nearly silver pole of the battery. Alternately between these bars, other bars are placed, exactly similarly arranged, but having small projections or buttons on one of their sides, to which the objects to be electrotyped are secured by a wire, and suspended in the solution, face to face with its corresponding copwith the cathode or zinc pole of the battery. It will thus be evident that each contiguous will searcely apply. pair of bars are mutually positive and negative electrodes, and the objects on the one Moulds. Whether the bees' wax have stearing



be electrotyped, suspended from the bar A A, may be visible; they are supposed to be behind and closely facing the copper plate. The bar AA is connected by the wire Z to the zinc pole of the battery

3672. with bees' wax or tallow, or, what is better, imbed the back of the coin in gutta percha. scribed for obtaining it from the original coin, and the deposit from it will be a fac-simile and would be liable to crack from shrinking.

3673. Coating for Copper Moulds. the same length as the trough are suspended Take a gill of rectified spirits of turpentine, from the bars, and submerged in the solution, and add to it about the size of an ordinary parallel with them. These bars, and conse- pea of bees' wax. When this is dissolved, wet quently the copper plates (which constitute over the surface of the mould with it, and continuous positive electrodes) are connected then allow it to dry: the mould is then ready with copper wire or ribbons to the anode, or to put into the solution. Medals taken from moulds so prepared retain their beautifully bright color for a long time. But when fine line engravings are to be coated, the little wax dissolved in the turpentine may be objectionable; so also is black lead, for both have a tendency to fill up the fine lines. In this case, let the turpentine wash be wiped per plate. These latter bars are commected off with a silk handkerchief, instead of drying it; but for ordinary medals this objection

must closely face the copper plate on the in it or not, it is best to prepare it in the folother. The accompanying cut will give some lowing manner: Put some common virgin idea of the arrangement of one pair of bars. wax into an earthenware pot or pipkin, and BB is the bar connected by the wire S place it over a slow fire; and when it is all with the silver pole of the battery, and sup-melted, stir into it a little white lead (flake porting a plate of copper suspended in the white), or black lead (plumbago), say about 1 trough. In the cut, the copper is supposed ounce white lead to the pound of wax; this to be transparent, in order that the objects to mixture tends to prevent the mould from cracking in the cooling, and from floating in the solution; the mixture should be re-melted two or three times before using it for the first time. Resin has been recommended as a mixture with wax; mixtures of which, in various proportions, have been used with success; but when often used, decomposition or some change takes place, which makes the mixture granular and flexible, rendering it less useful for taking moulds. When resin is used, the mixture, when first melted, should be boiled, or nearly so, and kept at that heat until effervescence ceases; it is then to be poured out upon a flat plate to cool, after which it may be used as described

3675. To Take Moulds in Wax. medal to be copied must be brushed over with a little sweet oil: a soft brush, called a painter's sash tool, suits this purpose well: care must be taken to brush the oil well into all parts of the medal, after which the superfluous oil must be wiped off with a piece of To Obtain a Copper Mould of cotton or cotton wool. If the medal has a a Coin. A fine copper wire must be put bright polished surface, very little oil is reround the edge of the coin and fastened by quired, but if the surface be matted or dead, round the edge of the coin and fastened by quired, but if the surface be matted or dead, twisting. Then cover the back part, and the it requires more care with the oil. A slip of wire, upon which the deposit is not required, card-board or tin is now bound round the edge of the medal, the edge of which slip should rise about one-fourth of an inch higher Have the fore part or face well cleaned, and than the highest part on the face of the the surface moistened with sweet oil, by a medal. This done, hold the medal with its camel's-hair pencil, and then cleaned off by a rim a little sloping, then pour the wax in the silk cloth, till the surface appears dry; or, in-lowest portion, and gently bring it level, so stead of oil, the surface may be brushed over that the melted wax may gradually flow over; with black lead, which will impart to it a this will prevent the formation of air-bubbles. bronze appearance. The use of the oil or Care must be taken not to pour the wax on black read is to prevent the deposit adhering too hot, as that is one great cause of failure in to the face of the coin. The coin is now ready getting good moulds; it should be poured on to be subjected to the single cell process (see just as it is beginning to set in the dish. As No. 3669), by which means a perfect counter- soon as the composition poured on the medal part or mould of the coin is obtained. This is set (becomes solid), undo the rim, for if it mould may next be treated exactly as de- was allowed to remain on till the wax became perfectly cool, the wax would adhere to it,

Put the medal and wax in a cool place, and in about an hour the two will separate easily. from Plaster Models. When a plaster When they adhere, the cause is either that mould is to be taken, the face of the model is

was poured on too hot.

Plaster. If the object from which the mould ture of soft soap and tallow, universally used is to be taken, which we assume to be a by potters for preparing their moulds, and medal, be composed of plaster of Paris, and called by them lacquer. It is prepared in the the mould is to be taken in wax, the first following manner: 1 pound soft soap is put operation is to prepare the plaster medal, into 3 pints clean water, which are set on a Some boiled linseed oil, such as is used by clear fire, and kept in agitation by stirring; house painters, is to be laid over the surface when the mixture begins to boil, add from 1 of the medal with a camel's-hair pencil, and to 11 ounces tallow, and keep boiling till it is continued until it is perfectly saturated, which reduced in bulk to about 2 pints, when it is is known by the plaster ceasing to absorb ready for use. The surface of the medal any more of the cil. This operation succeeds must be washed over with this lacquer, allowbest when the medal is heated a little. The ing it to absorb as much as it can, when it medal should now be laid aside till the oil assumes the appearance of polished marble; completely dries, when the plaster will be it is now prepared with a rim of paper, and found to be quite hard, and having the apthe mould taken as directed for taking plaster pearance of polished marble; it is, consequently, fit to be used for taking the wax mould, which is done in the same manner as model with a solution of soap before taking we have described for taking a wax mould the cast will do, or, if the plaster model has from a metallic medal. (See No. 3675.) Many prefer saturating the medal with water. This is best done by placing the medal metal model back down in the water, but not allowing it to flow over the face; the water rises, by capillary attraction, to the surface of the medal, of fusible metal be required from a plaster rendering the face damp without being wet. model, the plaster may be saturated either The rim being now tied on the plaster medal. the melted wax is poured upon it. method is equally good, but liability to fail-mould taken in the same manner as from a ures is much greater, caused generally by the metallic medal. (See No. 3677.) wax being too hot. The plaster medal may be saturated with skimmed milk and then Many electro-metallurgists prefer taking a dried; by repeating this twice, the plaster assumes on the surface an appearance like marble, and may be used for taking wax moulds.

3677. To Take Moulds in Plaster. If a plaster of Paris mould is to be taken from the metallic medal, the preparation of the an electrotype in the usual manner (See No. medal is the same as described in No. 3676; and when so prepared with the rim of cardboard or tin, get a basin with as much water withstanding, in the case of plaster models, in it as will be sufficient to make a proper to take a copper mould is the most preferable, sized mould (a very little experience will as it may be repaired in case of slight defect, enable the operator to know this), then take and it may be used over and over again with-the finest plaster of Paris and sprinkle it into out deterioration. When an electrotype is the water, stirring it till the mixture becomes required of a model that is undercut, or of a of the consistence of thick cream; then pour bust or figure, the process which we have a small portion upon the face of the medal, described will not answer, as the mould canand, with a brush similar to that used for oil- not separate from the model. In such ciring it, gently brush the plaster into every cumstances the general method of proceeding part of the surface, which will prevent the is to part the mould in separate pieces, and formation of air-bubbles; then pour on the then join these together. The material used remainder of the plaster till it rises to the edge of the rim: if the plaster is good, it will operation, however, to be well done, requires be ready for taking off in an hour. The mould is then to be placed before a fire, or in an oven, until quite dry, after which it is to be placed, back downwards, in a shallow yessel containing melted wax, not of sufficient depth to flow over the face of the mould, al- heat the gutta-percha in boiling water, or in a lowing the whole to remain over a slow fire chamber heated to the temperature of boiling until the wax has penetrated the plaster, and appears upon the face. Having removed it to a cool place to harden, it will soon be ready in the bottom of a metal saucer with a cylinfor electrotyping. Glycerine affords an ex- drical rim a little larger than the medal; the cellent coating for the interior of plaster medal being placed back down, a quantity of moulds, to prevent the melted wax from gutta-percha is pressed into the saucer, and as adhering to the inside of the mould.

3678. To Take Moulds of Plaster too little oil has been used, or that the wax prepared differently to that described, in order to prevent the adhesion of the two plasters. To Take Wax Moulds from The best substance for this purpose is a mixbeen saturated with oil or milk, it has only to be moistened with sweet oil the same as a

nedal, with boiled oil (see No. 3676), or the soap This and tallow lacquer (see No. 3678), and the

mould in copper when the medal is of plaster of Paris. This is done by the electrotype process (see No. 3671); the plaster model is saturated with wax over a slow fire, as 3672, se.) We need hardly mention that the model in this case is destroyed; but, nota person of considerable experience.

3681, To Take Moulds in Gutta-Percha. Gutta-percha, as a material for moulding, serves the purpose most admirably. The method adopted for taking moulds is to water, which makes it soft and pliable. The medal is fitted with a metallic rim, or placed much added as will cause it to stand above

the edge of the rim. It is now placed in a so under the edge. The inside of this vessel common copying-press and kept under pressis oiled, a piece of stout paper is pasted on Gutta-percha takes a coating of black lead readily, and the deposit goes over it easily. has been recommended for moulds as superior to gutta-percha alone. This method of mouldtype and engravings, employing sheets of prepared wax, at a temperature which gives

it the proper consistency. 3682. in Wax. resin, melt them at a slow fire, let them cool the eye-lids and eye-brows with paste, with a brush nimbly cover the face about the thicknot close his eyes firmly enough to wrinkle his face, because that will render the face destrengthen it with clay on the back, that it may cast all sorts of faces; laughing, weeping, or wry faces; also fruits or anything else, dividing the mould into two pieces with a warm knife; then fortify them with clay and join them together.

3683. To Mould Figures in Paste. Take the crumbs of a new drawn white loaf, mould it until it becomes as close as wax, and very pliable; beat it, and roll it with a rolling-pin, as fine and as far as it will go; then apply it to the figure to be moulded; dry it in a stove, and it will be very hard; and to preserve it from vermin, you may mix a little

powder of aloes with it. 3684. Composition for Taking Moulds of Medals, &c. Melt together equal parts of spermaceti, stearine or hard tallow, and white wax. Or: Mix together by melting, # ments, &c., and is poured on the object to be copied (previously oiled) in a melted state. on the surface so as to interfere with the design.

3685. To Make and Use Elastic Moulding. The process patented by Mr. Parks for taking a mould of any kind of model in one piece, is excellently adapted for the are dissolved off by acids. electrotypist. The material is composed of 3687. To Coat Figure glue and molasses. 12 pounds glue are steeped for several hours in as much water as will moisten it thoroughly; this is put into a metallie vessel, which is placed in a hot bath of boiling water. When the glue falls into a fluid state, 3 pounds of molasses are added, done, remove the plaster and wash over the and the whole is well mixed by stirring. inside with an alloy of tin and lead melted. Suppose, now, that the mould of a small bust In this case the copper must previously be is wanted, a cylindrical vessel is chosen so cleaned by washing first in a solution of potdeep that the bust may stand in it an inch or ash, and then with chloride of zinc. The lat-

sure until it is quite cold and hard. The im- the bottom of the bust to prevent the fluid pressions taken this way are generally very | mixture from going inside, and if it is comfine. When the medal is not deep cut a less posed of plaster, sand is put inside to prevent pressure may suffice, but when the pressure it from floating. It is next completely is too little the impression will be blunt. sel. This done, the melted mixture of glue and molasses is poured in till the bust is sub-A mixture of gutta-percha and marine glue merged to the depth of an inch. The whole must stand for at least 24 hours, till it is perfectly cool throughout—after which it is taken ing by pressure is adopted, in principle, by out by inverting the vessel upon a table, when, printers, for making electrotype plates from of course, the bottom of the bust is presented bare. The mould is now cut by means of a sharp knife, from the bottom up the back of the bust to the front of the head. It is next To Mould the Face of a Person held open by the operator, when an assistant Take 1 pound new wax, † pound lifts out the bust and the mould is allowed to re-close. A piece of brown paper is tied round till you can endure some of it on your hand it to keep it firm. The operator has now a without burning it; then, having oiled the complete mould of the bust in one piece; but face with olive oil, and covered the hair of he cannot treat it like wax moulds, as its substance is soluble in water, and would be destroyed if put into the solution. A mixture ness of a quarter of a dollar, being careful not of wax and resin, with occasionally a little to stop the nostrils, and that the person does suet, is melted and allowed to stand till it is on the point of setting, when it is poured carefully into the mould and left to cool. The Take the wax off gently, and mould is then untied and opened up as before; the wax bust is taken out, and the mould may not give way. After this manner you may be tied up for other casts. Besides wax and resin, there are several other mixtures used—deer's fat is preferable to common suct, stearine, etc. The object is to get a mixture that takes a good cast and becomes solid at a heat less than that which would melt the

3686. To Take Moulds of Figures. If the model or figure be composed of plaster of Paris, a mould is often taken in copper by deposition. The figure is saturated with wax (sce No. 3688), and copper deposited upon it sufficiently thick to bear handling without damage when taken from the model. The figure with the copper deposit is carefully sawn in two, and then boiled in water, by which the plaster is softened and easily separated from the copper, which now serves as the mould in which the deposit is to be made. pound black resin, 1 pound hard tallow, and ounces bees' wax. This last is more adapted for coarse work, such as architectural ornative. (See No. 3672.) When the deposit is made sufficiently thick, the copper mould is peeled off, and the two halves of the figure soldered to-Articles in plaster of Paris must be first gether. The copper moulds which are desoaked in water, observing that none remains posited upon the wax models taken in the elastic moulding are often treated in the same manner; but more generally these moulds are used for depositing silver or gold into them, to obtain fac-similes of the object in these metals, in which case the copper moulds

3687. To Coat Figures with Copper. When plaster busts or figures are wanted in copper, the usual way is to prepare the figure with wax (see No. 3688) and to coat it over with a thin deposit of copper, letting the copper remain. Some operators, when it can be

ter mode will cause the alloy to adhere to the cold, will not absorb the wax or tallow; hence copper and give it strength. In either of it may be recovered again. The sulphate of these cases the deposit must not be very thick, | copper possesses so penetrating a quality that or it will throw the figures out of proportion, such as the features of a bust, etc. Any slight roughness of deposit may be easily smoothed down by means of fine emery or glass paper. (See No. 1935.)

3688. To Prepare a Plaster Cast for Electrotyping. First dry the plaster cast in the oven thoroughly, then get equal parts of bees' wax and common resin, melt them together, and boil the cast until it will not absorb any more; when cold, get some good black lead and cover the cast entirely, not

thick, but a bright surface. (See No. 3389.)
3689. To Prepare Non-Metallic
Moulds to Receive Deposit. Were any of the plaster or wax moulds, described above, attached to the zinc and immersed in the copper solution in the same manner as described in No. 3569, no deposit would be obtained, because neither the plaster nor the wax is a conductor of electricity. Some substance must now be applied to the surface in order to give it conducting power. There are several ways of communicating this property, but the best and most simple for the articles under consideration is to apply common black lead (carburet of iron) in the following manner: A copper wire is put round the edge of the medal, or, if wax moulds are used, a thin slip of copper may be inserted into the edge of the mould—or, being slightly heated and laid upon the back, the two will adhere. A fine brush is now taken (a small hat brush is very suitable) and dipped into fine black lead, and of wax or plaster, the metal will either be brushed over the surface of the metal. The brushing is to be continued until all the face means of preserving them by bronzing see round to the wire upon the edge, or slip of copper forming connection, has a complete metallic lustre. A bright polish is necessary to obtain a quick and good deposit. In brushing on the black lead, care should be taken not to allow any to go upon the back or beyond the copper connection, or the deposit will follow it, and so cause a loss of copper, and make the mould more difficult to separate from the deposit; being, as it were, incased. When the face of the mould is properly black-leaded, the copper wire connected with it is attached to the zinc plate in the porous cell, and the mould immersed in the copper solution; the deposit will immediately begin upon the copper connection, and will soon spread over every part, completely covering the black-lead surface. When the deposit is considered sufficiently thick for removing-which, in ordinary circumstances, will require from 1 to 3 days—the medal is taken out of the solution, and washed in cold water, and the connection is taken off. If the deposit has not gone far over the edge of the mould, the two may be separated by a gentle pull; if otherwise, the superfluous deposit must be eased off, and if care be taken the wax may be fit to use over again; but when the mould is plaster of Paris, however well it may be saturated with wax, it is seldom in a condition to use again. If the plaster mould be large and thick, it is advisawhich is done by brushing it over with either of electricity. It is recommended by some substance in a melted state; the mould, being electrotypists to take out the bust, and coat

if the slightest imperfection occurs in the saturation of the mould by wax, the solution will penetrate through it, and the copper will be deposited upon the face of the object adhering to the plaster, giving to the metal a rough, matted appearance, and seriously in-

juring it. **3690**. To Use Metal Moulds. mould in fusible alloy does not require to be black-leaded, but the surface to be electrotyped must be prepared with turpentine, &c., (see No. 3673), and the back and edge must be protected by a coating of wax or other non-conducting material; it may be connected with the zinc pole by putting a wire round its edge previous to laying on the non-conducting substance, such as tallow or wax, which should also cover the wire. Or a slip of copper or wire may be laid upon the back, and fastened by a drop or two of sealing-wax; the back is then coated, but care must be taken that the wax does not get between the connection and the medal, which will prevent deposit. The deposit on this mould goes on instantaneously. When sufficiently thick, it may be taken off in the same manner as from the wax mould. These moulds may be used several times, if care be taken not to heat them, as they easily melt. The medals obtained from metallic moulds prepared with the turpentine solution have a bright surface, which is not liable to change easily, but if the mould has been prepared with oil or composed Nos. 3771, &c.

3691. Precautions on Putting the Moulds into a Solution. In putting moulds into the copper solution, the operator is often annoyed by small globules of air adhering to the surface, which either prevent the deposit taking place upon these parts, or, when they are very minute, permit the deposit to grow over them—causing small hollows in the mould, which give a very ugly appearance to the face of the medal. obviate this, give the mould, when newly put into the solution, two or three shakes, or give the wire attached to it, while the mould is in the solution, a smart tap with a key or knife, or anything convenient; but the most certain means we have tried, is to moisten the surface with alcohol just previous to putting it into the copper solution. A little practice in these manipulations will soon enable the operator to avoid these annoyances.

3692. Electrotyping on Large Ob-ects. When busts or figures, whether of jects. When busts or figures, whether of wax or plaster of Paris, are to be coated with copper, with no other conducting surface than black-lead, it is attended with considerable difficulty to the inexperienced electrotyper. The deposit grows over all the prominent parts, leaving hollow places, such as armpits, neck, etc., without any deposit; and when once missed, it requires considerable management to get these parts coated, as the coated ble to coat the back with wax or tallow, parts give a sufficient passage for the current

is not good, especially with plaster of Paris, out till finished. Sometimes the resistance of the hollow parts is occasioned by the solube remarked that when a bust or any large surface having hollow parts upon it, is to be may be covered over in a few hours. Care has to be observed in taking off the connections from the deposit, or the operator may tear off a portion of the deposit; if the wires used are fine, they should be cut off close to the deposited surface.

To Coat Busts and Figures. Busts and figures, and other complicated works of art, which cannot be perfectly coated with black-lead, may be covered by a film of silver or gold, which serves as a conducting medium to the copper. This is effected by a solution of phosphorus in sulphuret of carbon. The solution of phosphorus is prepared by adding to each pound of that substance 15 pounds bisulphuret of carbon, and then thoroughly agitating the mixture; this solution is applicable to various uses, and, amongst others, to obtaining deposits of metal upon non-metallic substances, either by combining it with the substances on which it is to be deposited, as in the case of wax, or by coating the surface thereof. Any of the known preparations of wax may be treated in this way, but the one preferred is composed of from 6 to 8 ounces of the solution, 5 pounds wax, and 5 pounds deer's fat, melted together at a low heat, on account of the inflammable nature of the phosphorus. The composition thus obtained is acted upon by an electrotyping solution as readily as if it were coated with the black-lead.

To Gild or Silver-Plate Flow-3694. ers, &c. If the solution of phosphorus (see No. 3693) is to be applied to the surface of the article, an addition is made to it of 1 pound wax or tallow, 1 pint spirits of turpentine, and 2 ounces pure India-rubber (dissolved with 1 pound asphalt, in bisulphuret of carbon), for every pound phosphorus contained in the solution. The wax and tallow being first melted, the solution of India-rubber and asphalt is stirred in; then the turpentine, and after that the solution of phosphorus is added. The solution prepared in this manner is applied to the surfaces of non-metallic substances, such as wood, flowers, etc., by immersion or brushing; the article is then immersed in a dilute solution of nitrate of silver or chloride of gold; in a few minutes the surthickness on the article being connected with a few drops of solution of nitrate of silver;

the parts deposited upon the wax, to prevent any of the electrical apparatus at present emany further deposit on them; but this practice ployed for coating articles with metal. The is not good, especially with plaster of Paris, solution intended to be used is prepared by for an electrotype ought never to be taken dissolving 4 ounces silver in nitricacid, and afterwards diluting the same with 12 gallons water; the gold solution is formed by dissolvtion becoming exhausted from its position in ing I ounce gold in nitro-muriatic acid (aqua regard to the positive pole. In this case a regia), and then diluting it with 10 gallons change of position effects a remedy. It may water. The solutions of silver and gold, prepared as above, will last for a long time, and serve for a great many articles. When it is electrotyped, as many copper connections as convenient it is best to use both solutions. possible ought to be made between these The connecting wire should first be attached parts and the zinc of the battery. Let the to the article to be coated, before being dipped connections with the hollow parts be made into the phosphorus solution, but connected with the finest wire which can be had, at such parts as will not hurt the appearance and let the zine plate in the cell have a of the object by leaving a mark when it is large surface compared to the surface of the taken off. Care should be taken not to touch figure, and the battery be of considerable in-the article with the hands after it is dipped tensity; if attention is paid to these condi-into the solution. The object supported by tions, the most intricate figures and busts the connections is immersed in the phosphorus solution, where it remains for two or three minutes. When taken out it is dipped into the silver solution, and, as soon as the surface becomes black, having the appearance of a piece of black china, it is to be dipped several times in distilled water, and then immersed in the solution of gold about three minutes; the surface takes a bronze tinge by the reduction of the gold. It is next washed in distilled water by merely dipping, not by throwing water upon it. The wire connection is now attached to the zinc of the battery, and then the article put into the copper solution, and in a few minutes the article is coated over with a deposit of copper. A thin copper

surface may thus be given to small busts or figures without sensibly distorting the features.

3695. Electrotyping on Wood. Dip the wood in melted wax, then brush over with black-lead until polished; insert a wire of copper, and see that it is also covered with the plumbago, and in contact with that already on the wood; now attach to the pole of the battery, and immerse in the solution of sul-phate of copper. The battery should not be too strong.

lectroplating. The foregoing matter refers to electrotyping, that is, copper-coating, by galvanism. Electroplating, or coating with silver, is conducted in a simi lar manner to electrotyping as far as general principles and manipulation are concerned, but differs in the solutions used, as well as in the preparation of the objects to be electroplated.

3697. To Prepare Cyanide of Silver. First dissolve 1 ounce pure silver in 2 ounces nitric acid and 2 ounces hot water, after which further dilute with I quart hot water. The propriety of diluting the nitrate of silver before precipitating by the eyanide of po-tassium arises from the fact that the salts of potash and soda (such as the nitrates, chlorides, and sulphates), when in strong solution, dissolve small quantities of the silver salt, and thus cause a loss, which is prevented by previous dilution with water. The nitric acid used must be free from hydrochloric (muriface is covered with a fine film of metal, used must be free from hydrochloric (murisufficient to ensure a deposit of any required atic) acid; to a small quantity of the acid add

if it gives a milky white precipitate, it contains muriatic acid, and should be rejected. Silver. A good silver solution for electroin 1 quart water. Add this by degrees to the solving 1 part oxide of silver in 8 parts evanide silver solution until the whole of the silver is of potassium and 64 parts warm water. Oxprecipitated, which may be tested thus: Stir ide of silver is made by precipitating a soluthe mixture and allow it to settle; then drop tion of the nitrate by a dissolved alkali like into the clear liquid a very small quantity of potassa or baryta. the second preparation, from the end of a glass roa; if the clear liquid is rendered turbid, it the Battery. is a proof that the whole of the silver is not method of makin

using, as there is always formed a black sediment, composed of iron, silver, and cyanogen, which, if left in the solution, would fall upon ver. The cyanide of potassium, used to dissolve the cyanide of silver, may be so diluted that the plating solution, when formed, shall In dissolving 100 ounces of silver, the following proportions of each ingredient are those which have been found in practice to be the best. Take 7 pounds of the best nitric acid, the 100 ounces of silver dissolved in the acid solution. After this is washed, take 62 ounces more of cyanide of potassium, the solution of which will dissolve the precipitate; this being done, the plating solution is then form-Of course these proportions will vary according to the difference in the quality of order, and cannot be rendered fit for use the materials; but they will serve to give an idea of the cost of the silver solution prepared

in this manner. potash (ferrocyanide of potassium), 3 pounds solution should be diluted, or a portion of the of which are required to dissolve 1 ounce of precipitate will be redissolved. The precipisilver. This forms an excellent plating solution, and yields a beautiful surface of silver. It must have a weak battery power, and con-sequently the silver is very soft. The positive electrode does not dissolve in this solution: there is formed upon its surface a white scaly crust, which drops off and falls to the bottom; and the solution soon becomes exhausted of silver, and will need to be renewed.

3700. Solution Made with Oxide of Then dissolve 5 ounces cyanide of potassium plating white metal and brass is made by dis-

3701. To Make Silver Solution by The best and cheapest method of making up the silver solution is by separated; but if the liquid remains un- the battery, which saves all expense of acids changed, it shows that the silver is entirely and the labor of precipitation. To prepare a separated. The clear liquid is then to be silver solution which is intended to have an poured off, and the precipitate, which is cyan-jounce of silver to the gallon, dissolve 123 ide of silver, washed at least 4 times in hot ounces cyanide of potassium in 100 gallons water, dried and bottled for use. The use water; get one or two flat porous vessels, and handling of cyanide of potassium requires submerge them in this solution to within half great caution, as 11 grains of it are sufficient an inch of the rim, and fill them to the same to kill a grown person. The fumes thrown height with the solution; in these porous off while dissolving the silver in nitric acid vessels place small plates or sheets of iron or are also highly deleterious, and must not be copper, and connect them with the zinc pole inhaled; it is better, therefore, not to dissolve silver in a close room.

3698. To Make Silver Solution. The silver connected with the silver pole of the solution of silver used for plating consists of battery. This arrangement being made at cyanide of silver dissolved in potassium, addinght, and the power employed being a cyanide of silver dissolved in potassium, add-night, and the power employed being a ing a solution of cyanide of potassium to the Smee's battery of 6 cells, the zines 7 inches cyanide of silver until it is all dissolved. The square, it will be found in the morning resulting solution constitutes the cyanide of that there will be dissolved 60 to 80 ounces potassium and silver, and forms the plating of silver from the sheets. The solution is now solution. It ought to be filtered previous to ready for use; and by observing that the articles to be plated have less surface than the silver plate forming the positive electrode, for the first two days, the solution will then the surface of the article receiving the deposit, have the proper quantity of silver in it. Ocand make it rough. The sediment, however, casionally a little silver is found in the must not be thrown away, as it contains silporous cell; it is therefore not advisable to easionally a little silver is found in the porous cell; it is therefore not advisable to throw away the solution in them without first testing it for silver, which is done by adding a little muriatic acid to it. The amacontain 1 ounce of silver in the gallon; of teur electrotypist may, from this description, course the proportion of silver may be larger make up a small quantity of solution for silver smaller, but that given is best for plating. vering his medals or figures. For example, a vering his medals or figures. For example, a half-ounce of silver to the gallon of solution will do very well; a small quantity may be prepared in little more than an hour. As the cyanide of potassium dissolves silver without and 61 ounces of cyanide of potassium, of the average quality; this quantity will precipitate formed by merely allowing a piece of silver to steep in this solution for a few days; but this is tedious and uncertain, although for small operations, and where porous vessels are not

convenient, it will serve the purpose.
3702. To Recover Silver from Solu-3702. To Recover Silver from Solution. When a silver solution gets out of again, the silver may be recovered by adding to the solution any acid that will neutralize the alkali; if nitric or sulphuric acid be used, 3699. To Dissolve Cyanide of Silver the silver precipitates as cyanide, but if hydroin Yellow Prussiate of Potash. Dissolve chloric acid be used, the silver will be pretted (foregoveride of potasium) 2 nounds adulting about the diluted of potasium) 2 nounds adulting about the diluted of potasium) 2 nounds adulting about the diluted of potasium) 2 nounds tate is allowed to deposit, the clear liquor de-canted, and the vessel filled with water to wash the precipitate, which is afterwards collected upon a filter and dried, and then mixed with twice its weight of carbonate of potash, and fused in a Hessian crucible for 15 minutes, or until the fused fluid ceases to effervesce. On removing the crucible, and pouring the whole into an iron ladle, when

cool the silver will be found in the metallic is known by taking some nitrate of silver, solution to dryness, and to fuse the product as described; in which case the cyanide is an excellent reducing flux, requiring no addition of carbonate of potash, and saves the necessity

of evolving poisonous fumes.

3703. Test for Free Cyanide of Potassium in Solutions. If we dissolve a a deep blue color. Cyanide of potassium will

dissolve in water; then take a certain quantity, say 100 grains, of sulphate of copper, and convert it into ammoniuret, the whole measuring a given quantity, and pour from an alkalimeter this blue liquor into the cyanide of potassium till it ceases to destroy the color, then mark the number of graduations required, and that amount of copper solution will rep-

resent 10 grains cyanide of potassium—a quantitative test will thus be got for the full cvanide of potassium in the solution, and should be used as follows: Say that the color of 60 graduations of the blue solution was destroyed by the 10 grains of cyanide of potassium; then, to test the quantity of free cyanide of potassium in the plating solution, take 60 graduations of the blue liquor in any convenient vessel, and add to it from an alkalimeter

the plating solution, till the color of the blue liquor is destroyed, then note the quantity which contains 10 grains free cyanide, from which the quantity in the whole solution may be calculated.

3704. Test for the Quantity of Free Cyanide of Potassium in Solutions. It has been already mentioned that the cyanide of silver, as it forms upon the surface of the silver plate, is dissolved by the cyanide of potassium. This renders it necessary to have always in the solution free cyanide of potassium. Were we to use the pure crystalline salt of cyanide of potassium and silver, dis-solved in water, without any free cyanide of potassium, we should not obtain a deposit beyond a momentary blush, as the silver plate or electrode would get an instantaneous coatquantity of free cyanide of potassium required there be too much, the silver plate will be dissolved in greater proportion than the quantity deposited, and the solution will consequently

state at the bottom of the ladle. In these dissolving it in distilled water and placing it operations, when pouring the acid into the in a common alkalimeter (see No. 82), gradueyanide solution, great care must be taken ated into 100 parts. The proportion of the not to inhale the fumes given off, which are nitrate of silver in the solution is to be such very abundant and poisonous. The operation should be done in the open air, and even then should contain 1 grain. A given quantity of it is bad. Instead of throwing down the silver by an acid, it is better to evaporate the solution to dryness, and to fuse the product nitrate of silver is added to it by degrees, so long as the precipitate formed is redissolved. When this ceases the number of graduations is then noted, and the following equation gives the quantity of free cyanide. Every 175 nitrate of silver are equal to 130 cyanide of potassium in solution. Suppose 20 gradusmall quantity of sulphate of copper and add ations were taken, equal to 10 grains nitrate to it an excess of ammonia, there is produced of silver, then 175: 130:: 10:7.4 grains free a deep blue color. Cyanide of potassium will cyanide of potassium. This, multiplied by destroy the blue color, in a fixed chemical 160, the number of fluid ounces per gallon, proportion. To obtain this proportion, take will make about 2½ ounces. We have taken ten grains of pure cyanide of potassium and 2 graduations to 1 grain of nitrate of silver, that the solution may be considerably dilute and less liable to error. The following table is calculated at a half grain nitrate of silver to the graduation, and will be a guide to the student or workman. The quantity of solution tested is 1 ounce by measure.

Number of graduations used.	Free cyanide per gallon.		
<u> </u>	oz.	dwt.	gr.
1	0	2	13
	0	5 7	3
2 3 4 5 6 7 8 9	0	7	16
4	$_{0}^{0}$	10	6
5	0	12	19
6	0	15	9
7	0	17	22
8	1	0	13
9	1	3	1
10	1	3 5 8	12
11	1		5
12	1	10	19
13	1	13	8
14	1	15	22
15	1	18	11
16	2	1	2
17	2	3	14
18	2 2 2 2 2	6	2
19	2	8	11
20	2	11	0

3705. To Cleanse Articles for Electro-Articles that are to be plated are plating. first boiled in an alkaline lye, to free them from grease, then washed from the lye, and dipped into dilute nitric acid, which removes any ing of cyanide of silver, and this not being oxide that may be formed upon the surface; dissolved, the current would stop. The they are afterwards brushed over with a hard brush and fine sand. (See No. 3381.) The in the solution varies according to the alkaline lye should be in a caustic state, which amount of silver that is present, and the is easily effected by boiling the carbonated rapidity of the deposition. If there be too alkali with slacked lime, until, on the addition little of it, the deposit will go on slowly; if of a little acid to a small drop of the solution, no effervescence occurs. (See No. 101.) The lime is then allowed to settle, and the clear liquor is fit for use. The lye should have get stronger. The proportion we have found about 1 pound soda-ash, or pearl-ash, to the best is about half by weight of free cyanide of gallon of water. The nitric acid, into which potassium to the quantity of silver in solution; thus, if the solution contains 2 ounces an extent that it will merely act upon the of silver to the gallon, it should have I ounce metal. Any old acid will do for this purpose. of free cyanide of potassium per gallon. This In large factories the acid used for dipping

Decomposing Cell. The article being therattached to it, either by twisting it round the article or putting it through any open part of it, to maintain it in suspension. It is then dipped into nitric acid as quickly as possible, and washed through water, and then immersed in the decomposing cell containing silver solution, suspending it by the wire which connects with the zinc pole of the battery. The nitric acid generally used and found best for dipping has a specific gravity 1.518, and contains 10 per cent. sulphuric acid. The article is instantaneously coated with silver, and ought to be taken out after a few seconds and fine sand will do for small work. This brushing is used in ease any particle of foreign matter may be still on the surface. It is then replaced in the solution, and in the course of a few hours a coating of the thickness of Any thickness of silver may be given to a plate by continuing the operation a proper length of time. 14 to 14 ounces of silver to the square foot of surface will give an excellent plate about the thickness of ordinary writing paper. We may remark that, in de-positing silver from the solution, a weak battery may be used; though when the battery is weak the silver deposited is soft, but if used as strong as the solution will allow, the silver will be equal in hardness to rolled or hammered silver. If the battery is stronger than the solution will stand, or the article very small compared to the size of the plate of silver forming the positive electrode, the silver will be deposited as a powder. Gas should never be seen escaping from either pole; and the surface of the article should always correspond as nearly as possible with that of the positive electrode, otherwise the deposit runs the risk of not being good; it requires more care, and the solution is apt to be altered in strength, because if the positive electrode be large compared with the negative, the solution will become stronger in silver, while if smaller in proportion the solution will become exhausted of silver.

3707. To Silver-plate Large Articles (such as those plated in factories), it is not always sufficient to dip them in nitric acid; wash and immerse them in the solution, in order to effect a perfect adhesion of the two metals. To secure this, a small portion of quicksilver is dissolved in nitric acid, and a little of this solution is added to water, in sufficient quantity to enable it to give a white silvery tint to a piece of copper when dipped into it; the article then, whether made of copper, brass, or German silver, after being dipped in the nitric acid and washed, is dipped into the nitrate of mercury solution till the surface is white; it is then well washed by plunging it into two separate vessels containing clean water, and finally put into the success in silver-plating upon metals and me-

before plating is generally afterwards em-!thus dissolved will do for a long time, though ployed for the above purpose of cleaning. the liquor is used every day. When the 3706. To Prepare Articles for the mercury in this solution is exhausted, it is liable to turn the article black upon being oughly cleaned and dried, has a copper wire dipped into it; this must be avoided, as in that ease it also causes the deposited metal to strip off.

3708. To Preserve the Dead, Matted Appearance of Silver after Electroplating. If it is desired to preserve the surface in this condition, the article must be taken out of the electroplating solution, care being taken not to touch it by the hand, and im-mersed in boiling distilled water for a few minutes. On being withdrawn, sufficient heat has been imparted to the metal to dry it instantly. If it is a medal, it ought to be put in an air-tight frame immediately, or if a well brushed. On a large scale, brushes of figure, it may be at once placed under a glass brass wire attached to a lathe are used for this shade, as a very few days' exposure to the air purpose; but a hard hair brush with a little tarnishes it, by the formation of sulphuret of silver, especially in a room where there is fire or gas.

To Remove the Chalky Apof Silver after Plating. When 3709. pearance of Silver after Plating. articles are taken out of the electroplating tissue paper is deposited on it, having the solution they are swilled in water, and then beautiful matted appearance of dead silver. put into boiling water. They are afterwards put into hot sawdust, which dries them perfectly. Their color is chalk-white. They are generally weighed before being scratch-brushed; that is, brushed with fine wire brushes (see Nos. 3381 and 3706), and old ale, beer, or water containing in solution a little gum, glue, or sugar, but the amateur may use a hard hair brush. It may be afterwards burnished according to the usual method of burnishing, by rubbing the surface with considerable pressure with polished steel or the mineral termed bloodstone. Although this operation does not displace any of the silver, still, in taking off the chalky appearance, there is a slight loss of weight. The appearance after scratching is that of bright metallic silver.

3710. To Increase the Brightness of the Deposit. A little sulphuret of carbon added to the plating solution prevents the chalky appearance, and gives the deposit the appearance of metallic silver; the reaction which takes place in this mixture is not yet understood. The best method of applying the sulphuret of carbon is to put one or two ounces into a large bottle, then fill it with strong silver solution having an excess of cyanide of potassium, and let it repose for several days, shaking it occasionally. A little of this silver solution is added, as required, to this plating solution, which will give the articles plated the same appearance as if scratched. It is also found that the presence of sulphuret of carbon prevents the solution from going out of order; indeed, we have seen a solution that has been constantly working from two to three years, while, generally, they were subject to go out of order for a time, in less than one year—although, after standing a time, they would recover—but these are curious reactions not yet investigated.

3711. To Insure Success in the Elecplating solution. This secures perfect adhetallic alloys, two solutions of silver are resion of the metals. One ounce of quicksilver quisite; the first, to whiten or fix the silver to such metals as iron, steel, britannia metal, the vessel. The silver being removed, the and German silver; the second, to finish the article is well washed and then passed through

posited from the second solution.

3712. First, or Whitening Solution. Dissolve 21 troy pounds cyanide of potassium, 8 ounces carbonate of soda, and 5 ounces operator.

3713. Second, or Finishing Solution. Dissolve 4½ troy ounces cyanide of potassium, and 1½ ounces cyanide of silver, in 1 gallon rain or distilled water. This solution should be used with one large cell of Smee's battery,

possible.

Boettger's Test for the Silver 3714. consists of a saturated solution of bichromate of potassa in nitric acid, specific gravity 1.2. Any dirt or varnish having been removed by strong alcohol from the metallic surface to be ash before it is plated. tested, a drop of the test fluid is applied to it by means of a glass rod, and immediately afterwards washed off with some cold water. coins, these are left in contact with the test Upon German silver (chromate of silver). the test liquid appears brown, but after washing with water the blood-red colored mark does not appear; the so-called britannia-metal silver is obtained, in combination with a little is colored black; on platinum no action is vis-copper. ible; metallic surfaces coated with an amalgam of mercury yield a reddish speck, which, however, is entirely washed off by water; on lead and bismuth the test liquid forms a yeltirely removed by water, while, as regards the latter, the test liquid is colored brownish, and addition of water produces a yellow precipitate which somewhat adheres to the

2 quarts rain water, dissolve 2 pounds cranide of potassium, and filter. In order to plate for one minute, then clean with pumics stone, and brush; rinse, and hang in solution of solution until plated heavy enough. (See No.)

Taking Silver from Copper, Etc. First by stripping or dissolving it off; this is done by putting into a stoneware or copper pan some strong sulphuric acid (vitriol), to which a little nitrate of potassa is added; the article is laid into this solution, is added by degrees, as occasion requires; and by giving it a very thick coating of silver, if the action is slow a little heat is applied to which takes away the sharpness of the im-

work, as any amount of pure silver can be de- the potash solution, and finished for plating. When the sulphuric acid becomes saturated with silver it is diluted, and the silver is precipitated by a solution of common salt; the chloride of silver formed is collected and fused cyanide of silver in 1 gallon rain or distilled in a crucible with carbonate of potash, when water. This solution should be used with a the silver is obtained in a metallic state, as a compound battery of 3 to 10 pairs, according knob or button. The crucible should not be to the size of the work to be plated. The use over two-thirds full, and sould be kept in furof this solution will insure the adhesion of silesion till effective scence ceases. The crucible is ver to all kinds of brass, bronze, type metal, then removed from the fire, and, when cool, it &c., without employing mercury, the frequent is broken. (See No. 3702.) The article thus use of which is injurious to the health of the stripped by acids often shows a little roughness, not from the effects of the acid, but because the copper under the silver has not been polished; it is therefore a necessary practice in the electroplating factories to polish the articles before plating. This is done by means of a circular brush, more or less observing that the silver plate is placed as hard as required, fixed upon a lathe, and a thin near the surface of the articles to be plated as paste made of oil and pumice-stone ground as fine as flour. By this process the surface of any article can be smoothed and polished; on Silver-Plated Metals. The test fluid but a little experience is required to ensure success, and enable the operator to polish the surface equally without leaving brush marks. After this the article must be cleaned in pot-

3717. To Recover Silver from Copper. Instead of stripping off the silver by means of acid, as in No. 3716, it is a more common If pure silver is present (as regards silver and preferable mode to brush off the silver by the operation just described. In this case fluid for a greater length of time), there will the brushings must be collected, dried, and appear clearly a blood-red colored mark burned; this may be done in an iron pan, keeping it at a red heat until all carbonaceous matters are consumed; the remainder is fused with carbonate of soda or potash, when the

copper. 3718. Cyanide of Silver and Potassium, its Decomposition During the Plating Process. The silver salt in the plating solution is a true double salt, being, low-colored precipitate; zinc and tin are as already described, a compound of 1 equiboth strongly acted upon by this test liquid, valent of cyanide of silver, and 1 of cyanide of which, as regards the former metal, is enpotassium—two distinct salts. In the decomposition of the silver solution by the electric current, the former, cyanide of silver, is alone affected; the silver is deposited, and the cyanogen passes to the positive plate or electrode. The cyanide of potassium is therefore 3715. Plating on Iron or Steel. Take set at liberty upon the surface of the article quarts rain water, dissolve 2 pounds cranide receiving the silver deposit, and its solution, of potassium, and filter. In order to plate being specifically lighter than the general steel or iron, dip it into pure sulphuric acid mass of the plating solution, rises to the top; this causes a current to take place along the face of the article being plated. If the article cyanide of potassium for three minutes, or has a flat surface, suppose that of a waiter or until it becomes white; then hang in silver tray, upon which a prominence exists, as a mounting round the edge, it will cause lines and ridges from the bottom to the top. Newly formed solutions are most subject to produce this annoyance.

Dead Silvering for Medals. 3719. The perfect smoothness which a medal generally possesses on the surface, renders it very difficult to obtain a coating of dead silver which will dissolve the silver without materi- upon it, having the beautiful silky lustre ally affecting the copper; nitrate of potassa which characterizes that kind of work, except

obtained by putting the medal, previous to bottle. silvering, in a solution of copper, and depositmere blush of copper, which gives the face of testing of silver is founded upon the insolumedal is then to be washed from the copper however, difficult to carry out when an article solution, and immediately to be put into the is very thinly plated. A drop of the test silver solution. A very slight coating of sil-liquid (see last receipt) is then brought in ver will suffice to give the dead frosty lustre so contact with the metal to be tested, and im-

Plated Goods. Oil of vitriol, together with lowing precautions: The metallic surface 5 per cent. of nitrate of soda, is heated in a must have been quite cleansed from grease or cast-iron boiler, or a stoneware pan, to 212° varnish with spirits of wine—water must be Fahr. The silver-plated clippings are placed poured over the treated surface before judging in a sheet-iron bucket or cullender, which is fastened to a pulley that it may be moved about in the acid. As soon as the silver is is not distinctly visible until the colored removed, the cullender is raised, allowed to liquid has been washed off. The red spot can drain, then immersed in cold water and emptied, to be again used in the same manner. finger. By this method the slightest trace of When the acid bath is fresh, the desilvering silver in an alloy may be ascertained. proceeds very rapidly, and even with heavy an article is suspected to be only thinly plated, plated ware takes but a few minutes; with a very minute drop of the testing fluid should the gradual saturation of the bath more time be used. With no other metal or alloy does is required, and it is readily perceived when this red spot, so characteristic of silver, apthe acid must be renewed. The small amount pear; in some cases the testing fluid only of acid solution adhering to the copper, precorrodes the surface of the metal, whilst in cipitates its silver when brought into the wa-To obtain its complete removal, the clippings, when raised from the desilvering bath, and before immersion in water, may be dipped into a second bath prepared in the same mauner, which is afterwards to be used been strongly corroded. Britannia metal in place of the first. The saturated bath, on yields a black spot; zinc is strongly corroded; cooling, congeals to a crystalline semi-fluid platinum is not attacked; lead gives a yellow mass of sulphate of copper and of soda. The silver is removed by chloride of sodium (com-fluid; when the brownish-colored testing mon salt) which is added in small portions at fluid is washed off, a yellow precipitate is pera time, while the solution is yet warm. The ceived, which adheres tightly to the metal; chloride of silver separates readily, and is copper is strongly attacked, a tarnished suracid solution contains but a very small por- of the acid. tion of copper, hardly enough to pay for recovering.

3721. To Recover Silver from Cop-This process is applied to recover the silver from the plated metal, which has been rolled down for buttons, toys, etc., without destroying any large portion of the copper. For this purpose, a dissolving solution is composed of 3 pounds oil of vitriol, 1½ ounces nitre, and 1 pound water. The plated metal is boiled in it till the silver is dissolved, and then the silver is recovered by throwing common salt into the solution. (See No. 3214.)

3722. Goods. For this purpose a testing fluid is prepared by adding pure nitric acid to powdered red chromate of potash, and mixing them in such a manner that a part of the latter remains in suspension, the whole being kept yellow deposit, which may be collected, well stirred during the mixing. Equal parts by weight of each may be taken. The nitric of gold, and must be handled and prepared must be quite free from hydrochloric acid, and have the proper degree of concentration, being neither too fuming nor too dilute; it should have a specific gravity between 1.20 Add a solution of cyanide of potassium to a and 1.25. When the mixture has been prepared for a few hours, and been stirred several until all the precipitate is redissolved; but times, the reddish-colored liquid is poured off this gives chloride of potassium in the solu-

This dead appearance can be easily from the residue and kept in a stoppered

3723. To Test Silver-Plated Goods. ing upon it, by means of a weak current, a The ordinary and very accurate method of the medal that beautiful crystalline richness bility of chloride of silver in dilute acids and that deposited copper is known to give. The in water. This otherwise satisfactory test is, much admired, and in general so difficult to mediately washed off again with water. If obtain.

3720. To Recover Silver from Old present. This method requires only the folafterwards be very easily removed with the others colored precipitates are formed, which, however, cannot be confounded with those of silver. German silver brought into contact with the testing fluid affords no red spot after being washed. The spot will, however, have been strongly corroded. Britannia metal washed and reduced in the usual manner. The face of this metal is brightened by the action

> Electro-Gilding. The opera-tion of gilding, or covering other metals with a coating of gold by the battery, is performed in the same manner as electroplating, with the exception of a few practical modifications.

3725. To Prepare Chloride of Gold. Dissolve 1 part gold in 3 parts nitro-hydro-chloric acid (aqua regia); evaporate until vapors of chlorine begin to be disengaged, then set the solution aside to crystallize. Test Fluid for Silver-Plated Aqua regia consists of 1 part nitric acid and 2 parts (both by measure) muriatic (hydrochloric) acid.

If aqua ammonia be added to a solution of with great caution, it being the fulminate of gold.

3726. To Prepare a Solution of Gold.

interesting reactions. cyanide of potassium. minate of gold), which precipitates with the collected and dried, it would explode when slightly heated. By previously diluting the is neutralized by the potash, further addition of the evanide of potassium precipitates the gold as cyanide of gold, having a light yellow is heated to 200°. color; but as this is slightly soluble in ammonia and some of the alkaline salts, it is not The process of gillows. moma and some of the alkaline salts, it is not advisable to wash the precipitate, lest there be a loss of gold. Cyanide of potassium is generally added until the precipitate is redissolved; consequently much impurity is form. in the solution, namely, nitrate and carbonate of potash with chloride of potassium and

3727. To Prepare Cyanide of Gold. Dissolve 1 ounce of fine gold in 28 penny-weights nitric acid and 2 ounces muratic

same manner.

3728. To Prepare a Solution of Gold. Dissolve 4 troy ounces evanide of potassium and 1 ounce cyanide of gold in 1 gallon rain or distilled water. This solution is to be used at about 90° Fahr., with a battery of at least two cells. Gold can be deposited, of various by the cyanide of copper solution (see Nos. shades to suit the taste, by adding to the sold 3754 and 3755), and immediately put into the solution a small quantity of the cyanides of silver, copper, or zinc, and a few drop of hydrosulphuret of ammonia.

3729. To Prepare a Gold Solution by the Battery Process. To prepare a gallon of gold solution, dissolve 4 ounces cyanide of potassium in 1 gallon water, and heat the solution to 150° Fahr.; now take a small porous cell and fill it with this cyanide in quantity to gild the articles at once, so solution, and place it inside the gallon of solution; into this cell is put a small plate of iron or copper, and attached by a wire to the zine pole of a battery. A piece of gold is placed at the point touching the surface of the solu-into the large solution, facing the plate in the tion. The rapidity with which metals are porous cell, and attached to the silver of the acted upon at the surface line of the solution battery. The whole is allowed to remain in is remarkable. If the positive electrode is action until the gold, which is to be taken out from time to time and weighed, has lost the in a short time, be cut through at the surface quantity required in solution. By this means of the water, as if cut by a knife. This is a solution of any strength can be made, according to the time allowed. The solution in the porous cell, unless the action has continued long, will have no gold, and may be the Gold Solution. As the gold solution thrown away. Half an hour will suffice for a small quantity of solution—of course any from time to time be added. The water quantity of solution may be made up by the should always be added when the operation

tion, which is not good. In the preparation same means. For all the operations of gilding of the solution by this means there are some by the cyanide solution, it must be heated to As the chloride of at least 130° Fahr. The articles to be gilt gold has always an excess of acid, the addi- are cleaned in the way described for silver tion of cyanide of potassium causes violent (see No. 3705), but are not dipped into nitric effervescence, and no precipitate of gold takes acid previous to being put into the gold soluplace until all the free acid is neutralized, tion. 3 or four minutes is sufficient time to which causes a considerable loss to the gild any small article. After the articles are There is always cleaned and dried they are weighed, and, formed in this deposition a quantity of ammonia and carbonic acid, from the deposition the quantity of gold deposited is ascerof the cyanate of potash; and if the chloride tained. Any convenient means may be of gold be recently prepared, and hot, there is adopted for heating the solution. The one often formed some aurate of ammonia (ful-generally adopted is to put a stoneware pan containing the solution into an iron or tincyanide of gold. Were this precipitate to be plate vessel filled with water, which is kept at the boiling point either by being placed upon a hot plate or over gas. The hotter the chloride of gold, or using it cold, this com-pound is not formed. After the free acid Generally a battery of 3 or 4 cells is used for gilding, and the solution is kept at 130° to 150° Fahr. But 1 cell will answer if the solu-

es, which cleanse away any tarnish from the surface, and prevents the formation of airammonia. Notwithstanding, this solution bubbles. They are then kept in clean water works very well for a short time, and it is until it is convenient to immerse them in the very good for operations on a small scale. which merely imparts a blush of gold; they are taken out and again brushed; they are weights nitric acid and 2 ounces muriatic then put back into the solution and kept acid, and add 1 quart hot water. Precipitate there for 3 or 4 minutes, which will be suffiwith the second preparation used for cyanide cient if the solution and battery are in good of silver (see No. 3697), and proceed in the condition; but the length of time necessarily depends on these two conditions, which must be studied and regulated by the operator.

3731. To Electro-Gild Iron, Tin, and Lead. Iron, tin, and lead are very difficult to gild direct; they therefore generally have a thin coating of copper deposited upon them

gilding solution.

3732. Conditions Required in Electro-Gilding. The gilding solution generally contains from one-half to an ounce of gold in the gallon, but for covering small articles, such as medals, for tinging daguerreotypes, gilding rings, thimbles, etc., a weaker solution will do. The solution should be sufficient that it should not have to be done bit by bit; for when there is a part in the solution and a part out, there will generally be a line mark not wholly immersed in the solution, it will, also the case in silver, copper, and other solutions

3733. To Maintain the Strength of

tain a deposit of a good color, much depends does the silver. upon the state of the solution and battery; it 3735. To exceed 3 per cent., though occasionally it rose color. Different hues may be had by a variation in the mixture. ever, was 25 per cent. In some cases double amount deposited. A little allowance, how-color as that desired to be deposited. ever, must be made for small portions of 3737. Practical Suggestions in Elecbeing gilt, and which is caused by the ten-dency to evolve gas. In this case an addition of eyanide of potassium would increase the evil. The black appearance from the tensure guide.

3734. To Regulate the Color of the Gilding. The gold upon the gilt article, on coming out of the solution, should be of a dark yellow color, approaching to brown; but this, when scratched (see No. 3709), will yield a beautifully rich deep gold. If the color is blackish it ought not to be finished, for it will have gitter brush or burnish a good color. blackish it ought not to be finished, for it will Gold by the Battery on Paper and other never either brush or burnish a good color. Fibrous Material. The whole question is If the battery is too strong, and gas is given to make the paper a good conductor of elec-off from the article, the color will be black; tricity without coating it with a material if the solution is too cold, or the battery rather weak, the gold will be light-colored; is to take a solution of nitrate of silver, pour so that every variety of shade may be impart- in liquid ammonia till the precipitate at first ed. A very rich dead gold may be made by formed is entirely dissolved again, and place adding ammoniuret of gold (see No. 3725) to the paper, silk, or muslin for one or two hours

of gilding is over, not when it is about to be the solution just as the articles are being put commenced, or the solution will not give so in; or, what is better, add some sulphuret of satisfactory a result. When the gilding opera- carbon in the same way as for silver solutions tion is continued successively for several days, (see No. 3710), which affects the color and the water should be added at night. To ob-appearance of the gold in the same way as it

3735. To Improve the Color of Gildis therefore necessary that strict attention be ing. A defective colored gilding may be impaid to these, and the more so as the gold so-proved by the help of the following mixture: lution is very liable to change if the size of 3 parts nitrate of potassa (saltpetre), 1½ parts the article receiving the deposit is not the alum, 11 parts sulphate of zinc, and 11 parts same as that of the positive electrode plate | common salt, are put into a small quantity of The result of a series of observations and experiments, continued daily throughout a upon the articles to be colored; these are period of nine months, showed that in five then placed upon an iron plate over a clear instances only the deposit was exactly equal fire, so that they will attain nearly to a black to the quantity dissolved from the positive plate. In many cases the difference did not cold water. This gives them a beautiful high

3736. To Electro-gild with Red the quantity dissolved was deposited, in Gold. Gold having the red color of 14 carat others the reverse occurred—both resulting gold may be deposited by the battery in the others the reverse occurred—both resulting gold may be deposited by the battery in the from alterations made in the respective profellowing manner: Prepare a solution of cesses; for in these experiments, the state of cyanide of copper by adding cyanide of potasthe solution and the relative sizes of the negsium to a solution of sulphate of copper until ative and positive electrodes were varied, as the precipitate at first throw, down is redisfar as practicable. The most simple method solved. Add to this a solution of cyanide of of keeping a constant register of the state of gold (see No. 3727) in sufficient quantity to the solution is to weigh the gold electrode give, on trial, the desired color of gold debefore putting it into the solution; and, when posit. When using this solution, the positive taking it out, to compare the loss with the electrode plate should be of gold of the same

metal dissolved in the solution, from the articles that are gilt, which, when gilding is pergold deposited, so will be its durability. A formed daily, is considerable in a year. A few grains will serve to give a gold color to a constant control can thus be exercised over very large surface, but it will not last. This the solution, to which there will have to be added from time to time a little cyanide of used for the most inferior quality of gilding. potassium, a simple test of requirement being Gold thinly laid upon silver will be of a light that the gold positive electrode should always color, because of the property of gold to come out clean, for if it has a film or crust it transmit light. The solution for gilding silis a certain indication that the solution is dever should be made very hot, but for copper ficient of cyanide of potassium. Care must it should be at its minimum heat. A be taken to distinguish this crust, which is mere blush may be sufficient for articles not occasionally dark-green or black, from a black subjected to wear; but on watch cases, pencil appearance, which the gold electrode will take cases, chains, and the like, a good coating when very small in comparison to the article should be given. An ordinary sized watch case should have from 20 grains to a pennyweight; a mere coloring will be sufficient for the inside, but the outside should have as much as possible. A watch case thus gilt, dency to the escape of gas has a slimy ap-pearance. This generally takes place when without becoming bare. Small silver chains the solution is nearly exhausted of gold, of should have 12 grains; pencil cases of ordinwhich fact this appearance, taken conjointly ary size should have from three to five grains; with the relative sizes of the electrodes, is a a thimble from 1 to 2 grains. These suggestions will serve as a guide to amateur gilders,

tricity without coating it with a material which may peel off. One of the best methods

the usual manner.

3739. To Dissolve Gold from Gilt Articles. are partly covered with gold, or when the gilding is imperfect, and the articles require may be dissolved from any metal, even from iron, without injuring it in the least. After

Solution. When the acid has become saturated by the gold that has been dissolved in it, or when it ceases to dissolve the gold rapidly, it is diluted with several times its bulk of greater portion of the acid is neutralized. A solution of sulphate of iron (copperas) i. then added, so long as a precipitate is formed; upon a paper filter, washed and dried, and common salt, when the gold is found as a button at the bottom of the crucible. When with carbonate of soda and a little borax; in have to be refined.

3741. To Separate Gold from Gilt Copper or Silver. Take a solution of borax in water, apply to the gilt surface, and sprinkle over it some finely powdered sul-phur; make the article red hot, and quench it in water; then scrape off the gold, and recover it by means of lead. (See No. 3191.)

3742. To Recover Gold from Gilt

Articles. Gold may be stripped from articles that have been gilt by placing them in strong nitric acid, in which some salt has been previously dissolved. When a number it begins to work slowly, and it is time then to abandon it, and use a new one. The gold may then be recovered from the old solution, by evaporating it to dryness, and fusing the residuum with a small piece of soda or potash, the gold being fused into a button. The addirefining process more complete. As there is some trouble connected with this process, it is scarcely worth adopting where very small quantities of gold are concerned. In such a case it is a better plan to suspend the article,

gilding another article. 3743. Electro-Battery. Dissolve 9 parts terchloride of cohol. The surface having dried, a little of gold in 1000 to 2000 parts pure water; then the testing fluid (see last receipt) is dropped add 360 parts bicarbonate of potassa, and boil on and allowed to remain in contact for about

in this solution. After taking it out and dry-for two hours. The metallic article, if not ing well, it is exposed to a current of hydrogen copper, is covered with a film of copper simgas, by which operation the silver is reduced ulfaneously with its being immersed into the to a metallic state, and the material becomes boiling gilding liquer, by placing a piece of so good a conductor of electricity that it may sheet-copper along with it. As soon as a debe electroplated with copper, silver, or gold, in posit of copper is observed, the piece of copper is taken out, and the liquor continued boiling until a deep yellow color is obtained. Before regilding articles which The article is then taken out, washed off with water, and rubbed with a metallic brush. When the liquor has again become clear by regilding, the gold should be removed from settling and decanting, it is again heated to them by putting them into strong nitrie acid; boiling, the article immersed, while the piece and when the articles have been placed in the of copper is moved about in the fluid without acid, by adding some common salt, not in so-touching the other. The same operation may letion, but in crystals. By this method gold be renewed ad libitum, until the desired thick-

ness of gold is obtained.
3744. Plating and Gilding Without coming out of the acid, the articles must be a **Battery**. Watts gives the following very polished. The best method, however, is to useful solution of silver or gold for plating or brush off the gold as described for silver (see gilding without the aid of a battery: Take 1 No. 3706), which gives the polish at the same ounce nitrate of silver, dissolved in 1 quart ne.
distilled or rain water. When thoroughly 3740. To Recover Gold from its Acid dissolved, throw in a few crystals of hyposulphite of soda, which will at first form a brown precipitate, but which eventually becomes redissolved if sufficient hyposulphite it is diluted with several times its bulk of has been employed. A slight excess of this water, and then soda or potash added till the salt must, however, be added. The solution thus formed may be used for coating small articles of steel, brass, or German silver, by simply dipping a sponge in the solution and when this settles down it is carefully collected rubbing it over the surface of the article to be coated; the silver becomes so firmly attached then fused in a crucible with a little borax and to the steel (when the solution has been carefully made) that it is removed with considerable difficulty. A solution of gold may be made the gold is brushed off, the brushings are in the same way, and applied as described. burned at a red heat, and the residue fused A concentrated solution of either gold or silver, thus made, may be used for coating parts this case, the gold will not be pure, and will of articles which have stripped or blistered, by applying it with a camel-hair pencil to the part, and touching the spot at the same time with a thin clean strip of zinc.

3745. To Distinguish Gold from its Imitations. The ordinary method of test-ing gold by the touchstone is founded upon the insolubility of this metal in nitric acid. If a mark be made on the touchstone with the article under examination, the gold is not dissolved by this acid, whereas golden colored alloys of inferior value are dissolved and disappear immediately. When articles are very thinly gilded, the detection of the gold in of articles have been stripped in the solution, this manner is uncertain, in which case the following method may be used with advan-

tage. (See No. 3190.)

3746. Test Fluid for Gilded Articles. A little carbonate of copper is put into a test-tube, and to this is added, drop by drop, pure hydrochloric acid, till the blue tion of a little saltpetre will tend to make the powder has dissolved to a clear green fluid, occasionally warming it over a spirit lamp. This concentrated solution of chloride of copper is diluted for use with from 10 to 11 times its volume of distilled water.

3747. To Test Gilded Articles. Befrom which the gold is to be removed, in the fore testing, the metallic surface must be well gilding bath, in the place of the anode, when cleaned. This can be done effectually by gilding another article. Electro-Gilding Without a spirits of wine, or, better, with absolute al-Dissolve 9 parts terchloride of cohol. The surface having dried, a little of

the metal completely dried with bibulous in a few seconds. The space between the paper; if no dark spot be then visible, the ar- | poles seems like a mass of crystallized threads, ticle is coated with pure gold. If the metallic and the electric current passes through them surface is but lightly gilded, a very slight without affecting further decomposition. So blackening is sometimes remarked, which tender are these metallic threads that when may throw a doubt upon the result. In such lifted out of the solution they fall upon the a case, to make quite certain, a little of the plate like cobweb. Seen through a glass they surface may be scraped off, and then the test-exhibit a beautiful crystalline structure. Tin ing fluid again applied. If a dark spot is then may also be deposited from its solution in perceived, the article may be considered as caustic potash or soda. very thinly gilded.

3751. Galvanic

or German Silver, with Aluminum, sheet was immersed in a mixture of equal take equal measures of sulphuric acid and parts of acetate of lead and common salt, and water, or take 1 measure each sulphuric and hydrochloric acids and 2 measures water; add to the water a small quantity of pipe-clay, in mains in constant action and working order the proportion of 5 or 10 grains by weight to for 8 days, at an outlay of only 2 francs. every ounce by measure of water (or ½ ounce) When the objects which are galvanically to the pint). Rub the clay with the water until tinned are afterwards heated to the melting the two are perfectly mixed, then add the acid to the clay solution, and boil the mixture in a hot-tinned materials is thus obtained. Copper covered glass vessel 1 hour. Allow the liquid thus tinned (galvanically), and afterwards to settle, take the clear, supernatant solution, heated, is superficially converted into bell while hot, and immerse in it an earthen porous cell, containing a mixture of one measure of sulphuric acid and ten measures of water. together with a rod or plate of amalgamated which the method of tinning in ordinary use zinc; take a small Smee's battery of 3 or 4 cells, and connect its positive pole by a wire with the piece of zinc in the porous cell. Having perfectly cleaned the surface of the article to be coated, connect it by a wire with the negative pole of the battery, and immerse it in the hot clay solution; immediately abundance of gas will be evolved from the whole of the immersed surface of the article. is adapted to the quantity of the current of electricity passing through it, a fine white deposit of aluminum will appear all over the surface. It may then be taken out, washed quickly in clean water, and wiped dry, and of sulphate of copper in 1 pint of hot water. it must be taken out when the deposit becomes dull in appearance, washed, dried, polished, and reimmersed; and this must be repeated at intervals, as often as it becomes or Zinc. Dissolve 8 ounces (troy) cyanide With small articles it is not absolutely necessary that a separate battery be employed, as the article to be coated may be connected, as in the one cell method (see No. 3669), by a receive a deposit, but more slowly than when a battery is employed.

3750. To Electroplate with Tin. Tin is easily deposited from a solution of protochloride of tin. If the two poles or electrodes

a minute. The fluid is then removed by shoots out from the negative electrode like means of a small pipette, and the surface of feelers, towards the positive, which it reaches

3751. Galvanic Tinning. M. Maistrasse-Dupré, it appears, had been commissioned by the French government to apply, by galvanic means, tin upon divers objects which had been made of so-called galvanized receipts furnish the means of coating objects receipts furnish the means of coating objects copper and zinc plates, the length of which is with tin, zinc, brass, German silver, and other 43 inches, the width 28 inches, placed in a metals.

3749. To Electroplate Copper, Brass, means of wooden partitions. The copper the zine element was placed in weak sulphuric acid, specific gravity 1.060. This battery repoint of tin, the goodness and durability of metal, while the method of tinning galvanically has the great advantage over the old method, that it can be applied to objects to is not applicable

3752. To Electroplate with Brass. Brass can be deposited when the solution is composed of 1 part sulphate of copper in 4 parts hot water, 8 parts sulphate of zine in 16 parts of hot water, 18 parts cyanide of potassium in 36 parts of hot water. These are mixed, and 250 parts of water added. Instead of a copper positive electrode plate, one of and in a few minutes, if the size of the article brass is necessary; the solution is required to be kept nearly boiling, and a powerful battery to be used.

To Prepare Cyanides of Cop-3753. per and Zinc. For copper, dissolve 1 ounce polished; but if a thicker coating is required, For zinc, dissolve I ounce of the sulphate of zine in 1 pint of hot water, and proceed the same as for cyanide of silver. (See No. 3697.)

duil, until the required thickness is obtained. of potassium, and 3 ounces cyanide of copper or zinc in 1 gallon of rain or distilled water. They should be used at about 160° Fahr.; with a compound battery of 3 to 12 cells.

3755. Cyanide Solution of Copper. wire with the piece of zinc in the porous cell, To prepare copper solutions by means of and immersed in the outer liquid, when it will evanide of potassium, for covering iron and other positive metals, there are several methods, but the method adopted in manufacturing purposes is as follows: To a solution of sul-phate of copper, add a solution of ferrocyanide of potassium (yellow prussiate of potassa), be kept about 2 inches apart, a most beautiful so long as a precipitate continues to be formphenomenon may be observed. The decom- ed; this is allowed to settle, and, the clear position of the solution is so rapid that it liquor being decanted, the vessel is filled with water, and when the precipitate settles, the tion that takes place. The solution is filtered, and allowed to repose all night. If the solution of evanide of potassium that is used is to dissolve the precipitate is dilute, it will be ammonia. necessary to condense the liquor by evaporation, to obtain the yellow prussiate in crystals; the remaining solution is the coppering

an iron article with copper, it is first steeped remaining mass is added a solution of cyanide in hot caustic potash or soda, to remove any of potassium; next, it must be slightly heated grease or oil. Being washed from that, it for a short time, and then filtered. This solumersed in the cyanide solution. coating; and, as the cyanide process is expensive, it is preferable, when the iron has re-ceived a film of copper by the cyanide solution, to take it out, wash it in water, and attach it to a single cell or weak battery, and put it into a solution of sulphate of copper. If there is any part not sufficiently covered with copper by the cyanide solution, the sulphate will make these parts of a dark color, which a touch of the finger will remove. When such is the case, the article must be taken out, scoured, and put again into the cyanide solution till perfectly covered. little practice will render this very easy. The sulphate solution, when used for covering iron, should be prepared by adding to it by degrees a little caustic soda, so long as the precipitate formed is redissolved. This neutralizes a the iron is not so readily acted upon.

covering iron with zine, the precautions necessary for copper are not required; zinc being the positive metal, acids have a stronger affinity for it than for iron, and therefore an way as sulphate of copper. (See No. 3661.)

3758. Test for Galvanized Iron. liquor is again decanted, and these washings When zine is deposited on iron by galvanic are repeated until the sulphate of potash is agency, it should form a chemical combination washed quite out. This is known by adding with the iron, and not be merely attached a little chloride of barium to a small quantity thereto. It is proposed by Mr. T. Bruce of the washings; if no white precipitate is Warren, of England, to use this fact for pracformed by this test, the precipitate is sufficiently washed. A solution of eyanide of tion. If mercury be poured over the surface, potassium is now added to this precipitate the zinc that is only locally attached will until it is dissolved, during which process the form an amalgam with the mercury. Mr. solution becomes warm by the chemical reac- Warren also uses this as a quantitative test, to verify the amount of zine in combination with the iron.

3759. To Make a Cyanide Solution strong, the greater portion of the ferrocyanide of Brass. Dissolve 1 pound (troy) cyanide of potassium crystallizes in the solution, and of potassium, 2 ounces eyanide of copper, and may be ollected and preserved for use again. I ounce cyanide of zinc, in 1 gallon rain or If the solution of cyanide of potassium used distilled water; then add 2 ounces muriate of This solution is to be used at 160° Fahr, on smooth work, with a compound

battery of 3 to 12 cells.

3760. Electroplating with Platinum. solution. Should it not be convenient to This metal has never yet been successfully separate the yellow prussiate by crystallization, the presence of that salt in the solution metals. A solution may be made by dissolvdoes not interfere with its power of depositing ing it in a mixture of nitric and muriatio copper.

3756. To Prepare Iron for Coating gold; but heat must be applied. The soluwith Copper. When it is required to cover tion is then evaporated to dryness, and to the is placed for a short time in dilute sulpharic tion, evaporated, yields beautiful crystals of acid, consisting of about 1 part of acid to 16 cyanide of platinum and potassium; but it is parts water, which removes any oxide that may unnecessary to crystallize the salt. A very exist. It is then washed in water, and scoured weak battery power is required to deposit the with sand till the surface is perfectly clean, metal; the solution should be heated to 100°, and finally attached to the battery, and im- Great care must be taken to obtain a fine (See No. metallic deposit; indeed, the operator may 3755.) All this must be done with dispatch, not succeed once in twenty times in getting so as to prevent the iron combining with more than a mere coloring of metal over the oxygen. An immersion of five minutes' durasurface, and that not very adhesive. The tion in the evanide solution is sufficient to causes of the difficulty are probably these: deposit upon the iron a film of copper. But the platinum used as an electrode is not acted it is necessary to the complete protection of upon; the quantity of salt in solution is very the iron, that it should have a tolerably thick little; it requires a particular battery strength to give a good deposit, and the slightest strength beyond this gives a black deposit; so that, were the proper relations obtained, whenever there is any deposit, the relations of battery and solution are changed, and the black pulverulent deposit follows.

3761. Electroplating with Palladium. Palladium is a metal very easily deposited. The solution is prepared by dissolving the metal in nitro-muriatic acid, and evaporating the solution nearly to dryness; then adding cyanide of potassium till the whole is dissolved; the solution is then filtered and ready for use. The evanide of potassium holds a large quantity of this metal in solution, and the electrode is acted upon while the deposit Articles covered with this is proceeding. metal assume the appearance of the metal; great portion of the sulphuric acid, and thus but so far as we are aware, it has not yet not so readily acted upon.

To Coat Iron with Zinc. In requires rather a thick deposit to protect metals from the action of acids, which is, probably, the only use it can be applied to.

3762. Electroplating with Nickel. Nickel is very easily deposited, and may be acid solution may be used. The solution gen- prepared for this purpose by dissolving it in erally used is the sulphate, used in the same nitric acid, then adding eyanide of potassium to precipitate the metal; after which the precipitate is washed and dissolved by the ad-isolved. Use this solution exactly in the same dition of more cyanide of potassium. Or the manner as the clay solution (see No. 3767), nitrate solution may be precipitated by car- and a fine white deposit of metallic silicium bonate of potash; this should be well washed, will be obtained, provided that the size of the and then dissolved in cyanide of potassium; a article is adapted to the quantity of the elecproportion of carbonate of potash will be in tric current. Common red sand, or, indeed, the solution, which has not been found to be any kind of silicious stone, finely powdered, detrimental. The metal is very easily depose may be used in place of the white sand, and ited; it yields a color approaching to silver, with equal success, if it be previously boiled which is not liable to tarnish ou exposure to in hydrochloric acid, to remove the red oxide the air. A coating of this metal would be of iron or other impurities. In depositing very useful for covering common work, such both aluminum and silicium, it is necessary to as gasaliers, and other gas-fittings, and even well saturate the acid with the solid ingre-common plate. The great difficulty experidients by boiling, otherwise very little deposit enced is to obtain a positive electrode: the of metal will be obtained.
metal is very difficult to fuse, and so brittle 3768. To Prepare a Brass Solution. that we have never been able to obtain either a plate or a sheet of it. Could this difficulty be easily overcome, the application of nickel pound cyanide of potassium, 2 ounces cyanide to the coating of other metals would be extensive, and the property of not being liable constitutes the solution for the decomposing to tarnish would make it eminently useful for cell. It may be prepared, also, from the above all general purposes.

3763. Nagel's Method of Electroplating with Nickel. A process devised by Mr. Nagel, of Hamburg, for coating iron, steel, and other oxidizable metals with an electro of a powerful galvanic battery or magneto-deposit of nickel or cobalt, consists in taking electric machine; and making a small piece of 4 parts, by weight, of pure sulphate of the metal the cathode or negative electrode, from protoxide of nickel by crystallization, and 2 which hydrogen must be freely evolved. This parts, by weight, of pure ammonia, so as to operation is continued till the solution has form a double salt, which is then dissolved in taken up a sufficient quantity of the brass to 60 parts of distilled water, and 12 parts of ammoniacal solution of the specific gravity of .903 added. The electro deposit is effected by an ordinary galvanic current, using a platinum positive pole, the solution being heated to about 100° Fahr. The strength of the galvanic current is regulated according to the number of objects to be coated.

3764. To Protect Steel from Rusting. It has been found by experiment that an electro-deposited coating of nickel protects the surface of polished steel completely from rust. Swords, knives, and other articles of steel liable to exposure, may be coated with nickel without materially altering the color of the metal.

3765. To Protect Copper and Brass. Copper and brass are equally well protected by nickel (see No. 3764), but, of course, with change of color on the surface. The nickel facing, when burnished, has a whiter color than polished steel, but not as white as silver, being nearer in appearance to platinum.

3766. Nagel's Method of Electroplating Metal with Cobalt. For coating with cobalt, 138 parts, by weight, of pure sulphate of cobalt, are combined with 69 parts of pure ammonia, to form a double salt, which is then dissolved in 1000 parts of distilled water, and 120 parts of ammoniacal solution, of the same specific gravity as before, are added. The process of deposition with cobalt is the same as with nickel. (See No. 3763.)

3767. To Electroplate with Silicium. In the following manner, a coating of silicium can be obtained direct from silica: Take the following proportions: # ounce, by measure, of hydrofluoric acid, † ounce hydrochloric acid, and 40 or 50 grains either of precipitated silica, or of fine white sand (the former dis-

For each gallon of water used to make the solution, take 1 pound carbonate of ammonia, 1 of copper, and I ounce eyanide of zine. This proportions of carbonate of ammonia and cyanide of potassium, by immersing in it a large sheet of brass of the desired quality, and making it the anode or positive electrode

produce a reguline deposit.

3769. To Electroplate with Brass. The solution (see No. 3768) may be used cold; but it is desirable, in many cases, to heat it (according to the nature of the articles to be deposited upon) to 212° Fahr. For wrought or fancy work, about 150° Fahr. will give excellent results. The galvanic battery, or magneto-electric machine, must be capable of evolving hydrogen freely from the cathode or negative electrode, or article attached thereto. It is preferred to have a large anode or positive electrode, as this favors the evolution of hydrogen. The article or articles treated as before described will immediately become coated with brass. By continuing the process, any desired thickness may be obtained. Should the copper have a tendency to come down in a greater proportion than is desired, which may be known by the deposit assuming too red an appearance, it is corrected by the addition of carbonate of ammonia, or by a reduction of temperature, when the solution is heated. Should the zine have a tendency to come down in too great a proportion, which may be seen by the deposit being too pale in its appearance, this is corrected by the addition of cyanide of potassium or by an increase of temperature.

3770. To Electroplate with German Silver. The alloy, German silver, is deposited by means of a solution consisting of carbonate of ammonia and eyanide of potassium (in the proportions given above for the brass), and evanides or other compounds of nickel, copper, and zinc, in the requisite proportions to constitute German silver. It is, however, preferred to make the solution by means of the galvanic battery or magneto-electric machine, as above described for brass. Should solves most freely), and boil the whole together the copper of the German silver come down for a few minutes, until no more silica is dis- in too great a proportion, this is corrected by

adding carbonate of ammonia, which brings brown polish, approaching black, but entirely down the zinc more freely; and should it be distinct from the well known appearance of necessary to bring down the copper in greater black-lead. If the same operation is perquantity, cyanide of potassium is addedsuch treatment being similar to that of the brass before described.

Bronzing. This is the process of giving a bronze-like or an antique This is the process metallic appearance to the surface of copper, brass, and other metals. This is generally effected by the action of some substance viously well cleaned and brightened; uni-which combines with and changes the nature formly warm the article by the fire, and afterof the surface of the metal. The application

3772. Brown Bronzes for Medals, &c. Take a wine-glass of water, and add to it 4 or 5 drops nitric acid; with this solution and then allow it to dry; when dry impart same to it a gradual and equable heat, by which 3775.) the surface will be darkened in proportion to

the heat applied.

paste on the face of the medal, which must washed over with the solution, which should then be put into an oven, or laid on an iron plate over a slow fire; when the paste is perof paste is thoroughly dried, brush it off. bronzes the surfa The medal being now effectually secured into a sulphuret. from grease, which often occasions failures in 3779. Gerr bronzing, coat it a third time, but add to the Brass Black. strength of the fire, and sustain the heat for a considerable time; a little experience will

over the face of the bronze, by which a touch is given by polishing with olive oil. beautiful lustre is imparted to it, and a con-

and applying a plate brush so soon as it ceases lution are precipitated upon the face of the to be hot enough to burn the brush. A few copper medal, which effect is accompanied strokes of the brush will produce a dark by a partial solution of the copper.

formed on a medal that has been kept some days, or upon one that has been polished, a different, but very brilliant tint is produced. The color is between red and brown. The richness of color thus produced is by many preferred to the true dark brown.

3776. Chinese Bronze. Take 2 ounces each verdigris and vermilion; 5 ounces each alum and sal-ammoniac, all in fine powder, and sufficient vinegar to make a paste; then spread it over the surface of the copper, prewards well wash and dry it, when, if the tint of powdered bronzing substances, made to be not deep enough, the process may be readhere by sizing, &c., to the surface of other peated. The addition of a little sulphate of &c., is termed surface bronzing. (See Nos. brown; and a little borax to a yellowish 3382, &c.) material than metal, such as wood, plaster, copper inclines the color to a chestnut copper tea-urns.
3777. Carl

3777. Carbonate of Iron Bronze. Beautiful tints are produced by using platewet the medal (which ought to have been powder or rouge. After moistening with wapreviously well cleaned from oil or grease) ter, it is applied and treated in precisely the same manner as the plumbago. (See No.

3778. Black Bronzes. A very dark colored bronze may be obtained by using a 3773. Bronzing with Crocus. Make little sulphuretted alkali (sulphuret of ama thin paste of crocus and water; lay this monia is best). The face of the medal is be dilute, and the medal dried at a gentle heat, and afterwards polished with a hard feetly reduced to powder, brush it off and lay hair brush. Sulphurefted hydrogen gas is on another coating; at the same time quicken sometimes employed to give this black bronze, the fire, taking care that the additional heat but the effect of it is not so good, and the gas is uniform; as soon as the second application is very deleterious when breathed. In these bronzes the surface of the copper is converted

German Method of Bronzing There are two methods of procuring a black lacquer upon the surface of brass. The one which is that usually embrass. soon enable the operator to decide when the ployed for optical and scientific instruments, medal may be withdrawn; the third coating consists in first polishing the object with being removed, the surface will present a Tripoli, then washing it with a mixture combeautiful brown bronze. If the bronze is posed of 1 part nitrate of tin and 2 parts deemed too light the process can be repeated.

3774. Bronzing with Black-Lead. to remain on for about 12 or 15 minutes, After the medal has been well cleaned from wiping it off with a linen cloth. An excess wax or grease, by washing it in a little of acid increases the intensity of the tint. In caustic alkali, brush some black-lead over the other method, copper turnings are disthe face of it, and then heat it in the same solved in nitric acid until the acid is saturaway as described in No. 3773 for crocus; or a ted; the objects are immersed in the solution, thin paste of black-lead may be used, and the cleaned, and subsequently heated moderately processes already referred to be repeated until over a charcoal fire. This process must be the desired brown tint is obtained. In this repeated in order to produce a black color, as kind of bronze a little hematitic iron ore, the first trial only gives a deep green; when which has an unctuous feel, may be brushed the desired color is attained, the finishing

beautiful lustre is imparted to it, and a considerable variety in the shade may be obtained. In the brown bronzes the copper is platinum, gold, palladium, antimony, etc., will impart a dark color to the surface of will impart a dark color to them. The 3775. Plumbago Bronze. This bronze medals when they are dipped into them. The is obtained by brushing the surface of the medal, after being dipped into the metallic somedal with plumbago, then placing it on a lution, is to be well washed and brushed. In clear fire till it is made too hot to be touched, such bronzes the metals contained in the so-

3781. and Busts. Green bronzes require a little portions observed between the zine and the more time than those already described. copper in the composition of the brass article, They depend upon the formation of an so will the tints obtained vary. In many inacetate, carbonate, or other green salt of copstances it requires the employment of a slight per upon the surface of the medal. Steeping degree of friction with a resinous or waxy for some days in a strong solution of common varnish, to bring out the wavy appearance salt will give a partial bronzing which is very beautiful, and, if washed in water and allowed to dry slowly, is very permanent. Sal ammoniac may be substituted for common salt. Even a strong solution of sugar, alone, or Parisian sculptor makes use of a mixture of with a little acetic or oxalic acid, will produce \(\frac{1}{2} \) ounce sal-ammoniae, \(\frac{1}{2} \) ounce common salt, a green bronze; so also will exposure to the 1 ounce spirits of hartshorn, and 1 imperial fumes of dilute acetic acid, to weak fumes quart of vinegar. A good result will also be of hydrochloric acid, and to several other obtained by substituting an additional ½ ounce vapors. A dilute solution of ammonia al- sal-ammoniac, instead of the spirits of harts-

small portion of bleaching powder (chloride of in the sunshine than in the shade. lime), place it in the bottom of a dry vessel, and suspend the medal over it, and cover the vessel; in a short time the medal will acquire a green coating, the depth of which may be regulated by the quantity of bleaching powder used, or the time that the medal is suspended in its fumes; of course, any sort of vessel, or any means by which the electropowder, will answer the purpose; a few grains of the powder is all that is required. According as the medal is clean or tarnished, dry or wet, when suspended, different tints, with different degrees of adhesion, will be obtained.

3783. Fine Green Bronze. Dissolve 2 ounces verdigris and 1 ounce sal-ammoniac in 1 pint vinegar, and dilute the mixture with water until it tastes but slightly metallic, when it must be boiled for a few minutes, and filtered for use. Copper medals, &c., previously thoroughly cleaned from grease and dirt, are to be steeped in the liquor at the boiling point, until the desired effect is produced. Care must be taken not to keep them in the solution too long. When taken out, they should be carefully washed in hot water,

and well dried. Gives an antique appearance.

3784. To Bronze Brass Orange,
Greenish Grey and Violet Tint. An
orange tint, inclining to gold, is produced by first polishing the brass, and then plunging it for a few seconds into a neutral solution of crystallized acetate of copper, care being taken that the solution is completely destitute of all free acid, and possesses a warm temper-Dipped into a bath of copper, the resulting tint is a greyish green, while a beau-tiful violet is obtained by immersing it for a single instant in a solution of chloride of antimony, and rubbing it with a stick covered with cotton. The temperature of the brass at the time the operation is in progress has a great influence upon the beauty and delicacy of the tint; in the last instance it should be heated to a degree so as just to be tolerable to the touch.

produced by boiling the object in a solution sizing not to absorb the gum.

Green Bronzes for Figures of sulphate of copper. According to the procharacteristic of moire, which is also singularly enhanced by dropping a few iron nails into the bath.

3786. French Bronze. An eminent lowed to dry upon the copper surface will horn. The piece of metal, being well cleaned, leave a green tint, but not very permanent. is to be rubbed with one of these solutions, 3782. Bronzing with Bleaching and then dried by friction with a clean brush. Powder. Electrotypes may be bronzed green, having the appearance of ancient bronze, by a very simple process. Take a is found to be more advantageous to operate and provided of blooking powder (chlorides).

3787. To Bronze Copper with Sulphur. When objects made of copper are immersed in melted sulphur mixed with lampblack, the objects so treated obtain the appearance of bronze, and can be polished with-

out losing that aspect.

3788. Antique Bronze. Dissolve 1 ounce sal-ammoniae, 3 ounces cream of tartype may be exposed to the fumes of the tar, and 6 ounces common salt, in 1 pint hot water; then add 2 ounces nitrate of copper, dissolved in a pint water; mix well, and apply it repeatedly to the article, placed in a damp situation, by means of a brush moistened therewith. This produces a very antique effect.

3789. Antique Bronze. Rub the medal with a solution of sulphuret of potassium, then dry. This produces the appearance of

antique bronze very exactly.

3790. Bronzing Liquids for Tin Cast-igs. Wash them over, after being well cleaned and wiped, with a solution of 1 part sulphate of iron, and 1 part sulphate of copper, in 20 parts water; afterwards with a solution of 4 parts verdigris in 11 of distilled vinegar; leave for an hour to dry, and then polish with a soft brush and crocus.

To Bronze Iron Castings. 3791. Iron castings may be bronzed by thorough cleaning (see No. 3641) and subsequent immersion in a solution of sulphate of copper, when they acquire a coat of the latter metal. They must be then washed in water.

3792. Surface Bronzing. This term is applied to the process of imparting to the surfaces of figures of wood, plaster of Paris, &c., a metallic appearance. This is done by first giving them a coat of oil or size varnish, and when this is nearly dry, applying with a dabber of cotton or a camel-hair pencil, any of the metallic bronze powders; or the powder may be placed in a little bag of muslin, and dusted over the surface, and afterwards finished off with a wad of linen. The surface must be afterwards varnished.

3793. To Bronze Paper. Paper is bronzed by mixing the powders up with a 3785. Moire Bronze. A moire appear-little gum and water, and afterwards burnishance, vastly superior to that usually seen, is ling. The paper used should contain sufficient

carbonate of soda, 60 parts; apply heat until and 1 ounce pearlash, in 1 pint water. they unite into a mass, then cool, powder, and add copper filings. 15 parts; well mix, and per. Dissolve 1 drachm sulphur, and 1 ounce keep them at a white heat for 20 minutes, pearlash, in 1 pint water. then cool, powder, wash thoroughly with water, and dry.

3795. Gold Colored Bronze Powder. Verdigris, 8 ounces; tutty powder, 4 ounces; borax and nitre, each 2 ounces; bichloride of mercury, 2 ounce; make them into a paste water. A similar effect may be obtained by with oil, and fuse them together. Used in mixing muriate of lead with water to the conjapanning as a gold color. Or: Grind Dutch sistency of cream. foil or pure gold leaf to an impalpable powder.

(See Nos. 2491 and 2517.)

3796. Silver White Bronze Powder. Melt together I ounce each bismuth and tin, then add 1 ounce running quicksilver; cool

and powder.

3797. Graham's Quick Bronzing Liquids. The following 19 receipts are preparations for bronzing brass, copper, and zine, by simple immersion. Their action is immediate

muriate of arsenic in 2 pints permuriate of is electroplating on a small scale. iron, and 1 pint water.

3816. Purple Bronzing for Zinc. Im-

Brown or Red Bronzing for merse in a boiling infusion of logwood. 3799. Brass. Dissolve 16 drachms nitrate of iron, and 16 drachms hyposulphite of soda, in 1 pint water. Or: 1 drachm nitric acid may be sub-

stituted for the nitrate of iron.

3800. Red-Brown Bronzing for Brass. Dissolve 1 ounce nitrate of copper, and 1 sults

Dark Brown Bronzing for Brass. Mix 1 ounce cyanide of potassium, and 4 drachms nitric acid, with 1 pint water.

3802. Red Bronzing for Brass. Mix 30 grains tersulphite of arsenic, 6 drachms solution of pearlash, and 1 pint water.

3803. Orange Bronzing for Brass. Mix 1 drachm potash solution of sulphur with

1 pint water.

3804. Olive Green Bronzing for Brass. Dissolve 1 pint permuriate of iron in 2 pints water.

3805. Brass. Dissolve 2 drachms sulphocyanide may be used as substitutes for various metals of potassium, and 5 drachms perchloride of now in general use, such as iron, lead, tin, or iron, in 1 pint water.

3806. Blue Bronzing for Brass. Mix

3807. Steel-Grey Bronzing for Brass, or Copper. Mix 1 ounce muriate of arsenic For giving silvery-grey alloys a blackishwith 1 pint water, and use at a heat not less than 180° Fahr.

3808. Dark Drab Bronzing for Copper. This is prepared by adding 2 drachms tity of nitric acid may be added. sulphocyanide of potassium to the mixture given in No. 3807. Or: mix 1 ounce sulphate impart a lead or copper color, add to the so-

3794. Beautiful Red Bronze Powder. 3809. Bright Red Bronzing for Cop-Mix together sulphate of copper, 100 parts; per. Mix 2 drachms sulphide of antimony,

3810. Dark Red Bronzing for Cop-

3811. Dark Grey Bronzing for Zinc. Mix 1 drachm protochloride of tin, and 1 drachm sulphocyanide of potassium, with 1 pint water. Or: Dissolve I drachm each sulphate of copper and muriate of iron, in 2 pints

3812. Green-Grey Bronzing for Zinc. Dissolve ½ drachm muriate of iron in 1 pint

water.

3813. Red Bronzing for Zinc. Use garancine (madder-red) infusion boiling hot. 3814. Copper-Colored Bronzing for Zinc. Agitate the articles in a solution of 8 drachms sulphate of copper, and 9 drachms hyposulphite of soda, in 1 pint water.

3815. Copper-Colored Bronzing for Zinc Plates. Make a solution of 4 drachms 3798. Black or Brown Bronzing for sulphate of copper, and 4 drachms pearlash, in Brass, Copper, or Zinc. Dissolve 5 1 pint water. Immerse the zinc plate in it, drachms nitrate of iron in 1 pint water. Or: 5 connected at one end with a plate of copper, drachms perchloride of iron in 1 pint water. as represented in Fig. I, No. 3665. This, it A black may also be obtained from 10 ounces will be seen, induces a galvanic current, and

3817. Larkin's Bronzing Fluids for Alloys of a Silvery-Grey Color. Mr. Larkin states that, for the purpose of rendering alloys which are of a silvery-grey color, perfectly suitable as substitutes for copper, bronze, brass, and other metals, the color ounce oxalic acid, in 1 pint water, brought proper to the metals which they are intended to the boil, and then cooled. Or: 1 pint to substitute is imparted to them by means solution of ferrocyanide of potassium and 3 of any solution of copper. The hydrodrachms nitric acid. This latter is slow in chlorate of copper is found to answer best, action, taking an hour to produce good re- and is employed as directed in the five following receipts.

3818. Directions for Using Larkin's Bronzing Fluids. In either of these methods of coloring, a solution of sal-ammoniac may be substituted for the liquid ammonia. The quantities of each ingredient have not been stated, as these depend upon the nature of the alloy, the shade or hue desired, and the durability required. The bluish-bronze color may be superadded to the red or copper color, whereby a beautiful light color is produced on the prominent parts of the article bronzed, or on the parts from which the blackish-bronze color Slate-Colored Bronzing for may have been rubbed off. These new alloys copper, in pipes and tubes; and bronze, brass, and copper, in machinery and manufactories, 20 drachms hyposulphite of soda with 1 pint as well as for most of the other purposes for which more expensive metals are employed.

3819. Blackish Bronze Coloring. bronze color, they are treated with a solution of hydrochlorate of copper diluted with a considerable quantity of water, and a small quan-

of copper, 1 ounce hyposulphite of soda, 2 lution of hydrochlorate of copper, liquid amdrachms hydrochloric acid, and 1 pint water. monia and a little acetic acid. The salt of copper may be dissolved in the liquid am- by a few gentle taps.

3821. impart a brass or antique bronze color, either of porcelain, biscuit, or stoneware, some of the three following means may be adopt- chemical union of the silicate will take place, ed:—A solution of copper, with some acetic but in other cases the water-glass will only acid. Or:—The means before described for tend to make the bronze powder adhere copper color, with a large proportion of liquid to the surface. After the heating, the bronze ammonia. Or:-Water acidulated with nitric may be polished or burnished with agate acid, by which beautiful bluish shades may be produced. It must be observed, however, this last process can only be properly employed on the alloys which contain a portion of copper.

Drab Bronze for Brass. Brass obtains a very beautiful drab bronze by being worked in moulders' damp sand for a short

time and brushed up.

3823. To Make Bronze Powder for Plaster Casts, &c. To a solution of sodasoap in linseed oil, cleared by straining, add a mixture of 4 pints sulphate of copper solution, and 1 pint sulphate of iron solution, which precipitates a metallic soap of a peculiar bronze hue; wash with cold water, strain,

and dry to powder.

3824. To Bronze Plaster Casts, &c. The powdered soap of the last receipt is thus applied: Boil 3 pounds pure linseed oil with rag or sponge till the whole surface is equally 12 ounces finely powdered litharge; strain moistened. Let it remain till the next day, through a coarse canvas cloth, and allow to stand until clear; 15 ounces of this soap var- may be again applied until a proper color is nish, mixed with 12 ounces metallic soap produced. When this is the case, wash in powder (see last receipt), and 5 ounces fine white wax, are to be melted together at a gentle heat in a porcelain basin, by means of a water-bath, and allowed to remain for a varnish. (See No. 2954.) time in a melted state to expel any moisture that it may contain; it is then applied with a brush to the surface of the plaster previously heated to 200° Fahr., being careful to lay it on smoothly, and without filling up any small indentations of the plaster design. Place it for a few days in a cool place; and, as soon as the smell of the soap varnish has gone off, rub the surface over with cotton wool, or fine linen rag, and variegated with a few streaks of metal powder or shell gold. Small objects may be dipped in the melted mixture, and exposed to the heat of a fire till thor-

oughly penetrated and evenly coated with it. 3825. To Make Bronzing for Wood. Grind separately to a fine powder, Prussian blue, chrome yellow, raw umber, lampblack, and clay, and mix in such proportions as will produce a desired dark green hue; then mix

with moderately strong glue size.

3826. To Bronze Wood. First coat the clean wood with a mixture of size and lampblack; then apply two coats of the green colored sizing in the last receipt; and lastly with bronze powder, such as powdered Dutch foil, mosaic gold, &c., laid on with a brush. Finish with a thin solution of Castile soap; and, when dry, rub with a soft woolen cloth. 3827. To Bronze Porcelain, Stone-

ware, and Composition Picture Frames. A bronzing process, applicable to porcelain, stoneware, and composition picture and looking-glass frames is performed as follows: The articles are first done over with a thin solution to the funnel, and, after sufficient time has of water-glass (see No. 2816) by the aid of a been allowed for the heavier liquid to settle,

The article is next heated, to dry the silicate, and the bronze be-Antique Bronze Coloring. To comes firmly attached. Probably, in the case tools

3828. Browning for Gun Barrels. Mix 1 ounce each aqua-fortis and sweet spirits of nitre; 4 ounces powdered blue vitriol; 2 ounces tineture of iron, and water, 11 pints;

agitate until dissolved.

Or: Blue vitriol and sweet spirits of nitre, of each 1 ounce; water, 1 pint; dissolve as

Or: Mix equal parts of butter of antimony and sweet eil, and apply the mixture to the

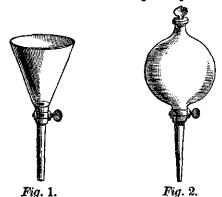
iron previously warmed.

3829. To Brown Gun Barrels. The gun barrel to be browned must be first polished and then rubbed with whiting to remove all oily matter. Its two ends should be stopped with wooden rods, which serve as handles, and the touch-hole filled with wax. Then rub on the solution (see last receipt) with a linen then rub it off with a stiff brush. The liquid pearlash water, and afterwards in clean water, and then polish, either with the burnisher or with bees' wax; or apply a coat of shellac

themical Manipulations. Some of the operations employed in

the preparation and use of chemicals have already been given at the commencement of this book (see No. 1); but, as the work progressed, it was deemed advisable, for the sake of greater precision, to add further directions for special manipulations, and descriptions of indispensable apparatus.

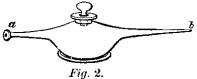
3831. Separating Funnels. These are glass funnels furnished with a stop-cock, and are used for separating mixed fluids of different densities. The mixed liquid is poured in-



soft brush. Bronze powder is then dusted on, it can be drawn off by opening the stop-cock, and any excess not adherent is knocked off closing it immediately after the heavy liquid

funnel, such as is used for ordinary purposes; must be filtered or decanted after repose. but for separating a mixed liquid containing ether or other volatile fluid, a funnel, closed with a stopper similar in construction to Fig. 2, is employed to prevent evaporation while the heavier liquid is settling. For very small quantities a pipette (see No. 3832) is the best instrument.

3832. Pipettes. These are glass instruments used for measuring liquids in drops, and so constructed that the flow of the liquid from them is under the complete control of the operator. They may be made in any form which may be suggested to adapt them to special purposes; but pipettes for general use are usually constructed as follows: Fig. 1 is an ordinary pipette, and consists of a small cylinder of glass with an upper and lower tube, the lower end terminating in a fine orifice for the discharge of the fluid, and the upper end adapted for the finger or thumb, by which the outward flow can be instantly arrested. This is filled by the suction of the mouth. Fig. 2 is made on the same principle, having a fine orifice (b), and a thumb-hole (a), but fitted with a mouth and stopper on the upper side, for convenience of filling, or inserting a measured quantity of liquid. The lower side being flat, to allow of the instru-ment being lad down without risk of waste of contents.



end, the upper or lower stratum of the mixed the lower stratum allowed to flow out.

Graduated pipettes of various forms, especially useful in acidimetry, &c., will be found described in No. 82. These instruments are also useful, and in many cases indispensable, an exhausted bottle, in 13 minutes.

in conducting delicate tests.

3833. Goniometer. used for measuring the angles of crystals. The only accurate and simple instrument of this kind is the reflective goniometer invented

by Dr. Wollaston.

this is not the case, filtration will be necessary | the liquid.

these, again, such as hemlock, henbane, aco- mixed with the whole body of the liquid, to

has passed. Fig. 1 represents a separating nite, &c., are greatly injured by heat, and

3835. To Filter Vegetable Infusions. In many instances vegetable infusions and decoctions may be clarified by defecation and decantation of the clear liquid. A convenient method of straining, when that is necessary, is by securing the corners of a square piece of flannel to a frame, which can be laid over the mouth of a pan; or by laving the flannel across the mouth of a coarse hair-sieve. Concentrated infusions and decoctions, being usually weak tinctures, may be filtered as tinctures. (See No. 17.) Viscid vegetable solutions may be clarified (see No. 1357); or may be made to filter rapidly by the addition

of acetic, sulphuric, or other strong acid.
3836. To Filter Corrosive Liquidz. Strong acids, &c., are filtered through powdered glass or siliceous sand, supported on pebbles in the throat of a glass funnel, or through asbestos placed in the same manner.

3837. To Filter Precipitates. When filtration is employed to separate precipitated matter from the solution in which it is suspended, the filtering medium should be such that the powder may be easily reclaimed from it with as little loss as possible. Linen or smooth bibulous paper are the best for this purpose. A camel-hair pencil should be used, if needed, in preference to a knife, to remove adhering powder from a filter, and the precipitate should be first washed down the sides of the filter by a small stream of water, so as to collect the most of it to one spot at the bottom.

The first runnings in filtration should al-

ways be returned to the filter.

Bunsen's Method of Rapid 3838. Filtration. A great deal of time is frequently lost in washing precipitates, by having to wait for the liquid to pass through a filter. Bunsen's improvement consists in fixing the A pipette affords also a ready means of filtering funnel air-tight, by means of a perseparating two liquids, too small in quanti-forated cork in the neck of a bottle which ty to allow of separation by decantation or has an opening connected with the receiver other methods usually employed. To this of an air-pump. By exhausting the air in the bottle, the liquid will run faster through the liquids (oil and water, for instance), may be filter in proportion to the diminution of the drawn by the mouth into the pipette; or the pressure in the bottle. Comparative experiwhole may be sucked into the pipette, and ments, some made according to the old, and others according to the new method, showing that the filtration, washing, and drying of a

3839. Filtering Powders. In many An instrument cases a liquid will not readily become transparent by simply passing through the filter; hence has arisen the use of filtering powders, substances which rapidly choke up the pores of the media in a sufficient degree to make the fluid pass clear. These powders should 3834. To Filter Vegetable Juices, the fluid pass clear. These powders should These should be allowed to deposit their fecu- not be in too fine a state of division, nor used lous matter before filtration. The supernatant in large quantities, as they then wholly choke liquid will often be found quite clear; when up the filter, and absorb a large quantity of For some liquids these subthrough coarse filtering paper. (See No. 17.) stances are employed for the purpose of Some vegetable juices can be made clear decoloring or whitening them. In such cases, simply by heating them to 180° to 200° Fahr., by which their albumen becomes coagulated. a layer of the substance in coarse powder, a layer of the substance in coarse powder. Others admit of clarification in the same from which it will run but slightly contamimanner as syrups. (See No. 1357.) Many of nated into the filters; or, if the substance be

move the cruder portion, before allowing it to allows the flow to be resumed until again run into the filter. Fuller's earth, pipe clay, stopped as before. (See No. 17, Fig. 6.) filter and bleach oils.

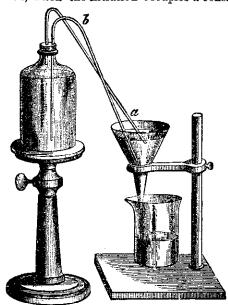
Fuller's earth or clay, 1 part, and 2 parts drained, then mixed together and dried, constitutes a filtering powder well adapted for

glutinous oils.

Granulated animal charcoal, sifted and fanned free from dust, is used to filter and bleach syrups and vegetable solutions.

Carbonate of magnesia and powdered glass, or pumice stone, are used for filtering weak alcoholic solutions of essential oils, and in the preparation of perfumed waters. (See Nos. 976, 1029, 1080, and 1081.)
3840. Self-Feeding Filter. It is usu-

ally a matter of more or less importance in filtration, that the filter should be kept rull. To effect this requires unremitting attention, which, when the filtration occupies a consid-



erable time, is at least tedious. By the use of a simple apparatus, this is avoided, and filtration will continue, without any personal attention, until the operation is complete. A bottle or jar, of sufficient capacity to contain the liquid to be filtered, is placed in a convenient position, above the level of the filter (see illustration); through the cork, which must fit air-tight, are inserted two bent tubes; one end of the tube b must reach nearly to the bottom of the jar, the other end descending deep into the filter; the tube a terminates at one end just below the cork of the jar, the outer end being adjusted in the filter at the height which it is desired that the liquid shall be kept at in the filter. The apparatus is set in working order by sucking the liquid into process somewhat resembles annealing or the tube b, so as to fill it. The liquid will continue to flow until its surface in the filter 3844. Decoloration. The blanching or rises sufficiently to reach to and close the end of the tube a, cutting off the ingress of air Syrups, and many animal, vegetable, and

pass it through some coarser medium, to re-the filter again sinks below the tube a, and stopped as before. (See No. 17, Fig. 6.)

or potter's clay, washed, dried without heat, and reduced to coarse powder, are used to cipitation takes place, the deposit requires to undergo edulcoration, or cleansing from the liquid from which it was precipitated. With fine silicious sand, first separately washed and heavy and bulky precipitates, this is done by repeated washing, and, after the deposit has again settled, decantation of the supernatant liquid (see No. 3847); but when the powder is light, and separates with less facility from the liquid, the washing is better performed by a continuous stream of water passing through a filter on which the precipitate has been previously collected. The apparatus employed for a self-feeding filter (see No. 3840) is admirably adapted for this purpose. Lixiviation, or the separation of soluble matter from an

insoluble powder, can be performed in the same way. (See Nos. 14, 23, and 32.)

3842. Chemical Drying. In order to deprive chemical substances of water or meisture, the simplest means is evaporation. This may be performed either by merely exposure in open shallow vessels to the natural action of a dry atmosphere, called spontaneous evaporation; or by the application of heat, either directly or by a water-bath, &c. (see No. 12): this is not always advisable or necessary, as some substances undergo change by heat, and must be dried by other means. By enclosing the substance to be dried in a box or dryingchamber in which is placed an open vescel containing strong sulphuric acid or chloride of calcium, the strong affinity for water that these substances possess, keeps the air perfeetly dry, and absorbs the moisture from it as fast as the water evaporates from the material which is being dried. The water of crystalline bodies is usually driven out by exposing the crystals in a capsule or evaporating dish to heat, only just sufficient being applied to effect the purpose. Some crystals part with their water of crystallization spontaneously by exposure to the air, crumbling into postder; such crystals are called efflorescent, to distinguish them from those deliquescent crystalline bodies which spontaneously liquely or dissolve in their own water of crystallization. Others will yield their water in an artificially dried atmosphere, as above stated; while many have sufficient affinity for water to retain it until driven off by heat, more or less intense. Crystalline substances which have been deprived of the water of crystallization, that is, have undergone desiccation, are said to be dry.

3843. Decarbonization. This operation is performed on cast iron, to convert it into steel or soft iron. The articles to be decarbonized are packed in finely-powdered hema-tite, or native oxide of iron, to which iron filings are often added, and exposed for some time to a strong red heat, by which the excess of carbon is abstracted or burnt out. The

3844. Decoloration. The blanching or loss of the natural color of any substance. into the bottle, and thus stopping the further saline solutions, are decolored or whitened by flow, until, by the falling of the filtrate into agitation with animal charcoal, and subscthe vessel placed to receive it, the liquid in quent subsidence or filtration. Many fluids rapidly lose their natural color by exposure In this way, castor, nut, poppy, and several to for the calcination of a substance at a other oils are whitened. Fish oils are partially deodorized and decolored by filtration 3851. To Bend Glass Tubes. Small ing.

separation of a liquid from its lees, dregs, or

that the term is scarcely ever applied accu-

3847. Edulcoration. removing the portion soluble in that fluid. Edulcoration is usually performed by agitating or triturating the article with water, and removing the latter after subsidence, by decan- at.

the body of the still. It is difficult to obtain specific gravities of the pulp and the liquid; an anhydrous product without employing lastly add this quotient to the difference of some agent having a strong affinity for water. weight already noted down, and the sum will some agent having a strong affinity for water. weight already noted down, an 3849. Calcination. The separation or be the dry weight of the pulp.

expulsion, by heat, of volatile from fixed matter. By this means crystalline salts are obtained in a dry or anhydrous form, by depriving them of their water of crystallization; in this particular, the process is similar to desiccation. (See No. 12.) Calcination is also employed for the ignition of silica, &c., in order to render it more easily reducible to

fragments or powder.

The operation of calcining is conducted on the small scale in platinum spoons or cruci-

rapidly lose their natural color by exposure 3850. Ignition. The heating of a subto light, especially the direct rays of the sun, stance to redness. It is especially resorted

through animal charcoal. (See No. 3839.) glass tubes may be bent over the flame of a By the joint action of light, air, and moisture, spirit lamp; for larger tubes, the heat of a By the joint action of light, air, and moisture, spirit lamp; for larger tubes, the heat of a cottons and livens are commonly bleached. blow-pipe flame is necessary. The tube The peculiar way in which light produces should be heated to a dull red about an inch this effect has never been satisfactorily ex- either way beyond the point of curvature, by plained. The decoloration of textile fabries revolving it in the flame; as soon as the glass and solid bodies, generally, is called bleach-begins to yield, bend the tube very gradually until curved as desired. Stopping one end of 3845. Defecation. In chemistry, the the tube, and blowing into the other while bending it, will prevent wrinkling or collapsimpurities. This is usually performed by ing at the point of curvature. It requires subsidence and decantation, and is commonly some tact to bend a tube with an even curve applied to the purification of saline solutions, and without collapsing its sides; and it is on the large scale, in preference to filtration, recommended by an experienced chemist to than which it is both more expeditious and use a Bunsen burner, having the extremity inexpensive.

3846. Neutralization. The admixture but broad flame, something like the flame of of an alkali or base with an acid in such pro- an ordinary gas burner. The tube is placed portions that neither shall predominate. A in this flame and turned around until a good neutral compound neither turns turmerie palheat is given to the tube; it is then withdrawn per brown, nor litmus paper red. The term from the flame and bent, when it does so with saturation is also applied to complete neutral—a perfect curve and no collapse on the sides of ization (see No. 27); but saturation has two the tube. Of course this is only intended for distinct meanings; chemically, it denotes that the smaller tubes, but a tube of one-third of a given alkali has been neutralized completely an inch and more can be thus bent very

3852. To Find the Dry Weight of a its utmost capacity with an active ingredient; Pulp or Moist Precipitate. Pulps or prethis point is, however, so difficult to determine, | cipitates, such as the metallic colors, chrome yellow, white lead, &c., are of different consistence at the top from what they are at or The affusion of near the bottom of the vessel in which they water on any substance for the purpose of are contained; and the actual weight of the precipitate in the dry state can therefore not be arrived at by merely taking a sample from top or bottom, but, in most cases, only guessed When, however, the specific gravity of tation or filtration. It is the method com- such a precipitate in its dry state is known, as monly adopted to purify precipitates and other powders which are insoluble in water.

3848. Rectification. A second distillation weight of the same while in pulp can be retion of a fluid, for the purpose of rendering it duced to the simple manipulation of weighing purer. In rectifying alcohol containing water, the distillation is conducted at a temperature full of the pulp; then weight the same vessel ture high enough to evaporate the alcohol and full of the same liquid that the pulp is moistcause it to distill over into the receiver, but ened with, and note down the difference benot high enough to boil the water, the greater tween the weights. Next divide this differpart of which, therefore, remains behind in ence of weight by the difference between the

Acids. An acid in chemistry is any electro-negative compound, capable of combining in definite proportions with bases to form salts. Most of the liquid acids possess a sour taste, and redden litmus paper. The acids have been variously classed by different writers, as into organic and inorganic; bles, and heat applied by the flame of a spirit metallic and non-metallic; oxygen acids, hylamp, or other appropriate means. When drogen acids, and acids destitute of either of large quantities of matter are calcined, metal these elements; the names being applied acor earthenware crucibles and the heat of a cording to the kingdom of nature, or class of furnace are employed. Charcoal is thus ob- bodies to which the radical belonged, or after tained from wood, bone-black from bones, &c. | the element which was presumed to be the

or less poisonous when concentrated. They zero. the effects of alkalies on vegetable blues and PHATES. yellows. Most of the acids are soluble in water in all proportions; they neutralize the alkalies, effervesce with the carbonates, and combine with the bases generally, forming compounds called salts. The methods for estimating the strength or neutralizing power of acids, as well as the strength of their solutions, will be found under ACIDIMETRY, No. 78. The names of the acids end either in -io or -ous; the former being given to that containing the larger portion of the electro-negative element, or oxygen, and the latter to that containing the smaller quantity. As 3 atoms of oxygen; sulphurous acid, another sulphur acid, containing only 2 atoms of oxygen. When a base forms more than 2 acid compounds with oxygen, the Greek preposition hypo is added to that containing the smaller portion, as hyposulphuric and hyposulphurous acids. The prepositions per, hyper, an increase of oxygen, as hypernitrous acid, perchloric acid, oxymuriatic acid, &c. The for convenience in obtaining the acid without prefix hydro to the name of an acid denotes unpacking. that the acid combination is with hydrogen, and not with oxygen. All the strong liquid acids should be kept in glass bottles, furnished with perfectly tight ground-glass stoppers; a glass retort connected with a well-cooled glass vessels should be used in measuring receiver. them, and they should be dispensed in stoppered vials. Fluoric acid must be kept in a 2 parts strongest oil of vitriol are gradually bottle made of lead, silver, platinum, or pure added to 3 parts anhydrous phosphoric acid, the combination of acids with bases to form salts, distinctive terminations are employed to denote the kind of acid present. The name of a salt of an acid ending in -ic, terminates in sulphite of lime, formed from sulphurous acid and lime. The names of compounds formed by the union of non-metallic elements, and certain other bodies, with the metals or with advisable to omit a number of acids, both simple and compound, of limited practical use; the selection being confined to acids of more general utility and adaptation to practical purposes.

3854. Sulphuric Acid. This is a colorless. odorless acid, and highly corrosive filter through paper, and pass sufficient disliquid, formed by the union of 1 equivalent of tilled water through the filter to make the sulphur and 3 of oxygen. It is immediately diluted acid measure 1 pint. The specific colored by contact with organic matter. It gravity of this mixture is 1.082. The officinal attracts water so rapidly from the atmosphere, strength of the British Pharmacopœie is when freely exposed to it, as to absorb a somewhat greater; sufficient distilled water its weight in 24 hours; and, under continued is added to 1350 grains sulphuric acid, so that, exposure, will absorb 6 times its weight, after it has been shaken and cooled down to

acidifying principle. Acids are in various When 4 parts water are suddenly mixed with forms; some are gaseous, as carbonic acid; 1 part sulphuric acid, the temperature of the some are liquid, as nitric and acetic acid; mixture rises to about 300° Fahr. Whilst 4 others are solid, as citric and oxalic acid; parts pounded ice mixed with 1 part acid, others again under peculiar conditions assume sinks the thermometer to some degrees below more than one of these forms. Acids, which zero. Sulphuric acid boils and distills over at are soluble or liquid, are corrosive, and more 620° Fahr., and freezes at about 20° below The salts formed by the union of change vegetable blues to red and neutralize sulphuric acid with a base are called sul-

3855. To Obtain Commercial Sulphuric Acid. This is commonly called oil 3855. of vitriol, and has a specific gravity not less than 1.840, nor more than 1.845. It was first obtained by the distillation of green vitriol (sulphate of iron), but it is now made by bringing the fumes of sulphurous acid (see No. 3865) into contact with those evolved from a mixture of nitre and oil of vitriol, so that the former becomes oxidized at the expense of the latter. This process is conducted in a series r to of leaden chambers, having a little water on As the floor, to absorb the acid, and so arranged sulphuric acid, an acid of sulphur, containing as to prevent the loss of gas. As soon as the water is found to have acquired a specific gravity of 1.350 to 1.450, it is drawn off, and concentrated (see No. 8) in leaden boilers to a density of 1.659 to 1.700; after which it is further concentrated in green glass or platinum retorts until the specific gravity reaches 1.842 to 1.844. When cold, the clear acid is put and the syllable oxy are also prefixed to the into carboys (large globular bottles of green names of acids when it is intended to denote glass) packed securely with straw in strong wooden cases, the neck being left exposed

3856. Anhydrous Sulphuric Acid. Anhydrous or dry sulphuric acid is obtained by heating Nordhausen acid (see No. 3858) in

It is also prepared in the following manner: gutta-percha, as it acts readily on glass. In contained in retort surrounded by a freezing mixture; when the compound has become brown, the retort is removed from the freezing bath and connected with a receiver which takes its place in the freezing mixture; a -ate; thus, sulphate of soda, formed from sul-phuric acid and soda. The name of a salt of white vapors pass over and condense in the an acid ending in -ous, terminates in -ite; as receiver under the form of beautiful silky crystals. The product equals in weight that of the phosphorus originally employed. addition of a few drops of water to these certain other bodies, with the metals or with crystals produces a dangerous explosion. each other, terminate in -ide or -uret; thus, sulphide or sulphuret of silver, formed of sil-introduced into water, they his like red-hot ver and sulphur. (Cooley.) In accordance iron. They melt at 66° Fahr., and boil at with the scope of this work it has been found about 1050°, and do not redden dry litmus

3857. Dilute Sulphuric Acid. officinal strength of this acid, according to the U.S. Pharmacopæia, is thus obtained: Take 2 troy ounces sulphuric acid; add gradually to it 14 fluid ounces distilled water;

60° Fahr., it measures 1 imperial pint. The sulphuric acid, heated to nearly its boiling

specific gravity of this is 1.094.

Nordhausen Sulphuric Acid. This is also known as fuming sulphuric acid. It is a brown, oily liquid, which fumes in the calcined sulphate of iron (green vitriol) in an from nitric acid and nitrous oxide. earthen retort.

Dilute Acid at Different Densities.

Liquid.	Sp. Gr.	Dry.	Liquid.	Sp. Gr.	Dry.
100	1.8485	81.54	ξ0	1.3884	40.77
99	1.8475	80.72	49	1.3788	39.95
98	1.8460	7 9.90	48	1.3697	39.14
97	1.8439	79.09	47	1.3612	38.32
96	1.8410	78.28	46	1.3530	37.51
95	1.8376	77.46	45	1.3440	36.69
94	1.8336	 76.65	44	1.3345	35.88
93	1.8290	75.83	43	1.3255	35.06
92	1.8233	75.02	42	1.3165	34.25
91	1.8179	74.20	41	1.3080	33.43
90	1.8115	73.39	40	1.2999	32.61
89	1.8043	72.57	39	1.2913	31.80
88	1.7962	71.75	38	1.2826	30.98
87	1.7870	70.94	37	1.2740	30.17
86	1.7774	70.12	36	1.2654	29.35
85	1.7673	69.31	35	1.2572	28.54
84	1.7570	68.49	34	1.2490	27.72
83	1.7465	67.68	33	1.2409	26.91
82	1.7360	66.86	32	1.2334	26.09
81	1.7245	66.05	31	1.2260	25.28
80	1.7120	65.23	30	1.2184	24.46
79	1.6993	64.42	29	1.2108	23.65
78	1.6870	63.60	28	1.2032	22.83
77	1.6750	62.78	27	1.1956	22.01
76	1.6630	61.97	26	1.1876	21.20
75	1.6520	61.15	25	1.1792	20.38
74	1.6415	60.34	24	1.1706	19.57
73	1.6321	59.52	23	1.1626	18.75
72	1.6204	58.71	22	1.1549	17.94
71	1.6090	57.89	21	1.1480	17.12
70	I.5975	57.08	20	1.1410	16.31
69	1.5868	56.26	19	1.1330	15.49
68	1.5760	55.45	18	1.1246	14.68
67	1.5648	54.63	17	1.1165	13.86
66	1.5503	53.82	16	1.1090	13.05
65	1.5390	53.00	15	1.1019	12.23
64	1.5280	52.18	14	1.0953	11.60
63	1.5170	51.37	13	1.0887	10.41
62	1.5066	50.55	12	1.0809	9.78
61	1.4960	49.74	11	1.0743	8.97
60	1.4860	48.92	10	1.0682	8.15
59	1.4760	48.11	9	1.0614	7.34
58	1.4660	47.29	8	1.0544	6.52
57	1.4560	46.48	7	1.0477	5.71
56	1.4460	45.66	6	1.0405	4.89
55	1.4360	44.85	5	1.0336	4.08
54	1.4265	44.03	4	1.0268	3.26
53	1.4170	43.22	3	1.0206	2.446
52	1.4073	42.40	2	1.0140	1.63
51	1.3977	41,58	1 1	1.0074	0.8154

nitrous acid, arsenic, and saline matter. These impurities must be removed in order to obtain the acid in any high degree of purity.

Nitrous acid is removed by adding about Acid. This is evolved during the action of

11 grains sugar to each fluid ounce of the sulphuric acid on mercury or clippings of

point, and continuing the heat until the dark color at first produced disappears, when it should be distilled. Another method is by adding to to f of 1 per cent. of sulphate of air, is intensely corrosive, and has a specific ammonia to the acid, and heating to ebullition gravity of about 1.900, and is chiefly used for for a few minutes. In this way the most dissolving indigo. It is prepared by distilling impure acid may be rendered absolutely free

Arsenic can be got rid of by adding a little 3859. Table Showing the Percentage sulphuret of barium, or of copper foil, to the of Liquid and Dry Sulphuric Acid in acid, agitating the mixture well, and, after

repose, decanting or distilling it.

Saline matter may be removed by simply redistilling (rectification.) The distillation is best conducted on the small scale, in a glass retort containing a few platinum chips, heated by a sand-bath or gas flame, rejecting

the first ½ fluid ounce that comes over. 3861. Test for Nitric Acid in Sulphuric Acid. Place in a watch glass a small portion pure and concentrated sulphuric acid at a density of 1.84; then pour, drop by drop, half the quantity of a solution of sulphate of aniline, prepared by mixing commercial aniline with diluted sulphuric acid. A glass rod is dipped in the liquid to be tested, and then stirred in the contents of the watch glass; from time to time the experimenter should blow slowly on the agitated liquid; if the liquid thus stirred contains traces of nitric acid, circular lines of a deep red are soon visible, coloring the whole liquid to a pink. On adding a very small quantity of nitric acid to the mixture, the liquid becomes of a carmine color; the addition of a single drop of very dilute nitric acid renders the liquid a deep red, and afterwards a dead red.

3862. To Remove Nitric Acid from Sulphuric Acid. Diluted sulphuric acid may be deprived of any small quantity of nitric acid it may contain, by shaking it up for a few minutes with a little powdered (freshly burned) charcoal, and afterwards filtering it. This will not answer for concentrated sulphuric acid; nitric acid is separated from it with great difficulty, and only by very

protracted methods.

3863. To Decolorize Sulphuric Acid. Acid which has become brown by exposure may be decolorized by heating it gently; the carbon of the organic substances is thus con-

verted into carbonic acid.

3864. Sulphurous Acid. This acid is used to bleach silks, woolens, &c., (see No. 1716), and to remove vegetable stains and iron-moulds from linen. For these purposes it is prepared from sawdust, or any other refuse carbonaceous matter. The salts formed by the combination of sulphurous acid with a base are called SULPHITES. (See Nos. 1717 and 1718.)

3865. To Obtain Sulphurous Acid. In the gaseous form this acid is freely evolved by burning sulphur in air or in dry oxygen. It is also given off during the digestion of metals in hot sulphuric acid. When charcoal, 3860. To Purify Oil of Vitriol. Com- wood, or cork chips, or sawdust are digested mercial sulphuric acid frequently contains in hot sulphuric acid, a mixture of sulphurous and carbonic acids is obtained, which is used

in a glass retort, a mixture of 100 parts black with water and becomes stronger at lower oxide of manganese, and 12 or 14 parts sultemperatures; but acid of higher specific phur. The gas evolved should be collected in gravity is weakened by exposure to heat. It a receiver over mercury.

3867. Sulphurous Acid Solution. The gas obtained according to the last method is to be passed through water, which is capable of dissolving or absorbing 30 times its bulk of the gas. To avoid waste in preparing the solution, the unabsorbed gas which escapes from the water is usually again passed through water, and the same arrangement re-

long as any gas escapes undissolved.

Pure Sulphurous Acid. acid and charcoal.

3869. Pure Liquid Sulphurous Acid. This can only be obtained by passing the pure dry gas through a glass tube surrounded by a powerful freezing mixture. The specific gravity of the pure liquid gas is 1.45; its boiling point is 14° Fanr., and causes intense

cold by its evaporation.

3870. Hydrosulphuric Acid, also Called Sulphuretted Hydrogen. When sulphur acts upon paraffine at a temperature a little above the melting point of sulphur, hy- rectifying it at a heat under 212° Fahr. A drosulphuric acid gas is evolved in large quantities, and this method may be advantageously used for its generation in the laright angles, about ½ inch bore and 12 to 18 inches long, containing cotton wool, and to this is attached the small tube for precipitation. The production of gas may be stopped a little red-lead before rectification. by removing the heat. Heavy paraffine oil, stearic acid, or suet, may be used as a substitute for paraffine.

3871. Nitro-Sulphuric Acid. Dissolve 1 part nitre in 9 parts sulphuric acid. This is used to separate the silver from the copper and solder of old plated goods. At about 200° Fahr. it readily dissolves silver, but scarcely acts on copper, lead, or tin, unless diluted, or assisted by a much higher tempera-

3872. Nitric Acid. There are five compounds of nitrogen and oxygen. The union of 1 equivalent of nitrogen with 1 of oxygen produces nitrous oxide, or laughing gas; with 2 oxygen, nitric oxide; with 3 oxygen, nitrous acid; with 4 oxygen, hyponitric acid; and with 5 equivalents of oxygen, nitric acid. Pure liquid nitric acid is colorless, highly corrosive, and possesses powerful acid properties. It is employed in assaying, to dve silk and woolens yellow, and to form various salts. In specific gravity of medicine, it is used as a caustic, &c. The 1.068, U. S. Dis. officinal strength of nitric acid of the U.S.

copper. It is also obtained pure by heating Nitric acid of less density than 1.42 parts freezes when exposed to extreme cold. It rapidly oxidizes the metals, and unites with them and the other bases, forming salts called NITRATES. Two strengths of this acid occur in the arts, known as double and single aqua-fortis. Double aqua-fortis has usually a specific gravity of 1.36, and single, or ordinary aqua-fortis 1.22. Both are frequently sold at lower strengths. This can easily be ascerpeated through a series of vessels of water so tained by acidimetry. (See No. 78.)

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3873. To Obtain Nitric Acid. In usual method adopted for obtaining this acid order to prepare sulphurous acid from sul- is to add to nitrate of potassa in coarse powphuric acid and charcoal, it is better to employ an acid of .74 per cent., or 1.825 specific weight of strong sulphuric acid, poured in gravity. If we take a stronger acid, a part of through a funnel, so as not to wet the neck of it is entirely deoxidized to sulphur, and if the retort. The materials should not exceed weaker acid be employed, sulphuretted hydrogen is evolved. To obtain absolutely pure sulphurous acid, it is well to put sulphite of the materials begin to thicken. Red vapors lead and coarse charcoal in the wash bottle. will at first arise and pass over into the re-With these precautions, it is possible to obtain pure sulphurous acid from sulphuric the distillation, but subsequently renewed, ceiver; these will disappear in the course of showing that the process is completed. The pale yellow acid thus obtained may be rendered colorless, if desired, by heating it gently in a retort.

3874. To Purify Nitric Acid. The nitric acid of commerce frequently contains chlorine, muriatic and sulphuric acids, and sometimes iodine, from which it may be purified by the addition of a little nitrate of silver, as long as it produces any cloudiness, and, after repose, decanting the clear acid, and perfectly colorless product may be obtained, by introducing a small portion of pure black oxide of manganese into the retort. Nitric boratory. A flask, holding about a pound of acid may also be purified by rectification at a the material, is fitted with a tube bent at gentle heat, rejecting the first liquid that comes over, receiving the middle portion as genuine acid, and leaving a residuum in the retort. Another method is to agitate it with

3875. Tests for Nitric Acid. It stains the skin yellow. When mixed with a little muriatic acid or sal-ammoniac, it acquires the power of dissolving gold leaf. When mixed with dilute sulphuric acid, and poured on a few fragments of zinc or iron in a tube, the evolved gas burns with a greenish white flame. Substitute alcohol for zinc in the last test. Morphia, brucia, and strychnia give it a red color, which is heightened by ammonia in excess. When placed in a tube, and a solution of protosulphate of iron cautiously added, a dark color is developed at the line of junction, which is distinctly visible when only 24000 part of nitric acid is present. When mixed with a weak solution of sulphate of indigo, and heated, the color is destroyed.

3876. Dilute Nitric Acid. Mix 3 troy ounces nitric acid specific gravity 1.42 in a glass vessel with sufficient distilled water to make the dilute acid measure 1 pint. The specific gravity of officinal dilute nitric acid is

3877. Fuming Nitric Acid. The red and British pharmacopæias has a specific fuming nitrous or nitric acid of commerce is gravity of 1.42, and boils at 250° Fahr. simply nitric acid loaded with nitrous or hy-

ponitric acid. It may be thus prepared: Put solvent for gold. By the mutual action of into an iron or stoneware pot, nitre or nitrate intric and muriatic acids a compound of of soda, add rather more than half its weight of strong sulphuric acid, and lute on a stoneware head. The vapor is conducted into a series of two-necked stoneware vessels, containing each $\frac{1}{6}$ of their capacity of water. The acid is usually obtained of the density of about 1.45. It is colored with nitrous acid gas, forming what is commonly, but improperly, termed nitrous acid. By gently heating the colored acid in a retort, the nitrous acid is driven off, and the acid remains nearly colorless, usually of the density of 1.38 to

3878. Ure's Table of Percentage of Nitric Acid. This table is useful for finding the strength of dilute acids.

tne strei		r anute e	reids.		
Specific	Liq.	Dry Acid	Specific	Liq.	Dry Acid
Gravity.	: Acid in 100.	in 100.	Gravity.	Acid in 100.	Dry Acid in 100.
				111 100.	i
1.5000	100	79.700	-1.2947	50	39.350
1.4980	99	78.903	1.2887	49	39.053
1.4960	98	78.106	1.2826	48	38.256
1.4940	97	77.309	1.2765	47	37.459
1.4910	96	76.512	1.2705	46	36.662
1.4880	95	75.715	1.2644	45	35.865
1.4850	94	74.918	1.2583	44	35.068
1.4820	93	74.121	1.2523	43	34.271
1.4790	92	73.324	1.2462	42	33.474
1.4760	91	72.527	1.2402	41	32.677
1.4730	90	71.730	1.2341	40	31.880
1.4700	89	70.933	1.2277	39	31.083
1.4670	88	70.136	1.2212	$\frac{38}{38}$	30.286
1.4640	87	69.339	1.2148		
1.4600	86	68.542	1.2146 1.2084	37	29.489
1.4570	85		1.2064 1.2019	36	28.692
1		67.745		35	27.895
1.4530	84	66.948	1.1958	34	27.098
1.4500	83	66.155	1.1895	33	26.301
1.4460	82	65.354	1.1833	32	25.504
1.4424	81	64.557	1.1770	31	24.707
1.4385	80	63.760	1.1709	30	23.900
1.4346	79	62.963	1.1648	29	23.113
1.4306	78	62.166	1.1587	28	22.316
1.4269	77	61.369	1.1526	27	21.519
1.4228	76	60.572	1.1465	26	20.722
1.4189	75	59.755	1.1403	25	19.925
1.4147	74	58.978	1,1345	24	19.128
1.4107	73	58.181	1.1286	23	18.331
1.4065	72	57.384	1.1227	22	17.534
1.4023	71	56.587	1.1168	21	16.737
1.3978	70	55.790	1.1109	20	15.940
1.3945	69	54.993	1.1051	19	15.143
1.3882	68	54.196	1.0993	18	14.346
1.3833	67	53.399	1.0935	17	13.549
1.3783	66	52.602	1.0878	16	12.752
1.3732	65	51.805	1.0821	15	11.955
1.3681	64	51.068	1.0764	14	11.158
1.3630	63	50.211	1.0708	13	10.361
1.3579	62	49.414	1.0651	12	9.564
1.3529	61	48.617	1.0595	11	8.767
1.3477	60	47.820	1.0540	10	
1.3427	59	47.023	1.0485	9	7.970
1.3376	58	46.226		- 1	7.173
1.3323	57	45.429	1.0430	8	6.376
1.3323	56		1.0375	7	5.579
1.3216	อบ 55	44.632	1.0320	6	4.782
1.3163	,	43.835	1.0267	5	3.985
1.3110	54	43.038	1.0212	4	3.188
;	53	42.241	1.0159	3	2.391
1.3056	52	41.444	1.0106	2	1.594
1.3001	_51	40.647	1.0053	1	0.797

3879. Nitro-Muriatic Acid. regia. This is used in the arts, chiefly as a the distillatory and condensing apparatus.

chlorine, nitrogen, and oxygen is formed. The best proportions and strength of the acids are variously stated. Colorless nitric acid must be used. Elkington employs 21 parts of nitrie acid, specific gravity 1.45; 17 parts of muriatic acid 1.15 specific gravity; and 14 parts of water. This dissolves 5 parts of gold. (See No. 3588.) According to Cooley this acid is prepared by mixing 1 part by measure nitric acid and 2 parts hydrochloric acid. The mixture should be kept in a bottle in a cold and dark place. (Sce No. 3193.) With a base, this compound acid forms a NITRO-MURIATE.

3880. Dyer's Aqua-Fortis. Another mixture of nitric and hydrochloric acids, known as Dyer's aqua-fortis, is used by dyers, as it dissolves tin without oxidizing it. Mix 10 pounds colorless nitric acid, specific gravity 1.17, with 1 pound hydrochloric acid 1.19.

3881. Dilute Nitro-Muriatic Acid. Mix 1½ troy ounces nitric acid. and 2½ troy ounces muriatic acid in a pint bottle. Shake occasionally during 24 hours, and add distilled water to make up to 1 pint. Keep in a cool place, protected from the light. (U.S.

3882. Muriatic or Hydrochloric Acid. Pure muriatic acid is a colorless invisible gas, having a pungent odor and an acid taste, and fuming on coming into contact with air. It is irrespirable and uninflammable. Its specific gravity is 1.2695. Under a pressure of 40 atmospheres it is liquid. Water at 40° Fahr. absorbs 480 times its volume of this gas, and acquires the specific gravity 1.2109. cubic inch of water at 69° Fahr. absorbs 418 cubic inches, and the specific gravity becomes 1.1958. The aqueous solution of the gas constitutes the liquid form of the acid. The combinations of muriatic acid with a base are MURIATES, OF HYDROCHLORATES.

3883. To Obtain Muriatic Acid. The acid solution in water is thus obtained: Introduce 48 ounces (avoirdupois) dried chloride of sodium into a flask capable of containing an imperial gallon. Pour 44 fluid ounces sulphuric acid slowly into 32 fluid ounces water; and, when cool, add the mixture to the chloride of sodium in the flask. Connect the flask, by corks and a glass tube, with a three-necked wash-boule, furnished with a safety tube, and containing 4 ounces water. Apply heat to the flask, conduct the disengaged gas through the wash-bottle, and thence, by means of a glass tube, into another bottle containing 50 fluid ounces distilled water, the end of the tube dipping about ½ inch below the surface. Continue the process until the product measures 66 fluid ounces, or till the liquid has acquired a specific gravity of 1.16. The bot-

tle must be kept cool during the process.

The muriatic acid of commerce is now chiefly obtained from the manufacturers of carbonate of soda, who procure it as a secondary product. When, however, it is directly prepared from sea-salt, an iron or stoneware boiler, set in brickwork over an open fire, furnished with a stoneware head, and connected with a series of capacious double-Aqua necked stoneware bottles, usually constitutes

ing Pure Muriatic Acid. Put into a matrix in bulk, and converted into hydrochloric trass 6 parts, by weight, of purified salt, and acid of 1.14 or 1.15 specific gravity. To prointroduce distilled water equal in weight to and common salt. the salt employed, and let the bent tube dip \(\frac{1}{2} \) 3885. Dilute Muriatic Acid. Mix 4 the salt employed, and let the bent tube dip 1/8 3885. Dilute Muriatic Acid. Mix 4 of an inch into the water. Apply a gentle troy ounces muriatic acid with sufficient disacid comes over. In about 2 hours the opera- ity of the diluted acid is 1.038. (U. S. Ph.)

3884. Gregory's Method of Obtain- | tion will be finished. The water is increased 10 ounces oil of vitriol previously diluted care it of 1.21 specific gravity, employ part with 4 of water, and cooled. Fix in the major of this acid during the first half of a similar trass a tube twice bent at right angles and operation, and it will be speedily saturated. having a bulb blown on the descending limb. Phillips says a perfectly colorless acid may be Into a bottle surrounded with ice and water obtained from the commercial sulphuric acid

heat of a sand-bath to the matrass as long as tilled water to make a pint. The specific grav-

Ure's Table of Percentage of Chlorine and Muriatic Acid Gas in Liquid

Muriatic Acid.											
Acid of 1.20 in 100.	Specific Gravity.	Chlorine	Muriatic Gas.	Acid of 1.20 in 100.	Specific Gravity.	Chlorine	Muriatic Gas.	Acid of 1.20 in 100.	Specific Gravity.	Chlorine	Muriatic Gas.
100	1.2000	39.675	40.777	66	1.1328	26.186	26.913	32	1.0637	12.697	13.049
99	1.1982	39.278	40.369	65	1.1308	25.789	26.505	31	1.0617	12.300	12.641
93	1.1964	38.882	39,961	մ 4	1.1287	25,392	26.098	30	1.0597	11.903	12.233
97	1.1946	38.485	39.554	63	1.1267	24.996	25.690	29	1.0577	11.506	11.825
93	1.1928	38.089	39,146	62	1.1247	24.599	25.282	28	1.0557	11.109	11.418
95	1.1910	37.692	38.738	6.L	1.1226	24.202	24.874	27	1.0537	10.712	11.010
94	1.1893	37.296	38.330	60	1.1206	23.805	24.466	26	1.0517	10.316	10.602
93	1.1875	36.900	37.923	59	1.1185	23.408	24.058	25	1.0497	9.919	10.194
92	1.1857	36.503	37.516	58	1.1164	23.012	23.650	24	1.0477	9.522	9.786
91	1.1846	36.107	37.108	57	1.1143	22.615	23.242	23	1.0457	9.126	9.379
90	1.1822	35.707	36.700	56	1.1123	22.218	22.834	22	1.0437	8.729	8.971
89	1.1802	35.310	36.292	55	1.1102	21.822	22.426	21	1.0417	8.332	8.563
83	1.1782	34.913	35.884	54	1.1082	21.425	22.019	20	1.0397	7.935	-8.155
87	1.1762	34.517	35.476	53	1.1061	21.028	21.611	19	1.0377	7.538	7.747
83	1.1741	34.121	35.068	52	1.1041	20.632	21.203	18	1.0357	7.141	7.340
85	1.1721	33.724	34.660	51	1.1020	20.235	20.796	17	1.0337	6.745	6.932
84	1.1701	33.328	34.252	50	1.1000	19.837	20.388	16	1.0318	6.348	6.524
83	1.1681	32.931	33.845	49	1.0980	19.440	19.980	15	1.0298	5.951	6.116
82	1.1661	32.535	33.437	48	1.0960	19.044	19.572	14	1.0279	5.554	5.709
81	1.1641	32.136	33.029	47	1.0939	18.647	19.165	13	1.0259	5.158	5.301
80	1.1620	31.746	32.621	46	1.0919	18.250	18.757	12	1.0239	4.762	4.893
79	1.1599	31.343	32,213	45	1.0899	17.854	18.349	11	1.0220	4.365	4.486
78	1.1578	30.946	31.805	44	1.0879	17.457	17.941	10	1.0200	3.968	4.078
77	1.1557	30.550	31.398	43	1.0859	17.060	17.534	9	1.0180	3.571	3.670
76	1.1536	30.153	30.990	42	1.0838	16.664	17.126	8	1.0160	3,174	3.262
75	1.1515	29.755	30.582	41	1.0818	16.267	16.718	7	1.0140	2.778	2.854
74	1.1494	29.361	30.174	40	1.0798	15.870	16.310	6	1.0120	2.381	2.447
73	1.1473	28.964	29.767	39	1.0778	15.474	15.902	5	1.0100	1.984	2.039
72	1.1452	28.567	29.359	38	1.0758	15.077	15.494	4	1.0080	1.588	1.631
71	1.1431	28.171	28.951	37	1.0738	14.680	15.087	3	1.0060	1.191	1.224
70	1.1410	27.772	28.544	36	1.0718	14.284	14.679	2	1.0040	0.795	0.816
69	1.1389	27.376	28.136	35	1.0697	13.887	14.271	1	1.0020	0.397	0.408
63	1.1369	26.979	27.728	34	1.0677	13.490	13.863		i I		
67	1.1349	26.583	27.321	33	1.0657	13.094	13.456			1	İ

nitrate of silver it gives a white, cloudy precipitate, insoluble in nitric acid, freely soluble in liquor of ammonia, and blackened by exposure to the light.

3888. To Purify Muriatic Acid. Commercial muriatic acid may be purified by diluting it with an equal weight of water, gently heating it in a retort, and receiving the evolved gas into a fresh quantity of pure water. Iodine and arsenic may be removed by agitating it for a few minutes with some small pieces of bright copper foil previously to recti-

Acetic Acid. This is the well-3889. known acid principle of vinegar. It is one of 35 pounds to the inch, traverses the bottom of the common products of fermentation, of the the apparatus. The refrigeratory consists of oxygenation of alcohol, and of the destructive well cooled earthenware vessels, and the

3887. Tests for Muriatic Acid. When distillation of wood and other vegetable mata glass rod, dipped in liquor of ammonia, is ter. The officinal strength of acetic acid held near it, it gives off white fumes. With adopted by the U. S. Pharmacopæia has a specific gravity of 1.047. Special methods for testing the strength of acetic acid are given under Acetimetry, No 69. With bases this acid forms ACETATES.

Commercial acetic acid is principally manufactured on the large scale from acetate of soda, which yields a sufficiently strong and pure acid for commercial purposes, without the trouble of rectification. In this process, shallow copper vessels formed without rivets or solder in those parts exposed to the action of the acid, are employed for the purpose of the distillation. A coil of drawn copper pipe, heated by steam, having a pressure of 30 to

adopter or pipe connecting the still with the of sulphuric acid and water, and, when cold, sometimes used. The crystalline acetate of of strong oil of vitriol are added to every 100 alyses. parts of the acetate of soda, and the whole stirred together with a wooden spatula. The head of the still is then luted on and the distillation commenced. This produces an acid of a specific gravity of about 1.050, and, after being agitated with a little animal charcoal, is ready for sale. Some manufacturers add a little acetic ether to it. By this process 4 pounds of acetic acid of the strength above 1741.)

3890. Dilute Acetic Acid. The U. S. Pharmacopæia directs 1 pint acetic acid to be mixed with 7 pints distilled water, producing an acid of specific gravity 1.006; 100 grains of dilute acetic acid saturate 7.6 grains bicarbon-

ate of potassa.

in a capacious retort, and pour on it 97 parts 1749.)
pure sulphuric acid. The heat developed by 389 the action of the ingredients will cause oneeighth of the acetic acid to pass over. The retort may then be placed in a sand bath until the contents become quite liquid. The product, carefully rectified, yields 2 parts of pure acid containing only 20 per cent. of water. By exposing the latter portion, which comes over in a closed vessel, to a temperature below 40° Fahr., crystals of hydrated (glacial) acetic acid will be deposited. The liquid portion being then poured off, the crystals are again melted and re-crystallized by cooling. These last crystals, separated from the liquid, are perfectly pure.

To Obtain Glacial or Hydrated 3892. Acetic Acid Without Distillation. The acid may also be obtained without resorting to distillation, thus: Place 100 parts powdered acetate of soda (pure commercial) in a hardglazed stoneware or glass pan; pour 35 or 36 parts concentrated sulphuric acid gradually into the pan, so that the acid may flow under the powder, and as little heat as possible be generated by the operation. In furtherance of this necessary end, the process is best conducted in a cool apartment, and the pan kept The whole must now be covered well cooled. and allowed to stand for some hours, when crystalline grains of sulphate of soda will be found covering the inside of the vessel, and hydrated acetic acid, partly liquid and partly in crystals, in the upper portion. The temperature must then be raised just sufficiently to liquefy the crystals of acetic acid, the fluid poured off, and a very small quantity of pure acetate of lime added gradually, until it yields no trace of sulphuric acid on evaporation. After repose it may be decanted for

3893. To Obtain Pure Acetic Acid. Triturate together 10 parts crystallized neutral acetate of lead, and 3 parts effloresced (dry) sulphate of soda; mix together 21 parts each

receivers is also of the same materials. Stills pour it on the acetate and sulphate, previously of earthenware are also frequently employed, placed in a retort; then distill to dryness in and even worms and condensers of silver are a sand bath. The acid that comes over in the distillation by this process is very pure, and soda is placed in the still, and 35 to 36 parts may be used as a test acid for chemical an-

3894. To Obtain Anhydrous Acetic This is acetic acid free from water, Acid as it exists in dry acetates. Mix, in a glass retort, well-fused acetate of potassa with half its weight of chloride of benzoyle; apply a gentle heat, collect the liquid that distills and passed through a prepared muslin filter, over, and rectify it carefully. Hot water added to this resolves it into hydrated or glacial acetic acid.

Camphorated Acetic Acid. 3895. mentioned is obtained for every 3 pounds of the acetate of soda employed. (See No. rectified spirit, and dissolve in 10 fluid ounces strong acetic acid. This is fragrant and refreshing, and used as an embrocation in rheumatism and neuralgia, and as a fumigation in fever, &c.

To Obtain Strong Acetic Acid 3896. from Vinegar. Expose the vinegar to the action of a freezing mixture, or place in the 3891. To Obtain Pure Glacial or air in very cold weather; the water separates Hydrated Acetic Acid. Place 30 parts and becomes ice, and the strong acid remaindry and finely powdered pure acetate of soda ing fluid may be drained from it. (See No.

> 3897. Mohr's Table of the Specific Gravity of Acetic Acid at Various strengths. The following table, drawn up by M. Mohr, exhibits the specific gravity of acetic acid of almost every strength.

Per cent. of Glacial Acid.	Sp. Gr.	Per cent. of Glacial Acid.	Sp. Gr.	Per cent. of Glacial Acid.	Sp. Gr.
100	1.0635	67	1.069	34	1.045
99	1.0635	66	1.069	33	1.044
98	1.067	65	1.068	32	1.0424
97	1.0680	64	1.068	31	1.041
96	1.069	63	1.068	30	1.040
95	1.070	62	1.067	29	1.039
94	1.0706	61	1.067	28	1.038
93	1.0708	60	1.067	27	1.036
92	[1.0716]	59	1.066	26	1.035
91	1.0721	58	1.066	25	1.034
90	1.0730	57	1.065	24	1.033
89	[1.0730]	56	1.064	23	1.032
88	1.0730	55	1.064	22	1.031
87	1.0730	54	1.063	21	1.029
86	[1.0730]	53	1.063	20	1 027
85	1.0730	52	1.062	19	1.026
84	1.0730	51	1.061	18	1.025
83	[1.0730]	50	1.060	17	1.024
82	[1.0730]	49	1.059	16	1.023
81	1.0732	48	1.058	15	1.022
80	1.0735	47	1.056	14	1.020
79	[1.0732]	46	1.055	13	1.018
78	1.0732	45	1.055	12	1.017
77	1.073	44	1.054	11	1.016
76	1.072	43	1.053	10	1.015
75	1.072	42	1.052	9	1.013
74	1.072	41	1.0515	8	1.012
73	1.071	40	1.0513	7	1.010
72	1.071	39	1.050	6	1.008
71	1.071	38	1.049	5	1.0067
70	1.070	37	1.048	4	1.0065
69	1.070	36	1.047	3	1.004
68	1.070	35	1.046	2	1.002
[!	İ			1.	1.001

3898. To Concentrate Acetic Acid. by steam. The evolved nitrous vapors are Acid containing 20 per cent. of water may be usually allowed to escape, but if conveyed deprived of a good deal of its superfluous into a chamber filled with cold damp air, and water by standing over dry sulphate of soda. It may then be used either with or without distillation. Acetic acid of ordinary strength nitric acid. In England an equivalent promay be concentrated to any degree of rectification once or oftener from dry acetate of potassa or soda, rejecting the first and last por-tions that come over. The same acetate may be used repeatedly. The heat employed must not exceed 500° to 570° Fahr. Pure hydrated acetic acid liquefies above 62° Fahr.; at 50° to 55° it crystallizes in brilliant, colorless, transparent needles and plates; at 40° it is a crystalline solid. Free acetic acid reddens litmus paper, and may be recognized by its odor and volatility.

Acid. By heat it escapes entirely in vapor. Either nitrate of silver or chloride of barium being added to it, will produce no precipitate. When a thin plate of silver is digested in it, and hydrochloric acid subsequently dropped in, no precipitate is formed. Its color is unchanged by the addition of hydrosulphuric acid, or ammonia, or by ferrocyanide of potassium added after the ammonia. The presence of sulphuric acid is indicated by a white precipitate being formed on the addition of a lit-

tle peroxide of lead.

3900. Oxalic Acid. This consists of colorless crystals, possessing considerable voland melts at 280°; is soluble in about nine crystals. times its weight of cold, and in its own weight pound ox of boiling water; soluble also, but in a less degree, in alcohol. It has a strong affinity for lime, and is therefore a good test for its presence, by yielding a precipitate insoluble potash with acetate of lead, washing the pre-in excess of the acid. With the bases, oxalic cipitate with water, and decomposing it, while acid forms OXALATES.

3901. To Obtain Oxalic Acid. Liebig proposes: Nitric acid (specific gravity 1.42), 5 parts; water, 10 parts; mix, add sugar, or preferably potato starch, 1 part, and from Epsom Salts. Oxalic acid has occadigest by a gentle heat as long as gaseous sionally been mistaken for Epsom salts, with products are evolved; evaporate and crystallize, dry the crystals, redissolve in the smallest possible quantity of boiling water, and crystallize; 12 parts of potato starch yield 5 of acid. The mother water, treated with ing this test. Epsom salts taste extremely bitter and nauseous; oxalic acid tastes extremely sour. It is taste to taste a weak solution in applymore nitrie acid, and again warmed, will and mixed with carbonate of soda, or carbo-yield a second crop of crystals; and this should be repeated till the solution is ex-white sediment subsides; oxalic acid, mixed

Schlesinger gives the following method: Sugar 4 parts (dried at 257° Fahr.); nitric acid (specific gravity 1.38) 33 parts; the mixture, as soon as the evolution of gas ceases, is to be boiled down to one-sixth its original volume, and allowed to crystallize. whole process may be executed in 2 hours, and yields of beautifully crystallized oxalic acid from 56 to 60 per cent, of the sugar employed.

On the large scale, the first part of the process is usually conducted in sait-glazed stonecess is usually conducted in salt-glazed stone- into water, drops the gallic acid, deprived of ware pipkins, about two-thirds filled and set some of its water. Gallic acid forms GALin a water-bath; but on the small scale a LATES with the bases. glass retort or capsule may be used. The

containing a little water, they will absorb oxygen, and be recondensed into fuming portion of molasses is usually substituted for sugar. Another process consists in first converting potato fecula into grape sugar with sulphuric acid, and then decomposing the sugar thus obtained by nitric acid, in the usual way. Dr. Ure recommends the use of a little sulphuric acid along with the nitric acid, which, he says, contributes to increase the product; 15 pounds of sugar yielding fully 17 pounds of crystallized oxalic acid.

Dale's Process for Obtaining 3902. Oxalic Acid. At present much of the oxalic 3899. Tests for the Purity of Acetic acid of commerce is obtained by heating sawdust with a mixture of 2 parts caustic soda with 1 part caustic potassa. A watery solution of the mixed alkalies is evaporated to specific gravity 1.35, and then mixed with sawdust to a paste. This is heated on iron plates to 400° Fahr., and kept at that temperature for 1 or 2 hours, with constant stirring; the heat is continued until the mass is quite dry, but not charred. It now contains 28 to 30 per cent. of oxalic acid combined with the alkalies. By washing the powder on a filter with a solution of carbonate of soda, all traces of potassa are washed out. The oxalate of soda is converted, by heated milk of lime, into oxalate of atility, and a strong, sour taste; when ex- lime, and the resulting oxalate of lime is posed to a very dry atmosphere they effloresce treated with sulphuric acid, leaving a soluslightly. Oxalic acid sublimes at 180° Fahr., tion of oxalic acid ready to be evaporated into Two pounds of sawdust yield 1 pound oxalic acid

3903. Chemically Pure Oxalic Acid. Chemically pure oxalic acid is best prepared by precipitating a solution of binoxalate of still moist, with dilute sulphuric acid or sul-phuretted hydrogen. Filter and evaporate gently, so that crystals may form as it cools.

To Distinguish Oxalic Acid 3904. sionally been mistaken for Epsom salts, with fatal results. They may be easily distinguishwhite sediment subsides; oxalic acid, mixed with carbonate of soda or carbonate of potash, effervesces, and the liquid, in a few seconds, becomes transparent.

3905. Gallic Acid. When pure, gallic acid forms small, feathery, and nearly colorrinal less crystals, which have a beautiful silky The lustre. Commercial gallic acid has usually a pale yellow color, soluble in both water and alcohol. Its aqueous solution decomposes by exposure to the air. It blackens the salts of iron. Dissolved in hot oil of vitriol, it forms a deep, rich, red solution, which, when thrown

3906. To Obtain Gallic Acid. Mix 36 evaporation should be preferably conducted troy ounces nut-gall, in fine powder, with suf-

glass or porcelain vessel, in a warm place, for evaporate spontaneously to a syrupy consista month, occasionally stirring with a glass ence; then spread it on glass or tinned rod, and adding sufficient distilled water to plates, and dry quickly in a drying closet, preserve the original consistence. Then press Put the dry residue in a well-stopped bottle. out the water, boil the residue in 8 pints dis-(U, S, Ph.)

Tannin. acid which will form in considerable quantity.

heated.

3909. Pyrogallic Acid. This acid is formed in white, shining scales, inodorous, a burning candle before venturing in. ether; fusible at 239° Fahr., and subliming at 410°. When quite pure, it has no action on It is used in photography. litmus paper. A solution of the crude acid mixed with a little alcohol imparts a fine brown color to the hair, but stains the skin also.

To Obtain Pyrogallic Acid. It may be prepared by heating gallic acid (previously dried at 212° Fahr.) in a glass retort, by means of a chloride of zinc bath, to 410°, when the pure acid sublimes, and forms in crystals on the neck of the retort, and in the receiver, which should be kept well cooled.

3911. Tannic Acid, also called Tannin. Pure tannic acid is solid, uncrystallizable, white, or slightly yellow; strongly astringent, but without bitterness; very soluble in water, less so in alcohol and ether, and insoluble in fixed or volatile oils. Its solution reddens With the bases tannic acid forms litmus.

Among the incompatibles of tannin are the alkaloids of opium, and it is altogether unavoidable that if solutions of them are brought together, a precipitate will form of tannates; also, if the preparation of opium contain saffron, as in acetum opii and Sydenham's laudanum, this will cause a further precipitation of the extractive of saffron. (See No. 3908.

To Obtain Tannic Acid. pose nut-gall in fine powder to a damp atmosphere for 24 hours, then mix it with sufficient ether, previously washed with water, to form a soft paste. Set this aside, closely covered, for 6 hours; then envelope it quickly portion by pressing powerfully between tinned

ficient distilled water to make a thin paste; its bulk of water, to form again a soft paste, expose the mixture to the air in a shallow and express as before. Mix the liquids, and

3913. Carbonic Acid. An acid comtilled water for a few minutes, and filter while pound, formed by the union of carbon with hot through purified animal charcoal. (See oxygen, sometimes called choke-damp. A No. 1752). Set aside to crystallize, and dry colorless gas possessing a pungent odor and the crystals on bibulous paper. If not sufficiently free from color, dissolve the crystals forming liquid carbonic acid. The agreeable in boiling distilled water, filter through a pungency of ale, beer, porter, wine, &c., is in fresh portion of the charcoal, and crystallize a great measure owing to the presence of carbonic acid, which they lose on exposure to To Obtain Gallic Acid from the air, and then become flat and stale. Add a strong aqueous solution of Spring and well water contain carbonic acid. tannic acid (tannin) to sulphuric acid, as long and water that has been boiled has an insipid as a precipitate falls; collect the powder, taste, from its absence. Under a pressure of wash, and dissolve it by the aid of heat in 36 atmospheres at 32° Fahr. it becomes diluted sulphuric acid; boil for a few min-fluid, and on the pressure being removed, utes, cool, and collect the crystals of gallic congeals, from the cold produced by its rapid evaporation. It has been estimated that the 3908. To Distinguish Gallic Acid temperature falls to 180° in this experiment. from Tannic Acid. Gallic acid does not Carbonic acid gas is destructive to life, and affect solutions of gelatine, the protosalts of extinguishes combustion. An atmosphere coniron, or the salts of the alkaloids; but it produces a black precipitate with the sesquisalts $\frac{1}{1000}$), is unfit for respiration. The air of wells, of iron, which disappears when the liquid is taminated with this gas (choke-damp); hence the necessity of the old plan of letting down a burning candle before venturing in. If the very bitter; soluble in water, alcohol, and candle will not burn, man cannot breathe With the bases, this acid forms CARthere. BONATES.

3914. To Obtain Carbonic Acid. Dilute muriatic acid with 4 times its weight of water, then pour it upon fragments of marble, previously placed in a tubulated retort. Carbonic acid gas will be rapidly evolved, and may either be collected in the mercurial pneumatic trough, or applied to immediate use. When wanted perfectly dry. it must be passed over dried chloride of calcium, or through concentrated oil of vitriol. This is the most convenient way of procuring the gas on the small scale, or in the laboratory. Or: Dilute oil of vitriol with 3 or 4 times its weight of water, then pour it on whiting placed in a suitable vessel, and apply This is the plan adopted on the agitation. large scale by the soda water makers. (See No. 718.)

3915. Tests for Carbonic Acid. It reddens litmus paper, extinguishes the flame of a burning taper, and forms a white precipitate in aqueous solutions of lime and baryta, which is soluble in acetic acid. the last test, a very small quantity of this gas may be easily detected in the atmosphere of rooms, &c.

3916. Carbolic Acid, also called Phenol, Phenic acid, and hydrate of Phenyle. It consists of long, colorless prismatic crystals, which melt at about 90° Fahr, into an oily liquid resembling creosote. The crystals deliquesce in moist air, forming a sort of hydrate, which boils at 370° and has a specific gravity of 1.065. Heated with ammonia, it yields aniline and water; and nitric acid conin a close canvas cloth, and obtain the liquid verts it into pieric acid. Commercial creosote consists principally of hydrated carbolic acid. plates. Reduce the resulting cake to powder, but is easily distinguishable from it, as carbolic mix it with sufficient ether shaken with 15 acid coagulates collodion, creosote does not.

cient disinfectant.

3917. To Obtain Carbolic Acid. This is obtained from that portion of coal-tar deodorized for toilet purposes. which distills over between 300° and 400° Fahr.; this, when mixed with a hot concentrated solution of hydrate of potassa, is resolved, on the addition of water, into a light oil and a heavier alkaline liquid. By separating the latter, and neutralizing it with muriatic acid, impure carbolic acid will float on the surface in the form of a light oil. be exposed to a low temperature, carbolic acid congeals in a colorless deliquescent crystalline mass, which may be separated from the liquid by pressure in bibulous paper. At 95° Fahr, the crystals melt and constitute the liquid earbolic acid. The introduction of a crystal of carbolic acid into the acid to be congealed, greatly facilitates its crystalliza-

3918. Tests for the Purity of Carbolic Acid. If it becomes brown under the influence of light and air it is impure.

Put 1 fluid drachm of the liquid acid in a bottle with ½ pint warm water, and shake occasionally for half an hour; the amount of oily residue will indicate the measure of adul-

Mix 1 part caustic soda with 10 parts of the acid, and shake them well together. Any

undissolved residue is impurity.

3919. To Remove the Odor from Carbolic Acid. It may be interesting to know of a method which will entirely remove this odor, substituting for it a delicate trace of geranium leaves, which may, perhaps, be improved upon by adding a few drops of that oil. The process, as recently published by Professor Church, consists in pouring 1 pound of the best carbolic acid of commerce (the water, taking care not to permit the whole of the acid to enter into solution. With a good sample, if, after shaking repeatedly at intervals, between 2 and 3 ounces of the acid remain at the bottom of the vessel used, this
will be a sufficient residue to hold and contain

Phosphoric Acid. Phosphoric acid (see all the impurities; with bad samples, less water must be used, and more acid. The watery solution is to be syphoned off, and filtered, if necessary, through fine filtering paper, till perfectly clear. It is then placed in a tall cylinder, and pure powdered common salt added, with constant agitation, till it no longer dissolves. On standing for a time, the greater part of the carbolic acid will be found floating as a yellow oily layer on the top of the saline liquor, and merely requires to be removed to be ready for use. As it contains 5 per cent. or more of water, it does not generally crystallize, but it may be made to do so by distilling it from a little lime. The portion col-lected has, at ordinary temperatures, and up to 335° Fahr., scarcely any odor save a faint one resembling that of geranium leaves. The addition of about 4 drops per fluid ounce of the French oil of geranium will still further few seconds' exposure to the air causes the mask the slight odor of the acid, and has an anhydrous acid to deliquesce into a syrupy additional advantage of liquefying the pure liquid, its attraction for water being intense. crystallized product. The pure acid may be Its anhydrous state cannot be restored after dissolved in 230 parts of water, and used as

It has come into prominent notice as an effi- a gargle, or in 25 parts of water for painting the throat, or in 50 parts for the carbolic spray. By this process it becomes sufficiently

3920. Phosphoric Acid. This acid, in its pure or anhydrous state, can only be obtained by the direct combination of its elements, phosphorus and oxygen, 1 equivalent of phosphorus combining with 5 of oxygen. It consists of a white, flaky, extremely deliquescent powder, which, when fused and cooled, assumes a vitreous appearance. It is this be distilled from dried chloride of cal- capable of assuming three separate conditions cium to separate the water, and the distillate in combination with water as a base; the union of 1 equivalent of anhydrous acid with 1 equivalent of water produces monobasic or glacial phosphoric acid, called also metaphosphoric acid; 1 equivalent of anhydrous acid, with 2 of water, gives bibasic or pyrophosphoric acid; 1 of anhydrous acid with 3 of water forms tribasic, or commercial phosphoric acid. This last is the common form of the acid. These three forms of the acid are not pure phosphoric acid in different degrees of dilution, as they have distinguishing characteristics. Monobasic phosphoric acid coagulates albumen, and gives white gelatinous uncrystallizable precipitates with the soluble salts of baryta, lime, and silver; the bibasic does not coagulate albumen, and makes, when neutralized only, a white precipitate with nitrate of silver; the tribasic does not affect albumen, and, when neutralized, throws down a yellow precipitate (phosphate of silver) from nitrate of silver. Tribasic phosphoric acid nitrate of silver. Tribasic phosphoric acid is the usual form under which phosphoric acid combines with the bases to form Phos-PHATES.

3921. To Obtain Phosphoric Acid. This is obtained by heating nitric acid in a tubulated retort connected with a receiver; small fragments of phosphorus are dropped into the acid, singly and at intervals. As white crystallized) into 2 gallons cold distilled soon as the phosphorus is dissolved, the heat is increased, and the undecomposed acid distilled off. The residuum is then evaporated to a syrupy consistence, and forms the phos-

last receipt) is gradually heated to redness in a platinum crucible, and the glacial acid obtained by evaporation. Solid hydrated or glacial phosphoric acid contains 89 per cent. of real acid, and 11 per cent. of water. It is a highly deliqueseent, glassy-looking substance, very soluble in water, yielding a solution exhibiting powerful acid properties. Its concentrated solution has nearly the same properties as the solid acid; its dilute solution is not poisonous, and does not precipitate albumen. (Cooley.)

3923. Anhydrous Phosphoric Acid. This is evolved by burning phosphorus in a stream of dry air, or under a bell-jar, copiously supplied with dry air. The product is anhydrous phosphoric acid in snow-like flakes. These must be collected immediately, and put

3924. Dilute Phosphoric Acid. Mix a substitute for citric acid and lemon juice, 5 troy ounces mitric acid with ½ pint distilled for the preparation of cooling drinks and saline water in a porcelain capsule of the capacity draughts. of 2 pints; add 6 drachms phosphorus and invert over it a glass funnel of such dimenting the small scale it is prepared as follows: Dis-Place the capsule on a sand-bath, and apply a moderate heat until the phosphorus is disthe funnel, continue the heat until the excess of nitric acid is driven off, and a syrupy liquid, free from odor and weighing 2 troy ounces, remains. Mix this, when cold, with sufficient distilled water to measure 20 fluid ounces, and filter through paper.

Or: Dissolve 1 troy ounce glacial phosphoric acid in 3 fluid ounces distilled water; add 40 grains nitric acid, boil to a syrupy liquid, free from the odor of nitric acid, add distilled water to make up to 121 fluid ounces,

and filter.

3925. Tests for the Purity of Phosphoric Acid. The U. S. Pharmacopæia should cause a white precipitate with chloride with an excess of ammonia, should cause only absence of earthy salts. If the presence of arsenic is denoted by the tests for that metal, it may be separated by boiling with muriatic acid, so as to convert the arsenic into a volatile chloride, which would escape with vapors of the muriatic acid.

3926. Test for the Presence of Phos-1 or 2 drops of a concentrated solution of sesquichloride of iron; a solution of acetate of potassa is next added in excess, when a flocoriginal liquor. Arsenious acid, if present, should be removed by sulphuretted hydrogen

before applying the test. (Cooley.)
3927. Phosphorous Acid. This is prepared by burning phosphorus under a bellglass with a very limited supply of air. White and pulverulent. It is a powerful deoxidizing agent. With the bases it unites to form PHOSPHITES.

3928. Hypophosphoric Acid. A name erroneously given by M. Dulong to a mixture of phosphoric and phosphorous acids.

(Cooley.)

3929. Tartaric Acid. Tartaric acid forms inodorous, sour, scarcely transparent prisms, soluble in 2 parts of water at 60°, and its own weight of boiling water. It

sions that its rim may rest on the inside of solve 4 pounds cream of tartar in 2 gallons the capsule, near the surface of the liquid. boiling water; add gradually 12 ounces 7 drachms chalk; and, when the effervescence ceases, add another like portion of chalk, dissolved, and red vapors cease to rise. If the solved in 261 fluid ounces muriatic acid, dilureaction becomes too violent, add a little dis- ted with 4 pints water; collect the precipitated tilled water; and if the red vapors cease to tartrate of lime, and well wash it with water, be evolved before the phosphorus is all disthen boil it for 15 minutes in 8 pints 1 fluid solved, gradually add nitric acid (diluted as ounce dilute sulphuric acid; next filter, evapbefore) until the solution is effected. Remove orate to the density 1.38, and set it aside to crystallize. The crystals must be dissolved and crystallized a second and a third time.

On the large scale, the decomposition of the tartar is usually effected in a copper boiler, and that of the tartrate of lime in a leaden eistern. This part of the process is often performed by mere digestion for a few days, without the application of heat. Leaden or stoneware vessels are used as crystallizers. cream of tartar requires 26 per cent. of chalk, and 28.5 per cent. of dry chloride of calcium for its perfect decomposition. Dry tartrate of lime requires 75 per cent. of oil of vitriol to liberate the whole of the tartaric acid. A directs that an aqueous solution of the acid very slight excess of sulphuric acid may be should yield no precipitate with sulphuretted advantageously employed. Some manufachydrogen, showing the absence of metals; it turers bleach the colored solution of the first crystals by treating it with animal charcoal; of barium, soluble in excess of acid; and, but for this purpose the latter substance should be first purified by digesting it in mua slight turbidness, proving the almost total riatic acid, and afterwards by edulcorating it absence of earthy salts. If the presence with water, and exposing it to a dull red heat with water, and exposing it to a dull red heat in a covered vessel. The general management of this manufacture resembles that of

citric acid. (Cooley.)
3931. To Detect Tartaric Acid in Citric Acid. Citric acid is sometimes adulterated with tartaric acid. This is readily dephoric Acid. Hydrochloric acid is added to tected by adding a solution of carbonate of the solution to acid reaction, and afterwards potassa to a solution of the suspected acid; if tartaric acid be present, a crystalline precipitate of bitartate of potassa (cream of tartar) will be found. A more delicate test is to diculent white precipitate (sesqui-phosphate of gest the suspected acid with hydrated sesqui-iron) will be found if phosphoric acid was oxide of iron in a test tube, and afterwards to present in any form or combination in the raise the heat slowly to the boiling point; allowing the excess of oxide to subside, decant the clear liquid, and evaporate it to a syrupy consistence. If the citric acid was pure, the liquid remains clear and of a fine red color; the presence of only 1 per cent. of tartaric acid renders it cloudy, and deposits tartrate of the sesquioxide. (U. S. Dis.)

3932. Citric Acid. This is an agree-

able acid, cooling and antiseptic; 20 grains of citric acid are equivalent to 5 fluid drachms lemon juice. When used for making saline draughts, it is preferable to use bicarbonate of potassa as the neutralizing alkali. Their respective saturating equivalents will be found in Nos. 80 and 81. With the bases it forms

CITRATES.
3933. To Prepare Citric Acid. Add contains about 90 of combined water, fuses at 41 ounces chalk by degrees to 4 pints lemon 220° Fahr., boils at 260°; and, at about 400°, juice, heated, and mix; set by, that the powafter losing 1 of its water, is converted into der may precipitate; afterwards pour off the tartralic acid. With the bases it forms salts supernatant liquor. Wash the precipitated called TARTRATES. Tartaric acid is chiefly emcitrate of lime frequently with warm water; ployed in calico printing, and in medicine, as then pour upon it 27½ fluid ounces diluted sul-

through a linen cloth, and filter it. Evapor- solution of the colored crystals, for the purate the filtered liquor with a gentle heat, and set it aside that crystals may form. To obtain minute quantity of oxalic acid is formed. the crystals pure, dissolve them in water a Good lemon juice yields fully 5 per cent. of second and a third time; filter each solution, lemon acid, or 2 gallons yield about 1 pound evaporate, and set it apart to crystallize. The of crystals. If the imported citrate of lime preparation of citric acid has become an important branch of chemical manufacture, from the large consumption of this article in various operations in the arts. In conducting this process some little expertness and care pounds of sulphuric acid of 1.845 (or a correspondent of the latter than the are necessary to ensure success. The chalk ponding quantity containing exactly 40 parts employed should be dry, and in fine powder, and be added to the juice until it be perfectly neutralized, and the quantity consumed must Acid. When pure, it does not yield a crysbe exactly noted. The precipitated citrate of talline precipitate when added in excess to a lime should be well washed with water, and the sulphuric acid diluted with 6 or 8 times its weight of water, poured upon it while still It is entirely soluble in water, and what is warm, and thoroughly mixed with it. The thrown down by acetate of lead from this soagitation must be occasionally renewed for 8 or 10 hours, when the dilute citric acid must be poured off, and the residuum of sulphate of a precipitate with the aqueous solution. It is lime thoroughly washed with warm water, entirely decomposed by heat; added sparingly fime thoroughly washed with warm water, and the washings added to the dilute acid. The latter must then be poured off from the bid, and when a few drops of a solution of impurities that may have been deposited, and evaporated in a leaden boiler, over the naked fire, until it acquires a specific gravity of 1.13, when the process must be continued at a fervescence. lower temperature until a pellicle appears upon the surface, This part of the process requires great attention and judgment, as, if not properly conducted, the whole batch may be carbonized and spoiled. At this point the evaporation must be stopped, and the concentrated solution emptied into warm and clean crystallizing vessels, set in a dry apartment, where the thermometer does not fall below temperate. At the end of 4 days the crystals will be ready to remove from the pans, when in water at 55° Fahr. than the opaque. In they must be well drained, redissolved in as taste it is slightly sweetish, with a slight little water possible, and, after being allowed to stand for a few hours to deposit impurities, again evaporated and crystallized. When the process has been well managed, the acid of the second crystallization will usually be suffi- during the smelting of cobalt ores. ciently pure; but if this be not the case, a arsenic is obtained from the crude, by a third, or even a fourth crystallization must be second sublimation in cast-iron vessels. The had recourse to. The mother liquors from arsenic, as imported, has usually been thus the several pans are collected together, and. by evaporation, yield a second or third crop is sufficiently pure for general purposes. It of crystals obtained by evaporation as before. Citric acid crystallizes with great ease, but in some cases, where all the citrate of lime has powdered lime or chalk; it is, therefore, betnot undergone decomposition by the sul-phuric acid, a little of that salt is taken up by the free citric acid, and materially obstructs the crystallization. This is best avoided by exactly apportioning the quantity of the sulphuric acid to that of the chalk used, always remembering that it requires a quantity of liquid sulphuric acid, containing method of preventing mistake in the use of exactly 40 parts of dry acid, to decompose 50 parts of carbonate of lime. Commercial sulphuric acid is usually of the specific gravity of 1.845; it will therefore take exactly 49 pounds of this acid for 50 pounds of chalk. In practice it is found that a very slight excess of sulphuric acid is better than leaving any citrate of lime undecomposed. The first crop of crystals is called "brown citric acid," soda turns green.

phuric acid and 2 pints distilled water, and and is much used by the calico printers, boil for 15 minutes; press the liquor strongly Sometimes a little nitric acid is added to the be used, a given quantity must be heated to

solution of carbonate of potassa; such a precipitate indicates the presence of tartaric acid. lution is entirely soluble in dilute nitric acid. to cold lime water, it does not render it turcitric acid are added to lime water, a clear liquid results, which, when heated, deposits a white powder, soluble in acids without ef-

3935. Arsenious Acid. This is the arsenic or white arsenic of commerce, imported chiefly from Germany, also manufactured in quantity in Cornwall, England. It consists of large, glassy, colorless or yellowishwhite, semi-transparent cakes or porcelainlike masses, which soon become opaque on their exterior, and sometimes friable and pulverulent. The transparent arsenic is found to be more than three times as soluble taste it is slightly sweetish, with a slight acidity and astringency, not perceived until some minutes after being swallowed, hence When the its dangerous character as a poison. Crude arsenic is obtained, as a collateral product, Pure purified; and, unless otherwise adulterated, is sometimes kept in fine powder, and in this state is occasionally found adulterated with ter to purchase it in the lump. The salts of arsenious acid are called ARSENITES.

3936. Self-Detecting Arsenious Acid. By adding a small quantity of any of the following substances to ordinary white arsenic, the mixture changes color when mixed with liquids. This is proposed as a this poisonous article.

The addition of a small quantity of a mixture of dry calomel and quicklime to the arsenic turns black when mixed with a liquid.

A mixture of thoroughly dry sulphate of iron and ferrocyanide of potassium turns it blue.

Dry sulphate of iron and dry sulphate of

Tests for the Presence of Arcopper (Scheele's green) after being washed, is soluble in nitric acid, and in ammonia; is turned a brownish-red by a solution of sulphuretted hydrogen,

a solution of ammonio-nitrate of silver.

There are a number of delicate tests emin organic matter, such as the contents of the stomach or other viscera, all more or less involving the preparation of the matter before applying the tests, and requiring the manipulation of an experienced analytical chemist. A very susceptible test, and recommended by Cooley for its simplicity, is as follows: A solution of the suspected matter is strongly acidulated with muriatic acid in the proportion of 1 part muriatic acid to from 5 to 9 parts of the solution; this is boiled in a porcelain or glass vessel containing bright the solution be weak, or less, if strong, characteristic iron-gray film of arsenic deposited on the surface of the copper. dried, may be cut into small pieces and heated in a test tube over a spirit lamp, when the metallic arsenic is volatilized, and will be condensed either in metallic form or in crystals of arsenious acid. This is known as Rensch's

3938. Arsenic Acid. An acid formed by the combination of metallic arsenic with oxygen. It is sour, reddens litmus, and forms salts with the bases, which are termed ARSENIATES. By careful evaporation it may be obtained under the form of small grains, but usually has the consistence of syrup, be-

ing very deliquescent. 3939. To Obtain 3939. To Obtain Arsenic Acid. Pour 6 parts of strong nitric acid on 1 part of white arsenic (arsenious acid) in a glass vessel, and distill until the solution acquires the consistence of a syrup, then transfer it into a platina crucible, and expose it for some time to a faint dull red heat, to expel the nitrie acid. The addition of a little muriatic acid

facilitates the process.

3940. Tests for the Presence of Arsenic Acid. Sulphuretted hydrogen gives a yellow precipitate; nitrate of silver added to the solution of an arseniate gives a precipitate of a brick red color; nitrate of lead gives a white one, and the salts of copper a bluish colored one. Pure lump sugar dissolved in an aqueous solution of arsenic acid, becomes in a few hours of a reddish color, and afterwards of a magnificent purple. For some test purposes it will be advisable to add sulphurous acid to the suspected liquor, and boil it for a short time, when the arsenic acid will be reduced to arsenious acid, in which tests. (See No. 3937.)

3941. Manganesic Acid—also called senious Acid. A weak solution of am- permanganic acid-may be obtained by mixmonio-acetate of copper added to a solution ing 8 parts of binoxide of manganese with 7 of white arsenic (arsenious acid) throws parts of chlorate of potassa, both in fine powdown a grass green precipitate of arsenite of der, adding 10 parts of hydrate of potassa. This precipitate, dissolved in a small quantity of water, evanorating to dryness, powdering, exposing the powder to a low red heat in a platinum crueible, dissolving the mass in a large quantity of blood-red by ferrocyanide of potassium, and water, decanting, evaporating, and crystalliz-vellow by nitrate of silver. water, decanting, evaporating, and crystalliz-ing. These crystals are permanganate of po-Arsenious acid in solution throws down a tassa, from which the acid may be obtained yellow precipitate of arsenite of silver from by conversion into permanganate of baryta, and by careful decomposition by dilute sulphuric acid. (Gregory.) It has a fine red ploved for detecting the presence of arsenic color, bleaches, and is rapidly decomposed by organic matter. It unites with some of the bases to form PERMANGANATES.

3942. Benzoic Acid. This is also called flowers of benzoin or benjamin. It has the ferm of white crystalline needles of a silky lustre, possessing an agreeable odor. Benzoic acid fuses at 230° Fahr., is volatile when heated, dissolves sparingly in cold water, with less difficulty in boiling water, and very freely in alcohol. Its salts are called

BENZOATES.

3943. To Obtain Benzoic Acid. Put and clean metallic copper in the form of coarsely triturated henzoin into an iron pot sheet, gauze, or wire. In about 15 minutes, if with a flat bottom, whose diameter is from 8 to 9 inches; the benzoin forming therein a presence of arsenic will be noted by the layer of from 1 to 2 inches in depth. The open end of the pot is then to be covered with a sheet of soft and loose blotting-paper, which copper, having been carefully washed and must be attached to the rim with paste. A cone, formed with strong and thick paper, (cartridge paper), is then to be capped over the top of the pot, including the blotting paper; and this is also to be attached with paste and string. The apparatus, thus prepared, should then be placed on the sandbath, and exposed from 4 to 6 hours to a gentle heat. After this lapse of time, it may be removed from the sand-bath, inverted, and the string detached, when beautiful white needles, of a silky lustre, possessing the agreeable odor of benzoic acid, will be found in the paper cone.

3944. To Obtain Anhydrous Benzoic Acid. Add oxychloride of phosphorus to an excess of benzoate of soda; agitate together, and wash the mixture with boiling water. The anhydrous benzoic acid sinks like a

heavy oil, and crystallizes on cooling.
3945. Chromic Acid. This consists of acicular crystals of a crimson-red color and an acid metallic taste, deliquescent, and very soluble in water, forming an orange-yellow solution. With the bases this acid forms CHROMATES. Chromate of lead forms the pigment known as chrome-yellow.

3946. To Obtain Chromic Acid. Take 10 measures of a saturated cold solution of bichromate of potassa, mix with it 15 measures sulphuric acid, and allow the mixture to cool. The chromic acid is deposited in crystals, which, after decanting the mother liquid, are placed on a tile to drain, covered with a bell glass.

3947. Hydrocyanic Acid. This is also called prussic acid, and consists of a thin, colorless, and volatile liquid, having a strong state it will be susceptible of more delicate odor of peach kernels. It boils at 79° Fahr. and solidifies at 45°; its specific gravity is

.7058. It constitutes one of the most deadly and convenient. To 100 grains, or any other poisons known. Its salts are HYDROCYAN-ATES and METALLIC CYANIDES. Prussic acid, a small phial, add in succession, small quaneven when dilute, is very liable to spontaneous decomposition, and this speedily occurs when it is exposed to the light. To promote its preservation, it is usual to surround the bottles containing it with thick purple paper, and to keep them inverted in an obscure situation. The addition of a very small quantity of muriatic acid renders it much less liable to change, and is generally made by manufacturers for that purpose.

Acid. Pure crystallized ferrocyanide of po- rapidly in the dilute prussic acid, with the aid tassium, 15 parts; water and sulphuric acid, of each 9 parts; distill in a glass retort into a ter. Should the presence of muriatic acid be well-cooled receiver, containing chloride of calcium in coarse fragments, 5 parts; stop the process as soon as the chloride in the receiver is perfectly covered by the distilled fluid, and decant the acid into a bottle furnished with a good stopper. Keep it in the

dark, with the bottle inverted.

3949. Dilute Prussic Acid. Mix 41 grains muriatic acid with 1 fluid ounce distilled water, add 501 grains cyanide of silver, and shake together in a well stopped phial. When the precipitate has subsided, pour off the riatic acid. clear dilute acid and keep for use. (See No. 3950. Tests for the Presence of Prus-

sic Acid. It is distinguished by a strong

odor of bitter almonds.

Neutralized by potash, and tested with a solution of sulphate or tineture of iron, it gives a blue precipitate, or one turning blue on the addition of dilute sulphuric or muriatic as it soon passes spontaneously into a white, acid. This test may be applied by spreading a single drop of solution of potassa over the bottom of a white saucer or porcelain capsule, and inverting it over another vessel of the reddens litmus strongly.

same size containing the matter under exam
3953. To Obtain Cyanic Acid. Distill single drop of a solution of sulphate or tineture of iron, and expose it to the air for a few seconds. Next add 1 or 2 drops of dilute sulphuric acid. when a blue color will be developed if hydrocyanic acid is present in the matter tested.

Nitrate of silver gives a white clotty precipitate, soluble in boiling nitric acid; and which, when dried and heated in a test tube, evolves fumes of cyanogen, which burn with a violet or bluish colored flame. A watch by the excess of the sulphuretted hydrogen. glass, moistened with this test and inverted over matter containing hydrocyanic acid, be-

of cyanide of silver.

Liebig's test is considered the most delicate. Moisten a watch-glass or porcelain capsule eyanide of potassium is the red prussiate of with 1 or 2 drops of yellow hydrosulphuret of potash used in the arts. ammonia; invert it over the matter as before, and after a few minutes dry it with a gentle Acid. persalt or sesquisalt of iron, drawn over the phuretted by hydrogen, or by sulphuric acid glass, will form a blood-red streak if the smallest quantity of hydrocyanic acid is pres-(Cooley.)

3951. Test for the Strength of Prussic Acid. For estimating the strength of the commercial acid the following plan, propedular compound of cyanogen, hydrogen, posed by Dr. Ure, will be found very exact and iron, discovered by M. Porret, and called

convenient quantity of the acid contained in tities of the peroxide of mercury in fine powder, till it ceases to be dissolved on agitation. The weight of the red precipitate taken up being divided by 4, gives a quotient representing the quantity of real prussic acid present. By weighing out beforehand, on a piece of paper or a watch-glass, 40 or 50 grains of the peroxide, the residual weight of it shows at once the quantity expended. The operation may be always completed in five 3948. To Obtain Anhydrous Prussic minutes, for the red precipitate dissolves as of slight agitation, as sugar dissolves in wasuspected, then the difference in the volatility of prussiate and muriate of ammonia may be had recourse to with advantage; the former exhaling at a very gentle heat, the latter requiring a subliming temperature of about 300° Fahr. After adding ammonia in slight excess to the prussic acid, if we evaporate to dryness at a heat of 212°, we may infer from the residuary sal-ammoniac the quantity of muriatic acid present. Every grain of salammoniae corresponds to .6822 grains of mu-

> 3952. Cyanic Acid. A compound of cyanogen and oxygen only known in its hydrated state in combination with 1 equivalent of water. It combines with bases to form CYANATES. When in contact with water for a few hours it suffers decomposition, and is converted into bicarbonate of ammonia. It cannot be preserved for any length of time, opaque, solid mass, to which the name of cyamelide has been given, which may be reconverted into cyanic acid by distillation. It

ination. After 2 to 5 minutes remove the dry cyanuric acid, or cyameilde, in a retort, upper capsule; add to the potassa upon it, a and collect the product in a well-cooled receiver. It is also formed when cyanogen is transmitted over carbonate of potassa heated to redness; a cyanate of potassa re-

sults.

Or: Pass a current of sulphuretted hydrogen gas through water in which cyanate of silver is diffused. The sulphuretted hydrogen must not be passed so long as to decompose all the cyanate of silver; for then the cyanic acid is converted into other products

3954. Hydroferridevanic This is sometimes written hydroferricyanic comes opaque and white from the formation acid, and is a compound of ferridcyanogen and hydrogen. With the oxides of metals this acid forms ferridcyanides; the ferrid-

3955. To Obtain Hydroferrideyanic cid. Prepared by decomposing recently A glass rod dipped in a solution of a precipitated ferrideyanide of lead by sulcarefully added. A yellow solution is thus obtained, which yields a deep brown powder when evaporated by heat, or yellow crystals by spontaneous evaporation.

by him ferrochyazic acid. It consists of water and alcohol. states. The ferrocyanide of potassium is (Cooley.) the yellow prussiate of potash of commerce. RATES.

3957. To Obtain Hydroferrocyanic 3965.

trated boiling solution of ferrocyanide of potassium, cooled out of contact with the air. and muriatic acid added in excess. The mixseparates the acid; the latter is collected by filtration, and dried.

3958. Lactic Acid. This is a limpid, syrupy liquid, colorless or of a pale wine color, with a slight odor and very sour taste. It is found in sour milk, and some other animal fluids, and in several vegetable juices, especially in that of beet-root. It unites with

bases to form lactates.

3959. To Obtain Lactic Acid. Fer specific gravity .963; boils at 327° Fahr. It lution. The liquor is filtered again and preconsists of a solution of lactic acid, containing some sugar of milk (lactin) and certain salts. Next concentrate the solution to a syrupy consistence, and treat it with alcohol, which dissolves the acid and precipitates all the other matter. The solution is finally filtered

with bases are called fluorides or hydro-FLUORATES. The well known mineral, fluorgutta-percha. It is highly corrosive and its vapor is poisonous. It is a colorless fluid

3961. To Obtain Fluoric Acid. The the receiver. Great care must be taken, as the acid, both in its gaseous and liquid form, is very destructive.

3962. Chloric Acid. This is a yellowish liquid, smelling like nitric acid; it sets fire to paper or other dry organic matter. It combination with bases forms CHLORATES.

3963. To Obtain Chloric Acid. Disevaporation to a thin, oily consistence.

3964. Perchloric Acid. A colorless white or yellowish white crystals, soluble in liquid of about 1.65 specific gravity, which With metallic oxides it fumes slightly in the air, attracts moisture, combines to form FERROCYANIDES or PRUS and distills unchanged at about 3920 Fahr. With bases it forms PERCHLO-

3957. To Obtain Hydroferrocyanic 3965. To Obtain Perchloric Acid. Acid. It may be obtained from a concentro finely powdered perchlorate of potassa contained in a retort, add about ½ its weight of strong sulphuric acid, previously diluted with an equal weight of water. At about ture is then agitated with a little ether, which 284° Fahr., vapors of perchloric acid pass over and condense in the receiver. (Cooley.) No organic matter should be used as a lute for the joints of the apparatus; if any be needed, it should be of asbestos. By distilling the concentrated liquid acid with oil of vitriol at a gentle heat, crystals of perchloric acid will be deposited on the neck of the retort and in the receiver. These crystals fuse at 113° Fahr., and are very deliquescent. (Booth.)

bulk; decant and filter, and then saturate it may be procured from the butyrate of magwith milk of lime. This converts the lactic nesia by adding a little sulphuric acid in quanacid into lactate of lime, which remains in soof the butyrate used; filter and distill the cipitated by oxalic acid, which throws down clear liquor, when the product will be butyric oxalate of lime and sets free the lactic acid, acid, from which the water may be removed The liquid is again filtered, and the filtrate by chloride of calcium. It forms butyrates

with some of the bases. (See No. 1625.)
3967. Malic Acid. Malic acid is very soluble in water, slightly deliquescent, has a pleasant acidulous taste, and, when neutralized with the bases, forms salts called malates. When kept fused for some time at a low heat. and the lactic acid obtained pure by distilling it is converted into paramalic or fumaric off the alcohol. (U. S. Dis.)

3960. Fluoric Acid. This is more maleic acid, while fumaric acid is left in the strictly hydrofluoric acid, as it is a compound retort. Malic acid forms with bases, MALATES; of hydrogen and fluorine. Its combinations maleic acid, MALEATES. Take the juice of the fruit of the mountain ash, immediately after it has turned red, but still unripe; heat it to spar, is a fluoride of calcium. Fluoric acid the boiling point, skim, filter, nearly neureadily dissolves glass and silica, hence it is tralize with ammonia, and precipitate with kept in bottles of lead, silver, platinum, or pure a solution of 1 part of acetate of lead to every 72 parts of juice; filter, and again precipitate with nitrate of lead; allow the whole to stand which evaporates at 59° Fahr. in dense white until it forms a mass of crystals, then well fumes when exposed to the air, and has a wash, dry, powder, suspend in water, and depowerful affinity for water. gen; again filter, neutralize with ammonia, anhydrous acid is made by distilling powdered decolor with animal charcoal, a second time fluor-spar with twice its weight of oil of vitriol precipitate with nitrate of lead, and decomin a leaden, or better, a silver alembic, the pose the resulting nitrate of lead by sulphurpipe of which fits into a bottle of the same etted hydrogen; lastly, filter, evaporate and material, surrounded with ice. But as it is crystallize. (Winckler.) Mr. Everett pro-usually required in a diluted state, water poses the juice of the leaf-stalks of garden equal in weight to the spar may be put into rhubarb as a source of malic acid. One imperial gallon of this juice contains 11,1391 grs. of dry malic acid. The stalks should be peeled before pressing out the juice, as the cuticle contains much color. Everett's process is as follows: Neutralize with hydrate of lime, boil, filter, precipitate with nitrate of is a compound of chlorine and oxygen, and in lead, allow it to stand for a few hours, boil, cool, filter, decompose the precipitate with sulphuric acid, avoiding excess, throw down solve chlorate of baryta in 16 times its weight the excess of lead from the supernatant porof water; then add dilute sulphuric acid until tion with sulphuretted hydrogen, evaporate, all the baryta be precipitated as sulphate, and crystallize. Malic acid is also obtained The clear liquid may then be concentrated by from the juice of apples and several other sorts of fruit.

3968. Iodic Acid. A compound of iodine and oxygen, forming IODATES with the water, and detonates with inflammable bodies like the nitrates and oblorates.

3969. To Obtain Iodic Acid. Dissolve iodate of soda in sulphuric acid in con-

the solution aside to crystallize.

Or: Iodine, 1 part; strongest (monohydrasyrup, put it into a place where the temperature is higher and the air drier, when, in a under Alkalimetry, No. 83. few days, very fine white crystals of rhomboidal shape will form.

50 grains of iodine into a large, tall flask: It occurs in two forms, anhydrous and hyadd I ounce of fuming nitric acid, boil, and as the iodine sublimes and condenses on the term potash applies to the crude commersides of the flask, continually wash it back cial, and potassa to the more purified or again with the acid. Continue this until chemical preparations. none of the iodine remains unchanged.

Then

3975. Anhydrou none of the iodine remains unchanged. Then 3975. Anhydrous Potassa. This is a pour the whole into a shallow evaporating volatile, fusible, white substance, intensely and again evaporate till all the nitrous acid is

got rid of.

3970. Hydriodic Acid. This is a compound of iodine and hydrogen. In gaseous strong, it is very liable to change, and should be kept in well stoppered bottles. In combination with bases it forms hydriodates. The hydriodates may be easily formed by saturating the acid with the oxides or hydrates of the bases, or more economically, by acting on the bases in water, with iodine. When the hydriodates are deprived or their water, they are true lodides; that is, simple combinations with iodine. (See No. 3853.)

3971. To Obtain Hydriodic Acid. Pour a little water over some periodide of retort, and apply a gentle heat, when gaseous taining potassa has a reddish tint; soda colors hydriodic acid will be evolved, and phosphoric it yellow. acid remain behind. The gas may be either collected over mercury or passed into water, when liquid hydriodic acid will be formed.

Or: Place iodide of barium in a retort, and decompose it with sulphuric acid, when pure

hydriodic acid will be evolved.

3972. Dilute Hydriodic Acid. 1 troy ounce iodine in fine powder. Mix 30 tained from carbonate of soda in a similar grains of the iodine with 5 fluid ounces distilled water in a tall glass-stoppered 1 pint Caustic soda is occasionally called sodic hybottle, and pass into the mixture hydrosul-phuric acid gas until the color of the iodine entirely disappears, and a turbid liquid remeins. Next, gradually add the remainder of color. Hydrate of soda, after it has delithe iodine, stirring at the same time. Again quesced in the air, speedily resolidifies by the the iodine, stirring at the same time. Again pass the gas through the liquid until it be comes colorless, and decant it into a small of soda, a salt marked by being easily crysmatrass which it must nearly fill; boil it untallizable, and rapidly efflorescing in dry air. til it ceases to give off the odor of hydrosul- In solution, soda is not precipitated by tarphuric acid, and filter through paper, passing sufficient distilled water through the filter to bring the filtered liquid to 6 fluid ounces. form (six-sided prisms, transparent, and ex-Ph.

lkalies. Substances which possess the property of neutralizing acids and bases. It is deliquescent and very soluble in combining with them in fixed proportions, forming salts, and for the most part of turning the vegetable blues to greens, and yellow turmeric paper brown. The principal alkalies are soda, potassa, and ammonia. The siderable excess, boil for 15 minutes, and set first has been called the mineral, the second the vegetable, and the third the volatile alkali; but this distinction is now obsolete. ted) nitric acid, 4 parts; mix, and apply a Soda and potassa have also been called the gentle heat until the color of the iodine dis- fixed alkalies, from their permanence in the appears, then evaporate to dryness and leave fire. The alkalies are strictly metallic oxides. the residuum in the open air at a temperature. The salts of the alkalies, both alone and carof about 59° Fahr. When, by attracting bonated, are generally freely soluble in water. moisture, it has acquired the consistence of a The methods for ascertaining the strength of alkalies and their solutions will be found

3974. Potassa. Pure potash (not the potash of commerce, which is an impure car-Mr. A. Connell's method is as follows: Put bonate of potassa), is the oxide of potassium. drated potassa. As a general distinction, the

dish, and evaporate to dryness. Redissolve, corrosive, and passing into the hydrate of potassa when moistened with water. It is obtained by the combustion of potassium in

hot dry air.

3976. Hydrate of Potassa. Hydrated form it is colorless, fumes in the a.r. and is or caustic potacsa, when perfectly pure, is very soluble in water. In liquid form, when white, solid, very soluble in water and in alcohol, very deliquescent, and corrosive. To obtain it, evaporate solution of potassa rapidly in an iron vessel over the fire until ebullition ceases and the potassa melts. Pour this into suitable moulds, and, when cold, put it into stoppered bottles.

3977. Tests for Potassa. may be distinguished from the other fixed alkalies (soda and lithia), by affording, when in solution, a white crystalline precipitate (cream of tartar) with an excess of tartaric acid; and a yellow one with bichloride of phosphorus, previously put into a small glass platinum. The flame of burning alcohol con-

> 3978. Soda. This substance bears the same relation to its metallic base, sodium, that potassa does to potassium, but its basic and alkaline action are rather less powerful

than those of potassa.
3979. To Obtain Soda. Take and hydrate of soda (caustic soda) are obmanner to the same preparations of potassa.

drate.

3980. Tests for Soda. The flame of burning alcohol containing soda is of a yellow absorption of carbonic acid, forming carbonate In solution, soda is not precipitated by tartaric acid. With sulphuric acid it yields a Keep it in a well-stoppered bottle. (U. S. tremely efflorescent) is easily recognized as sulphate of soda (Glauber's salt).

Ammonia. Pure ammonia is an this state forms strong liquid ammonia, filtration, yields crystals of hydrate of baryta which, when much more dilute, is popularly on cooling.

known as spirits of hartshorn, or water of 3988. Test for Baryta. Its solutions ammonia. As usually met with in the form give an immediate clear white precipitate of a semi-crystalline whitish mass, commonly called smelling salts, it is combined with carbonie acid and water, forming a sesquicarbonate of this base. According to the theory

slacked lime with an equal weight of sal-ammoniae, both dry and in fine powder; introcontained in the apparatus having been expelled, the gas may be collected for use. Ammonia cannot be dried by means of chlo-

ride of calcium.

translucent, does not deliquesce, but absorbs carbonic acid and becomes opaque. It is to found in some mineral waters; among which is that of the Gettysburg spring. Pure lithia may be obtained by decomposing sulphate of lithia by acetate of baryta, and by expelling the acetic acid from the filtered solution by heat.

3984. flame of alcohol containing it a carmine red. It is distinguished from potassa and soda by its phosphate and carbonate being only sparingly soluble in water; from baryta, strontia, and lime, by forming crystallizable and soluble

hibiting an alkaline reaction.

3985. Baryta. This alkaline earth is the oxide of barium, and is found abundantly in the form of native sulphate and carbonate deliquescent, and soluble in alcohol. of baryta. With the acids it forms salts sonous.

3986. To Obtain Pure Baryta. Ignite pure crystallized nitrate of baryta in a capacious porcelain crucible, until red vapors cease to be evolved. This forms a grayish white mass or powder, which, on the addition of water, slacks like lime, but with the evolution of more heat.

3987. To Obtain Hydrated Baryta. It may be precipitated from a solution of either nitrate or chloride of barium, by adding to it a solution of pure potassa or soda, collecting and drying the precipitate.

It is obtained in crystals, by boiling a incondensable colorless gas, possessing great strong solution of sulphuret of barium with pungency and acridness, and powerful alka-line properties. Water readily absorbs about of copper, until it ceases to give a black pre-500 times its volume of this substance, and in cipitate with a salt of lead. The liquid, after

> Test for Baryta. Its solutions with dilute sulphuric acid, which is insoluble

in both acids and alkalies.

3989. Strontia. An alkaline earth, the oxide of a metal called strontium. It greatly of Berzelius, ammonia should be the oxide of resembles baryta. Hydrate of strontia is ammonium, a supposed but undiscovered freely soluble in boiling water, and the saturametal. Its presence can always be detected ted solution deposits crystals on cooling. The by its pungent odor.

3982. To Obtain Ammonia. Mix unlike baryta, is precipitated white by sulphuric acid and the alkaline sulphates and carbonates. It is distinguished from baryta by its duce the mixture into a glass retort, and join inferior solubility and by its soluble salts givthe beak by a collar of India-rubber to a glass ing a red tinge to flame, while the salts of tube about 18 inches long, which must lie baryta impart a yellow tinge. The salts of horizontally, and have its beak bent up ready strontia may all be prepared by dissolving the to be placed under a glass jar, on the shelf of native carbonate in the respective acids. The a mercurial pneumatic trough. Heat being nitrate is the only one met with in comapplied by means of a spirit-lamp, and the air merce, and is employed to form colored fireworks.

3990. Magnesia. An alkaline earth. the oxide of the metal magnesium, in the form of a very light, white, odorless and tasteless 3983. Lithia. This is the band of the carth, or its hydrate of powder, almost insoluble in cold and boiling In the form of the hydrate it is white and direct solution of the earth, or its hydrate or carbonate. It dissolves in hydrochloric acid without effervescence. Neither bicarbonate be obtained from various minerals, and is also of potassa nor chloride of barium throws down anything from the solution. It turns turmeric paper brown when moistened.
3991. To Obtain Magnesia. Expose

carbonate of magnesia in a crucible to a full red heat for 2 hours, or till the powder suspended in water does not effervesce on the Tests for Lithia. It colors the addition of muriatic acid. On the large scale, covered crucibles, made of porous earthen-ware, are employed as the containing vessels and the heat is applied by placing them in a sort of furnace or oven heated with coke.

3992. Test for Magnesia. Magnesia salts with sulphuric or oxalic acid; and from is precipitated as a bulky white hydrate, by magnesia, by the solution of its carbonate expure alkalies; and as a bulky white carbonate, by the carbonates of potassa and soda. Both the above precipitates dissolve in nitric and muriatic acid, forming salts which are very

Solutions of magnesian salts are not preciwhich are all more or less white; except the pitated by the alkaline sulphates or sulphuric sulphate, they are soluble in water, or in acid, nor, when very dilute, by oxalate of dilute muriatic acid, and are extremely poi- ammonia. By these tests it may be distinguished and separated from lime. These tests distinguish it from the other earths, and its insolubility in alkaline solutions marks its difference from alumina

3993. Lime. A highly acrid, alkaline and caustic earth, less insoluble in cold than in hot water. It is the oxide of calcium. When heated to a high degree, it becomes intensely luminous, and is well known in use as the calcium light.

3994. To Obtain Lime. Lime, or quicklime, is obtained by exposing limestone, or chalk, which are carbonates of line, to a red

from the shells of the oyster and other shellfish. When sprinkled with water, heat is generated, and the lime, combining with the water, crumbles down into a powder, which is hydrate of lime, or slacked lime.

3995 Tests for Lime. The alkaline carbonates, phosphates, oxalates, and sulphates, occasion white precipitates in solutions of lime. The precipitates occasioned by the in ether. first three tests are soluble in dilute nitric or muriatic acid; that by the last is insoluble in those menstrua, but soluble in solution of salt, and not reprecipitated by dilute sulphuric acid.

Oxalate of ammonia or potassa is the most delicate test of lime. If the substance under examination be a solid, dissolve it in muriatic acid, filter, evaporate to dryness, redissolve in water, and test as above. All the soluble salts of lime tinge the flame of alcohol of an orange color, but this may be confounded with the color produced by the salts of strontia.

Alkaloids. Substances of a vegeta-ble origin, analogous to the alkaline bases, in which the medicinal activity of the plants in which they are found appear to reside. (Cooley.) Among the natural organic bases, or alkaloids, the following are the

principal, as enumerated by Professor Fownes.

3997. Morphine or Morphia. This is
the chief active principle of opium. The morphia of commerce is a white crystalline powder; but when crystallized in alcohol, forms brilliant, prismatic, transparent, and colorless crystals, which turn nitric acid red. In powder, unlike strychnine, it is fusible without decomposition, and strongly decomposes iodic acid. It is insoluble in ether, scarcely soluble in water, and freely soluble in alcohol. Potassa and ammonia precipitate morphia from the solutions of its salts.

3998. To Find the Percentage of Morphia in Opium. An excellent process for ascertaining the quality of opium is to boil an infusion of 100 grains opium with 25 alkaloid principle extracted from tea, coffee, grains quicklime, made into a milk with wa Paraguay tea, &c. It forms in tufts of white ter; to filter while hot, saturate with a dilute silky needles. hydrochloric acid, and to precipitate the-morphia by ammonia. After expelling any excess of ammonia by heat, the precipitate is collected, dried, and weighed; the weight in grains will nearly represent the percentage of morphia in the opium.

3999. Narcotine. An alkaloid found in the insoluble portion of opium, and forms small, colorless, brilliant crystals, which give

to nitric acid an orange tint.

4000. Codeine, or Codeia. Obtained from hydrochlorate of morphia, in colorless transparent, eight-sided crystals, which do not color nitric acid red.

Thebaine, or Paramorphine. This is also obtained from opium in colorless needles like those of narcotine. It does not color nitric acid red, and is much less soluble in water than codeine.

4002. Cinchonine, or Cinchonia. This duces Sarcosine. is the active principle of Peruvian bark, con-tained in the largest quantity in the pale bark, ent of the flesh of animals. It forms in It crystallizes in small, brilliant, transparent, delicate white microscopic needles, soluble

heat. Shell-lime is got in the same manner four-sided prisms, insoluble in ether. Cinchonicine and cinchonidine are other varieties of this alkaloid.

4003. Quinine, or Quinia. This is also obtained from Peruvian bark, being found in largest quantity in the yellow variety of the bark. It crystallizes in small white needles. It may be distinguished from cinchonine by the form of its crystals, and its solubility

4004. Quinoidine, or Amorphous Quinine, is a yellow or brown resinous mass, identical in composition with quinine. Quinicine and quinidine are also varieties of quinine. (See

Vos. 4025, &c.)

4005. Strychnine, or Strychnia. This is an alkaloid contained in nux vomica, and some other vegetable substances. Crystallizes in small, brilliant, eight-sided crystals, insoluble in absolute alcohol, and slightly soluble in water. It suffers decomposition on fusing, and does not decompose iodic acid; it may be thus distinguished from morphine.

4006. Brucine, or Brucia. tained from the same sources as strychnine, and resembles it in many respects, but is readily soluble in all strengths of alcohol, and insoluble in water. Brucine turns nitric acid red, which becomes violet on the addition of

protochloride of tin.

4007. Veratrine, or Veratria. alkaloid principle of cevadilla seeds, and of white hellebore. When pure, it is a white powder; but as usually met with, the powder is yellowish or greenish-white, insoluble in

4008. Colchicine. Extracted from the seeds of the common meadow saffron; has similar properties to veratrine, but is crystal-line, and soluble in water.

4009. Harmaline. A substance forming yellowish prismatic crystals, obtained from the Peganum Harmala, a plant abounding in southern Russia. By oxidation it yields Harmine, a fine red dye-stuff, also possessing basic properties.

4010. Theine, or Caffeine. This is an

4011. Theobromine. A white crystalline powder obtained from the cacao-nuts from which chocolate is prepared. Its properties are somewhat similar to theine.

A white powder, 4012. Xanthine. which may be obtained from guanine, which it resembles in its properties. It dissolves

easily in ammonia or potash.

4013. Creatine. This alkaloid, called by some kreatine, is a crystallizable substance obtained from the juice of the muscular fibre of animals. It forms brilliant, colorless prismatic crystals. Creatine is a neutral body combining with neither acids nor alkalies. By the action of strong acids it is converted into *creatinine*, a powerful organic base, with a strong alkaline reaction, and forming crystallizable salts with acids. Creatine, treated by boiling with a solution of baryta, pro-

as creatine. (See No. 4013.)

4015. Guanine. A base obtained from 4023. Tests for Distinguishing Alguano. It is a colorless, crystalline powder, kaloids. Perchloride of gold is a decisive

4016. Berberine. An alkaloid crystallizing in fine yellow needles slightly soluble in water, extracted from Barberry root.

of pepper forming colorless or yellowish crys-

tals. Insoluble in water.

4018. Conine, or Conia. An alkaloid extract of hemlock, in the form of a volatile, on being moistened with a solution of potassa.

4019. Nicotine, or Nicotia. This is also a volatile, oily, acrid liquid, soluble in water, ether. alcohol, and oils. Nicotine, moistened with a solution of potassa, evolves

a strong odor of tobacco.

402C. Sparteine. An alkaloid obtained from broom, also a volatile, oily liquid. Conine, nicotine, and sparteine are similar in character, being very poisonous, possessing strong alkaline reaction, and forming crystallizable salts with the acids.

4021. Salicine. A white, crystalline substance, found in the bark and leaves of abundantly in the white willow and the as- and pseudo-morphine resist the action of the pen. It is obtained by the careful evaporation of an infusion in cold water.

these substances require special processes for bark and the salts obtained from it.

will apply for general purposes:

When the base is insoluble in water, nonvolatile, and existing in the plant in an insolplant in water acidulated with muriatic acid. filter, neutralize the acid with an alkali, (ammonia, lime, or magnesia), and collect the precipitate, which must be purified by resolution in dilute acid, digestion with animal charcoal, and subsequent crystallization or precipitation by an alkali; or the first precipitate may be purified by dissolving it repeatedly in alcohol.

non-volatile, but existing in the plant in a in a solution of oxalic acid. To render the soluble state. Boil or macerate in hot water result strictly accurate, the bark should be as before; filter and precipitate by adding an

alkali; purify as last.

When the base is soluble in water, and non-volatile. Make an infusion with a dilute acid (muriatic); concentrate by a gentle heat; treat the liquor with potassa and ether (conjointly); decant and evaporate.

digested in alcohol, and this solution agitated supernatant liquid must be separated by de-

with difficulty in cold water, easily in boiling tion thus formed, if carefully evaporated, water. It is obtained from the same source leaves the base nearly pure. It may be further purified by cautious distillation.

insoluble in water, alcohol, ether or ammonia. test of certain vegetable alkalies. The follow-By treating guanine with muriatic acid and ing are the colors of the precipitates which it chlorate of potassium, quanidine is obtained produces with the salts of the annexed alkalies in colorless crystals, readily soluble in water dissolved in water; quinine, buff-colored; and alcohol.

Guanine, Sarcine, and Xanthine greatly relow, then bluish, and lastly, violet; in this semble one another. itate is insoluble in water, alcohol, the caustic alkalies, and sulphuric, nitric, or hydrochloric acids; brucine, milk, coffee, and then choco-4017. Piperine. An alcoholic extract late-brown; strychnine, canary-yellow; varatrine, slightly greenish-yellow. All these precipitates, with the exception mentioned, are very soluble in alcohol, insoluble in ether, and slightly soluble in water. Among the oily liquid. It evolves an odor of hemlock reactions of chloride of gold, there are two which appear to be especially important: they are those which occur with morphine and brucine; these are sufficiently marked to prevent these alkalies from being mistaken for each other, and also yield pretty good characteristics for distinguishing brucine from strychnine.

4024. Alkaloids Detected by Picric Acid. Hager has found that this acid precipitates various alkaloids from their solutions, such as brucine, strychnine, veratrine, quinine, cinchonine, and some alkaloids of opium. Morphine and atropine, however, are precipitated only from neutral and concentrasubstance, found in the bark and leaves of ted solutions, and the precipitate dissolves several kinds of poplar and willow; but most pretty easily in water. Glucosides, casein,

pieric acid.

4025. Quinometry. The method of 4022. To Obtain Alkaloids. Some of estimating the quantity of quinine in cinchons extracting them from the substances in which following tests give very accurate results in they are found, but the following methods examining the bark; and the salts are tested in the same way, but the result is not quite so accurate, as it includes any quinidine (see No. 4028) that may be present in the quinine; uble form. Boil or macerate the bruised and makes, therefore, the apparent richness of the sample greater than it really is. (Cooley.)

4026. Test for the Strength of Quinine. Make a decoction of 100 grains of bark in 2 fluid ounces distilled water; filter, and precipitate with a sufficient quantity of a concentrated solution of carbonate of soda. Heat the fluid until the precipitate is dissolved; and when cold, dry and weigh it. It should When the base is insoluble in water, and weigh 2 grains or more, and dissolve entirely result strictly accurate, the bark should be exhausted with ether, and the mixed solutions evaporated. Salts of quinine may be

tested in the same manner. (Cooley.)
4027. Test for the Percentage of Quinine in Bark, &c. Exhaust 100 grains of bark with acidulated water; filter the solution, and render it alkaline with liquor of When the base is both soluble in water and potassa; next agitate it with about 1 its volatile. The vegetable or its extract may volume of chloroform, and allow it to repose be mixed with potassa and distilled; the a short time; the chloroform, holding the alproduct, neutralized with oxalic or sulphuric kaloid in solution, sinks to the bottom of the acid, carefully evaporated to dryness, and vessel in a distinct stratum, from which the with potassa and ether; the ethereal solu- cantation; the chloroformuc solution, eather

at once or after being washed with a little 4031. Pneumatic Trough. A vessel cold water, is allowed to evaporate, and the or tank nearly filled with water, provided tions referred to in No. 4025. (Rebourdain.)

It is distinguished from quinine by not striking a green color when treated with comparatively feeble. It is present in nearly should be closed with a gall the ordinary sulphate (disulphate) of removed from the trough quinine as sold, either through careless preparation or wilful adulteration, and is not detected by, and consequently included in, the 3091 (the weight in grains of 1000 cubic inches results of the usual tests for quinine. (See of air), the product will be the weight of 1000 Nos. 4025, &c.) Cinchonine is another fee-

bler alkaloid also found in quinia.

Ure's Test for the Presence 4029. of Quinidine or Cinchonine in Quinine. This test is applicable to quinine salts generally, but more especially refers to the sulof the salt into a strong test tube, furnished ble. This can be done by giving the tubing a with a tightly-fitting cork; add 10 drops of a thin coating of a varnish made by dissolving water, and 15 drops water, accelerating so- 7 parts of white wine and 3½ parts strong allution by a gentle heat. When dissolved and cohol. The molasses and gum must first be entirely cooled, add 60 drops officinal suldissolved in the white wine, and the alcohol phuric ether with 20 drops spirits of ammonia, close the test tube with the thumb, and shake it well; cork the tube closely and down. shake gently from time to time, so that the bubbles of air may readily enter the layer of greater proportion than 10 per cent. of quinicipitate between the strata of the fluid. If No. 4002) will be unaffected.

A general term applied to all aëriform or permanently elastic fluids, excepting the compound of oxygen and nitrogen constituting the atmosphere, which is in a pneumatic trough. (See No. 4031.) distinguished from the other gaseous bodies by the name of air. (See No. 4072.) Gases for chemical purposes are usually generated lamp, in a suitable vessel, and collect the in a bottle of glass or other appropriate material; or, where the application of heat is necessary, in a retort. A connecting tube of Powder. Oxygen gas can be readily preconvenient shape is fitted air-tight into the pared by boiling bleaching powder (hyponeck or beak of the generating vessels, chlorite of lime) and nitrate of cobalt in a through which the gas is led into receiving flask. Make a clear solution of the powder in vessels. These are usually bottles, with ac- water, put it into any convenient flask procurately fitting stoppers.

weight of the residuum in grains gives the with a shelf placed 1 or 2 inches below the percentage of richness of the sample. Ether surface. The receiving bottles are first immay be used instead of chloroform, but the mersed in and filled with the water and then ethereal solution will form the upper stratum placed neck downwards on the shelf, which instead of the lower. This test is also applise furnished with holes to allow of the passage cable to the salts of quinine, but with restric- of the gas into the receivers from the connecting tube, the end of which is brought imme-4028. Quinidine. An alkaloid found in diately under one of the holes. For gases quinia which has been prepared by precipital which are easily absorbed by water, mercury or some other fluid is necessary in place of the water. As the gas ascends into the rechlorine followed by ammonia, as quinine ceiving bottle, the water is displaced; when does. In medicinal character its powers are full, and the gas begins to escape, the bottle should be closed with a greased stopper, and

To Find the Weight of a Gas. Multiply the specific gravity of the gas by 3091 (the weight in grains of 1000 cubic inches

eubic inches of the gas.

4033. To Prevent the Escape of Gas from India-Rubber Tubing. India-rubber tubing is slightly permeable to gas. The amount which escapes through the walls of the tabe is very small; but it may be advisphate (disulphate) of quinine. Place 10 grains able sometimes to render an escape impossimixture of 1 part sulphuric acid and 5 parts 11 parts molasses and 2 parts gum-arabic in must be added very slowly, constantly stirring the mixture, or the gum will be thrown

4034. Oxygen. An elementary gas, colorless, tasteless, odorless, and incombustiether. If the salt be free from, or contain no ble, having a specific gravity of about 1.057. Oxygen enters largely into the composition of dine, it will be entirely dissolved; while on the surface of contact between the two strata mosphere (see No. 4072), upon which it confers of fluid, the mechanical impurities only will the power of supporting life and combustion; be separated. From this it appears that 10 and water, present more or less through the grains of the salt may contain 1 grain of whole world, contains about 88 per cent. by quinidine, and still a complete solution take weight, or 33 per cent. by volume, of oxygen; place; but, in this case, the quinidine will it constitutes also a portion of the majority shortly begin to crystallize in a layer of other. of the mineral bodies that form the bulk of If more than 10 per cent. of quinidine be our globe. It is a powerful supporter of compresent, there will be found an insoluble pre-bustion, and its presence is essential to the bustion, and its presence is essential to the existence of animal and vegetable life. Oxythis be quinidine, it will be dissolved by the gen unites with certain other bodies in fixed addition of ether, while cinchonine (see proportions to form a class of acids distinguished as oxygen acids or oxacids. (See No. 3853.)

To Obtain Oxygen Gas. Heat 4035. in a retort or flask, finely powdered chlorate of potassa, mixed with about one-fourth its weight of black oxide of manganese. The gas must be collected by attaching a tube to the flask, and passed into a receiving bottle

Or: Take chloride of potassa, or red oxide of mercury, expose it to the heat of a spirit-

vided with a perforated cork and tube, and

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bottle. (See No. 4031.) 4037. To Obtain 4037. To Obtain Oxygen Without light is applied, or an explosion will ensue. Heat. According to M. Boettger, oxygen 4043. Cheap Method of Obtaining can be obtained in a very pure state by em-Hydrogen. Take quicklime, slack it, let it ploying binoxide of barium and peroxide of lead. Take equal parts of these substances and pour on weak nitric acid; the reaction commences immediately, and the gas can be collected as usual over cold water. (See No.

4038. Pure Oxygen for Inhalation. Eliot recommends for the preparation of oxygen gas, to be used in medicine, the employment of a mixture of equal parts of peroxide of barium and peroxide of lead. By pouring dilute nitric acid upon these salts, there is a violent effervescence and a copious evolution of pure oxygen gas. For greater security, the gas may be afterwards washed in water. As very little heat is necessary, the operation can be performed in any stout bottle, thus filling the balloons. The vessel should be dispensing with the usual retorts. For great purity, the first portion of gas that evolves should be allowed to escape, as it contains

the air which was in the apparatus.
4039. To Obtain Oxygen on the Large Scale. Nitre is exposed to a dull red heat in an iron retort or gun barrel; 1 pound of nitre thus yields about 1200 cubic inches of oxygen, slightly contaminated with nitro-

gen. (Ure.)
4040. Tests for Oxygen. It is distinguished from other gases by yielding nothing but pure water when mixed with twice its volume of hydrogen and exploded, or when a jet of hydrogen is burned in it. A recently extinguished taper, with the wick still red hot, instantly inflames when plunged into this gas. A small spiral piece of iron wire, ignited at the point and suddenly plunged into a jar of oxygen, burns with great bril-

liancy and rapidity.

4041. Hydrogen. A gaseous element, colorless, combustible, and the lightest of ponderable bodies, its specific gravity being only 06935. It is a constituent part (about 12 per cent. by weight, and 67 per cent. by volume) of water. According to Dumas, "it is a gaseous metal, as mercury is a liquid metal." al." It forms an ingredient in all bodies that possess the power of burning with flame; it burns with a pale blue flame, and, in combination with carbon, constitutes the illuminating gas in general use. In contact with spongy platinum it inflames spontaneously; and, from its extreme lightness, is the best means employed for inflating balloons. It is one of the most useful elements in the material world. Hydrogen forms, with other bodies, a class of acids called hydrogen acids or hydracids. (See No. 3853.) 4042. To Obtain Hydrogen Gas.

Hydrogen gas is readily procured by pouring on fragments of zinc, in a glass bottle, or flask with a bent tube, or retort, some diluted

pour in a few drops of a solution of nitrate or pass the gas first through alcohol, and then chloride of cobalt, and set it to boil. The through a concentrated solution of pure pogas, as it is evolved, is collected in a receiving tassa. Care must be taken that all the air has bottle. (See No. 4031.)

> cool and crumble into a dry hydrate; then mix it with charcoal, coke, or peat, and heat in a retort. The hydrate of line (slacked lime) gives up the water that was used in slacking it, and becomes quicklime. The water is de-composed into hydrogen and carbonic acid, and these two gases can be separated by passing them through water, or the carbonic acid may be economized by employing it in the manufacture of bicarbonates. The quicklime can be again slacked and used as often as required.

> Hydrogen Gas for Balloons. **4044.** For this purpose hydrogen may be obtained by pouring slightly diluted muriatic acid upon an equal weight of zine, in a covered vessel having a small tap or stop-cock in the top for

made of lead, to prevent corrosion.
4045. To Estimate the Buoyant Power of Balloons. It will take about 12 cubic feet of the hydrogen gas, used for infla-ting balloons to balance or suspend 1 pound in the air. The rule used for balloons is as follows: The specific gravity of the gas compared with the air is .0693; 1 cubic foot of air weighs 527.04 grains, the cubic foot of gas weighs 36.93 grains; and therefore there are 527.04-36.93—490.11 grains difference between the air and gas, in one cubic foot. Multiply this difference by the number of cubic feet in the balloon, and divide by 7,000. This will give the capacity or buoyancy of the balloon, in pounds; then subtract the weight of the balloon and car.

For Obtaining Hydrogen in 4046. Quantities. Place iron wire in a gun-barrel, or a porcelain tube, open at both ends, to one of which attach a retort containing water, and to the other a bent tube, connected with a pneumatic trough. The gun-barrel must now be heated to redness, and the water in the retort brought into a state of brisk ebullition, when the vapor will be decomposed, the oxygen being absorbed by the iron. and the hydrogen escaping into the gas re-ceiver. The gas evolved may be purified, if

desired, by passing it through alcohol, &c. (See No. 4042.)
4047. Tests For Hydrogen. Hydrogen is recognized by its combustibility; by the pale color of its flame; by producing water only when burnt in air or oxygen; by extinguishing the flame of other bodies; and by exploding when mixed with half its weight of oxygen and fired. (Cooley.)

4048. Carburetted Hydrogen. There are two leading gaseous compounds of carbon and hydrogen, known as carburetted hydrogen, and distinguished as light and heavy.

The light carburetted hydrogen is often abunflask with a bent tube, or retort, some diluted sulphuric acid (1 measure of strong acid to 5 methane, and fire damp. It consists of 2 of water). It may be collected over water. equivalents of hydrogen and 1 of carbon, and If zinc be not at hand, fine iron wire, or the burns with a yellowish flame. This gas also turnings or filings of iron, may be substituted escapes in bubbles from the mud on the bot-for it. To procure gas of great purity, distom of stagnant pools, combined with cartilled zinc must be used, and it is advisable to bonic acid, from which it may be freed by GAS. 379

of caustic potassa. (Cooley.) It has a specific gravity of about 559. (Fownes.) It has a specific gravity of about 559. (Fownes.) collect the gas over mercury. (See No. 4031)

Heavy carburetted hydrogen is a combination of 2 equivalents of carbon and 2 of hydrogen (4 carbon and 4 hydrogen-Booth), and cognized by the odor, and by its blackening burns with a white luminous flame; it is a moist carbonate of lead, and tarnishing sillittle lighter than air, having a specific gravity of .981. It is also called Ethine.

4049. To Obtain Light Carburetted salts of lead black. Hydrogen. When 2 parts crystallized acetate of soda, 2 parts dry hydrate of potassa, and 3 parts powdered quicklime, are strongly heated in a flask or retort, this gas is abund-antly evolved, and may be collected over

water. (See No. 4031.)

prepared by heating in a refort 1 part of alco-small retort, and collecting it by a pneumatic hol with 6 or 7 of oil of vitriol until it black- trough. (See No 4031.) ens, and conducting the mixed gases through milk of lime, which retains the sulphurous this gas is made by boiling phosphorus with acid; and afterwards through oil of vitriol, which absorbs water, ether, and alcohol. This of which is kept under water: as each bubble may also be prepared by passing the vapor of gas rises from the water, it inflames, and of boiling alcohol through a mixture of 10 forms a ring of white smoke, which dilates as parts oil of vitriol and 3 parts water, heated it ascends. The spontaneous inflammability to ebullition (320° to 330° Fahr.), and purify- of the gas, when mixed with atmospheric air ing the vapor as before.

4051. Olefiant Gas. A name given to heavy carburetted hydrogen, arising from its 4057. Nitrogen or Azote. An ele-producing, in combination with chlorine, an mentary gaseous body. Pure nitrogen is a

heavy, and other hydrocarbons.

4052. Sulphuretted Hydrogen. A compound of hydrogen and sulphur; a colorless gas, possessing a powerful odor of rotten eggs; specific gravity 1.171; it is absorbed by water, forming liquid sulphuretted hydrogen, or hydrosulphuric acid. It is a powerful poison. Being considerably denser than air, it or when a jet of hydrogen is burnt in the may be poured from its generating bottle into cavities, a scheme successfully employed by 4059. To Obtain Nitrogen. M. Thenard to destory rats in their holes, a pheric air may be made to yield an unlimited method equally applicable to other vermin. It forms saline compounds with the alkalies, and the earths termed HYDROSULPHATES or sulphurets from solutions of most of the met-als; hence its value as a test. Air containing zolog part of pure hydrogen will sensibly blacken a piece of white paper, moistened with a solution of acetate of lead. Sulphusulphurous mineral waters.

To Obtain Sulphuretted Hy-Mix together 2 parts of iron filings with 1 of sulphur into a thin pap with water, and heat it gently in an iron vessel. Combination takes place with the evolution of heat bichromate of ammonia in a retort. heat forming sulphuret of iron. Cover it till The evolved nitrogen is deprived of all aquecold. On this compound, contained in a glass ous vapor by sulphuric acid as above, or by bottle, or other suitable apparatus, pour sulletting it stand over fused chloride of calphuric acid previously diluted with 7 parts of cium. If more acid be afterwards required, dilute the strong acid with only 4 of water. gas is also called nitrous oxide, and is largely

in the laboratory.

passing through milk of lime, or a solution strong muriatic acid, in a small glass retort or

4054. Tests for Sulphuretted Hydrogen. Sulphuretted hydrogen may be rever, and also by its precipitating arsenious acid yellow, tartar emetic orange, and the

4055. Phosphuretted Hydrogen. This is a gaseous combination of phosphorus and hydrogen; colorless, very fetid, slightly soluble in water, and burns with a white flame.

It has a specific gravity of 1.24.

4056. To Obtain Phosphuretted Hy-4050. To Obtain Heavy Carburetted drogen. The pure gas may be evolved by Hydrogen. Heavy carburetted hydrogen is gently heating hydrated phosphorus acid in a

The spontaneously inflammable variety of solution of potash in a small retort, the beak or oxygen, renders caution necessary in its preparation.

oily-looking liquid. It is the presence of this colorless, odorless, tasteless gas, neither comgas which gives the illuminating power to bustible nor capable of supporting combustion coal-gas, which is a combination of light, or respiration. It is neutral to test paper, does not affect lime water, and is only slightly absorbed by pure water. Liebig places its specific gravity at 0.9722, Berzelius at 0.976.

4058. Tests for Nitrogen. It is recognized by its purely negative qualities, and by its forming nitric acid when mixed with oxygen, and exposed to the electric spark;

supply of nitrogen, by exposing it to the action of substances which combine with its oxygen. By burning a small piece of phos-HYDROSULPHURETS, and it precipitates metallic phorus, placed on a capsule floating on the water in a pneumatic trough, under a large bell-glass, and allowing it to stand over the water a few hours, nearly pure nitrogen is obtained, which may be further purified by agitating it with solution of pure potassa. retted hydrogen is the active ingredient in the may be dried by passing it through concentrated oil of vitricl.

Nitrogen may be evolved by passing chlorine gas into a solution of pure ammonia, and drying, as before, through sulphuric acid.

Another plan, well recommended, is to

4060. Protoxide of Nitrogen. The resulting gas is absorbed by water, and used by inhalation, under the name of laughis therefore collected, in preference, over ing gas, to produce insensibility to pain. It mercury. This is the plan commonly adopted is colorless, possesses an agreeable odor, and a sweetish taste. At 45° Fahr., and under a To obtain it pure, mix 1 part finely powder- pressure of 50 atmospheres, it is liquid. Its ed tersulphuret of antimony, and b parts specific gravity is 1.5241; it supports combus-

tion, and is absorbed by water. Its most re- properties, preparation, and application to the markable property is its action on the system arts, will be found in Nos. 3864, &c. when inspired. A few deep inspirations are constitutions.

cold plate instantly solidifies; cool, break the lump into pieces, and place it in a stoppered bottle. For use, a portion is introduced into acid formed of equal equivalents of hydrogen a glass retort, and heat applied by means of a and chlorine. (See Nos. 3882, &c.) spirit lamp. As soon as the heat reaches 4800 Fahr., protoxide of nitrogen is evolved, and may be collected in bladders, gas bags, a gasometer, or in the pneumatic trough over warm lowered, as, when heated to about 600°, nitrate of ammonia explodes with violence. Nitrous oxide may also be made in the same way from crystallized nitrate of ammonia, or by exposing nitric oxide for some days over iron filings, but it requires great care in its preparation.

When pure, it is colorless, has an agreeable

3193, &c. The application of this gas to the acid gas are given in No. 3914.

4064. Carbonic Oxide. neutral gas, formed of equal equivalents of carbon and oxygen, and has a specific gravity of .913. It burns with a pale blue flame,

acid.

To Obtain Carbonic Oxide. Carbonic oxide may be obtained from carbonic

in a glass retort, at a gentle heat.

Equal weights of chalk (or carbonate of soda) and iron filings (or charcoal), strongly color, odor, and bleaching properties.

lution or milk of lime, to deprive it of carbonic acid, and next over dried chloride of to hold a rod, dipped in water of ammonia, calcium, to deprive it of moisture. It may be over it, when white fumes of sal-ammoniac collected either over mercury or water, as the | will be formed; this, coupled with the proplatter absorbs but very little.

Sulphurous Acid. gaseous combination of 1 equivalent of sulphur substance. and 2 of oxygen, having a specific gravity of

4067. Ammonia. A highly pungent usually succeeded by a pleasing state of ex- gas formed by the union of 1 equivalent of citement, and a strong propensity to laughter nitrogen with three of hydrogen. Its specific and muscular exertion, which soon subside, gravity is .569. (See Nos. 3981, &c.) Double without being followed by languor or depressialts of ammonia are sometimes called AMsion. Its effects, however, vary with different MONIURETS. Thus, sulphate or nitrate of copper precipitated in solution by ammonia, and 4061. To Prepare Laughing Gas. the precipitate redissolved by an excess of Evaporate a solution of nitrate of ammonia ammonia, may be called ammoniurets of until a drop of the fused mass placed on a copper, but more correctly ammonio-sulphate, or ammonio-nitrate of copper.

4069. Chlorine. An elementary gas, of a vellowish green color, a pungent, suffocating odor, and an astringent taste. Its spccific gravity is 2.47. Under a pressure of 4 water. (See No. 4031.) Should white fumes atmospheres it condenses into a yellow limpid appear within the retort after the evolution of liquid. Its most remarkable properties are its the gas has commenced, the heat should be power of destroying almost all animal and vegetable color, and the putrid odor of decomposing organic matter. It has a very strong attraction for metals. With bases chlorine forms Chlorides of Chlorurets. (See No.

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4070. To Obtain Chlorine. This gas is obtained, for laboratory use, &c., by mixing 4062. Test for Pure Laughing Gas. together in a glass flask or retort, strong muriatic acid with half of its weight of finelyodor, and does not affect a solution of natrate powdered peroxide of manganese. Or: Pour of silver.

4063. Carbonic Acid. An invisible weight of water, upon half its weight of chloride of lime. Chlorine gas is immediately equivalent of earbon with 2 of oxygen, having evolved even in the cold, but much more a specific gravity of 1.524, and highly soluble rapidly on the application of a gentle heat. in water. Its general properties and the This gas must be collected in clean dry bot-methods of obtaining it will be found in Nos. tles by displacement. The tube conducting the gas must reach to the bottom of the botpurposes of wine-making, &c., is given in the, when the chlorine, being heavier than the No. 718. The methods for obtaining carbonic air, will displace the latter, without mixing with it. The bottle is known to be full by A colorless, the gas overflowing the mouth, which is quivalents of easily perceived by its green color. The bottle must now be closed up with an accurately of .913. It burns with a pale blue flame, fitting stopper, previously greased, and an and is even more poisonous than carbonic empty one put in its place, which is subsequently treated in like manner. To free the gas entirely from muriatic acid, it may be passed through water; and to render it dry. acid gas by passing the latter over fragments it may be passed over dry chloride of calcium. of charcoal heated to redness in a tube of porcelain or iron.

Also, by treating binoxalate of potassa with 5 or 6 times its weight of oil of vitriol ure be no objection. (See No. 4031.)

4071. Tests for Chlorine. This gas is readily distinguished from other gases by its heated in an iron retort or gun barrel, will aqueous solution dissolves gold leaf, and inevolve the gas rapidly. Whichever way the gas is evolved, it must it. It rapidly destroys the color of iodide of be passed first through a caustic alkaline so- starch, solution of indigo, litmus, and turmeric. A simple method of detecting free chlorine is erty of bleaching colors, may, in most cases, This is a be taken as evidence of the presence of this

4072. Air. The air or atmosphere 1.45, and very soluble in water, which will which surrounds the earth is a mixture (not absorb 30 times its volume of the gas. Its combination—Fourier of 77 parts by weight

(or 79.19 parts by measure) of nitrogen, and 23 parts by weight (or 20.81 by measure) of in Solutions. oxygen. It usually contains also a variable a brown precipitate, which acquires a metalamount of moisture, a very small proportion lie lustre when rubbed. of carbonic acid, a trace of ammonia, and sometimes of carburetted hydrogen; these last are found incidentally in the air, in a variable degree. It is the standard in the acid. comparative or specific gravity of gaseous bodies. (See No. 47.) At 60° Fahr., and with the barometer at 30 inches, 100 cubic in simple acids. inches of air weigh 30.935 grains; and water (the standard of specific gravity for fluids) weighs just 816 times as much as air.

4073. Tests for Pure Air. A simple method of ascertaining the presence of impurity (carbonic acid) in the atmosphere, is to nearly fill a glass tumbler with limewater, and formed by ammonia, insoluble in excess, to place it in any convenient position, as on 4077. Fused Nitrate of Silver. Take to place it in any convenient position, as on the mantelpiece of a room. The rapidity 3 ounces refined silver, 2 fluid ounces nitrice the mantelpiece of a room. amount of the carbonic acid present in the

atmosphere that surrounds it.

A little moist carbonate of lead put on a plate or saucer, and exposed in the same way, will turn black, should any sulphuretted hydrogen be contained in the air. This is a very delicate test for that destructive gas.

Miscellaneous Chemicals. It is proposed, in this place, to give a concise description of the chemical compounds referred to in the various depart- its weight of water; evaporating the soluments of this book. A complete list of chem-tion until it will crystallize on cooling very icals would not be necessary for the scope of slowly. (See No. 3213.) the work, which is a purely practical one; 4078. Oxide of s deemed necessary to render the whole thoroughly intelligible, and as complete as possible. A considerable number of them are inserted, for the sake of clearness, in connection with the process or special purpose for which their use is directed. These will be found in their proper place by reference to the

Chloride of Gold. Gold unites with chlorine under two different proportions,

the terchloride of gold.

evaporate until vapors of chlorine begin to be disengaged, and then set the solution aside to crystallize. It forms orange-red crystalline needles, or ruby-red prismatic crysether, and alcohol, forming a deep yellow solution. (Cooley.)

The protochloride of gold, or aurous chlorgold and terchloride of gold. (Coolcy.)

4076. Tests for the Presence of Gold Solutions. Protosulphate of iron gives

Protochloride of tin (preferably containing a little perchloride) gives a violet, purple, or blackish precipitate, insoluble in muriatic

Sulphuretted hydrogen and hydrosulphuret of ammonia give a black precipitate, insoluble

Ammonia gives a reddish-yellow precipitate (fulminating gold) with tolerably concentrated solutions, either at once, or on boiling the liquid.

Liquor of potassa gives, with neutral solutions of gold, a similar precipitate to that

the mantelpiece of a room. The rapidity 3 ounces refined silver, 2 fluid ounces nitric with which a pellicle forms on its surface, or acid, and 5 fluid ounces distilled water; mix the water becomes cloudy, corresponds to the in a glass flask and apply a gentle heat until amount of the carbonic acid present in the the metal is dissolved. Transfer the solution to a porcelain capsule or crucible, decanting it off a heavy black powder which appears at the bottom of the flask; evaporate the solution to dryness; raise the heat, in a dark room, until the mass liquefies, then pour it into hinged brass or iron moulds furnished with cylindrical cavities of the size of a goose-quill. Keep the product, which is Lunar Caustic. or fused nitrate of silver, in well stopped bottles, impervious to the light.

Crystallized (or crystals of) Nitrate of Silver is obtained by dissolving grain silver (see No. 3217) in nitric acid diluted with twice

Oxide of Silver. Dissolve 2 such information only is therefore given as is parts nitrate of silver, and 1 part hydrate of potassa, each separately, in distilled water; mix the solution, and, after frequent agitation during an hour, collect and wash the precipitate, and dry it by a gentle heat in the shade. This is more strictly the protoxide of silver, and is in the form of a pale brown powder.

4079. To Reduce Solid Silver from its Chloride. Mix together the dry chloride of silver in 1 its weight of powdered black resin; heat moderately in a crucible until the and are distinguished as the protochloride and flame ceases to have a greenish blue color; then increase the heat suddenly until the sil-The terchloride of gold, or auric chloride, ver fuses into a button at the bottom of the consists of 3 equivalents of chlorine and 1 of crucible. Some parties recommend an adgold, and is obtained by dissolving 1 part gold dition of a little powdered calcined borax, in 3 parts nitro-muriatic acid (aqua-regia); sprinkled on the surface before increasing the

heat. (See No. 3214.)

4080. To Prepare Nitrate of Silver from an Alloy of Silver and Copper. Palm's method. When it is desired to pretals; is deliquescent, and soluble in water, pare nitrate of silver from silver containing copper-coins for example-filter the nitric acid solution, dissolve the alloy in nitric acid, evaporate it nearly to the consistence of oil. ide, consists of 1 equivalent each of chlorine not to dryness, and add to a part of this conand gold, and is obtained by evaporating the terchloride to dryness and exposing it to a cid free from chlorine. The silver salt preheat of 450° (440° Fownes) Fahr., until cipitates in the form of crystals and the copchlorine ceases to be evolved. It forms a per remains in the solution. Wash the preyellowish-white mass, insoluble in water; but cipitate 2 or 3 times with concentrated nitrie it is decomposed by water, slowly when cold, acid, and evaporate to dryness. The merand rapidly by the aid of heat, into metallic concentrated the nitric acid, the more court pletely is the silver salt precipitated; an acid of 1.250 specific gravity is sufficient, however, tates in solutions previously acidulated with to separate completely the two metals. (See hydrochloric acid. (Cooley).

hot water, and falls in small needles as the solution cools. (Cooley). According to Fownes it dissolves in 88 parts boiling water.

4082. Sulphuret of Silver. A greyishblack substance prepared by passing sulphuretted hydrogen gas through a solution of ni-trate of silver. It may also be obtained by

melting sulphur and silver together.

4083. Tests for Silver in Solution. Silver is entirely soluble in diluted nitrie acid. This solution, treated with an excess of muriate of soda, gives a white precipitate entirely soluble in ammonia water, and a fluid in the air. which is not affected by sulphuretted hydro-The nitric solution of silver also gives a white curdy precipitate (chloride of silver) with muriatic acid, solvble in ammonia and insoluble in nitric acid, and blackened by exposure to light. It gives white precipitates! with solutions of the alkaline carbonates, oxalates, and prussiates. It gives yellow precipitates with the alkaline arsenites and phosphates. With the arseniates, red precipitates. With the fixed alkalies, brown precipitates. With sulphuretted hydrogen, a black powder. With phosphorus and metallic copper or zinc,

with phosphorus and metanic copper of zine, a precipitate consisting of pure silver.

4084. Chloride of Platinum. The commercial chloride of platinum is the bichloride, formed by dissolving piatinum in nitro-muriatic acid (aqua-regia), and evaporating the solution to dryness at a gentle heat. It is reddish-brown, deliquescent, and very soluble in water and in alcohol, yielding orange-colored solutions. (Cooley.) (See No.

3220.

Protochloride of Platinum. This is formed by exposing the dried and powdered bichloride (see No. 4084) for some time to a temperature of 450° Fahr. It is a greenish-grey, powder, insoluble in water, but sol-

uble in muriatic acid.

4086. Ammonio-Chloride of Platinum. A solution of sal-ammoniac is added heat. It consists of a superb red powder to a strong solution of bichloride of platinum with a metallic lustre. It is used as a pig-(see No 4084), avoiding excess; the precipitate ment and a bronze, and as a stain for glass is collected on a filter, washed with a little and enamel, to which it gives a rich red color. weak alcohol, and dried at a heat not exceed- | Heat converts it into the black oxide. With ing 180° Fahr. It consists of minute, transparent, yellow crystals, very feebly soluble rapidly becomes blue from the action of the in water, less so in dilute alcohol, and in- air. soluble in acids. By heating to redness, it is converted into spongy platinum. (See No.

4087. Tests for Solutions of Platia blackish-brown precipitate, which is only application of heat, and decomposable by heat, (See No. 120.)
with production of spongy platinum. Ammonia and potassa also give similar precipiblack oxide of copper in muriatic acid; evap-

4088. Subacetate of Copper. A green 4081. Sulphate of Silver. Prepared or bluish-green powder, better known as verby dissolving silver in sulphuric acid containing one-tenth of nitric acid; or by precipitating or property of grapes, or pieces of cloth dipped in ting a solution of the nitrate by another of crude acetic acid, upon plates of copper, sulphate of soda. It dissolves in 80 parts of with exposure to the air for several weeks. with exposure to the air for several weeks. (Founes.)

4089. Binacetate of Copper. Verdigris, dissolved in vinegar with the aid of heat, forms dark green or blue crystals of binacetate of copper. This is the commercial acctate of

4090. Ammonio-Sulphate of Copper. A dark blue pulverulent substance, formed by rubbing together 1 ounce sulphate of coppper and 1 ounce sesquicarbonate of ammonia, until carbonic acid ceases to be evolved; then drying the product, wrapped in bibulous paper,

4091. Nitrate of Copper. This consists of deep blue, very deliquescent crystals, obtained by dissolving pure copper in dilute nitric acid. (See No. 97.)

Protoxide of Copper—also 4092. known as black oxide of copper-may be formed by calcining metallic copper, nitrate of copper, or the hydrate, thrown down from solutions of the salts of copper by means of pure potassa. This preparation was formerly called the deutoxide of copper. It is not changed by heat, but readily gives out its oxygen when heated with combustible matter; hence its general use in organic analysis for supplying oxygen. It communicates a beautiful green color to glass and enamels.

4093. Sulphite of Copper. To a concentrated solution of bisulphite of potash add a cold solution of sulphate of copper, filter,

and heat gently.

4094. Suboxide of Copper. This is the red oxide of copper, obtained by heating together in a covered crucible 4 parts copper filings, and 5 parts black oxide of copper. (See No. 4092.) Or: Mix 100 parts sulphate of copper with 57 parts carbonate of soda, (both in crystals), and fuse them at a gentle heat; cool, pulverize, add 25 parts fine copper filings, ram the mixture into a crucible, cover it over, and expose it for 20 minutes to a white ammonia it forms a colorless solution, which (Cooley.)

4095. Peroxide of Copper. An oxide formed by the action of peroxide of hydrogen water on the hydrated black oxide.

4096. Sulphate of Copper. The blue num. Sulphuretted hydrogen throws down ritriol of commerce is obtained from the nafrom neutral and acid solutions of platinum, tive sulphuret of copper (copper pyrites). Pure sulphate of copper is made by the direct formed after a time in the cold, but immessolution of the metal, or preferably, of its diately on heating the liquid. Sal-ammoniae oxide or carbonate, in sulphuric acid. It conand chloride of potassium give yellow crys- sists of fine blue crystals, slightly efflorescent talline precipitates, insoluble in acids, but in the air. By heat it loses its water of cryssoluble in excess of the precipitant, upon the tallization and crumbles into a white powder.

orate and crystallize. quescent crystals, soluble in alcohol, the flame crystals. of which it turns green; exposed to a heat under 400° Fahr. it becomes anhydrous, as-

suming the form of a yellow powder.

4098. Ferrocyanide of Copper. Called also Prussiate of Copper. Precipitate a solution of a salt of copper (sulphate of copper, for instance,) with another of yellow prussiate of potash; collect the powder, wash it with water, and dry. Has a beautiful reddish-brown color, and is sometimes used as a in boiling dilute hydrochloric acid. pigment.

4099. Tests for Copper Solutions. The solutions of copper possess a blue or green 9 ounces; water, 6 pints; dissolve; iodide of color, which they retain, even when considera-

bly diluted with water. With caustic potassa they give a light blue bulky precipitate, turning blackish-brown or

black on boiling the liquid.

Ammonia and carbonate of ammonia produce a bluish-white precipitate, schuble in

The carbonates of potassa give a similar precipitate to the last, but insoluble in excess of the precipitate.

Ferrocyanide of potassium gives a reddishbrown precipitate. Sulphuretted hydrogen and hydrosulphuret of ammonia give a black-ish-brown or black one.

A polished rod of iron, on inmersion in an acidulated solution, quickly becomes coated with metallic copper.

4100. Delicate Test for Iron and The alcohol tincture of logwood will produce a blue or bluish-black tint in water which has been run through iron or copper pipes, when neither tincture of galls. sulphocyanide, nor the ferrid and ferrocyanides of potassium show any reaction.

4101. Acetate of Lead. Acetate of lead should be completely soluble in distilled water, and when the lead is exactly precipi-tated with dilute sulphuric acid, or by sulphuretted hydrogen, the clear supernatant liquid dissolved by a gentle heat, strain, evaporate, and crystallize. On the large scale it is usu-The best proportions are, finely powdered litharge 13 parts, and acetic acid specific gravity 1.0482 to 1.0484, 23 parts. These ingredients should produce about 381 parts of arts. crystallized sugar of lead. A very slight ex-cess of acid should be preserved in the liquid ounces; diluted nitric acid, 1 pint; dissolve crystallized sugar of lead. A very slight exduring the boiling and crystallization, to pre- by a gentle heat, and set the solution aside to

It forms green, deli- | which would impede the formation of regular

4102. Chloride of Lead. This is a white crystalline powder, called also muriate of lead. Precipitate a solution of 19 ounces acetate of lead in 3 pints boiling distilled water, with a solution of 6 ounces chloride of sodium in 1 pint boiling water; when cold, wash and dry the precipitate. It may be obtained in brilliant colorless needle-shaped crystals, by dissolving finely powdered litharge

while hot, and the crystals form on cooling.
4103. Iodide of Lead. Acetate of lead, potassium (pure), 7 ounces; water, 2 pints; disŝolve. Add the latter solution to the former, wash and dry the precipitate, and keep it from the light. Or: Iodide of potassium and nitate of lead, of each 1 ounce; dissolve each separately in 2 pint of water, mix, collect the precipitate in a muslin or linen filter, and wash excess of ammonia, yielding a rich deep blue it with water; then boil it in 3 gallons water, soured with pyroligneous (acetic) acid, 3 fluid ounces; let the solution settle (still keeping the liquid near the boiling point), and decant the clear; as the water cools, the iodide will subside in brilliant golden yellow lamellæ, or minute crystals.

The latter is the best process, as any adhering oxide of lead is dissolved out by the (Cooley). acid.

4104. Chromate of Lead. To a filtered solution of acetate or nitrate of lead, add a filtered solution of chromate of potassa, as long as a precipitate forms, which is cellected, washed with water, and dried. This forms chrome-yellow. (See No. 2705.)

4105. Dichromate of Lead. Boil pure carbonate of lead with chromate of potassa in excess, until it assumes a proper red color; then wash it with pure water, and dry it in the shade. This is the pigment known as chrome-red. (See No. 2706.) 4
4108. Litharge. Litharge is an oxide

of lead prepared by scraping off the dross that should be wholly volatilized by heat without forms on the surface of melted lead exposed residue. Sulphuric acid poured on acetate of to a current of air (dross of lead), and heating lead evolves acetic vapors. Acetate of lead it to a full red, to melt out any undecomposed is powerfully astringent. Take 4 pounds 2 metal. The fused oxide in cooling forms a ounces oxide of lead (litharge), acetic acid yellow or reddish semi-crystalline mass, which (specific gravity 1.048), and distilled water, of readily separates into scales; these, when each 4 pints; mix the fluids, add the exide, ground, constitute the powdered litharge of commerce. Litharge is also prepared by exposing red lead to a heat sufficiently high to ally prepared by gradually sprinkling oxide of fuse it, and English litharge is obtained as a lead into strong vinegar, heated in a copper secondary product by liquefaction, from arboiler rendered negative-electric by having a gentiferous lead ore. The litharge of comlarge flat piece of leat soldered within it, conmerce is distinguished by its color into lithstant stirring being employed until the acid is saturated, when the mother liquors of a pure, and litharge of silver, which is purer, former process may be added, the whole and paler colored. The dark color of the forheated to the boiling point, allowed to settle mer is chiefly owing to the presence of red till cold, decanted, evaporated to about the lead. In grinding litharge, about 1 pound of specific gravity 1.266 or 1.267, and then run olive oil is usually added to each 1 cwt., to into salt-glazed stoneware vessels to crystal- prevent dust. Litharge is employed in pharmacy, to make plasters and several other preparations of lead; by painters as a dryer These for oils, and for various other purposes in the

vent the formation of any basic acctate, crystallize. Employed as external application

hands, &c.

4108. in its Solutions. The presence of lead in solutions may be recognized by the effects produced by the following reagents:

The addition of sulphuretted hydrogen, hydrosulphuret of ammonia, or the alkaline sulphurets, to a solution containing lead, give black precipitates, insoluble in cold dilute acids, alkalies, alkaline sulphurets, and cyanide heat, and preserve them in a bottle. of potassium.

Caustic potassa or seda gives a white precipitate, soluble in excess of the precipitant. Ammonia throws down a white precipitate,

insoluble in excess, from all the solutions of lead salts, except that of the acetate.

Dilute sulphuric acid, in excess, also solutions of the sulphates, give a white precipitate, solution of potassa.

Chromate of potassa gives a yellow precipitate, whose soluble qualities are the same as that from sulphuric acid last mentioned.

Iodide of potassium gives a yellow precipiwater it is deposited in small, brilliant, golden-yellow scales, as the liquid cools. (See also Nos. 2694, &c.)

4109. To Prepare Chloride of Zinc. Dilute 1 pint hydrochloric acid with 1 quart water, add to it 7 ounces zine in small pieces; when the effervescence is nearly finished, apdecant the clear and evaporate to dryness. Fuse the product in a lightly covered crucible, by a red heat; pour it out on a flat, smooth

Ammonio-Chloride of Zinc. 4110. By dissolving 68 parts chloride of zinc and 54 parts sal-ammoniae, a crystallizable salt

4111. Chloride of Zinc. Dissolve $2\frac{1}{2}$ troy ounces zine in small pieces, in sufficient muriatic acid; strain the solution, add 60 grains nitric acid, and evaporate to dryness. Dissolve the mass in 5 fluid ounces water, add 60 grains chalk, and let the mixture stand for anhydrous protoxide. (Cooley.)
24 hours: then filter, and evaporate to dry4120. Sesquioxide of Tin. 60 grains chalk, and let the mixture state.

24 hours; then filter, and evaporate to dryness. Lastly, fuse the dry mass, pour it out slimy precipitate, soluble in muriatic acid, and in ammonia, obtained by mixing fresh, and in ammonia, obtained by mixing fresh, break the mass in pieces and keep in a well-stoppered bottle. (U. S. Disp.)

4112. Precipitated Carbonate of Zinc.

Take 12 troy ounces each sulphate of zinc and carbonate of soda; dissolve each separately in 4 pints water; mix the solutions and let ings are nearly tasteless, and dry with a gen-(U, S. Ph.)tle neat.

Tutty Powder. Impure oxide 4113. of zinc. It is a substance which collects in the chimneys of the furnaces in which the ores of zinc are smelted.

in cutaneous affections, &c. A very weak so- | pint water, in a porcelain capsule, and when lution is an excellent remedy for chapped gas ceases to be evolved, boil for 10 minutes, filter through muslin, and evaporate to dry-Tests for the Presence of Lead ness; next dissolve it in 1 pint water, agitate this solution frequently during 6 hours with 1 ounce prepared chalk, and filter it; add to the filtered solution 1 fluid drachm each commercial nitric acid and dilute sulphuric acid; evaporate the mixture until a pellicle forms on the surface, and set it aside to crystallize; dry the crystals on bibulous paper without mother liquor will yield more crystals by further evaporation. This substance is als known as white vitriol.

4115. Cyanide of Zinc. Add a solution of eyanide of potassium to a solution of pure sulphate of zinc; wash and dry the precip-

4116. Flowers of Zinc. This is obinsoluble in dilute nitric acid, but soluble in a tained by the rapid combustion of zinc in a deep crucible, placed sideways in a furnace, so that the flowers (oxide of zine) may be collected as they form.

4117. Oxide of Zinc. Place carbonate of zine in a covered clay crucible, and expose tate, soluble in acetic acid, a solution of po- to a very low red heat, until a portion taken tassa, alcohol, and boiling water; from boiling from the centre of the mass ceases to effervesce on being dropped into dilute sulphuric This is the commercial zinc-white. acid.

(See No. 2696.)

4118. Tests for the Solutions of Zinc. The solutions of zine are precipitated white by the pure alkalies and carbonate of ammonia, but are completely redissolved by excess of ply heat until bubbles cease to be evolved; the precipitant. The carbonates of potassa and soda give a permanent white precipitate of carbonate of zinc. Hydrosulphuret of ammonia also gives a white precipitate, and stone, and, when cold, break it into small so does sulphuretted hydrogen when the solupieces, and preserve it in a well-stoppered tion is quite neutral. Prussiate of potash gives a gelatinous white, or bluish-white precipitate

4119. Protoxide of Tin. Usually termed oxide of tin. Precipitate a solution is formed, which dissolves oxides of copper of protochloride of tin with carbonate of poand of iron, and is useful in tinning or zincing tassa, wash and dry the powder at a heat those metals. the air as possible. It is a white or greyishwhite powder, scluble in acids and in the pure fixed all:alies. If it be heated in an atmosphere of carbonic acid it loses its water and changes to a dense black powder, which is

moist hydrated peroxide of iron with a solution of the neutral protochloride of tin.

(Fuchs).

Binoxide or Peroxide of Tin. 4121. Obtained by adding potassa, or an alkaline carb nate, to a solution of perchloride of tin. the powder subside; pour off the liquid, wash the precipitate with hot water until the wash hence, its compounds with alkalies are sometimes called stannates. It is soluble in acids, and in pure alkalies. If grain tin be heated in a test tube with nitric acid, the tin is converted, with evolution of yellow fumes, into a white powder, peroxide of tin. The nitric acid will convert the tin into an oxide, but it 4114. To Prepare Pure Sulphate of cannot combine with the oxide produced. Zinc. Mix 4 ounces laminated or granulated (Stöckhardt.) From this it appears that zinc with 3 fluid ounces oil of vitriol, and 1 nitrate of tin is a misnomer.

tin with rather more than an equal quantity color; then cool and powder it. Crocus of of lead, then rapidly raise the heat till the antimony is sometimes sold for the above, but mixture is red hot; the tin will then be the latter is prepared by deflagrating equal thrown off in dross, which should be removed parts of antimony and saltpetre (nitrate of as it forms. This dross is the peroxide of tin, potassa), a small portion at a time, and the or tin putty; the dross may be calcined until fused mass, separated from the dross, reduced as it forms. This cross may be calcined until fused mass, separately; the dross may be calcined until fused mass, separately; the dross may be calcined until fused mass, separately; to fine powder. (Cooley.)

129. Potassio-Tartrate of Anti-Commercial Tartar Emetic. Take 2

of tin is obtained by distilling a mixture of chloride of mercury and tin in fine powder. It is grey, solid, resin-like, fusible, and volatile.

(Cooley.)

Perchloride of Tin. Called also 4124. Bichloride and Permuriate of Tin. The pure bichloride is obtained by heating the proto-chloride in chlorine gas, or by distilling a further evaporation the mother-water will mixture of 8 parts of grain tin with 24 parts of corrosive sublimate, when a very volatile, colorless liquid comes over, which was formobtained by dissolving tin in nitromuriatic acid. This solution is much used by dyers, under the name of Spirits of Tin, Dyers' Spirits, &c. (See Nos. 107, &c.) For this purpose, the acid is best made by mixing 2 parts of muriatic acid with 1 part each of nitric acid and water, all by measure. (Liebig). The tin should be added by degrees, one portion being allowed to dissolve before adding another; as, without this precaution, the action is apt to become violent, the temperature rise, and peroxide of tin to be deposby passing chlorine through it.

4125. Tests for the Salts of Tin. The salts of tin are characterized by the following general properties: Ferroprussiate of potash gives a white precipitate. Hydrosul-phuret of potash, a brown-black with the protoxide, and a golden-yellow with the peroxide. Galls do not affect the solutions of these salts. Corrosive sublimate occasions a black precipitate with the protoxide salts; a white with the peroxide. A plate of lead frequently throws down metallic tin, or its oxide, from the saline solutions. Chloride of gold gives, with the protoxide solutions, the as directed for prepared chalk. (See No. 1292.) purple précipitate of Cassius. Chloride of

the protoxide salts. (Cooley.)

4126. Ethiops of Antimony. urate together 3 parts sulphuret of antimony, and 2 parts black sulphuret of mercury.

4127. Flowers of Antimony. Throw powdered sulphuret of antimony, by spoonfuls, into an ignited tubulated retort that has a short and very wide neck, until as many flowers collect in the receiver as are required.

The argentine flowers are thus prepared: Keep metallic antimony melted in a vessel, freely exposed to the air, and furnished with a cool place for the flowers to rest upon; collect the flowers as deposited. According to Berzelius, these are sesquioxide of mercury.

4122. Tin or Polishers' Putty. Melt potash), and heat until it acquires a proper

troy ounces oxide of antimony, and 21 troy ounces bitartrate of potassa, both in very fine powder; mix them together, and add them to 18 fluid ounces boiling distilled water in a glass vessel. Boil for I hour, filter while hot, and set aside to crystallize. Dry the crystals, yield more crystals, which should be purified by a second crystallization. (U.S. Ph.)

4130. Oxide of Antimony. Insert 4 erly called Libavius' fuming liquor. A solutroy ounces sulphuret of antimony in very tion of the bichloride or permuriate of tin is fine powder into a quart flask; add 18 troy ounces muriatic acid, and digest in a sandbath until effervescence ceases. Then remove the bath and add 600 grains nitric acid, and when nitrous fames cease to be given off, and the liquid has grown cold, add it to 1 pint water, and filter. Pour the filtrate gradually into 12 pints water, constantly stirring, and wash the precipitate twice by decantation, using each time spirits water; drain it through muslin, and then wash it with water until the washings cease to have an acid reaction. Add 11 fluid ounces water of ammonia, and, ited. (See No. 108.) A process which has after standing 2 hours, filter through wet been highly recommended, is to prepare a muslin, and wash with distilled water as long simple solution of the protochloride, and to as the washings form a precipitate with nitrate convert it into the bichloride, either by the addition of nitric acid and a gentle heat, or biblious paper. (U. S. Ph.) A greyishwhite powder, insoluble in water, soluble in muriatic and tartaric acids.

413i. Butter of Antimony. The liquid chloride of antimony, commercially known by this name, is usually made by dissolving crude or roasted black antimony in muriatic acid with the addition of a little nitric acid. It usually contains pernitrate of

4132. Sulphuret of Antimony. The black snlphuret (tersulphuret) of antimony is prepared from commercial sulphuret of antimony or by elutriation, in the same manner The commercial sulphuret is obtained from platinum occasions an orange precipitate with the native gray antimony ore by fusion; this separates the sulphuret from the less fusible earthy matter; it is then run into cakes. (Cooley.)

> Mixtures of an acidulated menstruum or syrup with a sulphuret of antimony, are apt to disengage sulphuretted hydrogen, when there is much of them, if kept in a warm room. The rule should be to prepare as small a quantity as possible, and to keep the bottle

cool. (Eymael.)
4133. Penta-Sulphuret of Antimony. Called also golden sulphuret of antimony. Boil together for some hours 72 parts tersulphuret of antimony, 68 parts dry carbonate of soda, 52 parts fresh hydrate of lime, and 13 4128. Liver of Antimony. Melt parts sulphur; filter, evaporate, and crystaltogether 1 part sulphuret of antimony, lize. Redissolve the crystals (Schlippe's salt), and 2 parts dry carbonate of soda (or add dilute sulphuric acid, collect the golden floculent precipitate, wash it with cold dis- by dissolving, with beat, 6 ounces bichloride tilled water, and dry with a gentle heat, of mercury (corrosive sublimate) in 3 quarts

(Liebig.)

4134. Nitrate of Pismuth. The neutral nitrate is made from 2 ounces pure bismuth broken into fragments, dissolved by heat in 6 ounces nitric acid, adding more acid, if necessary, to effect entire solution. Add to filter through powdered glass, and crystallize by evaporation. (Cooley.)

4135. Subnitrate of Bismuth. This is also called trisnitrate of bismuth, magistery of bismuth, and pearl white. It is insoluble in water, but freely soluble in nitric acid. Dissolve 2 ounces bismuth in 3 fluid ounces ni- monia. tric acid, previously diluted with 2 fluid ounwater, and allow the white precipitate to sub-Afterwards decant the clear liquor, wash the powder, and dry it by a gentle heat.

(Br, Ph.)

4136. Oxide of Bismuth. The anhu-This is a straw-yellow colored powder. The hydrated oxide is a righ-looking white powder, obtained thus: Dissolve 2 pounds bismuth in 2½ pounds nitric acid, and drop it together in a wide-bottomed glass vessel, requal parts of quicksilver and nitric acid (qual parts of quicksilver and nitric acid (qual parts)); after digestion for 24 rendered caustic by previous treatment with quicklime (see No. 101); wash the precipitate well with cold water.

4137. Tests for the Salts of Bismuth. Tin, copper, iron, and zine throw down bismuth from its solutions in the metallic state. of soda by the flame of a blowpipe, a bead of the metal, surrounded by a crust of yellow oxide, is obtained. The brittleness of the bead under the hammer distinguishes it from lead. The salts of bismuth are mostly devoid of color; some are soluble, others insoluble. The soluble salts redden litmus paper; and, when the solution contains but little free acid, and is largely diluted with water, a subsalt, more or less soluble, is deposited. This property of forming subsalts is very characteristic. (Makins.)

4138. Chloride of Mercury. preparation is usually known as calomel. Boil, by means of a sand-bath, 24 troy ounces mercury with 36 troy ounces sulphuric acid, until a dry white mass is left. Rub this, when cold, with 24 ounces mercury in an earthenware mortar until thoroughly mixed; add 18 troy ounces chloride of sodium, triturate until the globules of mercury cease to appear, and sublime the mixture. Reduce the sublimate to a very fine powder and wash it with boiling distilled water until the washings afford no precipitate with water of ammonia, and dry it. (U. S. Ph.)

4139. Bichloride of Mercury. corrosive sublimate of the drug stores. Boil 24 troy ounces mercury in 35 troy ounces sulphuric acid, by means of a sand-bath. cold, rub the dry white mass with 18 troy ounces chloride of sodium in an earthenware

distilled water; when cool, add 8 fluid ounces liquor of ammonia, frequently shaking it. Wash the precipitate with water, and dry it. It is used to make an ointment for skin diseases; also to destroy small vermin.

4141. Red Precipitate. Red oxide or the solution half its volume of distilled water, binoxide of mercury is now used in medicine as an escharotic, also to induce salivation. Dissolve 4 ounces bichloride of mercury in 6 pints water; add 28 fluid ounces liquor of ammonia; wash the precipitate in distilled water, and dry by a gentle heat.

4142. Chloride of Mercury and Am-This is obtained by triturating together equal parts of bichloride of mercury ces distilled water; then add 3 quarts cold and sal-ammoniac. This addition of sal-ammoniae renders the corrosive sublimate more soluble in water, for use in lotions and injections

4143. Black Precipitate. Protoxide of mercury is obtained by agitating together drous oxide is made by exposing the nitrate 1 ounce calomel with 1 gallon lime-water; deor subnitrate to gentle ignition in a crucible. canting the clear liquid after subsidence, and washing the sediment with distilled water,

> hours in a cool place, remove the crystals that have formed, wash them with a little nitric acid, drain them, and keep from the air in a stoppered bottle. (Paris Codex.)

4145. Tests for the Salts of Mercury. The salts of mercury are all volatilized at a If a salt of bismuth be heated with carbonate dull red heat—give a white precipitate with prussiate of potash, a black one with sulphuretted hydrogen and hydrosulphurets, an orange-yellow one with gallic acid, and with a plate of polished copper, a white coat of

metallic mercury.

Solutions of the protosalts of mercury yield a grey or black precipitate with alkalies, a yellowish or greenish-yellow one with iodide of potassium, a white one with muriate of

Solutions of the persalts of mercury yield with caustic alkalies, yellowish or red precipitates; with alkaline carbonates, a brick-red one; with iodide of potassium, a scarlet one.

4146. Sulphate of Iron. Commercial sulphate of iron is known also as Copperas, Green Vitriol, Shoemakers' Black, &c. For medicinal purposes it requires some preparation: Mix 1 fluid ounce sulphuric acid with 4 pints water; add 4 pounds commercial sulphate of iron, and 1 ounce iron wire; digest with heat and occasional agitation until the sulphate is dissolved; strain while hot, and set aside so that crystals may form; evaporate the mother-liquor for more crystals, and dry the whole. (Cooley.)

4147. Sulphuret of Iron. get er 4 parts sublimed sulphur, and 7 parts iron filings. Heat in a crucible in a common When fire till the mixture begins to glow; then remove the crucible from the fire, and cover it up until the reaction is at an end and the

mortar; then sublime with a gentle heat. whole has become cold.

(U. S. Ph.)

4148. Bisulphuret of Iron. This is found in large quantities in mineral form, and ammonio-chloride of mercury, and is prepared is known as Iron pyrites. It may also be ob-

tained by projecting a mixture of 5 parts sul-|digested in water (or very weak spirit), gives phur, and 4 parts iron filings, into a red-hot a solution which is colored violet by the procrucible, excluding the air as much as possi- tosalts of iron. ble. It melts easily, and takes sharp casts, and may be colored red with vermilion.

This is a black, insoluble substance, rapidly decomposed by exposure to the air. A monia in excess, and washing, drying, and neutral solution of protosulphate of iron made igniting the resulting hydrated peroxide. with recently boiled or distilled water, is precipitated by adding a solution of hydrosul- jewelers' rouge is prepared by calcining the phuret of ammonia, or of sulphuret of pota:-Collect the precipitate on a filter, wash it as quickly as possible with recently boiled water, squeeze in a linen cloth, and soluble than the oxide prepared by calcinapreserve in its pasty state under water.

This preparation of iron is proposed by Mialhe as an antidote to the salts of arsenic, antimony, bismuth, lead, mercury, &c., and to arsenious acid, more especially to white arsenic and corrosive sublimate. On contact Take 4 ounces sulphate of iron; 3½ fluid ounc

substances.

the precipitate, in the same way as in hydrated protosulphuret of iron. Bouchardat and Sandras recommend this persulphuret as a substitute for the protosulphuret, to which,

they say, it i; preferable.

4151. Protoxide of Iron. Dry protoxide of iron is a black powder; in its hydrated state it is white, and when exposed to the air rapidly absorbs oxygen, assuming first a greyish-green color, and then a brownish-red, red heat, at the same time that its solubility in acids is considerably lessened. The salts of protoxide of iron have a greenish color, but yield nearly colorless solutions, except when concentrated. The white hydrate is precipitated from solutions of the protosalts of iron by the pure alkalies. (Cooley.)
4152. Tests for Solutions of the Salts

of Protoxide of Iron. When acidulated they are not precipitated by sulphuretted hydrogen; even neutral solutions with weak acids are incompletely precipitated; whilst alkaline solutions are precipitated of a black

Neutral solutions are precipitated black by

bydrosulphuret of ann onia.

Ammonia and potasse give a greenish-white precipitate, gradually becoming green, and then brown in the air. The presence of ammoniacal salts interferes with these tests.

Ferrocyanide of potassium (yellow prussiate of potash) gives a nearly white precipitate, becoming gradually blue in the air, and immediately so on the addition of a little weak

nitric acid or chlorine water.

Ferrideyanide of potassium (red prussiate of pota-h, produces a rich deep blue precipitate, insoluble in muriatic acid. In highly dilute solutions the effect is only a deep bluish-green coloration.

Aurochloride of sodium gives a purple precipitate; and phosphate of soda a blue one.

Cochineal freed from fat by ether, and then down a white precipitate.

Anhydrous Sosquioxide of 4153, Iron. A pure anhydrous sesquioxide is ob-4149. Hydrated Protosulphuret of tained by precipitating a solution of sesquisulphate or sesquichloride of iron with am-

> precipitated peroxide of iron (see No. 4153) until it becomes scarlet. The rust of iron contains some combined water, and is more tion; but it is less soluble than that recently precipitated from its solution in an acid. This is also called Colcothar, Crocus, or Crocus

with the latter substance it is instantly con-ces oil of vitriol; water, 1 quart; mix, disverted into protochloride of iron and sul-solve, and boil, then gradually add 9 fluid phuret of mercury, two comparatively inert drachma nitric acid; stirring well and boiling for a minute or two after each addition, 4150. Hydrated Persulphuret of until the Equor yields a yellowish-brown pre-iron. Prepared by adding, very gradually, eipitate with ammonia, when it must be fil-adiluted solution of sulphuret of potassium, or tered and precipitated with 3½ ounces strong of hydrosulphuret of ammonia, to a neutral liquor of ammonia, rap ' 7 added and well solution of persulphate of iron, collecting, &c., mixed in; collect, was, well with water, drain on a calico filter, and dry at a heat not exceeding 1800 Fahr. When intended as an antidote for arsenic it should not be dried, but kept in the moist or gelatinous state. It should be kept in a well-stoppered bottle filled with recently distilled or boiled water. This preparation is also called hydrated peroxide of iron.

4156. Peroxide of Iron. Peroxide, or sesquioxide of iron, is a brownish-red powder, which is much brightened by exposure to a known as the red exide or rust of iron; in its hydrated form it is very soluble in acids, but less so when anhydrous. The salts of peroxide of iron have for the most part a reddishyellow color, and redden blue litmus paper. (Coolcy.)

4157. Tests for the Solutions of the Salts of Peroxide of Iron. Sulphuretted hydrogen throws down a black precipitate

from alkaline solutions.

Hydrosulphuret of ammonia does the same with neutral solutions; in very dilute solutions the precipitate is blackish-green; the precipitate in both cases being soluble in muriatic and acetic acids.

Ammonia and potassa produce bulky redlish-brown precipitates insoluble in excess of

the precipitant.

Ferrocyanide of potassium (yellow prussiate of potash) gives a rich blue precipitate, insoluble in muriatic acid, and readily decomposed by potassa.

Ferrideyanide of potassium (red prussiate of potash) deepens the color, but does not give a blue precipitate, as it does with the

protoxide. (Sec No. 4152.)

Sulphoeyanide of potassium gives an intense ruby-red color to neutral or acid solutions; this is the most sensitive test known.

Meconic acid and the meconiates also give a

red color.

A tineture or infusion of galls strikes a black color; and phosphate of soda throws tinues to burn until the whole becomes coneminently fitted for all the finer polishing purposes, had led to the use of this article for polishing the finest optical glasses. By heating the product to a higher temperature, a much and the stoppers dipped into melted wax harder substance may be obtained, useful rather for grinding than for polishing purposes. By adding salts of alumina, chromium and other similar salts to the iron solution, we may obtain in the final result—using sufficient heat-products nearly, if not quite, equal to emery, and of extraordinary fineness

ceases, while still hot, add sufficient ammonia to precipitate all the iron as sesquioxide. into a bottle with sufficient strong acetic acid

to dissolve it.

4 ounces iron; hence, if sufficient water be added to make the acetate up to 50 ounces, the be kept in well-stopped bottles. solution of acetate of iron thus obtained

will contain 8 per cent. of iron.
4160. Citrate of Iron.

with citric acid, and evaporating the solution as quickly as possible out of contact with the effervescence. Take 4 ounces sulphate of air. It presents the appearance of a white iron, and 41 ounces carbonate of soda; dispowder, nearly insoluble in water, and rapidly passing to a higher state of oxidation by exposure to the air. Its taste is highly metallic. It is usually administered in the form of pills, mixed with gum or syrup, to prevent premature decomposition.

4161. Iodide of Iron. Mix together 6 ounces iodine, 2 ounces iron filings, and 41/2 pints water; boil in a sand-bath until the liquid turns to a pale green, filter, wash the black-lead, is the native carburet of iron. To mixed liquors in an iron vessel, at 212°, to dryness, and immediately put the iodide into well-stoppered bottles. A great deal has been written and said about the preparation of iodide of iron, but there is in reality very little difficulty in the process. As soon as iodine and iron are mixed together under water, much heat is evolved, and if too much water be not used, the combination is soon the air, at a heat not exceeding 212°. This is most cheaply and easily performed by em-

4158. To Obtain Pure Oxalate of evolved steam will exclude air from the vessel. One Vogel recommends the precipitation The whole of the uncombined water may be of a solution of an ordinary protosulphate of known to be evaporated when vapor ceases iron by oxalic acid. The filtered solutions to condense on a piece of cold glass held over exclude all insoluble matter, and the precipit the mouth of the liask; a piece of moistened tated oxalate needs but sunfcient washing and starch paper occasionally applied in the same drying to obtain the oxalate of iron in a state way will indicate whether free iodine be of purity and or the accomposition. This evolved; should such a the case, the heat salt gently heated, what exposure to the air, should be immediately lessened. When the takes also, or may be hindled, and then convaporation is completed, the mouth of the evaporation is completed, the mouth of the flask should be stopped up by laying a piece verted into impalpable peroxide of iron. This of sheet India-rubber on it, and over that a cheap, rapid, and perfect method of obtaining flat weight; the flask must be then removed, a perfect oxide of iron, free from all grit and and, when cold, broken to pieces, the iodide weighed, and put into dry and warm stoppered wide-mouthed glass phials, which must be immediately closed, tied over with bladder,

4162. Ammonio-Citrate of Iron. Take 121 ounces carbonate of soda, and 12 ounces sulphate of iron; dissolve each separately in 6 pints boiling distilled water. Mix the solutions while hot, and allow the precipitate to subside. Decant the liquor, and, after washing the precipitate frequently with water, drain it. Then add to it 6 ounces 4159. Acetate of Iron. Dissolve 20 citric acid in powder, and dissolve the mix-ounces sulphate of iron in 7 ounces strong ture by a gentle heat. When cool, add 9 fluid sulphuric acid, and heat in a porcelain dish ounces liquor of ammonia of specific gravity nearly to boiling. Then add gradually 10 .960. It must then be filtered, gently evapounces strong nitric acid; and, when action orated to the consistence of syrup, and spread very thinly on warm sheets of glass to dry, which it will rapidly do, if exposed in an atmo-Collect this on a linen cloth, and wash with sphere of warm dry air, and may then be easily water until the washings taste no longer detached from the glass, in thin scales of saline. While still moist, put the sesquioxide great brilliancy and beauty. Only a gentle heat must be employed, not exceeding that of a water-bath. This is the method of produc-Twenty ounces of sulphate of iron contain ing those beautiful transparent ruby-colored scales which are so much admired. It must

4163. Saccharine Carbonate of Iron. A sweet-tasted greenish mass or powder. It 4160. Citrate of Iron. This salt is is one of the best of the chalybeates in doses easily formed by digesting iron filings or wire of 5 to 10 grains. When pure it should be easily soluble in hydrochloric acid with brisk solve each separately in 1 quart boiling water. Mix the solutions while hot; and, after allowing time for subsidence, collect the precipitate, wash it frequently with water, and drain. Then add 2 ounces sugar previously dissolved in 2 fluid ounces water, evaporate over a water-bath to dryness, and keep in a well-

stopped bottle.

residue with a little water, and evaporate the purify it for chemical use, heat it to redness with caustic potassa in a covered crucible, then wash it well with water, boil it in nitric acid and in nitro-muriatic acid (aqua regia); again wash it in water, dry it, and expose at a white heat to a stream or dry chlorine Lastly, wash it with water and again

heat it to dull redness. (Dumas.)
4165. Chloride of Iron. The muriate or protochloride of iron is obtained by dissolvcompleted, and the liquor merely requires to | ing iron filings or scales in hydrochloric acid, be evaporated to dryness, out of contact with and crystallizing by evaporation. It forms soluble green crystals, and is sometimes called hydrated chloride of iron. The above ploying a glass flask, with a thin broad bot- is not quite pure, but to obtain a pure white tom and narrow mouth, by which means the crystalline protochloride, transmit dry hydrochloric acid gas over iron heated to redness. | parts of Europe. The manganese of com-

No 117.)

4166. Perchloride of Iron. The permuriate or sesquichloride of iron is obtained by dissolving sesquioxide or rust of iron in hydrochloric acid, evaporating to the consistence of syrup, and crystallizing. It forms red crystals, not quite pure. The pure perchloride is formed by passing chlorine over heated iron. This is soluble in water, alcohol, and ether, very deliquescent and corrosive, and is dissipated by a heat a little above drous by heat; if cobalt be present the salt (Cooley.) Perchloride of iron retains a green tint.

e given in mixtures containing 4175. Protoxide of Nickel. The pro-2120 Fahr. should not be given in mixtures containing tannin, which is the case with those syrups, are incompatible with ferric salts. The proper menstruum is simple sugared water; it i also necessary to keep these mixtures from the light, on account of the chemical reduction produced by the latter. (Eymael.)

4167. Ferrocyanide of Iron. This is pure Prussian blue. Dissolve 9 troy ounces ferrocyanide of potassium in 2 pints water, of the solution of tersulphate of iron previously diluted with 1 pint water. Filter the mixture, and wash the precipitate on the filter

Solution of Tersulphate of Take 21 troy ounces sulphuric acid, Iron. and 14 troy ounces nitric acid; mix them with pint water in a large capsule, heat to the boiling point, and add 12 troy ounces sulphate of iron in coarse powder, 3 ounces at a time, stirring after each addition till effervescence ceases. Continue the heat until the solution acquires a reddish-brown color, and is free from nitrous odor. When nearly cold add water to make it up to $1\frac{1}{2}$ pints. (U. S. Ph.)

4169. Ferridcyanide of Iron. This is better known as Turnbull's Prussian blue.

(See No. 2674.)

4170. Tannate of Iron. Dissolve 1 part of tannin in 150 of boiling water; add 9 parts hydrated sesquioxide of iron, freshly precipitated, washed, and dried in the water-bath; evaporate gently to one half; filter, then add 1 part sugar, evaporate to dryness, and keep in a close vessel. Or: 1 part sesquioxide of iron and 2 of tannic acid evaporated to dryness with 3 parts alcohol.

4171. Nitrate of Iron. The protonitrate of iron is obtained by dissolving protosulphuret of iron in dilute nitric acid in the cold, and evaporating the solution in a vacuum. It forms small green crystals, very

soluble, and liable to oxidation.

Pernitrate of Iron. red liquid formed by digesting nitric acid diluted with about half its weight of water on the sesquioxide of iron. It is also prepared from the metal. (See No. 116.)

4173. Oxide of Manganese. are, according to Cooley, seven distinct compounds of oxygen and manganese, but the black oxide (binoxide or deutoxide) of manganese. It is a very plentiful mineral producganese. It is a very plentiful mineral production, and is found in great abundance in many driven off, then raise the heat to redness and

This is volatile at a high temperature. (See merce is prepared by washing, to remove the earthy matter, and grinding in mills. blackest samples are esteemed the best. chiefly used to supply oxygen gas, and in the manufacture of glass and chlorine; in dyeing, and to form the salts of manganese.

4174. Chloride of Nickel. Neutralize muriatic acid with oxide (protoxide) of nickel, and evaporate gently; small green crystals of chloride (muriate) of nickel. If these crystals are pure, they are rendered yellow and anhy-

medicated syrups or gum-arabic, since the toxide (oxide) of nickel is obtained in an latter, as well as all substances containing anhydrous form by heating oxalate of nickel toxide (oxide) of nickel is obtained in an to redness in an open vessel. The hydrated oxide is an ash-grey powder formed by pre-cipitating the oxalate of nickel with caustic potassa.

4176. Peroxide of Nickel. The peroxide (sesquioxide) is obtained by passing chlorine through water holding the hy-

drated oxide in suspension.

4177. Sulphate of Nickel. By neuand add it gradually, with stirring, to 1 pint tralizing the protoxide of nickel with dilute sulphuric acid, green prismatic crystals of sulphate of nickel are obtained.

with boiling water until the washings pass pale bluish-green precipitate formed by adding nearly tasteless. Lastly dry it and rub it a strong solution of oxalic acid to a like solution of sulphate of nickel. 4178. Oxalate of Nickel. This is a

tion of sulphate of nickel.
4179. Tests for Solutions of the Salts of Nickel. Caustic alkalies give a pale-green precipitate, insoluble in excess of the precipitant, but soluble in a solution of carbonate of ammonia, yielding a greenish-blue liquid. Ferrocyanide of potassium gives a greenishwhite precipitate. Sulphuretted hydrogen occasions no change in solutions of nickel containing free mineral acid; but with alkaline solutions gives a black precipitate.

4180. Acetate of Potassa. Mix together 26 fluid ounces acetic acid with 12 fluid ounces distilled water; add gradually 1 pound or more, until saturation, of carbonate of po-tassa; filter, and evaporate, by a sand-bath, to

dryness.

4181. Carbonate of Potassa. also known under the name Salt of Tartar, and Salt of Wormwood. The crude carbonate is obtained by lixiviating (see No. 23) wood ashes, evaporating the solution to dryness, and fusing in iron pots for several hours. This constitutes the potash of commerce.

Another method of preparation is to transfer the product of the first evaporation to an oven or furnace so constructed that the flame is made to play over the alkaline mass, kept constantly stirred with an iron rod. The ignition is continued until the impurities are burned out, and the mass becomes of a bluish-white; this is commercial pearlash. U. S. Pharmacopæia directs, for general purposes, the impure carbonate to be dissolved in water, filtered, and evaporated until it thickens, and then granulated in the manner directed for the pure carbonate.

Pure Carbonate of Potassa. 4182. only one directly employed in the arts is the Put 12 troy ounces bicarbonate of potassa, in coarse powder, into a large iron crucible; heat then remove it from the fire and stir it con- in larger and more regular crystals. (Cooleg.) stantly with an iron spatula until it granu-

(U.S. Ph.)

4183. solve 48 ounces carbonate of potassa in 10 by adding sulphuric (or, still better, acetic) pints distilled water; pass carbonic acid gas acid in quantity equal to half that required through the solution to saturation (the gas for the neutralization of the salt. (See No. may be evolved from chalk by diluted oil of 83.) The liquid is then concentrated by evapovitriol). Filter, and evaporate, that crystals ration, and slowly cooled, so that crystals may may form, at a heat not exceeding 160° Fahr.; form. decant the clear, and dry the crystals. (U. S. Ph.)

4184. Chlorate of Potassa. Transmit chloring gas through a moderately strong and is pure chlorate of potassa. liquor, which contains much chloride potassiam, by evaporation will yield more crystals, less pure than the former, or it may be soft. saved for a future operation. This salt crystallizes in four and six-sided pearly scales; great violence. It also fulminates when potash, which may be evaporat thrown into strong acids. (See No. 2124.) or kept in solution. (Beasley.) (Cooley.)

cold water, and the remaining perchloride of potassa dissolved in boiling water and crys-

tallized.

4186. Chromate of Potassa. called the draining-box, where it is left to matter. (Cooley.)

maintain it at that heat for 30 minutes. When 'drain and dry. In this state it forms the cool, dissolve it in distilled water, filter, and commercial chromate of potash. By a second evaporate over a gentle fire until it thickens, solution and crystallization, it may be obtained

> 4187. Bichromate of Potassa. The S. Ph.)
>
> Bicarbonate of Polassa. Disconcentrated solution of the yellow chromate,

4188. Substitute for Bichromate of Potassa. One of the German scientific journals calls attention to the fact that for many purposes, such as for dveing wool black. warm solution of pure caustic potassa, or its Glauber's salt and sulphuric acid can be ecocarbonate, until the alkali be completely neu-nomically substituted for bichromate of potralized, then boil for a few minutes, gently tassa. It gives the following recipe for dyeing evaporate until a pellicle forms on the surface. 100 pounds of loose wool-namely, 6 pounds and set it aside, where it will cool very slowly. sulphate of soda, 2 pounds sulphuric acid, and Crystals of the chlorate will form as the liquor 2 pounds sulphate of copper, which are to be cools, and must be collected, carefully washed boiled together for an hour, and colored with with a little ice-cold water, and purified by 40 to 50 pounds logwood, and 1 pound sul-re-solution and crystallization; the product phate of copper, and finally colored black by The mother means of a little sulphate of iron. The black thus obtained is pronounced to be beautiful, cheap, and easily spun, remaining loose and

4189. Nitrite of Potassa. It is obtained mixed with a little nitre and potash by dissolves in 16 parts of water at 60°, and in heating nitre to redness. To purify the 2½ parts at 212°. Lit about 450° it undergoes residuum, dissolve it in boiling water, set the igneous fusion, and on increasing the heat aside for 24 hours, pour off the liquid from almost to redness, effervescence ensues, and the deposited nitre, neutralize the free alkali fully 39 per cent. of pure oxygen gas is given with acetic acid, and add twice its volume of off and the residue becomes changed into chloride of potassium. When mixed with inzes, and the liquid separates into two layers; flammable substances, and triturated, heated, the upper is alcoholic solution of acetate of or subjected to a smart blow, it explodes with potash, the lower is solution of nitrate of great violence. It also fulminates when potash, which may be evaporated to dryness,

Or, pass nitrous acid gas, formed by acting 4185. Perchlorate of Potassa. To on 1 part of starch with 10 of nitric acid, concentrated sulphuric acid, gently warmed through a solution of caustic potash, specific in an open vessel, add, in small portions at a gravity 1.38, until it becomes acid; then add time, an equal weight of well-dried and finely a little caustic potash, so as to render it dispowered chloride of potassa. The bisulphate tinctly alkaline. It may then be kept in the of rotassa formed, is washed off with a little liquid form, or evaporated to dryness. (Corenwinder.)

419Ó. Permanganate of Potassa. This consists of slender, prismatic crystals, The of a dark-purple color, inodorous, and of a yellow chromate of potash of commerce is sweetish, astringent taste. It is a powerful only prepared on the large scale from the disinfectant, and oxidizing agent, from the crude chrome ore, and is the common source facility with which it parts with its oxygen. of nearly all the other compounds of chromium. It has been found useful in medicine in various. The ore, freed as much as possible from its imways, and forms an excellent, though unstable purities, is ground to powder in a mill, and hair dye. (See No. 1211.) It may be obmixed with ½ or ½ of its weight of bruised tained by mixing 8 parts of peroxide of nitre, and in this state exposed to a powerful manganese with 7 parts chlorate of potassa, heat for several hours, on the hearth of a both in fine powder, adding 10 parts of hydrate reverberatory furnace, during which time it is of potassa, dissolved in a small quantity of frequently stirred up with iron rods. The water, evaporating to dryness, powdering, calcined matter is next raked out and lixiexposing the powder to a low red heat in viated with hot water. A beautful yellow a plantinum crucible, dissolving the mass in a colored solution results, which is evaporated large quantity of water, decanting, evaporabriskly over a naked fire, when the chromate ting, and crystallizing. These crystals are perof potash falls down under the form of a granmanganate of potassa. The PERMANGANATES ular yellow salt, which is removed from time or basic compounds of permanganic (mangato time with a ladle, and thrown into a wooden nesic) acid are all marked by their rapid vessel, furnished with a bottom full of holes, decomposition when in contact with organic

4191. rose-color, free from green tinge, and is in- decolorized with charcoal (see No. 1729), and stantly decolorized by arsenite of potassa, aluminous clay; the resulting clear liquid is with the formation of a brown precipitate, allowed to cool slowly, forming crystals of (U. S. Ph.) Dissolve 44 grains granulated the cream of tartar of commerce. sulphate of iron in 2 fluid drachms dilute 4198. Bromide of Potass sulphuric acid; the solution should completely | troy ounce iron filings into 11 pints distilled decolorize 5 grains of the permanganate dissolved in water. (Br. Ph.

4192. Hydrate of Potassa. This is also known under the name of caustic potash, add gradually 21 troy ounces pure carbonate Liquor of potassa, 1 gallon; craporate in a of potassa (previously dissolved in 11 pints clean iron vessel over the fire until the ebullidistilled water), until it ceases to produce a tion being finished, the hydrate of potassa precipitate; continue the heat for 30 minutes, liquefies; pour this into proper moulds. A then filter. Wash the precipitate with 1 pint pale greyish or bluish solid, very soluble in boiling distilled water, and filter. Mix the water and alcohol. It should be totally filtered liquids, and crystallize by evaporation. soluble in alcohol. Its solution should be Dry the crystals on bibulous paper and keep searcely affected by the nitrates of baryta and them in a well-stoppered bottle. (U. S. Ph.) silver. It is chiefly used as a caustic, and in chemistry. (Cooley.)

4193. Potassa with Lime. Rub tobottle. This is a caustic, but less manageable oration. than either nitrate of silver (lunar caustic) or hydrate of potassa (caustic potash.)

nitre and saltpetre. This salt is spontaneously of potassium in 16 parts cold water, by passgenerated in the soil, owing to the action of ing chlorine gas slowly through it, with conthe atmosphere, and crystallizes upon its sure stant agitation, until the liquid appears of a face in various parts of the world, especially reddish green color, and ceases to give a blue in the East Indies. It is also produced artifi- precipitate, or even a blue tinge, to a solution cially by exposing a mixture of calcareous of a sesquisalt of iron, an excess of chlorine soil and animal matter to the atmosphere, being carefully avoided. The liquor is then when nitrate of lime is slowly formed, and is evaporated till a pellicle forms on the surface, extracted by lixiviation. The liquid is then filtered while hot, and set aside to cool; the decomposed by adding carbonate of potash, crystals are again dissolved and crystallized. by which carbonate of lime is precipitated (Cooley.) and nitrate of potash remains in solution.

lowing manner: Dissolve 4 pounds commercial by exposing 10 parts potash or pearlash; 10 nitre in 1 quart boiling distilled water; with parts coke, cinders, or coal; and 5 parts iron draw the heat, and stir constantly as it cools. turnings, all in coarse powder, to a full red draw the heat, and stir constantly as it cools. The minute crystals, thus obtained, are to be heat in an open crucible, stirring occasionally drained, and washed in a glass or earthenware until small jets of purple flame are no longer percolator, with cold distilled water, until the seen. When cool, the soluble matter is diswashings cease to give a precipitate with a so-solved out of it, the solution filtered, evapolution of nitrate of silver. The contents of rated, and crystallized. The crystals obthe percolator are then to be withdrawn and dried in an oven. (Cooley.)

ally 1 pound, more or less, of bitartrate of glass vessel, dissolve the fused mass in water, potassa (cream of tartar) in fine powder, neutralize any excess of alkali with acetic until the solution is neutralized, or ceases acid, and precipitate the salt with strong alto change the color of either blue or red-cohol; wash the precipitate with a little weak dened litmus paper. Filter through muslin, alcohol, rand evaporate until a pellicle forms on the (Cooley.) surface; then set it aside to crystallize. After 12 hours, collect the crystals, dry them on sium. Mix thoroughly 8 ounces of dry ferrobibulous paper, and keep preserved from the cyanide of potassium and 3 ounces dry carair.

4197. Bitartrate of Potassa. This is well known under the name of cream of tartar, and is found deposited as a crust on the fluid portion of the mass becomes colorless; sides of the casks and vats used for the fermentation of grape juice. The deposit from to settle, the clear portion is poured from the white wine is white tartar; that from red heavy black sediment at the bottom on a wine is red tartar, or argol. It is purified by clean marble slab; and, while yet warm, bro-

Tests for Permanganate of boiling it in water, and crystallizing; it is A very dilute solution has a then again dissolved in boiling water, and

4198. Bromide of Potassium. Put 1 water; add 2 troy ounces bromine, stirring frequently during 30 minutes; heat gently until the liquid assumes a greenish color, and

4199. Chloride of Potassium. This is obtained from the mother liquor after making chlorate of potassa (see No. 4184), by evap gether, in a warm mortar, 1 ounce each of orating it to dryness, and heating it to a dull hydrate of potassa and quicklime, and keep reduess; it is then dissolved in water, puri-the powder from the air in a well-stopped fied by defecation and crystallized by evap-

4200. Ferridcyanide of Potassium. hydrate of potassa (caustic potash.)

This is the red prussiate of potash, and is obtained from a solution of 1 part ferrocyanide

4201. Ferrocyanide of Potassium. 4195. To Purify Nitre. Nitre or salt-petre is purified for medicinal use in the fol-siate of potash of commerce. It is obtained tained are redissolved in hot water and cooled very slowly, forming large yellow crystals of 4196. Tartrate of Potassa. Dissolve the ferrocyanide of potassium of commerce. 8 ounces carbonate of potash in 2 quarts In order to obtain a pure article, fuse efflodistilled water; whilst boiling hot, add graduresced commercial prussiate of potash in a alcohol, redissolve it in water, and crystallize.

Cyanide (Cyanuret) of Potas-4202. bonate of potassa; throw the mixture into a deep red-hot earthen crucible, the heat being sustained until effervescence ceases, and the after a few minutes' rest, to allow the contents

it contains iron. (Liebig.)

4203. Iodide of Potassium. This imwith the dried salt. Rub this to powder, and expelled. additional quantity of crystals may be ob-

nor aromatic syrup or sugar in it. When crystallization. gargles of honey of roses, with alum and 4209. Bics honey be or the proper shade, this is owing to the presence of iron in the alum, which is by

no means a rare occurrence.

4204. Sulphuret of Potassium. Rub together 1 ounce sublimed sulphur, and 2 ounces dry carbonate of potassa; heat it gradually in a covered crucible until it ceases to swell and is completely melted. Pour the previously passed through water. liquid on to a marble slab, and, when cold, break the mass into pieces, and keep in well-stopped bottle of green glass. (U. S. Ph.)
4205. Sulphocyanide of Potassium.

Take 3 parts cyanide of potassium, and 1 part sulphur; digest them for some time in 6 parts water, then add 3 parts more water; filter, evaporate, and crystallize. It forms long, slender, colorless prisms, which are anhydrous, deliquescent, and fusible; very soluble in water and in alcohol, and not poison-

No. 4180), except that the resulting solution. is evaporated to a pellicle, and set aside to

crystallize

4207. Sulphate of Soda. Also called Glauber's sult. This is usually obtained by dissolving 2 pounds of the chloride of sodium left after the distillation of muriatic acid (see No. 3883) in 1 quart of boiling water; the solime evaporated, and crystallized. It is soluble in cold water, its solubility decreasing as the temperature of the water is raised; insoluble in alcohol, and fuses when heated.

ken up and placed in well-closed bottles, from sulphate of soda. The ashes of marine When pure, this salt is colorless and odorless, plants have been long an article of commerce, its crystals are cubic or octahedral, and are under the names of barilla, barilla ashes, kelp, anhydrous. If it effervesces with acids, it blanquette, &c., but the carbonate made from contains carbonate of potassa. If it be yellow, them is of a very impure description. That made from the sulphate is much purer, and, when the process is well managed, merely portant medicinal compound is obtained in contains a trace of sulphuric acid. The sulvarious ways. The United States Phar- phate of soda is mixed with an equal weight macopæia gives the following formula for of chalk and about half its weight of coal, its preparation: To 6 troy ounces potassa, each being previously ground to powder, and its preparation: To 6 troy ounces potassa, each being previously ground to powder, and dissolved in 3 pints boiling distilled water, the mixture is exposed to a great heat in a readd gradually finely powdered iodine, stirr- verberatory furnace, and during the calcinaing after each addition until the solution be-tion is frequently stirred with a long iron rod. comes celorless, and continue the addition. The dark grey product usually contains about until the liquid remains slightly colored from 22 or 23 per cent. of carbonate of soda. This excess of iodine. (This will require about 16 is now lixiviated with tepid water, and the troy ounces of iodine.) Evaporate the solution, after defecation, evaporated to drytion to dryness, stirring in 2 troy ounces fine ness, mixed with a little sawdust, and roasted ly powdered charcoal towards the close of the in a reverberatory furnace at a heat not exoperation, so that it may be intimately mixed ceeding 700° Fahr., until all the sulphur is The product now receives the heat it to dull redness in an iron crucible, name of soda-ash, or soda-salt, and contains maintaining that temperature for 15 minutes. about 50% of alkali. It may be purified by After it has cooled, dissolve out the saline solution in water, defecation, evaporation, matter with distilled water, filter the solution, and crystallization; it then becomes commerevaporate, and set it aside to crystallize. An cial crystallized carbonate of soda, consisting of large transparent crystals, which effloresce tained from the mother water by further evaporation.

A solution of iodide of potassium keeps
decidedly better when there is neither plain

tained from the mother water by further evawhite dry powder. The carbonate used in
medicine is prepared from the commercial
crystais by dissolving, filtering, and careful

4209. Bicarbonate of Soda. This may water, have a black color, though that of be prepared from a solution of carbonate of soda treated in the same manner as for bicarbonate of potassa. (See No. 4183.) The U. S. Pharmacopæia directs carbonate of soda in small pieces to be enclosed in a box (having an air-tight lid, and an inner bottom perforated with holes), and thus subjected, until saturated, to a stream of carbonic acid gas

Cooley recommends the following process: Mix together 1 part carbonate of soda with 2 parts dried carbonate of soda, both in powder, and surround them with an atmosphere of carbonic acid gas, under pressure. Let the action go on till no more gas is absorbed, which will generally occupy 10 to 14 hours, according to the pressure employed, then re-move the salt and dry it at a heat not above

120° Fahr.

4210. Phosphate of Soda. pounds powdered bene ashes with 44 fluid 4206. Acetate of Soda. This is pre-pared from carbonate of soda, by the same water, and digest for 3 days, replacing the method directed for acetate of potassa (see water which evaporates; then add 6 pints boiling water, strain through linen, and wash the residue on the filter with boiling water. Mix the liquors, and, after defecation, decant and evaporate to 6 pints; let the impurities again settle, and neutralize the clear fluid, heated to boiling, with a solution of carbonate of soda in slight excess; crystals will be deposited as the solution cools, and by suclution is next neutralized with carbonate of cessively evaporating, adding a little soda to the mother liquor till it is feebly alkaline, and cooling, more crystals may be obtained. Keep it in closed vessels. (Ed. Ph.)

4211. Hyposulphite of Soda. 4208. Carbonate of Soda. The cartogether 1 pound dried carbonate of soda and bonate of soda of commerce is either pre- 10 ounces flowers of sulphur, and slowly heat pared by lixiviating the ashes of sea-weed, or the powder in a porcelain dish until the sul-

phur melts; stir freely, to expose it to the at-ltate of potassa, and distill; binacetate of mosphere, until the incandescence flags, then ammonia passes over into the receiver, as an dissolve the mass in water, and immediately oily liquid, which, on cooling, forms a radiated boil the filtered liquid with some flowers of crystalline mass. By passing dry ammoniacal sulphur; lastly, carefully concentrate the so- gas into this salt, melted by a gentle heat, it

carbonate of soda in 16 parts water; add 1 part sublimed sulphur, and pass sulphurous ammonia, and evaporating over sulphuric acid acid gas, in excess, into the solution; boil the liquid in a glass matrass for a few minutes, filter, gently evaporate the filtrate to 1 its and water, and very deliquescent. volume, and set it aside in a cool place to crysdlize. (Paris Codex.)
4212. Tungetet tallize.

Tungstate of Soda. formed by dissolving tungstic acid in a con-centrated solution of pure soda. *Tungstic* acid is a yellow powder obtained by digesting native tungstate of lime, finely powdered, in nitric acid. It forms TUNGSTATES with metals and bases.

4213. Potassio-Tartrate of Soda. Known in commerce as Seignette's or Rochelle salt. Dissolve 12 ounces carbonate of soda directs 5 pints of boiling water to be used.

bromide of potassium; it is more active than to render the product translucent. The heat the latter, is more quickly absorbed, and more is usually applied by means of a common regularly eliminated. To prepare it pure and furnace, but a steam or water bath is preferain large quantities the following method is recommended: Bromide of ammonium is decomposed by an equivalent quantity of caustic or carbonate of soda, which, of course, must be free from sulphuric and hydrochloric acids. The solution yields, after evaporation, small cubes of anhydrous bromide of sodium.

muriate of soda, or common table salt, and is bonate until saturated, and drying the crystals largely obtained by the evaporation of sea which form without heat. water, or from the water of salt springs. It dissolves in about 2½ parts of water at 60° Fahr.; is insoluble in pure alcohol; ruses at a red heat; and at a higher temperature becomes volatile.

4216. Iodide of Sodium. This is obtained from soda in the same manner as iodide of potassium. (See No. 4203.)

4217. Nitro-Prusside of Sodium. To 213 parts of powdered ferroprussiate of potash, in a porceliain basin, add 450 parts of nitric acid of 1.42 density (or 337½ parts at 1.50), adding all the acid at once. When dissolved, transfer to a bolt-head, and digest in a waterbath until the solution precipitates salts of protexide of iron of a slate color. Neutralthe cold, with a cold solution of carregitate by filtration. Evaporate the liquid again filter, and allow the nitrates of posa h liquid again, and remove the prismatic crystory or masses, having a semi-crystalline texture, tals of nitro-prusside as they form. They and varying in weight from 100 to 1000 may be dissolved in water and recrystallized pounds. It forms a clear and colorless solu-

gether equal parts of sal-ammoniae and ace- evolves the pungent odor of ammonia; it

lution for crystallization. (Cooley.) is transformed into the new It may also be prepard by dissolving 8 parts becomes solid and inodorous. is transformed into the neutral acetate, and

Or: By saturating strong acetic acid with in vacuo, crystals of acetate of ammonia may be obtained. Very soluble both in alcohol

4219. Carbonate of Ammonia. The Neutral Carbonate is prepared by mixing equal parts sal-ammoniac, powdered and well dried, and dried carbonate of soda, and subliming, by a gradually increased heat, from an earthen retort into a refrigerated receiver.

4220. Sesquicarbonate of Ammonia. This is the commercial carbonate of ammonia, and is prepared as follows; Sal-ammoniac, or pure commercial sulphate of ammonia. and chalk, equal parts, both dry and in powder. Mix and sublime from an iron pot, in 2 quarts boiling water; add gradually in into a long earthen or leaden receiver, well ounces bitartrate of potassa in fine powder. Strain, evaporate to a pellicle or crust (see No. moveable lead cover, secured by a water-joint, 9), and set it aside to crystallize. The mother and has an open lead pipe in the bottom, to liquor may be further evaporated for a second allow the liquid products of the distillation to supply of crystals. (Cooley.) The U.S. drain off into a second receiver. When made Pharmacopæia adopts the same method, but of the impure sulphate of ammonia, it must be re-sublimed in iron pots, furnished with 4214. Bromide of Sodium. This is leaden heads kept cool. A little water is now employed to a great extent instead of commonly introduced into the subliming pots, ble, as the temperature required for this purpose does not exceed 200° Fahr.

4221. Bicarbonate of Ammonia. The commercial carbonate reduced to fine powder, and exposed to the air for 24 hours, becomes a bicarbonate spontaneously. It can also be obtained by passing a stream of carbonic **4215.** Chloride of Sodium. This is a acid gas through a solution of the sesquicar-

4222. Muriate of Ammonia. called sal-ammoniac and hydrochlorate of ammonia. This substance was formerly prepared in Egypt by the sublimation of the soot from camels' dung, which yields from 1 to 1 its weight. The sal-ammoniac of commerce is now wholly prepared at the great chemical works, and never by the small consumer, by whom it is merely occasionally refined or purified. The crude ammoniacal salt of the gas-works is placed in iron pots, lined with elcy, and a leaden dome or head adapted, and heat applied until the whole has sublimed. When the crude salt is a sulphate, it is mixed with a sufficient quantity of muriate of soda before sublimation, and the sal-ammoniac is formed by the double decomposition of the its of soda; then boil, and separate the ingredients. The preparation of sal-ammoniac from bone-spirit salt is nearly similar. The sal-ammoniac of commerce is found under and soda to crystallize out. Evaporate the the form of large hemispherical, cup-like cakes tion with water, and wholly volatilizes by 4218. Acetate of Ammonia. Mix to- heat. Mixed with lime or caustic potassa, it

gives a white curdy precipitate with nitrate of 4229. Manganate of Baryta. it may be broken into pieces and re-sublined of air, and dissolving in water. (Booth.) from an earthenware vessel into a large receiver of earthenware or glass, in which state pared in the same manner as muriate of from being in fine powder. Chemically pure acid for the muriatic acid. hydrochlorate of ammonia may be prepared 4231. Sulphate o to dilute hydrochloric acid until saturated. (Cooley.)

4223. Sulphate of Ammonia. The sulphuriz acid, and afterwards with pure wacommercial sulphate is obtained by saturating ter. (See No. 2697.) with weak oil of vitriol the ammoniacal 4232. Acetate of Baryta. Dilute liquor of the gas-works, or bone-spirit. For acetic acid neutralized with carbonate of medicinal purposes it is prepared by saturating dilute sulphurie acid with sesquicarbonate of ammonia in slight excess; it is then filtered, evaporated by a gentle heat, and crys-

tallized

4224. Murexide. This is the purpurate of ammonia, and consists of iridescent crystals, which reflect a beautiful green color, but transmit an equally fine reddish-purple color. It is obtained from alloxan, a substance formed by the action of nitric acid on uric

acid.

4225. Iodide of Ammonium. Place a portion of iodine in a flask with a little water; add to it a solution of hydrosulphuret of ammonia, until the mixture loses its red color, and is turbid from the separation of sulphur; by shaking the flask, the most of the sulphur will form into a mass. Pour off the liquid, and boil it until all odor of sulphuretted hydrogen and of ammonia is lost. Then filter it, and evaporate it, constantly stirring, over a flame, until it becomes pasty, and then in a water-bath until it forms a dry (U. S. Dis.)

4226. Sulphocyanide of Ammonium. Saturate 2 parts of common water of ammohydrogen; and add 6 parts of the same ammonia. To this mixture add 2 parts of sulphur, and the product of the distillation of 6 parts of prussiate of potash, 3 of sulphuric acid, and 18 of water. Digest till the sulphur is no longer acted on, and the liquid becomes yellow. Boil the liquid till it becomes color-

less, filter, evaporate, and crystallize.
4227. Bromide of Ammonium. For the preparation of bromide of ammonium, bromine is added very gradually to diluted The ensuing reaction produces much heat, which may cause ammonia and bromine to volatilize with the escaping nitrogen. The combination, therefore, is effected in a Wolffe's apparatus, which will condense and retain both perfectly. The evaporation mixture as long as acid vapors are evolved. of the fluid is also best done in an iron retort connected with a stoneware receiver, in which ammonia and some bromide of ammonium are condensed.

4228. Sulphuret of Ammonium. Usually called hydrosulphuret of ammonia. This is prepared from strong liquor of amnionia, by saturating it with sulphuretted hydrogen gas, and then adding a second portion of quantity to that first used. Keep it in well- heavy and the light.

stoppered bottles. (See No. 1203.)

The sal-ammoniac of commerce is manganate of baryta, and of other alkalies, generally sufficiently pure for all the purposes is formed by igniting the nitrate of the alkaof the arts, but when wanted of greater purity, lies with peroxide of manganese, with excess

it is known as "flowers of sal-ammoniac," baryta (see No. 4234), substituting pure nitric

Sulphate of Baryta. by adding the pure carbonate of ammonia occurs as a native mineral, and is white, if pure. It occasionally contains iron, which may be removed by washing first with dilute

4232. baryta, and evaporated to form crystals.

4233. Carbonate of Baryta. A heavy white powder found in the crude state abundantly in flature, and sufficiently pure for general purposes. The pure carbonate may be precipitated from a solution of chloride of barium by the addition of any pure aikaline carbonate, washing and drying the product.

4234. Chloride of Barium. called Muriate of Baryta. Mix gradually 10 ounces carbonate of baryta in small pieces, with ½ pint muriatic acid diluted with 1 quart distilled water; evaporate to a pellicle or crust (see No. 9), and set aside to crystallize.

4235. Protoxide of Barium. This is the oxide of barium or baryta. (See No.

3985.1

4236. Peroxide of Barium. The peroxide or binoxide is prepared from pure baryta, heated to a full red heat in a porcelain tube, and exposed to a stream of pure dry oxygen gas. Instead of baryta, its nitrate may be used, but the nitrous fumes must be allowed to

pass off entirely before applying the oxygen.
4237. Sulphuret of Barium. Calcine and reduce to powder 2 pounds sulphate of nia (specific gravity 0.950) with sulphuretted barvta, mix it with 4 ounces finely powdered charcoal; submit the mixture for 3 hours to a low white heat in a covered crucible. When cool, powder, and boil for 5 minutes in 5 pints water; decant the clear, and repeat the operation with 3 pints more water; unite the liquors, and crystallize by cooling.

4238. Carbonate of Lithia. Precipitate a solution of sulphate of lithia, by a strong solution of sesquicarbonate of ammonia; collect the precipitate, drain and press it, wash it with a little rectified spirit, and dry it. Dissolve in boiling water, and crystallize by

slow evaporation.

The residuum must be dissolved in pure water of ammonia, boiled, filtered, the solution evaporated to dryness, and the dry mass heated to redness. The matter left is pure sulphate of lithia. (Berzelius.)

Petalite or Spondumene is a mineral found

in various parts of Europe, also in Massa-chusetts and Connecticut. (Booth.) 4240. Carbonate of Magnesia. There liquor of ammonia, equal in strength and are two simple carbonates of magnesia, the

The heavy carbonate is prepared from a

saturated solution of sulphate of magnesia, 1 chlorine is generated in leaden vessels, heated part by measure; water, 3 parts; heat to the by steam, and the gas, after passing through boiling point, then add cold saturated solu-water, is conveyed by a leaden tube into an tion of carbonate of soda, 1 part; boil, with apartment built of silicious sandstone, and arconstant agitation, till effervescence ceases, ranged with shelves or trays, containing then add boil ag water, 100 parts, agitate well, fresh-slacked lime, placed one above another decant off the clear liquid, drain, and wash the about an inch assunder. The process must be precipitate with hot water, in a linen cloth, continued for 4 days to produce a good article and finish the drying by heating it in an iron of chloride of line. During this time the

pounds sulphate of magnesia, and 4 pounds boxes of lime placed in the walls of the cham-9 ounces carbonate of soda, each separately dissolved in 2 gallons water. Mix and boil the liquors, constantly stirring for 15 minutes: also as muriate of line. From the strong afafter subsidence, decant the clear, wash the finity this salt has for water, it is much used precipitate with boiling water, and dry it. for drying gases and absorbing the water The carbonate of magnesia of commerce is from ethereal and oily liquids, in organic usually made up into cakes or dice, while analyses. For this purpose it is used in the drying, or is permitted to drain and dry in dry state. In its hydrous or crystallized masses, which are then cut into shapes with form, it is much used in the preparation of a thin knife. It is powdered by rubbing it freezing mixtures with snow. In this case,

the well-known Epsom salts of commerce, moval from the fire. For both this and the called after the saline springs of Epsom, in last-mentioned use it is reduced to powder. England, from the waters of which it was It is also much used as a test for sulphuric originally obtained. It is prepared on the acid, with which it produces a white precipilarge scale from Dolomite, or magnesian lime-rate insoluble in nitric acid; in the rectificadilute sulphuric acid to convert all its carbonate into sulphate of lime, wash out all has been given in some scrofulous and glandthe sulphate of magnesia with hot water, and, after defecation, evaporate and crys-

Or, from bittern. Boil the residual liquor, or mother-water of sea-salt, for some hours, is called singles. By re-solution in water, and re-crystallization, doubles, or Epsom salts, fit for the market, are obtained.

4242. Sulphuret of Magnesia. The sulphide, or sulphuret, is prepared by fusing together, in a covered crucible, 5 parts calcined magnesia and 4 parts sulphur.

4243. Chloride of Magnesium. Dissolve magnesia in muriatic acid, evaporate to dryness, add an equal weight of muriate of ammonia, project the mixture into a red hot platinum crucible, and continue the heat until ing 140° Fahrenheit. Another way to prepare tranquil fusion is attained. Pour out the this salt is to mix 44 ounces (by weight) of a fused mass on to a clean stone; and, when solution of fused chloride of calcium of 1.238 solid, break it into pieces, and transfer to a warm, dry bottle. (Cooley.)

Or: Dissolve magnesia in muriatic acid; evaporate to a specific gravity of 1.384; and put it, while hot, into a wide-mouthed flask sodium; then allow to cry to crystallize. (Paris Codex.) This chloride the crystals by re-solution. of magnesium is also called hydrochlorate or muriate of magnesia.

Acetate of Lime. Neutralize acetic acid with prepared chalk (see No. 1292), filter the solution, evaporate by a gentle heat, and allow to crystallize.

4245. Chloride of Lime—called also hypochlorite and oxymuriate of lime, bleaching obtained by dissolving metallic cobait in powder, and chlorinated lime-is seldom, if nitric acid, and collecting the crystals. These ever, made on the small scale, as it can be crystals are ready soluble in water; of a red purchased of the large manufacturer of better color; deliquescent, and melt below 212° quality and cheaper than it could possibly be Fahr. At a higher heat, nitrous fumes are

time is occasionally agitated by means of iron The light carbonate is obtained from 4 rakes, the handles of which pass through ber, which act as valves.

4246. Chloride of Calcium. Known through a wire sieve. (Cooley.) the evaporation need only be conducted so far 4241. Sulphate of Magnesia. This is that the whole becomes a solid mass on rethe evaporation need only be conducted so far Heat the mineral with sufficient tion of alcohol, and for forming a water-bath with a high boiling point. As a medicine, it ular diseases, and has also been used as a bath in the same cases.

4247. To Prepare Chloride of Calcium. To hydrochloric acid, diluted with a equal weight of water, add powdered chalk skim, and decant the clear, then concentrate or white marble, in small fragments, until efby evaporation, and run the solution into fervescence entirely ceases, and the liquid no wooden coolers; in 1 or 2 days a part of longer reddens litmus paper. Filter, evapo-Epsom salts will have crystallized out. This rate to one-half, and set it aside to crystallize. Then collect the crystals, dry them by pressure between bibulous paper, and keep in a stoppered bottle. The mother-liquid will yield more crystals by further evaporation.

4248. Hyposulphite of Lime. Slack 5 ounces lime with enough water to make 4 pints, boil up with 10 ounces of flowers of sulphur, and pass into the solution sulphurous acid gas (free from carbonic acid) until it has become colorless. Then filter and evaporate to crystallization, at a temperature not exceedspecific gravity, with a warm solution of 25 ounces hyposulphite of soda in 30 ounces water; evaporate to 38 ounces, and pour off, while warm, from the crystals of chloride of sodium; then allow to crystallize, and purify

4249. Cobalt. A metal found in ores associated with arsenic and other metals; also present in meteoric iron. It is white, brittle, and does not change in the air; has a high melting point, and is strongly magnetic. Specific gravity 8.5. (Cooley.)

4250. Nitrate of Cobalt. This may be

made by the druggist. On the large scale the given off, and peroxide of cobalt remains.

(Cooley.)

4253. is obtained by dissolving carbonate of cobalt in acetic acid. Acetate of cobalt forms a sym-

1 part calcined borax.

is directly employed in the arts. It is a plentiful mineral production in a crude state; and pyrolusite in mills, and removing the earthy matter by washing. The blackest samples are

esteemed the best.

4256. Alum. lixiviation (see No. 23) from crude alum ore. or schist. It is obtained in large crystals, slightly efflorescent. It is applied in the arts to a great variety of purposes. When deprived of its water of crystallization by heat, it becomes burnt or dried alum. Pure red or roche alum was originally imported from Italy, where it is found in a native state. This has a reddish tinge, which extends more or less through the crystals.

4257. Hydrate of Alumina. Dissolve alum in 6 times its weight of boiling water, the precipitate or sediment, and wash the white transparent crystals. (U. S. Disp.) latter three or four times with tepid distilled latter three or four times with tepid distilled or soft water. Next collect the precipitate made from cadmium filings and bromine, in on a fine calico filter, and again wash to with tepid water. When it has drained, press it between bibulous paper, and, lastly, dry it between bibulous paper, and lastly, dry it rescent, crystalline needles.

4264. Hydriodate of Quinine. To a calution of neutral sulphate of is a soft white powder. (Cooley.)

4258. Acetate of Alumina. Add a solution of acetate of baryta to another of sulphate of alumina, and filter. Or, add 5 parts alum to 6 parts sugar of lead, each being first dissolved separately in hot water, and allowed to cool before mixing; decant the clear liquor. The pure acetate is made from pure hydrate of alumina, by digesting it in cold, strong acetic acid, until the latter is saturated. By

4251. Chloride of Cobalt. Dissolve carbonate of cobalt in muriatic acid; the solution deposits rose-colored crystals on stand-celain vessel, at a heat of 66°, for some days; ing, which contain water. By evaporating carefully collect the oily portion which sepathe solution, anhydrous blue crystals of the rates, and agitate it with an equal weight of chloride are obtained. (Coolcy.) 4252. Carbonate of Cobalt. This is the clear and evaporate, treat the oily residuprecipitated from a solution of nitrate of co- um with a little carbonate of magnesia to rebalt, by carbonate of potassa, producing a move any free acid, and wash off the butyrate pale peach-colored powder, soluble in acids, of magnesia thus formed with water: next heat the remaining fatty matter in alcohol, Acetate of Cobalt. The acetate filter, and evaporate, to obtain the butyrine.

4261. Bromine. A dark reddish-colored liquid, having an odor resembling chlorine. pathetic ink. (See No. 2540.)

It freezes at -4°, boils at about 135° Fahr., is

4254. Manganese. A hard, brittle, very soluble in ether, less so in alcohol, and greyish-white metal, very easily oxidized, only slightly so in water. With hydrogen it fuses with difficulty, unaffected by cold water, forms hydrobromic acid, and, with the bases, but dissolving freely in dilute sulphuric acid, compounds called bromides or hydrobroevolving hydrogen gas. It has a specific MATES. It is obtained as follows: A current of gravity of 8.013. It is obtained by calci-chlorine is passed through the uncrystallizable nation in a crucible, at a strong heat, of 10 residuum of sea-water, called bittern, which parts by weight of an oxide of manganese, then assumes an orange tint, in consequence made into a paste with oil, and combined with of bromine being set free from its combinations; sulphuric ether is then agitated with it, and 4255. Peroxide of Manganese. The the mixture allowed to stand until the ethereal black oxide is the only oxide of manganese that portion, holding the bromine in solution, floats upon the surface. By decanting, and evaptiful mineral production in a crude state; and orating the ether, a crude bromine may be is purified by grinding the native mineral or obtained at once. To get it pure, the ethereal solution is carefully decanted, and agitated with a solution of potassa, by which means bromide of potassium and bromate of potash are The alum of commerce is formed. The whole is next evaporated to drya sulphate of alumina and potassa, obtained by ness, and submitted to a dull red heat; the residuum is then powdered, mixed with pure peroxide of manganese, and placed in a refort; sulphuric acid, diluted with half its weight of water, is now poured in. Red vapors immediately arise, and condense into drops of bromine, and are collected by plunging the neck of the retort to the bottom of a small receiver containing cold water. The bromine forms a stratum beneath the water, and may be collected and further purified by distillation from dry chloride of calcium. (Cooley.)

Iodide of Cadmuim. 4262. add a solution of carbonate of potassa, in prepared by mixing iodine and cadmum filings slight excess, agitate the mixture for a few in a moist state. This is freely soluble in minutes, and then allow it to repose. After water or alcohol, and may be crystallized by a time, pour the clear supernatant liquor from evaporation from ether solution, in large

The product concentrated solution of neutral sulphate of quinine, add, drop by drop, a concentrated solution of iodide of potassium; dry the precipitate in the shade; or, heat the liquid nearly to the boiling point, and allow it to crystal-

4265. Sulphate of Quinine. This is the disulphate of quinia. Boil 48 troy ounces coarsely powdered yellow cinchona, in 13 pints of water containing 15 troy ounces muriatic acid, and strain through muslin. Boil spontaneous evaporation long transparent the residue twice successively with the same crystals form.

4259. Sulphate of Alumina. Saturate dilute sulphuric acid with hydrate of alumina; evaporate and crystallize.

quantity of water and acid as before, and strain. Mix the decoctions, and, while the liquid is hot, gradually add 5 troy ounces finely powdered lime, previously mixed with 2 pints of water, stirring constantly until the with 1 per cent. of salicine, the two first-quinia is completely precipitated. Wash the named acids cause a distinct red coloration, pressed, dried, and powdered it, digest it in nitric acid. This latter acid is not even colboiling alcohol. Pour off the liquid, and ored by pure selicine. repeat the digestion several times until the may be necessary to dissolve the quinia. Then add 11 troy onnees animal charcoal, boil tion be entirely neumal, acidulate it very coal, filter the solution, and set it aside to crystallize. Lastly dry the crystals on bibulous paper with a gentle heat, and keep them cutting the unripe fruit of the white popps, in a well-stopped bottle. The mother-water and hardened by exposure to the air. It acid, and animal charcoal, as before. When pure it forms light, delicate, weight. white needles. It is entirely soluble in hot or 3 drops of sulphuric acid, if decomposed by a solution of ½ ounce carbonate of soda, in two waters, and heated till the precipitate of oxalic acid.

adulterated with starch, magnesia, gum, sugar, &c. The first three remain undissolved when the salt is digested in spirit; the fourth is dissolved out by cold water, and the last may be detected by precipitating the quinine by liquor of potassa, and dissolving the precipitate in boiling alcohoi; cinchona crystallizes out as the solution cools, but the quinine remains in the mother liquor. (Cooley.)

of salicine in sulphate of quinine. He em- color to the flame of alcohol. It occupies a ploys three kinds of sulphuric acid-viz.: the fuming, pure concentrated acid, free from stances used to produce insensibility to pain arsenic and nitric acid; ordinary concentrated by inhaling them), but has in later times sulphuric acid of commerce, containing a been, to a certain extent, superseded by trace of nitric acid; and, lastly, sulphuric nitrous oxide. (See No. 4060.) Externally acid, to which, purposely, nitric acid had been applied, it is refrigerant, soothing, and allays a sheet of white paper, and a drop or two of the acids above referred to (each in a separate glass) having been poured therein, a few crys- prepared on the large scale, by mixing, in a tals of sulphate of quinine are put on the capacious retort or still, 4 pounds chloride of acid; if pure, there is no coloration; but, even lime, 12 pounds water, and 12 fluid ounces

precipitate with distilled water; and, having which does not ensue with the acid containing

4267. Acetate of Morphia. alcohol is no longer rendered bitter. Mix the acetate of morphia of commerce is usually in liquids, and distill off the alcohol until a brown the form of a whitish powder, and is prepared viscid mass remains. Transfer it to a suitable by the mere evaporation of the solution to vessel, and pour upon it 4 pints distilled dryness by a gentle heat. During the process water; and, having heated the mixture to the a portion of the acetic acid is dissipated, and boiling point, add as much sulphuric acid as hence this preparation is seldom perfectly soluble in water, unless it be slightly acidulated with acetic acid. It is prepared by disfor 2 minutes, filter while hot, and set it aside solving 6 drachms morphia in 3 fluid drachms to erstallize. Should the liquid before filtra- acetic acid specific gravity 1.048, diluted with 4 fluid ounces distilled water; evaporate slightly with sulphuric acid; should it, on the gently, and crystallize. 100 measures of a contrary, change the color of litmus paper to solution of 10 grains in 1 fluid ounce water, a bright red, add more charcoal. Separate and 5 minims of acetic acid, heated to 212°, the crystals from the liquid, dissolve them and decomposed by a very slight excess of in boiling distilled water slightly acidulated ammonia, yield by agitation a precipitate, with sulphuric acid, add a little animal char-which, in 24 hours, occupies 15½ measures of the liquid.

may be made to yield an additional quantity yields several alkaloids, the principal of which of sulphate of quinia by precipitating the is morphine. The best opium comes from quinia with water of ammonia, and treating Smyrna, in Turkey. Sometimes the comthe precipitate with distilled water, sulphuric mercial article is found adulterated with (U. S. various substances in order to increase its

4269. To Test the Strength of Opium. water, and more readily so when an acid is Take 25 grains quicklime made into a milk Precipitated by ammonia, the re- with water, boil in this 100 grains opium, and siduary liquid, after evaporation, should not filter the solution while hot; saturate the taste of sugar. By a gentle heat it loses 8 or filtrate with dilute hydrochloric acid, and 10 per cent. of water. It is wholly consumed then precipitate the morphia by the addition by heat. If chlorine be first added, and then of liquor of ammonia, any excess of the latter by heat. If chlorine be first added, and then of liquor of ammonia, any excess of the latter ammonia, it becomes green. A solution of 10 being expelled by heat. Collect the precipigrains in 1 fluid ounce distilled water, and 2 tate, dry, and weigh it; the weight in grains will represent the percentage of morphia in the sample of opium tested. (Couerle.)

4270. To Test the Purity of Opium. shrinks and fuses, yields on cooling a solid Macerate 100 grains opium for 24 hours in 2 mass, which, when dry, weighs 7.4 grains, fluid ounces water; filter and express the and in powder dissolves entirely in a solution residue; then precipitate with a solution of ‡ cance carbonate of soda in 2 fluid ounces cold 4266. Tests for the Purity of Sul-water; gently heat the precipitate until it phate of Quiniae. This salt is frequently fuses, then cool and weigh it. It should weigh at least 10 grains; and, when powdered, be entirely soluble in a solution of oxalić acid.

4271. Chloroform. A thin, colorless liquid, of agreeable ethercal odor, and sweetish but slightly acrid taste. Its specific gravity (water standard) is 1.49, and the specific gravity of its vapor (air standard) is 4.2. It kindles with difficulty, burning with a green-Dr. Stonelen proposes a test for the presence ish flame, and gives a dull, smoky-yellow prominent place among the anæsthetics (sub-Watch glasses having been placed on pain. It neither reddens nor bleaches litmus paper.

4272. To Obtain Chloroform. rectified alcohol; distill cautiously as long as plete.

to settle. Separate and wash the chloroform ized alcohol and chloral to condense and flow with 3 fluid ounces distilled water, repeating back into the retort. this operation 3 times, each time with fresh and Imperial measure are adopted.

4275. Tests for the Purity of Chloroform. Its specific gravity should not be less than 1.400, nor more than 1.494; and vent by exposing them in thin layers to the should boil at 140° Fahr. When dropped air. (Flückiger.) into water, it sinks in transparent globules without milkinds. When mixed in a bottle with an equal back of sulphuric acid, it should produce no warmth; and after standing for 24 hours, neither liquid should be discolored, or, at most, a faint yellow tinge imparted to the lower or acid stratum; more discoloration than this would denote the presence of em-pyreumatic oily matter. When evaporated on a porcelain plate, it leaves behind a slightly aromatic odor, but free from pungency.
4276. Chloral. Chloral is an oily li-

quid, possessing an ethereal small; it is soluble in alcohol, ether, and water, but its solution in the latter rapidly changes into a semisolid crystalline mass of hydrate of chloral, soluble in a larger quantity of water. Chloral boils at 2020, and has a specific gravity of

4277. To Obtain Chloral. Place anhydrous alcohol in a tubulated retort, and It is recommended to mix only a portion of pass dry chlorine gas through it, at first in the alcohol at first with the acid, and as soon passes undecomposed through the liquor at place the fluid as it distills over; also not to the boiling temperature, the process is com- allow the heat to exceed 286°.

On cooling, the liquid in the retort a dense liquid is produced, which sinks in and solidifies, forming a crystalline mass of hydraseparates from the water with which it passes ted chloral. This must be melted by gentle over. Separate the lower stratum of chloro- heat, and agitated with thrice its volume of form from the water, agitate it with a little oil of vitriol, when, on increasing the heat a sulphuric acid, and distill it by the heat of little, an oily stratum of impure chloral will a water-bath from carbonate of baryta, rise to the surface. This must be removed, (Dumas.)

4273. To Obtain Pure Chloroform.

Place in a capacious still 3 gallons water and tilled with an equal volume of oil of vitriol; 30 fluid ounces rectified spirit, and raise the lastly, it must be rectified from finely-powtemperature to 100° Fahr. Add 10 pounds dered quicklime, stopping the process as soon chlorinated lime (slacked lime saturated with as the surface of the lime becomes dry. The chlorine gas), and 5 pseuds slacked lime, chlorine is best introduced by a tube inserted mixing thoroughly. Apply heat, which must into the tubulature of the retort, and a long be withdrawn as soon as distillation has complete, bent upwards, should be connected with menced, and distill 50 ounces; agitate it with the beak to convey, away the hydrochloric acid gas extricated, and to allow the crude chloroform acid gas extricated, and to allow the volatil-

4278. To Purify Hydrate of Chloral. distilled water. Next agitate the chloroform There is perhaps scarcely a liquid in which for 5 minutes with an equal volume of sul-chloral hydrate is insoluble at ordinary temphuric acid: when settled, transfer the upper perature; four parts of it dissolve gradually stratum to a flask containing 2 ounces chloride in one part of water, the solution crystallizes of calcium in small pieces, and ½ ounce perfectly dry slacked lime. Agitate thoroughly, and, after an hour, distill the pure chloroform over a water-bath. Keep in a well-stoppered bottle, in a cool place. The U.S. Dispensato-cohol must be excluded, because it combines are hear three-forms from the Dritin Black. ry has transferred this from the British Phar-macopæia, consequently avoirdupois weight well adapted for recrystallization, but the first is too dear, and the last cannot be entire-4274. To Purify Commercial Chloro- ly removed from the crystals. The same form. To 102 troy ounces commercial holds good for most other liquid solvents, but chloroform add 17 troy ounces sulphuric acid, uniformly satisfactory results are obtained occasionally shaking during 24 hours. Sena- with bisulphide of carbon; 45 parts of it disrate the lighter liquid and mix it with 6 fluid solve at 60° to 65° Fahr., but 1 part chloral drachms stronger alcohol. Then add 2 troy bydrate; it precipitates ethereal and alcoholic ed to redness, and rubbed into powder while below the boiling of bisulphide of carbon, 4 warm. Agitate thoroughly and distill to dry-part sees. Keep the distilled liquid in well-stop ped bottles. (U.S. Ph.) ounces carbonate of potassa, previously heat-solutions of the latter. But at temperatures slowly, beautiful crystals, often an inch in length, are obtained, easily collected, and readily freed from the last traces of the sol-

4279. Sulphuric Ether-also called oxide of ethyl-is a colorless, transparent, very limpid fluid, having a penetrating and

agreeable smell and a burning taste.

4280. To Obtain Sulphuric Ether. Put 2 pounds rectified spirit into a glass retort, and add 2 pounds sulphuric acid; place the retort on a sand-bath, and apply heat so that the liquor may boil as quickly as possible, and the other pass into a receiver cooled by ice or water; continue to distill until a heavier fluid begins to pass over; then lower the heat, add another pound of spirit, and distill as before. Mix the distilled liquors to-gether, pour off the supernatant portion, add I ounce carbonate of potassa (previously ignited), and agitate occasionally for one hour; finally, distill the ether from a large retort, and keep it in a well-stoppered bottle. This ether should have a specific gravity of .750.

the cold, but afterwards with the application as it reaches boiling point (about 280° Fahr.), of a gentle heat. As soon as the chlorine add the remainder only fast enough to re-

Another rethod is, to heat the sulphuric! fine lower orifice, introduced through a cork at 60° Fahr, of a mixture of ether and alcohol. mometer being adjusted in a similar manner, of absolute ether contained in the mixture: so that its bulb is immersed in the contents of the retort. By this means the danger of the heat rising above 286° is obviated.

4281. Stronger Ether. Officinal Æther Fortior. Take 3 pints each of ether and water; shake them thoroughly together in a bottle; and, when the water has subsided, separate the ether from it, and agitate it well with 1 troy ounce each of chloride of calcium and lime, both in fine powder. After standing for 24 hours, decant the ether into a retort, with a Liebig's condenser, connected with a receiver surrounded by ice-cold water, and distill 14 pints tonger ether, which should be of a sound gravity not exceeding .728.

is purified by first agitating it with 2 or 3 times its volume of distilled water containing a few grains of carbonate of potassa, or a few drops of milk of lime; and, after decantation, again agitated with a like quantity of water only.

vapor of ether is very inflammable, and when it rapidly sinks, and frequently accumulates in the lower parts of buildings, especially celevery joint in the floors of rooms, the space beneath doors, &c., offer a roud for the passsurely runs out of every orifice, and finds its only remedy is thorough ventilation. Many serious accidents have arisen from this cause: a light carried where such vapor is present causes an explosion.

in a flask with binoxide of barium, adding gradually perfectly pure and very dilute eleansing agent, and as a test for chromic acid, which it instantly turns indigo blue. equivalent to it.

4285. Tests for the Purity of Ether. Pure ether should be neutral to test paper; vaporize totally when exposed to the air; of calcium, its volume should not be lessened; becomes acid by age. water should dissolve only $\frac{1}{10}$ its volume of ether, and remain transparent. Dry carbona test-tube will become moist or form a syrupy solution, in case any water is present. The the greater in direct proportion to the quantity of alcohol which it contains.

1286. To Find the Percentage of acid to 280°, and then introduce the alcohol Ether in a Mixture of Ether and Alin a fine stream, by means of a tube with a cohol. By ascertaining the specific gravity fitted to the mouth of the retort; a ther the following table will give the percentage

TABLE OF PERCENTAGE OF ETHER.

Spec. Grav.	Per cent.	Spec. Grav.	Per cent.
0.7198	100	.7673	65
.7246	95	.7636	60
.7 293	90	.7701	55
.7343	85	.7772	5.0
.7397	80	.7840	45
.7455	75	.7830	40
.7514	70 [į	

4287. Nitric Ether. Take 50 parts nitric acid, specific grayity 1.375, dissolve in it 2 or 3 parts nitrate of urea, and add 50 parts alco-4282. To Purify Ether. Ordinary ether hol. Distill until 4 of the whole has passed over; agitate the distillate with a little water to separate the ether, and preserve the heavier portion. It has a specific gravity of 1.112; its vapor is explosive when strongly heated, consequently great care is necessary in the This may be used for inhalations. The washed distillation, to keep the heat down to the lowether is afterwards digested on chloride of calcium to deprive it of retained moisture.

4283. Cautions About Ether. The for Sulphuric Ether, in No. 4280.)

4288. Nitrous Ether. Nitrous or hypomixed with atmospheric air it forms a vio- nitrous ether has a pale yellow color, bons at lently explosive mixture. The density of 62° Fahr.; at 60° its specific gravity is .947; nitrous ether has a pale yellow color, boils at this vapor is 2.586, that of air being 1, hence it is very volatile. Take starch, 1 part; nitric acid, specific gravity 1.30, 10 parts; alcohol of 85 per cent., 2 parts; water, 1 part; introduce lars which are badly ventilated. Every crack, the starch and acid into a capacious retort connected with a wide tube 2 or 3 feet long, bent at right angles, and terminating near the age of this vapor, which, though invisible, as bottom of a two-necked bottle, containing the alcohol and water mixed together, and surlevel, as a stream of water would do. The rounded with a freezing mixture or very cold water. The other neck of the bottle must be connected by a wide and long glass tube, with a good refrigerator or condenser. The heat of a water-bath must be cautiously applied to 4284. Ozone Ether. By agitating other the retort, when pure hyponitrous acid will be set free, and, passing into the alcohol, will form gradually perfectly pure and very dilute hyponitrite of oxide of ethyl (ether), which hydrochloric acid, occasionally cooling and will distill in a gentle stream. The tube consubsequently allowing the ether to settle, necting the retort and bottle must be cooled we obtain a liquid which has been recom- by means of a rag or moist paper, wetted from by means of a rag or moist paper, wetted from mended as a disinfecting, bleaching, and time to time with ice-cold water; for if the tube and the alcohol be not carefully cooled, the latter becomes spontaneously hot, and According to Boettger, this does not contain boils violently, when the product is vitiated. ozone, but binoxide of hydrogen, which is This process is very productive and economical, and yields perfectly pure hyponitrous ether. (Liebig.) ether.

4289. Sweet Spirit of Nitre. This is an alcoholic solution of nitrous ether. The when shaken in a graduated tube with half its mixture should have, according to the U.S. volume of a concentrated solution of chloride Pharmacopæia, a specific gravity of .837. It

4290. Hydrochloric Ether. the chloride of ethyl, and is distilled in a ate of potassa or tannin shaken with ether in retort, from rectified spirit of wine saturated with dry hydrochloric acid gas. (Thénard directs equal volumes of concentrated hydropresence of alcohol is shown by shaking the chloric acid and absolute alcohol.) The reether with water, its solubility in water being tort is connected with a Wolffe's apparatus, the first bottle of which should be two-thirds full of tepid water (70° to 75° Fahr.), and the digested on a few fragments of fused chloride

of calcium. (Cooley.)

4291. Acetic Ether. This is a color ether consists of 1 part chloroform in 8 parts less fluid, and bears a considerable resem-rectified spirit. blance to sulphuric ether, of which it is' acetate of ethyl.

equivalent quantity of acetate of soda (see No. for the preparation of most of the others.

80), 3 parts 85 per cent. alcohol, and 2 parts 4299. Acetate of Ethyl. Heat together 80), 3 parts 85 per cent. alcohol, and 2 parts strongest oil of vitriol. Distill them in a in a retort, 3 parts acctate of potassium, 3 chloride of calcium, to absorb water. Lastly, rectify by a gentle heat. (Fownes.)

4293. To Prepare Butyric Ether. largely diluted with rectified spirit, is the pine-apple essence used for flavoring. It is prepared from crude butyric acid saponified

butyrate of ethyl.

4294. Benzoic Ether. A colorless oily them together, and, as soon as the product turns milky when mixed with water, change the receiver and collect the subsequent distillate; add water to it, decant the ether from the surface of the water, and boil it with calcium. Benzoic ether is also called benzoate of ethyl.

4295. Formic Ether—also called formiate of ethyl, is a limpid, aromatic fluid, lighter than water; soluble in 10 parts of that fluid; has a specific gravity of .915, and boils at 130° Fahr. To obtain it, mix in a thylic alcohol or pyroxylic spirit, forming retort, with a well-cooled receiver, 7 parts compounds with the acids, analogous to those dry formiate of soda, 10 parts oil of vitriol, of ethyl. and 6 parts 90 per cent. alcohol. The greater part will distill over by the heat spontaneously developed, after which the heat of a waterbath may be applied. Purify it by agitation,

chloride of calcium. (Cooley.)

enanthylate of cthyl, and pelargonic ether treated with dilute sulphuric acid and distilled, (see No. 1471)—is color ess, and has a power yields an aqueous solution of valerianic acid. ful intoxicating vinous odor. Its specific By careful redistillation it may be deprived gravity is .862, and boils at 480° Fahr. It is of water. Valerianic acid may also be proof fermented liquors, especially wines, and along with the oil of potato, or corn spirit, purified by agitation with a weak solution of when valerianate of potassa is obtained, the

remainder surrounded with salt and ice. To has the odor of quince, and dissolved in a due render it perfectly anhydrous, it must be proportion of alcohol, forms quince essence.

4297. Chloric Ether. This is synonymous with chloroform. Medicinal chloric

Ethyl. This is a colorless, in-4298. strictly an acetate. Liebig assigns it a specifiammable gas, of a specific gravity a little fie gravity of .89 at 60° Fahr., dissolving in 7 over 2 (air standard). Under a pressure of times its bulk of water; Ure gives it a specific 21 atmospheres, at 37.5 Fahr., it assumes the gravity of .866 at 45°, dissolving in 8 parts form of a colorless othereal liquid. It forms It is decomposed by alkalies and the basis of ether, which is exide of ethyl; strong acids. (Cooley.) It is also called and of alcohol, which is the hydrated oxide cthyl. of ethyl; its usefulness lays chiefly in its com-To Obtain Acetic Ether. Mix pounds with acids. The following are the together 3 parts acetate of petassa (or an principal ones in use, and will serve as a guide

glass retort or earthenware still, connected parts strong alcohol and 2 parts oil of vitriol. with a well-cooled receiver: agitate the pro- The distilled product is mixed with water to duct with a little water, to remove undecom- separate the alcohol; digested first with a posed alcohol, then digest it with a little chalk, little chalk, and afterwards with fused to remove acidity, and afterwards with fused chloride of calcium; lastly, it is rectified. A fragrant, limpid liquid, having a density of .890, and boiling at 165° Fahr. (Founes.)

4300. Valerianate of Ethyl. This is the pine-apple oil of commerce; and, dry hydrochloric acid gas through an alcoholic solution of valerianic acid. Its odor resembles

butyric ether.

4301. Amyl. This is the basis of the with caustic potassa, and the resulting soap fusel oil compounds; fusel oil being the distilled along with alcohol and oil of vitriol. oxide of amyl. It is a colorless, ethereal It is sparingly soluble in water, very soluble liquid, boiling at 311° Fahr. Like ethyl, its in alcohol; boils at 230°. It is also called acid compounds are most used. (See No.

4302. Acetate of Amyl. Mix together liquid, slightly heavier than water, aromatic 1 part fusel oil and 2 parts dry acetate of poin taste and odor. It boils at 410° Fahr. It tassa (potassium-Founces); add 1 part conis prepared as follows: Take 4 parts 90 per centrated sulphuric acid, and distill. Purify cent. alcohol, 2 parts crystallized benzoic acid, the distillate by washing it with a dilute soluand 1 part concentrated muriatic acid; distill tion of potassa, and again distill 2 from dry chloride of calcium. (Cooley.) Acetate of amyl, diluted with alcohol, forms the essence of Jargonelle or Bergamot pear.

4303. Valerianate of Amyl. Mix carefully 4 parts fusel oil with 4 parts sulwater and a little oxide of lead (to separate phuric acid; when cold, add 5 parts valerianic the benzoic acid); lastly, free it from water acid. Warm the mixture for a few minutes by allowing it to stand over chloride of in a water-bath, then mix it with a little water, which causes the ether to separate. Purify this by washing it with water, and a weak solution of carbonate of soda. An al-coholic solution of valerianate of amyl consti-

tutes apple essence.
4304. Methyl. This is the basis of me-

4305. Valerianic Acid. A volatile. fatty acid, obtained by distilling valerian root along with water, and acting on the product with caustic potassa, when valerianfirst with milk of lime, and afterwards with ate of potassa is formed, and a volatile oil is separated; by evaporating to dryness, the Enanthic Ether-named also latter is dissipated, and the dry mixture, obtained towards the end of the distillation duced artificially, by heating fused potassa carbonate of potassa. (Coolcy.) This ether acid of which is identical in all respects with that obtained from the root of valerian, ing moisture and sulphur by distilling it at a (Liebig.) It is colorless, limpid, oleaginous; low temperature from chloride of calcium, boils at 270° Fahr.; soluble in alcohol and 4311. Bisulphide or Bisulphuret ether, and in 30 parts of water; smells strongly of valerian; with the bases it forms salts called VALERIANATES, most of which are solulile

equal weight of sand, and distilling it by a gradually increased heat; the product is puriremove the oil, and then subliming it. It water; is fusible and volatile without decom-

position. (Cooley.)

4307. Aldehyd-Ammonia. 80 per cent., 4 parts; peroxide of manganese next the manganese; agitate and distill with a gentle heat, from a spacious retort into a from its own weight of dried chloride of calcuim until 3 parts have come over, which must be again rectified in the same manner, with an equal bulk of ether, and the mixture saturated with dry ammoniacal gas; brilliant colorless prismatic crystals will form, which, after washing with ether and drying, are pure aldehyd-ammonia. It smells like turpentine; melts at 160° Fahr.; volatilizes, unchanged, at 212°; decomposed by exposure to the air; soluble in most menstrua except ether.

Aldehyde. Dissolve 8 parts 4308. aldehyd-ammonia in 8 parts water; place the solution in a retort, and add 7 parts sulphuric acid, diluted with about half its weight of water; then distill as directed in last receipt. Rectify the product twice from its own weight of dried muriate of lime, at a heat not exceeding 86° Fahr. It is an ethereous liquid, boiling at 72°; neutral, inflammable, mixed with water, alcohol, and ether; decomposed by exposure to the air, into liquid acetic acid;

spoils by age.

4309. Sulphuret of Carbon. A colorless, pungent, fætid liquid, exceedingly volatile and combustible. It exceeds all substances in refractive power. In dispersive power it exceeds all fluid substances except oil of cassia. It produces intense cold by its evaporation. A spirit thermometer, having its bulb covered with cotton, if dipped into this fluid and suspended in the air, rapidly sinks from 60° to 6° , and if put into the receiver of an air-pump it will fall to -81° . Mercury may be readily frozen in this way

4310. To Prepare Sulphuret of Carbon. Heat together in a close vessel 5 parts heated to a certain point, a transparent solid. bisulphuret of iron, and 1 part well dried 4316. Turpentine. An oleo-resin flowin a porcelain tube. In either case the result- transparent, and of the consistence of honey. ing compound should be carried off as soon as 4317. Oil of Turpentine. Oil or ing compound should be carried off as soon as formed, by means of a glass tube plunged spirits of turpentine is obtained by distilling into pounded ice, beneath which it will colorude turpentine along with water. The re-

4311. Bisulphide or Bisulphuret of Carbon. This is used in the arts as a solvent for India-rubber, gutta percha, &c. To procure it. Mulder recommends the following process as the most convenient. Provide an 4306. Succinic acid. This is obtained from bottle (a quicksilver bottle answers very by mixing coarsely powdered amber with an well), and make a second opening into it. To one opening adapt a copper tube bent twice at right angles; and to the other a straight fied by pressing it between bibulous paper, to tube dipping into the bottle. Having nearly filled the bottle with pieces of charcoal (reforms coloriess, inodorous crystalline scales, cently heated to redness), and having screwed soluble in 5 parts cold or 2½ parts boiling on the bent and straight tubes, place the bottle in a furnace, closing the mouth of the latter with a stone or clay cover in two pieces. Take sul- hollowed in the centre so as to fit the upper phuric acid, 6 parts; water, 4 parts; alcohol of part of the bottle, and defend it from the 80 per cent., 4 parts; peroxide of manganese action of the fire. Connect the curved tube in fine powder, 6 parts. Dilute the acid with with a Wolffe's bottle half-filled with water, the water, then carefully add the alcohol, and and placed in a freezing mixture; and when the iron bottle is sufficiently heated, introduce by the straight tube fragments of sulphur, receiver surrounded with ice, and connected and immediately close the mouth of the tube with the former perfectly air-tight. When 6 with a plug. The bisulphuret, as it comes parts have distilled, re-distill this portion over, falls to the bottom of the water. Separate it from the water, and distill over dry chloride of calcium.
4312. Terpine. Leave oil of turpentine

until 1½ parts of liquid are obtained in the for a long time in contact with a mixture of receiver. This liquid must then be mixed nitric acid and alcohol. Crystals of terpine form. By boiling an aqueous solution of terpine with a small quantity of sulphuric or other acid, terpinole is formed, and may be separated by distillation. It has the odor of

hyacinths.

4313. Sugar Resin. Mix 16 parts strong sulphuric acid with 8 of the strongest nitric acid; when cooled to 70° Fahr., stir in 1 part of finely-powdered sugar. In a few seconds, when the sugar has become pasty, take it out of the acid and plunge it into cold Add more sugar to the acid, and water. proceed as before. Wash the resinous matter carefully, and dissolve it in alcohol or other. Evaporate the solution with a gentle heat. It is very combustible. Its solution may be used to render gunpowder, lucifer matches, &c., waterproof.

4314. Aluminized Charcoal. This is recommended by Dr. Stenhouse as a cheap and very efficient decolorizing agent. Dissolve in water 54 parts of the sulphate of alumina of commerce, and mix with 92½ parts of finely powdered wood charcoal. When the charcoal is saturated, evaporate to dryness, and heat to redness in covered Hessian crucibles till the water and acid are dissipated. The charcoal contains just 71 per cent. of

anhydrous alumina.

4315. Styrol. Mix 20 parts of storax with 7 of carbonate of soda, and put them into a retort with water, and apply heat. A limpid fluid distills, which becomes, when

charcoal; or transmit the vapor of sulphur ing from the trunk, after removing the bark over fragments of charcoal heated to redness of the pitch of swamp pine. It is viseid,

lect. It may be afterwards freed from adher-| mainder left in the still after distillation is

resin. It congeals at 14°, and boils at 312° | the retort, and through it introduce by deexposure to the air. merce

4318. resin which exudes from the larch tree. Venice turpentine usually met with is a facturpentine added to 48 pounds melted black

resin. (Cooley.)

4319. To Purify Turpentine. However carefully the oil of turpentine may have been distilled, it always leaves, after evaporation, a disagreeable odor, firmly adhering to the goods that have been treated with it. the real article consists. (Hager.) The same is the case with benzine and the this preparation is less inflammable, cheaper, and more agreeable to the workman than ben-

4320. Benzine. This is the name given in the United States to one of the products all temperatures. (See No. 346.) Fenzine searcely attacks asphaltum or pitch, and cannot (like benzole), be converted by nitric acid into nitro-benzole. It is consequently useless for the preparation of aniline. Benzine consists of about 84 per cent. carbon and 16 per cent. hydrogen. (See No. 440.)

gave it the name of bicarburet of hydrogen. Some years afterwards Mitscherlich, of Berlin, obtained the same liquid from benzoic acid, it benzole. The French, however, adhered to Mitscherlich's name, and continue to call it benzole, from coal-tar, is a different liquid from benzine, obtained from petroleum. (See ration) with nitric acid. No. 1527.) Benzole has a specific gravity of .85, and freezes at 37° Fahr; it dissolves asphaltum or pitch rapidly, is volatile at all temperatures, but less so than benzine. Benzole can be converted by nitric acid into nitrohydrogen.

4322. Nitro-Benzole. A yellowish, oily fluid, insoluble in water; boils at 415° Fahr., and has a specific gravity of 1.209; found both in the animal, vegetable, and known also as essence of mirbane. The mineral kingdoms, but exists in greatest method of preparing it is as follows: Place 10 abundance in sea-weed. It is principally parts fuming nitric acid in a tubulated retort manufactured from the mother-waters of kelp. capable of holding 3 times the quantity; ap- Iodine is usually met with under the form of ply heat sufficient to produce gentle ebullition.

Fahr.; its specific gravity is about 870°. It grees, a drop at a time, benzole (not benzine, is very inflammable, and becomes resinous by sec No. 4321), so long as nitrous vapors are When purified, by evolved; the liquid which passes into the reredistilling with 3 or 4 times its volume of ceiver being poured back from time to time water, it produces the *camphene* of cominto the retort. When the red vapors have ceased to rise, distill off the excess of benzole. Venice Turpentine. A liquid if any, from the acid. Then pour the contents exudes from the larch tree. The remaining in the retort into 120 to 150 parts pentine usually met with is a faccold water, and let it stand for a few days, titious article composed of 2 gallons oil of when the nitro-benzole will be found separated at the lower part of the vessel. Decant the upper stratum of acid, wash the nitrobenzole with water, and keep it in stoppered bottles. This substance is used as a factitious oil of bitter almonds, being, although poisonous, far less so than the prussic acid of which

4323. Urea. A crystalline, colorless, lighter petroleum oils. This may be ob transparent substance, consisting of cyanate viated, according to Bremer, by distillation of ammonia. Fresh urine, gently evaporated over tannin. Articles treated with oil of to the consistence of a syrup, is to be treated turpentine that has been distilled in this with its own volume of nitric acid at 24 deg.; way, are heated to 150° Fahr., when they the mixture is to be shaken and immersed in lose every trace of odor. Bremer adds that an ice-bath to solidify the crystals of nitrate of urea; these are washed with ice-cold water, drained, and pressed between sheets of blotting paper. When they are thus separated from foreign matters, they are to be dissolved in water to which subcarbonate of potdistilled from petroleum, having a specific ash is added, whereby the nitric acid is taken gravity of about .73, or 65° of Baumé's light up, and the urea set at liberty. This new hydrometer. (See No. 1527.) It has not yet liquor is evaporated at a gentle heat, nearly been frozen, and is dangerously volatile at to dryness; the residue is treated with pure Fenzine alcohol, which only dissolves the urea; the solution is concentrated, and the urea crystal-(Thénard.) lizes.

Or: Mix 28 parts of perfectly dry ferro-cyanide of potassium with 14 parts of black oxide of manganese, both pure and in fine powder; then place them on a smooth iron 4321. Benzole. In 1825, Faraday discovered a peculiar liquid which was deposited charcoal fire. When the mass begins to burn, by condensation by ordinary coal-gas, and it must be frequently stirred; after which cool and dissolve in cold water, filter, and add 20½ parts of dry sulphate of ammonia, and decant the clear from the precipitated suland proposed for it the name of benzine, phate of potassa. Concentrate at a heat be-Faraday objected to this name, as too similar low 212°, again decant, evaporate to dryness, to the distinctive names of the alkaloids, as and digest in boiling alcohol of 808; crystals strychnine, morphine, &c., and decided to call of urea will be deposited as the solution cools. (Liebig.)

4324. Nitrate of Urea. This may be benzine, causing considerable confusion; as prepared as in last receipt from urea; or by saturating the artificial urea (Liebig's prepa-

4325. Stearine. The solid portion of fats which is insoluble in cold alcohol. Pure strained mutton suct is melted in a glass flask with 7 or 8 times its weight of ether, and the solution allowed to cool; the soft pasty mass benzole, and, by further treatment, into anilis then transferred to a cloth, and is strongly line. (See No. 2552.) It contains about pressed, as rapidly as possible, to avoid evap-92.5 per cent. of carbon, and 7.5 per cent. of oration; the solid portion is then dissolved again in ether, and the solution allowed to

crystallize. The product is nearly pure.
4326. Iodine. A chemical ele A chemical element The mineral kingdoms, but exists in greatest semi-crystalline lumps, having a metallic Insert a glass tube through the upper neck of lustre, or friable scales, somewhat resembling

ganpowder. It has a greyish-black color, a of its vapor.—Striking a blue color with hot, acrid taste and a disagreeable odor not starch; this test is so delicate that water much unlike that of chlorine. It fuses at containing only 100000 part of iodine acquires 225° Fahr., volatilizes slowly at ordinary tem- a perceptible blue tinge on the addition of peratures, boils at 347°, and when mixed with starch.-Nitrate of silver causes a white prewater rapidly rises along with its vapor at 212°. It dissolves in 7000 parts of water, and freely in alcohol and ether. It may be crystallized in large rhomboidal plates, by exposing to the air a solution of it in hydriodic acid. Iodine, like chlorine, has an extensive range of affinity; with the salifiable bases it forms compounds termed lodides, lodurers, or hy-DRIODATES; and it destroys vegetable colors.

4327. To Obtain Iodine. Saturate the residual liquor of the manufacture of soar from kelp (or other iodine lye) of a specific gravity of 1.374, heated to 236° Fahr., with sulphuric acid diluted with half its weight of water; cool, decant the clear, strain, and with a wide neck, over which invert another glass globe, and apply heat with a charcoal fire; iodine will sublime very copiously, and condense in the upper vessel, which, as soon as warm, should be replaced by another; and the two globes thus applied in succession as long as violet vapor arises. It may be washed out of the globes with a little cold water. A thin disc of wood, having a hole in its centre, should be placed over the shoulder of the matrass, to prevent the heat from acting on the globular receiver. On the large scale, a leaden still may be employed, and receivers of stoneware economically substituted for glass ones. The top of the leaden still is usually furnished with a moveable stopper, by which the process may be watched, and additions of manganese or sulphuric acid made, if required. The addition of the sulphuric acid should be made in a wooden or stoneware basin or trough. To render the iodine pure, it should be dried as much as possible, and then resublimed in a glass or stoneware ves-

Or: Extract all the soluble part of kelp by water, and crystallize the soda by evaporation; to the mother-lye add oil of vitriol in excess, and boil the liquid, then strain it to separate some sulphur, and mix the filtered liquor with as much manganese as there was oil of vitriol: on applying heat, the iodine sublimes in the form of greyish-black scales, with a metallic lustre. The boiling is con-ducted in a leaden vessel; and a cylindrical leaden still with a very short head, and connected with 2 or 3 large globular glass recivers, is used for the subliming apparatus. Care must be taken to watch the process, and prevent the neck of the still becoming choked with condensed iodine. (Cooley.)

4328. To Dissolve Iodine in Cod Liver Oil. To effect this it is best to triturate the iodine with balf its weight of iodide of potassium, and to add gradually the oil so as to form a uniform mixture. After standing perfect solution, the oil having but little of its taste. (Eymael.)

cipitate in solutions containing iodine.-It strikes a blue color with opium and narceine. Iodine in combination, as it exists in iodic acid and the iodates, does not strike a blue color with starch, without the addition of some deoxydizing agent, as sulphurous acid or morphia; and as it exists in the iodides. not until the base is saturated with an acid (as the sulphuric or nitric), when iodine being set free, immediately reacts upon the starch. An excess of either acid or alkali destroys the action of the test. By mixing the liquid containing the iodine with the starch and sulphuric acid, and lightly pouring thereon a small quantity of aqueous chlorine, a very to every 12 fluid ounces add 1000 grains of visible blue zone will be developed at the line black oxide of manganese, in powder; put of contact. (Balard.) Solutions containing the mixture into a glass globe, or matrass iodates yield, with nitrate of silver, a white precipitate, soluble in ammonia; the iodides, under the same circumstances, give a pale yellowish precipitate with nitrate of silver. scarcely soluble in ammonia; a bright yellow one with acetate of lead; and a scarlet one with bichloride of mercury. The iodates deflagrate when thrown on burning coals, but the iodides do not. The iodates may also be tested as iodides, by first heating them to redness. by which they lose their oxygen, and are converted into iodides.
4330. Kelp. The alkaline ashes obtained

by burning various kinds of sea-weed. 4331. Galipot. A French term for that portion of turpentine which concretes on the

trunk of the tree when wounded, and is removed during the winter.

4332. Phosphorus. Phosphorus is a pale yellow, semi-transparent, and highly combustible solid; specific gravity 1.77 (water standard); melts at 108° Fahr., and unites with oxygen, forming acids, and with the metals, forming phosphides or phosphurets. It is soluble in ether, naphtha, and the oils. From its great inflammability it can only be safely kept under water. In commerce it is always packed in tin cylinders, soldered airtight. It is a powerful corrosive poison. The specific gravity of its vapor is 4.327 (air standard).

To Obtain Phosphorus. Ground 4333. bone-ash, 12 parts; water, 24 parts; mix to a pap in a large tub, and add in a slender stream (still stirring) oil of vitriol, 8 parts; work well together, adding more water if required; in 24 hours thin with water, agitate well, and, if convenient, heat the mixture in a leaden pan, and as soon as the paste has lost its granular character, transfer it into a series of tall casks; largely dilute with water, and, after settling, decant the clear portion; wash the residue well with water, mix the clear liquids, and evaporate in a copper or lead pan, till the calcareous deposit (gypsum) becomes considerable, then cool, decant the clear, and drain for a few hours all the iodide will be found at the sediment on a filter; evaporate the clear the bottom of the flask, leaving the iodine in liquid to the consistence of honey (say to 4 parts), add 1 part of powdered charcoal, and evaporate to dryness in an iron pot, or till the 4329. Tests for Iodine. Free iodine bottom of the latter becomes red hot; the dry may be recognized by — The violet color mixture, when cold, is put into earthen retorts

beak of the retort is connected with a copper in a close phial. tube, the other end of which is made to dip about 1 inch beneath the surface of lukewarm given to substances which inflame spontanewater placed in a trough or wide-mouthed ously when exposed to the air. When a small bottle. The distilled product is purified by quantity of any of the powders given below squeezing it through chamois leather under is exposed to the air, it rapidly becomes hot warm water, and is then moulded for sale by and inflames. Their action is quicker in a melting it under water heated to about 145° damp atmosphere, or by the moisture of the Fahr., plunging the wider end of a slightly breath. tapering but straight glass tube into the water, sucking this up to the top of the glass, so as to warm and wet it, next immersing the water to congeal the phosphorus, which will cooled. then commonly fall out, or may be easily expelled by pressure with a piece of wire. Keep 3 parts; burnt alum, 4 parts; carbonate of it in places where neither light nor heat has access, in phials filled with cold water which has been boiled, to expel all air, and enclose the phials in opaque cases.

4334. Baldwin's Phosphorus. Heat nitrate of lime till it melts; keep it fused for 10 minutes, and pour it into a heated iron ladle. When cool, break it into pieces, and keep it in a closely-stoppered bottle. After exposure to the sun's rays, it emits a white

light in the dark.

4335. Canton's Phosphorus. Put calcined oyster shells in layers, alternately with sulphur, and heat strongly in a covered cruci-

dark after exposure to the sun.

4336. Phosphorus Bottles. a 1 ounce phial; and place it, loosely corked, in a basin of hot water; as soon as the phosphorus is melted, remove the phial, cork it securely, and agitate it until nearly cold. On being uncorked it emits sufficient light in the dark to see the time by a watch, and will retain this property for some years if not too

frequently employed.

4337. To Coat Phosphorus with Cop-Dr. Siewert, of Halle, suggests a method by which the sticks can be kept, even in the light, without undergoing deteriorareduce some metals from their solutions. The sticks of phosphorus are put into a cold saturated solution of the sulphate of copper. Presently they become coated with a deposit years. When a stick is wanted for any purpose, on removing the metallic film, and scraping off a black deposit underneath it, the phosphorus will be found to have retained its translucency, as if it had been freshly cast.

4338. To Reduce Phosphorus to Melt the phosphorus in a phial Powder. containing some fresh urine, or a solution of pure urea, by the heat of hot water, and agiused instead of urine or urea.

1 grain phosphorus in 1 ounce olive oil in a parent substance.

well covered with luting and properly dried, test tube by the heat of hot water, or add a and heat is applied sideways rather than at larger quantity to some oil of lavender, in the bottom, by means of an air furnace. The which it will dissolve spontaneously. Keep

> 4340. Pyrophorus.

4341. Homberg's Pyrophorus. Stir. equal parts of alum and brown sugar (or 3 parts alum and 1 part wheat flour) in an end into the liquid phosphorus, and sucking it iron ladle over the fire until dry; then put it up to any desired height. The bottom of the into an earthen or coated glass phial, and keep tube being now closed with the finger, it is it at a red heat so long as flame is emitted; withdrawn, and transferred to a pan of cold it must then be carefully stopped up and

4342. Hare's Pyrophorus. Lampblack,

potash, 8 parts; as above.

4343. Gay Lussac's Pyrophorus. Sulphate of potash, 9 parts; calcined lampblack, 5 parts; as last.

4344. Goebel's Pyrophorus. tartrate of lead red hot in a glass tube, and

then hermetically seal it.

4345. Dextrine or Starch Gum. Heat 4 gallons water in a water-bath to between 77° and 86° Fahr., stir in 1½ or 2 pounds finely ground malt; raise the temperature to 140°, add 10 pounds potato or other starch; mix all thoroughly, raise the heat to 158°, and keep it between that and 167° for ble for an hour. This is also luminous in the 20 or 30 minutes. When the liquor becomes thin, instantly raise the heat to the boiling point, to prevent the formation of sugar. grains phosphorus with & ounce olive oil in Strain the liquor, and evaporate it to dryness. as the dextrine will not keep long in a liquid form. Another method is to boil solution of starch with a few drops of sulphuric acid, filter the solution, and add alcohol to throw down the dextrine.

Or: Mix 500 parts potato starch with 1500 parts of cold distilled water and 8 parts of pure oxalic acid; place this mixture in a suitable vessel on a water-bath, and heat until a small sample tested with iodine solution does not produce the reaction of starch. When this is found to be the case, immediately retion. For this purpose, he takes advantage move the vessel from the water-bath, and of the well-known property of phosphorus to neutralize the liquid with pure carbonate of lime. After having been left standing for a couple of days the liquor is filtered, and the clear filtrate evaporated upon a water-bath until the mass has become quite a paste, of metallic copper, and in this state resemble which is removed by a spatula, and, having copper rods. They can now be removed to a been made into a thin cake, is placed upon bottle containing water, and will keep for paper and further dried in a warm place; 220 parts of pure dextrine are thus obtained. No. 2925.)

4346. Albumen. A substance which enters largely into the composition of animal bodies. It is scarcely soluble in water, but dissolves readily by adding to the water a small portion of caustic soda or potassa.

White of egg is a solution of albumen.

4347. To Make Albumen. tate until cold. Rectified spirit may be the strained white of egg, or the serum of ed instead of urine or urea. (See No. 1899.) bullock's blood in a thin stratum, to a current 4339. Phosphorescent Oil. Dissolve of dry air, until it hardens into a solid trans-

Or: Agitate strained white of egg with 10 or 12 times its bulk of alcohol, and collect tersulphuret or tersulphide of arsenic is a fine the flocculent precipitate on a muslin filter. Dry it at a temperature not over 120° Fahr.

of bichloride of mercury dropped into a fluid ous acid and sulphur. containing albumen, occasions a white preci-pitate. Tannin or tincture of galls gives a

yellow, pitchy precipitate.

4349. Sulphur. Sulphur or brimstone is usually of a pale yellow color; melts to a clear, thin fluid, and volatile at about 2320 Fahr., when it inflames spontaneously in the turpentine and fat oils, and freely so in bisulphuret of carbon and hot liquor of potassa. With oxygen it forms sulphuric and sulphur-SULPHURETS or SULPHIDES. Its specific gravity is from 1.982 to 2.045 (water standard). The etandard)

Amorphous or Brown Sul-4350. Prepared from sublimed sulphur by melting it, increasing the heat to 3200 Fahr. and continuing it at that temperature for about 30 minutes, or until it becomes brown and viscid; it is then poured into water. It is now ductile like wax, may be easily moulded, and when cooled does not again become fluid

below 600° Fahr.

Precipitated Sulphur. limed sulphur, 1 part; dry slacked lime, 2 parts; with 25 parts more water, filter, precipitate by muriscie acid, and drain; well wash, and dry the precipitate. Resembles sublimed sulphur in its general properties, but is much

paler, and in a finer state of division.

To Purify Precipitated Sul-The precipitated sulphur of the shops phur. contains about two-thirds of its weight of sulphate of lime (plaster of Paris), owing to the if it be first broken with the pestle, and then substitution of sulphuric for muriatic acid in its preparation. This fraud is detected by heating a little of the suspected sample in an iron spoon or shovel, when the sulphur is volatilized, and leaves behind the sulphate of lime, which, when mixed with water and gently dried, gives the amount of the adulteration. A still simpler plan is to dissolve out the sulphur with a little hot oil of turpen-

4353. Roll Sulphur. Crude sulphur, purified by melting and skimming it, is poured into cylindrical moulds. Common roll sulphur frequently contains from 3 to 7

per cent. of yellow arsenic.

4354. Sublimed Sulphur. Sometimes called Flowers of Sulphur. This is prepared by subliming sulphur in iron vessels. For medical purposes it is well washed with water and dried by a gentle heat. (Cooley.) An aqueous solution of pure anhydrous car-bonate of soda will dissolve an appreciable quantity of flowers of sulphur, by digesting for 10 hours at 212° Fahr. (Pole.)

4355. Sulphur Vivum. Crude native sulphur, or black sulphur, is of a grey or mousecolored powder. The same names are given to the residuum in the subliming pots, after plaster, by mixing them together, filtering, the preparation of flowers of sulphur; it gen-

erally contains arsenic.

4356. Tersulphuret of Arsenic. The golden yellow substance in lumps or powder. It is found, ready formed, in nature, or is pre-4348. Tests for Albumen. A solution pared artificially by sublimation from arseni-The artificial sulphuret, King's Yellow, often contains 80 to 90

per cent. of white arsenic.

45.57. Camphor. The camphor of commerce is a natural production. It is principally extracted from the laurel camphor tree, but it is also found in several other members of the vegetable kingdom. It is a white, semiopen air, and burns with a bluish flame. It crystalline solid, very volatile at common is insoluble in water and in alcohol; soluble in temperatures; soluble in alcohol, ether, oils, and acetic acid, and slightly but sufficiently so in water to impart its characteristic smell and taste. The Chinese and Japanese extract ous acids, and with the metals it combines as the camphor by cutting the wood into small pieces, and boiling it with water in iron vessels—which are covered with large earthen specific gravity of its vapor is 6.648 (air capitals or domes-lined with rice straw. As the water boils, the camphor is volatilized along with the steam, and condenses on the straw, under the form of greyish granulations. In this state it is collected and transported to Europe, when it undergoes the process of refining into white camphor. To refine it. 100 parts of crude camphor are mixed with 2 parts each of quicklime and animal charcoal, and placed in a thin globular glass vessel sunk in a sand-bath. The heat is then cautiously applied, and the vessel gradually and limed sulphur, 1 part; dry slacked lime, 2 parts; carefully raised out of the sand as the subwater, 25 parts; boil for 2 or 3 hours, dilute limation goes on. When this is completed, the whole is allowed to cool. If the process be conducted too slowly, or at a heat under 375° Fahr., the product will be flaky, and consequently unsaleable, without remelting or subliming.

4358. To Pulverize Camphor. Camphor may be beaten in a mortar for some time, without being reduced to powder, but sprinkled with a few drops of spirit of wine, it may be readily pulverized. By adding water to an alcoholic or ethereal solution of By adding camphor, it is precipitated under the form of an impalpable powder of exquisite whiteness, which may be collected and spontaneously dried on a filter; the addition of a minute quantity of carbonate of magnesia to the water (say 1 drachm for each 16 ounces of camphor), before mixing it with the camphor solution, will prevent the powdered camphor

from hardening again after drying.

4359. Glycerine. This is a sweet, syrupy liquid, formed during the saponification of cils and fats. Its various uses will be found embodied in their respective receipts.

4360. To Obtain Commercial Glycerine. The sweet stearine liquor of the stearine manufacturers is used for this purpose. The lime contained in it is precipitated by a stream of carbonic acid gas, or by a solution of carbonate of soda, carefully avoiding adding the latter in excess; the liquor thus obtained is then boiled a little, filtered, and evaporated to a syrupy consistence. Glycerine is also obtained from the water and washings left in the manufacture of lead or litharge and submitting them to the action of a stream of sulphuretted hydrogen, which precipitates the lead; the clear liquid, after samples by digesting them for several days ted to the consistence of syrup, in a water- subside, and decanting. (Schacht.)

chemicals soluble in 100 parts glycerine.

	PARTS.
Arsenious acid	
Arsenic acid	
Benzoic acia	
Boracic acid.	10
Oxalicacid	15
Alum	40
Carbonate of ammonia	20
Muriate of ammonia Tartrate of antimony and potassa	20
Tartrate of antimony and potassa	5.50
Atropia	3
Sulphate of atropia	
Chloride of barium	
Brucia	$\dots 2.25$
Sulphide of calcium	5
Quinine	50
Sulphate of quinine.	6.70
Quinine Sulphate of quinine Tannate of quinia	
Acetate of copper	10
Sulphate of copper	30
Tartrate of iron and potassa	8
Lactate of iron	
Sulphate of iron	25
Corrosive sublimate	7.50
Cyanide of mercury	27
Iodine	1.90
Morphia	45
Acetate of morphia	20
Muriate of morphia	20
Phosphorus	20
Acetate of lead	20
Arseniate of potassa	50
Chlorate of potassa	3.50
Bromide of potassium	25
Cyanide of potassium	32
Iodide of potassium	40
Arseniate of soda	50
Bicarbonate of soda	8
Borate of soda	60
Carbonate of soda	98
Chlorate of soda	20
Sulphur.	10
Strvennia	25
Nitrate of strychnia	4
Sulphate of strychnia	22.50
Urea	
Veratria	1
Chloride of zinc	
Iodide of sinc	40
Sulphate of zinc	
4362. To Furity Glycerine.	Jonimer.

animal charcoal (see No. 1729), filtered, and evaporated to the consistence of a thin syrup, vacuum, or over sulphuric acid, until it acquires a specific gravity of 1.265.

always contain what their labels declare. afford any jelly.

Some samples called pure are rich in lead, 4367. Bone Gelatine. The bones are others contain chlorine, most are diluted with boiled to remove the fat, then digested in diwater, and the best is generally acid. It is luted muriatic acid till the earthy matter of necessary, therefore, to purify even the best the bone is dissolved. The gelatine, which

settling, is decanted. Altered, and evapor i with powdered chalk, allowing the latter to

4364. Tests for the Purity of Glycer-4361. Solvent Power of Glycerine. Rue. Pure glycerine has a neutral reaction, Klever gives the following parts of various and on evaporation in a porcelain dish leaves only a very slight carbonaceous crust, while PARTS. the impure has a much greater percentage of coaly matter. The pure article does not become brown when treated, drop by drop, with concentrated sulphuric acid, even after several hours; the impure becomes brown even when but slightly adulterated. Pure glycerine, treated with pure nitric acid and a solution of nitrate of silver, does not become cloudy, while the impure exhibits a decidedly milky appearance. Sometimes the impure article becomes blackened with the sulphide of ammonium. Oxalate of ammonia produces a black clouding; lime-water sometimes causes a milky discoloration. Pure glycerine, however, constantly remains perfectly uncolored, and clear as water, the impure becoming colored to a greater or less extent. If a few drops are rubbed between the fingers, pure glycerine arses no fatty smell; the contrary is the case with the impure, especially if a few drops of dilute sulphuric acid be introduced. (Köller.) (See No. 1151.)

4365. Gelatine. Animal jelly obtained by heat from the organic tissue of the bones, tendons, and ligaments, the cellular tissue, the skin, and the serous membranes in contact with water. Glue and size are coarse varieties of this substance, prepared from hoofs, hides, skins, &c.; and isinglass is a purer kind, prepared from the air-bladders and some other membranes of fish. Gelatine is insoluble in cold water, but dissolves with greater or less readiness on the application of heat, forming a tremulous and transparent jelly on cooling. It is insoluble in alcohol or ether, and

is decomposed by strong alkali or acid. 4366. To Obtain Gelatine from Bones. The bones of good meat form most excellent materials for making soups and gravies, as is well known to every good cook. In France, soup is extensively made by dissolving bruised bones in a steam heat of 2 or 3 days' continuance, and also by dissolving out the earthy part by digestion in weak muriatic acid, when a lump of gelatine is obtained, which, after being well washed with water, will dissolve by boiling, and is equal to isinglass for all the purposes of making soups and jellies. Proust has recommended the following process for making bone gelatines: Crush the bones small, then boil them for 15 minutes in a kettle of water, cool, and skim the fat off, which cial glycerine is rendered pure by diluting it is fit for all common purposes. The bones with water; it is then decolored with a little are then ground, and boiled in 8 to 10 times their weight of water, of which that already used must form a part, until evaporates to after which it is further evaporated in a one-half, when a very nutritious jelly is obtained. A copper vessel should not be used, as the jelly acts upon this metal. An iron 4363. To Purify Glycerine. Bottles digester is the most suitable. The bones of sent out from wholesale and manufacturing boiled meat are nearly as productive as those houses, labeled, "Pure Glycerine," do not of fresh meat, but roasted meat bones scarcely

When well washed, it is dried on rendered more perceptible. of soda. open baskets or nets. By steeping the raw gelatine in cold water, dissolving it in boiling ring to substances which hold a prominent water, evaporating the jelly, and cutting it place in some special process, have been ininto tablets, it may be dried and preserved in troduced in immediate connection with the that form.

4368. Nelson's Patent Gelatine. This is made from cuttings of the hides of cattle, and skins of calves. These, freed from hair, flesh, fat, &c., are washed and scoured, then macerated for 10 days in a lye of caustic soda, and afterwards placed in covered vessels at a temperature of 60° to 70° Fahr, until they become tender: then washed from the alkali, exposed to the vapor of burning sulphur until they become sensibly acid, dissolved in earthen vessels heated to 150°, strained, put into Or a spoonful of ground coffee may be settling vessels heated to 100° or 120° for placed in a small bottle of cold water, and nine hours, the clear l'quor drawn off and poured on the cooling slabs to the depth of 1 pieces, washed till free from acid, redissolved

4369. Gelatine Wafers. Dissolve fine glue or isinglass in water, so that the solution, when cold, may be consistent. Pour it hot on a plate of glass (previously warmed with steam and slightly greased), fitted in a metalhe frame whose edges are just as high as the wafers should be thick. Lay on the surface a nor does it tinge spirit of hartshorn blue. second glass place, also hot and greased, so as The infusion is amber-colored, and is not to touch every point of the gelatine while resting on the edges of the frame. By its pressure the thin cake is rendered uniform. When the glass plates have cooled, the gelatine will be solid, and may be removed. It is cut into discs of different sizes by means of infusion of it is not turned blue by this mixproper punches.
4370. Tes

Tests for Gelatine. dissolved in water is recognized by forming a jelly on cooling; it is precipitated by alcohol; corrosive sublimate throws down a whitish, floceulent precipitate; a solution of taunin, or an infusion of galls, gives a curdy, yellowish-white precipitate, which, on being stirred, coheres into an elastic mass, insoluble in water, and, when dry, assumes the appearance of the upper part of the tube, and occupy from over-tanned leather.

4371. Asbestos. A natural substance, resembling flax, capable of withstanding unchanged a considerable degree of heat; it may, therefore, be cleansed or purified by fire. It is also called Amianthus.

ests or Reagents. These are name or character of any other substance, or form. All mineral adulterations will collect to detect its presence in compounds. They are used in both the solid and fluid state; generally the latter, when they are known as liquid tests. Their application as reagents is called testing. For this purpose they are commonly added drop by drop to the liquid hand, and shows the impressions of the finto be tested, contained in a test-tube or test- gers, and even of the marks of the skin, much

retains the form of the bone, is washed in alliquid or substance for examination on a slip stream of water, plunged in hot water, and of common white glass, and to add to them a again in cold, to remove all remains of acid, drop of the test liquid. By placing the glass and sometimes put into a solution of carbonate over a sheet of white paper, the effect will be

> A number of tests, not included here, referdescription of those substances, and will be found in the index under the head of the arti-

cle to be tested.

4373. Test for Chicory in Coffee. Place a spoonful of ground coffee gently on the surface of a glass of cold water. The pure coffee will float for some time, and scarcely color the water; the chicory, if my be present, rapidly absorbs the water and sinks to the bottom, communicating a deep reddish-

brown tint as it falls.

shaken for a moment; if the sample of coffee poured on the cooling slabs to the depth of $\frac{1}{2}$ is pure, it will rise to the surface and hardly an inch. When cold, the jelly is cut in tinge the water, whilst if the coffee is adulterated with chicory, the latter will fall to at 85°, poured on slabs, cut up, and dried on the bottom and color the water as before. A similar coloration of the water will be produced, however, if the coffee be adulterated with burnt sugar, which is the basis of the socalled "coffee essences or extracts.

4374. To Test Tea. Pure China tea is not turned black by being put into water impregnated with sulphuretted hydrogen gas, reddened by adding a few drops of oil of vitriol

to it

To Detect Copper in Liquids. 4375. Spirit of hartshorn turns them blue. Therefore tea has not been dried on copper if an ture. Cider, being passed through brass Gelatine pots, is detected by this experiment.

4376. To Detect Watered Milk. cheapest and easiest method of adulterating milk is by adding water, and we may readily ascertain the exact extent of adulteration by the following plan. It a glass tube, divided into 100 parts, be filled with milk and left standing for 24 hours, the cream will rise to 11 to 13 divisions, if the milk is genuine.

4377. To Detect Chalk in Milk. lute the milk with water; the chalk, if there be any, will settle to the bottom in an hour or two; put to the sediment an acid, vinegar for instance, and if effervescence take place it is

chalk.

4378. To Detect Mineral Substances in Flour. The presence of a mineral adulteration of flour or meal may be readily detected. A small quantity of the suspected substances employed to determine the flour is shaken up in a glass tube with chloroat the bottom, while the flour will float on the liquid.

4379. How to Know Good Flour. When flour is genuine or of the best kind, it holds together in a mass when squeezed by the glass. A simple way of employing them is to longer than when it is bad or adulterated; place a few drops or a small portion of the and the dough made with it is very gluey,

tion without breaking.

4380. To Detect Adulterations in and suddenly immersed in cold water while ugar. Sugar is largely adulterated. Pure at that heat. cane and beet sugars may be known by their solutions bending the luminous rays in circumpolarization to the right, whereas grape and rub gently with lunar caustic. If gen-and fecula sugars bend it to the left. Pure uine gold or silver the mark will be faint; but cane sugar boiled in a solution of caustic po- if an inferior metal it will be quite black. tassa remains colorless, but if starch sugar is present the liquid turns brown. potassa, and then agitated with 1½ grains sultried: if they turn yellow, they are poison-phate of copper in a close vessel, remains ous; if black, they are wholesome. clear, even after the lapse of several days; the solution first turns blue or green, and then entirely loses its color. Of late years moist sugar has been largely adulterated with the styptic, and disagreeable taste; when cut sweet waste liquor (solution of glycerine) of they turn blue; they are moist on the surface, the stearine manufactories; but this fraud and are generally of a rose or orange color. may be detected by its inferior sweetness, and by its moist and dirty appearance.

Test for Starch. 4381. The old and familiar test for starch is the blue color which drical. free iodine produces when brought in contact with it; but this is not the only reagent by starch in combination with similar bodies. Bromine is nearly as good as iodine, and tannin is said, in some instances, to be better. A solution of 50 grains tannin in ½ pint distilled water will answer for making the test.

A drop of this tannin solution will cause a precipitate in extremely dilute solutions of sort. starch; the precipitate dissolves when warmed and reappears when the solution cools; and where the starch paste is old, the reaction is said to be more sensitive than

that of iodine.

4382. To Test Arrow-Root. Genuine arrow-root is odorless and tasteless, and proor rubbed, and emits no peculiar odor when mixed with muriatic acid. Stirred up in a equal parts of aqua-fortis and water, it does not become gelatinous and adhesive in less than 15 minutes.

4383. To Detect Arsenic in Colored Paper. Take a fragment of the paper and put it into a solution of ammonia. If arsenic color. In case a further test is required, pour a little of the ammoniacal solution on crystals on the crystals. As arsenic is used in coloring all qualities of paper, from the cheapest to of service.

4384. To Detect Gum Arabic in Gum Tragacanth. Make the gum into a clear mucilage, and filter carefully; pour strong alcohol upon it, and if it retains its solubility and transparency, no gum arabic is present, but if it becomes cpaque, or deposits a powder at the bottom, it contains gum arabic or some similar substance.

ductile, and elastic, easy to be kneaded; and 4385. To Test Slates. The test of a may be flattened and drawn in every directive superior slate is its ability to remain unbroken, after being made red hot in a furnace

> 4386. To Test Silver or Gold. For testing gold or silver, slightly wet the metal

4387. To Test Mushrooms. The fel-A filtered lowing are said to be tests of the wholesomesolution of 33 grains cane or beet sugar in 1 ness of mushrooms: Sprinkle a little salt on ounce water, mixed with 3 grains pure caustic the spongy part or gills of the sample to be

False mushrooms have a warty cap, or else but if starch sugar is present, a red precipi-tate is formed after some time, and if present surface; are heavy, and emerge from a vulva in considerable quantity the copper will be or bag; they grow in tufts or clusters in wholly converted into oxide within 24 hours; woods, on the stumps of trees, &c.; whereas the true mushrooms grow in pastures.

False mushrooms have an astringent.

The gills of the true mushroom are of a pinky red, changing to a liver color; the flesh is white; the stem is white, solid, and cylin-

Introduce a silver spoon, or an onion, into a vessel in which mushrooms are seething; if, means of which we can detect the presence of on taking either of them out, they assume a dark, discolored appearance, the circumstance denotes the presence of poison existing among them; if, on the other hand, the metal or onion, on being withdrawn from the liquor. wears its natural appearance, the fruit may be regarded as gonuine, and of the right

> Rub the upper skin with a gold ring or any piece of gold: the part rubbed will turn yellow if it is a poisonous fungus.

4388. To Test the Hardness of Water. Hard water contains more or less carbonate of lime; the presence of this substance in waters is tested thus: Soap, or a soduces a sort of crackling noise when pressed lution of soap in proof spirit, mixes easily and perfectly with pure water, but is curdled and precipitated in water containing carbonates, mortar with double its weight of a mixture of chlorides, or sulphates. The degree of hardness of water depends on the amount of carbonate of lime held in it in solution, and is ascertained as follows: Dissolve 1 drachm finest white soap in 1 pint proof spirit; so adjust the strength (if not already so) that exactly 32 measures are required to be added to be present the liquid will assume a bluish 100 measures of the standard solution of chloride of calcium (see No. 4786), before a lather can be produced. Every measure of of nitrate of silver, and arsenic, if present, this test solution of soap and alcohol, which is will show itself by leaving a yellow deposit required to produce the same effect on 100 measures of a sample of hard water, represents $\frac{1}{2}$ grain of carbonate of lime or $\frac{1}{2}$ ° of hardness; the costliest, a knowledge of this test will be 2 measures equal 1° of hardness or 1 grain of carbonate per gallen, &c.
4389. To Test the Purity of Borax.

Its strength is best ascertained by the quantity of sulphuric acid required to neutralize a given weight of borax. (See Alkalimetry.) The impurities in borax are common salt and alum, which are mixed with it to lower the

value.

Common salt may be detected by a solution

of the borax in hot water yielding with nitrate matter with equal facility-some, as starch, from pure borax.

The presence of alum is determined by

the borax giving a bulky white precipitate.

4390. To Test the Purity of Musk.

Musk is often largely adulterated with dried by the inferiority of the odor; by an assay for the iron contained in the blood; or by microscopic examination. after burning pure musk are neither red nor foul water. yellow, but grey, and should not exceed 6 per cent, of the amount burned.

To Test the Purity of Ambergris. From the high price of the genuine ambergris, it is very frequently adulterated. ether, and yields about 85 per cent. of the odorous principle (ambreine).

To Test Diamonds. 4392. To Test Diamonds. If you have a doubtful stone, put it into a leaden or Urine. Dissolve 400 grains pure crystallized the mixture with a glass rod to fish out the equivalent to 5 grains of grape sugar. diamond. If you find it intact it is a genuine 4398. Pettenkofer's Test for stone; but if it is false it will be corrode. by the hydrofluoric acid that has been generated around it. A small paste diamond would disappear altogether under the treatment. test is given by Massimo Levi, an Italian

4393. Test for the Presence of Blood. Gunning has discovered in acetate of zinc a of the coloring matter of blood from solutions, even where the liquids are so dilute as to be phuric acid, may be substituted for sugar. colorless. Blood washed from the hands in a pail of water can readily be detected in this The flocculent precipitate thrown wav. down by acetate of zinc must be washed by decantation, and finally collected on a watchglass, and allowed to dry, when the microscope will readily reveal crystals if any blood

be present. (See No. 6415.)
4394. Test for the Presence of a Free Dissolve chloride of silver in just sufficient ammonia to make a clear solution. If and tested, proves to be sulphuric acid. a little of the test be added to ordinary spring glass chimneys used with Argand gas-burners water, the carbonic acid present in the latter

organic matter in air and water, its accuracy to it a substance which, on the hand being has been called in question, on the ground rinsed in distilled water, will yield a precipi-

of silver a curdy white precipitate which is resisting its action for a long time. It must soluble in ammonia; this must be distin- be admitted, however, that it is, at present, guished from the white pulverulent precipitate, the only practical test that we have, and cerof borate of silver which will be thrown down tainly shows very rapidly and clearly the presence of hurtful organic matter in water or in air. It can be applied by any one, it addition of ammonia water to a solution of being only necessary to use a weak solution; the disappearance of the color indicates the presence of organic matter. In time of epidemics, such as cholera or dysentery, this blood, the presence of which may be detected test might be of much value in singling out the contaminated from the pure water. It is, perhaps, well also to recall the fact that this The ashes left test forms the readiest means of purifying

4396. Trommer's Test for the Presence of Sugar in Urine. Put some of the suspected urine into a large test-tube, and add a few drops of solution of sulphate of copper, then sufficient solution of potash to When quite pure and of the best quality it is render it strongly alkaline. If sugar be presnearly wholly soluble in hot alcohol and ent, the precipitated oxide redissolves into a blue liquid, and on boiling red oxide of copper It is also is precipitated. White merino that has been easily punctured with a heated needle, and on wet with a solution of bichloride of tin is said withdrawing it not only should the odor be to form a ready test for sugar in urine, &c. immediately evolved, but the needle should A portion wet with the suspected liquor, and come out clean, without anything adhering exposed to 200° to 300° of heat, becomes blackened if sugar is present.

platinum cup, with some powdered fluor-spar sulphate of copper in 1600 grains of distilled and a little oil of vitriol; warm the vessel water; add this gradually to a solution of over some lighted charcoal, in a fireplace, or 1600 grains neutral tartrate of potash in a wherever there is a strong draught to carry little water mixed with 6000 or 7000 grains away the noxious vapors that will be copiously evolved. When these vapors have ity. Add water to make up the whole 11,544 ceased rising let the whole cool, and then stir grain measures. 1000 grain measures are

4398. Pettenkofer's Test for Bile in Urine, &c. Put a small quantity of the suspected liquid into a test-tube, and add to it, drop by drop, strong sulphuric acid till it becomes warm, taking care not to raise the Then add temperature above 122° Fahr. from 2 to 5 drops of syrup, made with 5 parts sugar to 4 of water, and shake the mixture. If the liquid contain bile, a violet coloration reagent that precipitates the slightest traces is observed. Acetic acid, and those substances which are converted into sugar by sul-

4399. To Detect Sulphur in Coal-Gas. The presence of sulphur in coal-gas can be proved in the following simple manner: Let a platinum basin be filled with a pint of water, and the basin be heated over a spirit lamp until all the liquid has evaporated; the basin will be found to be coated on the outside, where it has been struck by the flame, with a dirty, greasy looking substance, which, on being washed off with pure distilled water, soon become coated over internally with a will neutralize the ammonia and precipitate white substance, which, on being wanted to be, on the chloride. The above forms a good lecter with distilled water, will be found to be, on the chloride water being a very delicate testing, sulphate of ammonia. The glass panes of a room wherein gas is burned for 4395. Permanganate of Potassa as a a few evenings consecutively, will, when rub-Test for Organic Matter. As a test for bed with the fingers of a clean hand, impart that it does not attack all kinds of organic tate of sulphate of baryta with chloride of

barium, and a brick-red precipitate with po-

tassio-iodide of mercury.

4400. Test for Benzole. For distin- potash and a solution of liquid ammonia and guishing genuine benzole, or that made of potash. coal tar, from that prepared from petroleum, Brandberg recommends us to place a small matter of the grape, potash changes the red pince of pitch in a testing tube, and pour color to a bottle green or brownish-green; amover it some of the substance to be examined. monia changes the color to brownish-green or The genuine will immediately dissolve the greenish-brown; a solution of alum to which pitch to a tar-like mass, while that derived from petroleum will searcely be colored. (See Nos. 4320 and 4321.)

To Detect Cotton in Linen. 4401. Unravel a piece of the fabric, both warp and weft, and plunge it into a solution of aniline and fuchsine. This will dve the whole red. Take it out, wash it, and while moist dip into ammonia; the cotton threads will lose their color, while the linen will remain red. (See No 296, &c.)

4402. Hahnemann's Test for Lead in Wine. Take 1 ounce quick-lime, 1½ ounces flowers of sulphur; heat in a covered crucible as above. for 5 or 6 minutes; take 2 drachms of this cipitate.

4403. Paris Test for Lead in Wine. Expose equal parts of sulphur and powdered ovster shells to a white heat for 15 minutes. and, when cold, add an equal quantity of cream of tartar; these are to be put into a strong bottle, with common water, to boil for an hour, and the solution is afterwards to be decanted into ounce phials, adding 20 drops muriatic acid to each. Both the above tests will throw down the least quantity of lead from wines, as a very senible black precipitate. As iron might be accidentally contained in the wine, the muriatic acid is added, to prevent the precipitation of that metal. acts in the same manner as Hahnemann's test. (See No. 4402.)

To Distinguish Artificially Vines. As the real coloring mat-Colored Wines. ter of wine is of difficult solubility in water free from tartaric acid, Blume proposes to make this fact of practical use in testing the purity of wine. A crumb of bread saturated in the supposed wine is placed in a plate of water; if artificially colored, the water soon partakes of the color; but if natural, a slight opalescence only will be perceptible after a

quarter of an hour.

4405. To Detect Logwood in Wine. M. Lapeymere, having observed that hæmatine, the coloring principle of logwood, gives a sky-blue color in the presence of salts of copper, proposes the following test for logwood in wines: Paper is saturated with a strong solution of neutral acetate of copper, A strip of this is dipped into the and dried. suspected liquor, and, after removal, the adhering drops are made to move to and fro over the paper, which is finally to be carefully dried. If the wine contain logwood, the ter the paper will have a grey tint.

4406. To Detect Artificial Coloring in Wine. Use, as test liquid, a solution of

If the wine is colored by the coloring some potash has been added gives a dirty

grey precipitate.

If the wine is artificially colored, potash gives the following colored precipitates: Dwarf elder, mulberry, or beet root give a violet precipitate; pokeweed berries, a yellow; Indian wood, a vlolet red; pernambuco, a red; litmus, a violet blue; orchil or cudbear, a dirty lees color.

Or: Pour into the wine to be tested a solution of alum, and precipitate the alumina it contains, by adding potash, and the precipitates will have the same characteristic colors

4407. Test for Rum. Dr. Wiederbold compound (which is sulphuret of lime), 2 proposes the following method for distinguishdrachms tartaric acid; powder, mix, and ing between true rum and the factitious shake in a stoppered bottle with a pint of liquid sold under this name: Mix a little of water; let it settle, pour off the clear liquid, the rum to be tested with about a third of its and add 1½ ounces tartaric acid. The above bulk of sulphuric acid, and allow the mixture test will throw down the least quantity of to stand. If the rum is genuine its peculiar lead from wines, as a very seusible black predouter remains after the liquid has cooled, and odor remains after the liquid has cooled, and even after 24 hours' contact may still be distinguished. If, on the contrary, the rum is not genuine, contact with sulphuric acid promptly and entirely deprives it of all its aroma.

> est Papers. These consist of paper which has been wetted thoroughly and uniformly with a solution of some appropriate substance, dried and cut into convement strips, and is used to test, by its change of color, the presence of some other substance known to produce that change. This is effected by dipping a strip of the proper test paper into, or wetting it with, the liquor to be tested, and the effect noted.

> 4409. Brazil-wood Test Paper. Made by preparing the paper with a decoction of Brazil-wood. Alkalies turn it purple or violet;

strong acids, red.

4410. Buckthorn Test Paper. From a decoction of the berries; is reddened by acids

4411. Cherry-juice Test Paper. From the juice of cherries; has the same properties

as buckthorn paper.

4412. Dahlia Test Paper. Made from an infusion of the petals of the violet dahlia (georgina purpurea); alkalies turn it green; acids, red; strong caustic alkalies turn it yellow. This is a very delicate test paper. The juice of elderberries will make a similar test paper.

4413. Indigo Test Paper. From a solution of indigo; loses its color in contact

with chlorine.

Iodide of Potassium Test 4414. paper will assume a violet-blue color; but Paper. From a solution of it in distilled if the wine possess its natural coloring mat-water; turned blue by an acidulated solution of starch.

Prepared by mixing starch paste with iodide for the preparation of test paper, and is pre-of potassium; turned blue by chlorine, ozone, pared like litmus paper, by saturating unand the mineral acids, and by the air contain-

4416. Lead Test Paper. From a seluhydrosulphuret of ammonia, which turn it

4417. Blue Litmus Test Paper. Triturate 1 ounce litmus in a wedgwood-ware mortar with 3 or 4 fluid ounces boiling water; put the mixture into a flask, and add more boiling water until the liquid measures fully filter it; divide the filtered fluid into 2 equal and used for the preparation of the paper, portions, stir one portion with a glass rod This, when dried, has to be kept in tightly dipped into very dilute sulphuric acid, repeat-closed bottles. ing this until the liquid begins to be very slightly tinged red, then add the other portion and mix them thoroughly. Prepare the paper the University of Maryland, proposed paper with this infusion. Acids turn it red; alkastained with an infusion of the petals, as a subthe other blue test papers that are affected by acids

the rod dipped in dilute sulphuric acid until by light, as is the case with the latter. The it turns distinctly red. Alkalies, alkaline alkaline reaction is produced in natural or earths, and their sulphurets, restore its blue atmospheric waters; and the presence of nicolor; alkaline carbonates and the soluble trites, which change the red paper to purple, borates produce the same effect. Red litmus is indicated in greater dilution than with iopaper may also be made by helding a strip of the blue litmus paper over a jar into which

have been thrown.
4419. Mallow Test Paper. From an infusion of the purple flowers of the common mallow.

Manganese Test Paper. From a solution of sulphate of manganese; turns black by contact with ozone.

4421. Rhubarb Test Paper. From a strong infusion of the powdered root; alkalies turn it brown, but boracic acid and its salts

do not affect it. 4422. Rose Test Paper. Made with a strong infusion of the petals of the red rose; alkalies turn it a bright green.

4423. Starch Test Paper. From a cold decoction of starch; free iodine turns it

Sulphate of Iron Test Paper. Made with a solution of the protosulphate; as a test for hydrocyanic acid and the soluble

4425. Turmeric Test Paper. pared with a decoction of 2 ounces turmeric to 1 pint water; is turned brown by alkalies, and by boracic acid and the soluble borates.

rendered slightly green by an alkali, carbonic acid will restore the color.) from it.

4415. Starch and Icdine Test Paper. tive reagent for alkalies and acids; it is used sized paper with a solution of the alkanet red. This is obtained by extracting dry alkanet root with ether; the filtered liquid is ready tion of either acetate or diacetate of lead; for use. The blue paper may be obtained used as a test for sulphuretted hydrogen and from the red one by dipping it in an aqueous solution of carbonate of soda of specific gravity 1.5. A paper, answering for both alkaline and acid test, may be prepared by dividing the ethereal solution of alkanet red into two equal parts; to one is added, drop by drop, a watery solution of carbonate of soda, until the red just has changed to a dis-I pint; agitate it frequently until cold, then tinct blue hue; then both liquids are mixed filter it; divide the filtered fluid into 2 equal and used for the preparation of the paper.

4428. Test Paper from Hollyhock

lies, green. The neutral salts of most of the stitute for litmus paper. His altheat paper is heavy metallic oxides redden this as well as purplish-blue when dry; acids impart a carmine hue, which is turned to bluish-green by alkalies, the neutral tint being purplish-blue; it 4418. Red Litmus Paper. Treat the is superior in intensity of reaction to turmeric, whole of a blue infusion, made as above, with and quite equal to litmus, and is not affected and quite equal to litmus, and is not affected

dide starch.

4429. Ozonometer. This name has 2 or 3 drops of muriatic (hydrochloric) acid been given to paper prepared with a mixed solution of starch and iodide of potassium. It is white, but is turned blue by ozonized air when exposed to it in a slightly moistened This test is sufficiently delicate to state. detect the presence of ozone in the atmosphere.

actitious Mineral Wa-

ters. These are the imitations of different celebrated springs, whose waters have more or less medicinal properties; they are prepared by adding to pure water the ingredients which the original spring water is found, by chemical analysis, to contain. der this class are also included the ordinary aerated or carbonated waters, which are known as soda waters. The majority, whether plain or medical, are charged with carbonic acid gas by the powerful apparatus employed by manufacturers of soda waters (see No. 718); the gas being evolved by the action of weak sulphuric acid on marble chalk, whiting, &c. 4426. Cabbage Test Paper. Make a Some few obtain their carbonic acid gas by strong infusion of red cabbage leaves, strain the action of an acid and an alkali introduced it, and evaporate it by a gentle heat till con- into the bottle, and instantly corked. The siderably reduced. Then dip the paper in it quantity of gas introduced is usually about 5 and dry it in the air. (This paper is of a times the volume of the liquid. In making greyish color; alkalies change it to green, chalybeate and sulphuretted water, the water acids to red. It is a very delicate test; if should be previously boiled, to expel all air

acid will restore the color.)

4431. Simple Aerated Water. Car427. Alkanet Test Paper. The red principle of the alkanet root (Anchusa tincfive or more volumes of carbonic acid gas, by toria, L.) is, as is well known, a most sensi-means of a scitable apparatus. (See No. 718.) 4432. Alkaline Aerated Waters. soda, 8 grains; sulphate of magnesia, 3 grains; Aerated soda and potash waters should be water, 1 pint; dissolve and add 1 scruple dry ated alkali in each pint of water, and charging diately it strongly with carbonic acid gas. The soda; or no soda.

4433. Aerated Magnesia Water. 10 grains; muriate This is a solution of magnesia of various ated water, 1 pint. strengths, charged with carbonic acid gas in the same manner as other aerated waters.

on a cotton or linen cloth, with warm water, till the latter passes tasteless. Mix the pre-cipitate, without drying it, with a gallon of under strong pressure, till a complete solution sulphate of magnesia, 8 grains; muriate of is effected. The Eau Magnésienne of the soda, 15 grains; muriate of lime, 10 grains; French Codex is about a third of this strength; and some fluid magnesias prepared in this country are not much stronger. Dinneford's preparation is similar to the above.

4435. Carbonated Lime-Water—Carrara Water. Lime-water (prepared from lime made by calcining Carrara marble) is supersaturated, by strong pressure, with carbonic acid, so that the carbonate of lime at first thrown down is regissolved. It contains 8 grains carbonate of lime in 10 fluid ounces

water.

4436. Aerated Lithia Water. This may be conveniently made from the fresh precipitated carbonate, dissolved in carbonated water, as directed for fluid magnesia. Its antacid and antilithic properties are found useful.

4437. Baden Water. Muriate of magnesia, 2 grains; muriate of lime, 40 grains; muriate of iron, 2 grain (or 3 minims of the ters, and deserving of wider popularity, tineture); muriate of soda, 30 grains; sulphate of soda, 10 grains; carbonate of soda, 1 grain; water, 1 pirt; carbonic acid gas, 5 volumes.

4438. Carlsbad Water. Dissolve 8 grains of muriate of lime, 1 drop of tincture of sesquichloride of iron, 50 grains of sulphate the immediately. of soda, 60 grains of carbonate of soda, 8 grains of muriate of soda, in one pound of water.

4439. Carlsbad Water. Muriate of lime, 8 grains; tincture of muriate of iron, 1 drop; sulphate of soda, 50 grains; carbonate of soda, 60 grains; muriate of soda, 8 grains;

carbonated water, 1 pint.

Congress Water. Take comgrains; bicarbonate of soda, 20 grains; and calcined magnesia, 1 ounce. Add the above ingredients to 10 gallons of water, and charge with gas.

4441. Eger Water. Carbonate of soda, 5 grains; sulphate of soda, 4 scruples; muriate of soda, 10 grains; sulphate of magnesia, 3 grains; muriate of lime, 5 grains; carbonated water, 1 pint.

Or it may be made without apparatus thus:

made by dissolving I drachm of the carbon-bisulphate of soda, and close the bottle imme-

4442. Ems Water. Carbonate of soda. water usually of red for sale contains little 2 scruples; sulphate of potash, 1 grain; sulphate of magnesia, 5 grains; muriate of soda, 10 grains; muriate of lime, 3 grains; carbon-

4443. Kissingen Water. Mix together bicarbonate of soda, 1 drachm; carbonate of 4434. Murray's Fluid Magnesia may lime, 8 scruples; precipitated carbonate of be thus made: To a boiling solution of 16 iron, 2 scruples; common salt, 8 ounces; be thus made: To a boiling solution of 10 iron, z scrupies; common sair, o ounces, ounces sulphate of magnesia in 6 pints water, add a solution of 19 ounces crystallized carbonate of soda in the same quantity of water; ounces; phosphate of soda, 13 grains; phosphate of line, 8 scruples. Add water, ½ galring constantly; then set it aside to settle; on. Let it stand half a day, filter, add carring constantly; then set it aside to settle; ring constantly; then set it aside to settle; lon. Let it stand half a day, filter, add carpour off the liquid, and wash the precipitate bonate of magnesia, 10 scruples, and 10 gallons water. Lastly, charge with gas by means of the usual apparatus. (See No. 718.)
4444. Marienbad Water.

water, and force carbonic acid gas into it of soda, 2 scruples; sulphate of soda, 96 grains; soda, 15 grains; muriate of lime, 10 grains;

carbonated water, 1 pint,

Or, bicarbonate of soda, 50 grains; sulphate of soda, 1 drachm; muriate of soda, 15 grains; sulphate of magnesia, 10 grains; dissolve in 1 pint water, add 25 grains dry bisulphate of

soda, and cork immediately.

4445. Marienbad Purging Salts. Bicarbonate of soda, 5 ounces; dried sulphate of soda, 12 ounces; dry muriate of soda, 11 ounces; sulphate of magnesia, dried, 2 ounces; dried bisulphate of soda, 2½ ounces. Mix the salts, previously dried, separately, and keep them carefully from the air.

Pullna Water. 4446. Pullna Water. Sulphate of soda, 4 drachms; sulphate of magnesia, 4 4446. drachms; muriate of lime, 15 grains; muriate of magnesia (dry), 1 scruple; muriate of soda, 1 scruple; bicarbonate of soda, 10 grains; water slightly carbonated, 1 pint. One of the most active of the purgative saline wa-

It may be prepared without apparatus as follows: Bicarbonate of soda, 50 grains; sulphate of magnesia, 4 drachms; sulphate of soda, 3 drachms; muriate of soda, 1 scruple; dissolve in 1 pint of water; add, lastly, 2 scruples bisulphate of soda, and close the bot-

4447. Salts for Making Pullna Water. Dry bicarbonate of soda, 1 ounce; sulphate of soda, 2 ounces; sulphate of magnesia, 11 ounces; muriate of soda, 2 drachms; tartaric acid, # ounce (or rather, bisulphate ef soda, 1 ounce). All the ingredients must be

previously dried.

4448. Pyrmont Water. Carbonate of lime, 12 grains; crystallized carbonate of soda, mon salt, 7\frac{2}{4} ounces; hydrate of soda, 23 31 grains; sulphate of soda in crystals, 7\frac{1}{4} grains; sulphate of lime, 14 grains; sulphate of magnesia, 20 grains; sulphate of iron, 2 grains; chloride of sodium, 2 grains; chloride of magnesium, 4 grains; chloride of manganese, 30 grain; water, 2 pints; carbonic acid, 5 volumes. Dissolve the sulphate of iron in part of the water; dissolve the other soluble salts in the remainder of the water, add the insoluble salts to the solution, and charge it with the carbonic acid. Mix the two solutions Bicarbonate of soda, 30 grains; muriate of in a bottle, and cork it immediately.

effloresced sulphate of magnesia instead of water. the potassio-tartrate of soda. A still more citric acid, an effervescing water is obtained. exact compound will be the following: Effloresced sulphate of magnesia, 2 ounces; bicaring on the analysis of Longehamps, imitates esced sulphate of magnesia, 2 ounces; bicarbonate of soda, ½ ounce; dry bisulphate of bonate of soda, ½ onnce; dry bisulphate of Vichy water by the following combination: soda, ½ onnce; mix, and keep in a close bot- Bicarbonate of soda, 135 grains; chloride of

thoroughly 1 troy ounce bicarbonate of soda, and 3 troy ounces Rochelle salt, both in fine trate of iron and potash † grain; water, 210 powder, and divide into 12 equal parts. Dipints; carbonic acid, 305 cubic inches (10) vide 420 grains tartaric acid also into 12 equal parts. Put up the parts, severally, of the part of the water, dissolve and add the sulmixture and of the acid in separate papers, phate of magnesia, and then the chloride of each kind of a distinctive color. (T. S. Ph.) calcium in the remaining water. Charge The alkaline mixture is usually put up in now with the carbonic acid gas under presblue, and the acid in white papers.

of lime, bicarbonate of soda, of each 8 grains; effloresced sulphate of soda, 1 drachm; efflosulphate of potash, 5 grains; aerated water, 1

4453. Seltzer or Selters Water. The seltzer water, as commonly sold, is prepared mix the powders, previously dried, and keep as follows: Prepare a solution of fused chloride of calcium, I part in 5 of water (specific gravity should be 1.088 to 1.089); a solution magnesia at the rate of 20 grains in dilute common substitute for sea-water as a bath is hydrochloric acid to make 1 fluid ounce of made by dissolving 5 or 6 ounces of common saturation (specific gravity 1.080); lastly, a solution of dry sulphate of soda in 10 parts water (specific gravity 1.092). These solutions are mixed with water in the following proportions: Solution of carbonate of soda, 1000 grains; solution of chloride of calcium, 200 grains; solution of chloride of magnesium, 150 grains; solution of sulphate of soda, 20 grains; added to 250 to 300 ounces (troy) of water, afterwards to be charged with car-

4454. Seltzer Water. Muriate of lime and muriate of magnesia, of each 4 grains; dissolve these in a small quantity of water, and add it to a similar solution of 8 grains bicarbonate of soda, 20 grains muriate of soda, and 2 grains phosphate of soda; mix, and add a solution of 1 of a grain sulphate of iron; put the mixed solution into a 20-ounce bottle, and fill up with aerated water. An imitation of seltzer water is also made by putting into a stone seltzer bottle, filled with water, 2 drachms bicarbonate of soda and 2 drachms citric acid in crystals, corking the bottle immediately.

4455. Vichy Water. Sulphate of potassa, 2 drachms; sulphate of soda, 4 scruples; phosphate of soda, 25 grains; common salt, 6 drachms; bicarbonate of soda, 51 ounces; carbonate of ammonia, 10 grains. Mix. Add water, 1 gallon. Let it stand half a day; filter, add 10 gallons water, and charge with

4449 Seidlitz Water. This is usually 4456. Vichy Water. Bicarbonate of imitated by strongly aerating a solution of 2 soda, 1 drachm; muriate of soda, 2 grains; drachms sulphate of magnesia in 1 pint of sulphate of soda, 8 grains; sulphate of magwater. It is also made with 4, 6, and 8 nesia, 3 grains; tincture of muriate of iron, 2 drachms of the salts to 1 pint of water, according to the strength required.

4450. Seidlitz Powders. The common Seidlitz powders do not resemble the water. It is also made with 4, 6, and 8 nesia, 3 grains; tincture of muriate of iron, 2 drops; aerated water, 1 pint. Dorvault directs 75 grains of bicarbonate of soda, 4 grains of chloride of sodium, \$ grain sulphate of iron, 10 grains sulphate of soda, and 3 grains; alphate of magnesia, to a pint of grains sulphate of soda, 8 grains; sulphate of magnesia sulphate of soda, 8 grains; tincture of muriate of iron, 2 grains of chloride of sodium, \$ grains of chloride of sodium, \$ grains sulphate of iron, 2 grains of chloride of sodium, \$ grains sulphate of iron, 2 grains of chloride of sodium, \$ grains sulphate of iron, 2 grains of chloride of sodium, \$ grains sulphate of iron, 2 grains of chloride of sodium, \$ grains sulphate of iron, 2 grains of chloride of sodium, \$ grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 2 grains sulphate of iron, 3 grains sulphate of iron, 3 grains sulphate of iron, 3 grains sulphate of iron, 3 grains sulphate of iron, 3 grains sulphate of iron, 3 grains sul By adding 45 grains (or less) of

sodium, 2½ grains; crystallized chloride of seidlitz Powders. Mix together calcium, 12 grains; sulphate of soda, 11½ grains; sulphate of magnesia, 3½ grains; tarpints). Dissolve the salts of soda and iron in

4452. Seidschutz Water. Sulphate of magnesia, 3 drachms; muriate of lime, nitrate soda, 13 ounces; muriate of soda, 15 grains; resced sulphate of magnesia, 1 scruple; dry tartarized sulphate of iron, 1 grain; dry tartaric acid, 1 ounce (or dry bisulphate of soda);

them in a close bottle.

4459. Sea-Water. Muriate of soda, 4 ounces; sulphate of soda, 2 ounces; muriate of calcined carbonate of soda, 1 part in 10 of of lime, 1 ounce; muriate of magnesia, 1 water (specific gravity 1.105); a solution of ounce; iodide of potassium, 4 grains; bromide chloride of magnesium, by dissolving calcined of potassium, 2 grains; water, 1 gallon. A

salt in a gallon of water.

4460. Dry Salt to Imitate Sea-Water. The following mixture of dry salts may be kept for the immediate production of a good imitation of sea-water. Chloride of sodium (that obtained from evaporating seawater and not recrystallized, in preference), 85 ounces; effloresced sulphate of soda, 15 ounces; dry muriate of lime, 4 ounces; dry muriate of magnesia, 16 ounces; iodide of potassium, 2 drachms; bromide of potassium, 1 grain. Mix and keep dry. Put 5 or 6 ounces to a gallon of water.

4461. Balaruc Water. Muriate of soda, 1 ounce; muriate of lime, 1 ounce; muriate of magnesia, & ounce; sulphate of soda, 3 drachms; bicarbonate of soda, 2 drachms; bromide of potassium, 1 grain; water, 1 gallon. Chiefly used for baths.

4462. Simple Sulphuretted Waters.

Pass sulphuretted hydrogen into cold water (previously deprived of air by boiling, and cooled in a close vessel), till it ceases to be absorbed.

4463. Aix-la-Chapelle Water. carbonate of soda, 12 grains; muriate of soda, 25 grains; muriate of lime, 3 grains; sulphate of soda, 8 grains; simple sulphuretted water, 2½ ounces; water slightly carbonated, 17½ ounces.

4464. Bareges Water. (Cauterets, Bagnères de Luchon, Bonnes St. Sauveur, may be made in the same manner.) Crystallized hydrosulphate of soda, crystallized car-A stronger solution for adding to baths is thus 30 grains; syrup of gum, 2½ ounces; aerated made; Crystallized hydrosulphate of soda, water, 17½ ounces. crystallized carbonate of soda, and muriate of soda, of each 2 ounces; water, 10 ounces; To be added to a common bath at dissolve. the time of using.

4465. Naples Water. Crystallized carbonate of soda, 15 grains; fluid magnesia, 1 ounce; simple sulphuretted water, 2 ounces; aerated water, 16 ounces. Introduce the sulphuretted water into the bottle

sodium, 100 grains; muriate of lime, 10 the directions laid down in No. 41 should be grains; muriate of magnesia, 6 grains; bi-carefully followed to ensure success. carbonate of soda, 2 grains; water, 18½ ounces. Dissolve and add simple sulphuretted water, 1½ ounces.

4467. Simple Chalybeate Water. (T. S. Ph.)Water, freed from air by boiling, 1 pint;

sulphate of iron, ½ grain

Aerated Chalybeate Water. 4468. recommends 10 grains each of sulphate of (U.S. Ph.) iron and bicarbonate of soda to be taken in a bottle of ordinary soda-water. This is equivalent to 4 grains of carbonate of iron.

of igon, muriate of soda, muriate of lime, of each 2 grains; carbonate of soda, 3 grains;

carbonated water, 1 pint.

4470. Bussang Water. Dissolve from to from grain of sulphate of iron, 2 or 3 grains carbonate of soda, 1 grain sulphate of magnemanner.

4471. Mont d'Or Water. Bicarbonate of soda, 70 grains; sulphate of iron, & grain; (See No. 4431.)

4472. Passy Water. Sulphate of iron, 2 grains; muriate of soda, 3 grains; carbonate of soda, 4 grains; muriate of magnesia, 2

grains; aerated water, 1 pint.
4473. Pyrmont Water. 4473. Pyrmont Water. Sulphate of magnesia, 20 grains; muriate of magnesia, 4 grains; muriate of soda, 2 grains; bicarbonate of soda, 16 grains; sulphate of iron, 2 grains; Carrara water, 1 pirt. (See No. 4435.)

Water. Water, 1 pint; citric acid, 1 drachm; citrate of iron, 15 grains; dissolve, and add

75 grains bicarbonate of soda.

4475. Trousseau's Martial Aerated Potassio-tartrate of iron, 10 grains; Water. artificial Seltzer water, 1 pint.

4476. Bouchardat's Gaseous Purgative. Phosphate of soda, 11 ounces; carbon-

ated water, 1 pint.

4477. Water. Iodide of potassium, 15 grains; Cork immediately.

4478. Dupasquier's Gaseous Water bonate of soda, and chloride of sodium, of of Iodide of Iron. Solution of iodide of each 2½ grains; water (free from air), 1 pint. | iron (containing 10 per cent. of dry iodide),

edicinal Tinctures. These are solutions of the active principles of bodies, obtained by digesting them in alcohol more or less dilute. Ethereal tinctures are similar solutions prepared with ether. (See Nos. 35, dc.) Where percolation 4466. Harrogate Water. Chloride of is resorted to in the preparation of tinctures,

> 4480. Tincture of Assafetida. rate 4 troy ounces assafetida in 2 pints alcohol for 2 weeks, and filter through paper.

4481. Tincture of Aconite Leaf. Take 4 troy ounces recently dried aconite leaf in fine powder; moisten with 2 fluid ounces Sulphate of iron, 1 grain; carbonate of soda, diluted alcohol; pack it firmly in a conical 4 grains; water, deprived of air and charged percolator, and gradually pour diluted alcohol 4 grains; water, deprived of air and charged percolator, and gradually pour diluted alcohol with carbonic acid gas, 1 pint. Dr. Pereira sufficient to displace 2 pints of tincture.

4482. Tincture of Aconite Root. Take 12 troy ounces aconite root in fine powder; moisten with 6 fluid ounces alcohol; 4469. Brighton Chalybeate. Sulphate pack it firmly in a cylindrical precolator, and gradually pour alcohol upon it until 2 pints

of tincture are obtained. (U. S. Ph.)
4483. Tincture of Arnica. Take 6 troy ounces tincture of arnica; mix 12 pints alcohol and ½ pint water; moisten the arnica slightly with this mixture, and bruise it sia, and 1 of muriate of soda, in a pint of thoroughly in a mortar. Then pack it firmly aerated water. Forges, Provins, and other in a cylindrical percolator, and pour upon it similar waters can be imitated in the same first the remainder of the mixture, and afterwards sufficient diluted alcohol to make the tincture measure 2 pints. (U. S. Ph.)

4484. Tincture of Belladonna. muriate of soda, 12 grains; sulphate of soda, en 4 troy ounces recently dried belladonna 1 grain; muriate of lime, 4 grains; muriate leaf, in fine powder, with 2 fluid ounces diluof magnesia, 2 grains; aerated water, 1 pint. ted alcohol; pack it firmly in a conical percolator, and gradually pour diluted alcohol upon it until 2 pints of tineture are obtained.

(U. S. Ph.)

Tincture of Hemp. Dissolve **4485**. 360 grains purified extract of hemp in 1 pint alcohol, and filter through paper.

4486. Tincture of Capsicum. Moisten 1 troy ounce capsicum, in fine powder, with ½ fluid ounce diluted alcohol; pack it in a 4474. Mialhe's Aerated Chalybeate conical percolator, and gradually pour diluted alcohol upon it until 2 pints of tincture are obtained. (U. S. Ph.)

4487. Tincture of Cinchona. Moisten

6 troy ounces yellow cinchona, in moderately fine powder, with 2 fluid ounces diluted alcohol; pack it firmly in a glass percolator and displace, with diluted alcohol, 2 pints of tinc-

ture. (U. S. Ph.)

4488. Compound Tincture of Cin-Mialhe's Ioduretted Gaseous chona. Take 4 troy ounces red cinchona, 3 troy ounces bitter orange peel, 6 drachms bicarbonate of soda, 75 grains; water, 1 serpentaria (Vinginia snakeroot), 3 drachms pint; dissolve, and add sulphuric acid di-red saunders, all in moderately fine powder; luted with its weight of water, 75 grains, and 3 drachms saffron in moderately coarse powder. Mix the powders, moisten with 4

fluid ounces diluted alcohol, pack it firmly in monium seed and diluted alcohol. (Am. Dis.) a glass percolator, and displace, with diluted

4 troy ounces recently dried hemlock, in fine; powder, with 2 fluid ounces diluted alcohol; Macerate for 14 days 5 ounces blossoms of St. pack it firmly in a conical percolator, and gradually pour diluted alcohol upon it until filter. 2 pints of fincture are obtained. (U. S. Ph.)

4490. Tincture of Digitalis. Moisten 4 troy ounces recently dried digitalis (fox glove), in fine powder, with 2 fluid ounces diluted alcohol; pack it firmly in a conical percolator, and displace, with diluted alcohol, 2 pints of tineture. (U.S. Ph.)

4491. Tincture of Iodine. Dissolve 1 ounce iodine in 1 pint alcohol. (U. S. Ph.) Tineture of iodine may be readily prepared on account of its coagulating. previously filled the neck with broken glass, and pouring or the alcohol as it passes funnel with a close-fitting glass top. Spirits of camphor may also be speedily made in this

4492. Tincture of Turkey-Corn. Take 3 ounces powdered Turkey-corn root (corydalis) and make 1 pint tineture by maceration or displacement with diluted alcohol.

4493. Tincture of Yellow Jasmine (Gelseminum). Cut into small pieces 8 ounces of the fresh root of yellow jasmine (gelseminum); macerate for 14 days in 2 pints diluted alcohol, express and filter. This forms

a saturated tineture. (Am. Dis.) 4494. Universal Tineture. Bruise the following ingredients and digest for several days in 18 ounces brandy: 10 drachms aloes; 8 drachms each white agaric, rhubarb root, zedcary root, gentian root, galanga root, gum myrrh, and molasses electuary; 2 drachms saffron, and 4 ounces sugar. Express and

4495. Compound Tincture of Black This is prepared with 30 parts capsicums; 40 parts black pepper; 15 parts each grains of paradise, cinnamon, ginger, and calamus; 15 parts by measure acetate of

potassa, and 60 parts alcohol.

4496. Tincture of American Helle-Moisten 16 troy ounces American Hellebore (veratrum viride), in moderately fine powder, with 4 fluid ounces alcohol. Pack it firmly in a cylindrical percolator, and displace, with alcohol, 2 pints of tineture. (U, S)

4497. Compound Tincture of Dew-Take 4 ounces Dewberry (rubus trivialis) root, ½ ounce powdered Aleppo galls, 3 drachms powdered cinnamon, 10 grains powdered capsicum, 1 drachm powdered cloves, and 1 ounce gum kino. Digest for 14 days in 2 pints best brandy. Filter, and add 1 ounce tineture of opium, 1 ounce essence of peppermint, and I pint white sugar. Dose, 1 tea-spoonful for an adult.

Tincture of Skunk-Cabbage. Take 3 ounces skunk-cabbage root in powder, and 1 pint diluted alcohol. Make a tincture by maceration, or displace 1 pint from a per-

(Am. Dis.)

4499. Tincture of Stramonium. Make

4500. Tincture of Monesia. Take 1 alcohol, 2½ pints of tineture. (U.S. Ph.) part extract of monesia, 6 parts alcohol, and 4489. Tineture of Hemlock. Moisten 14 parts water. Mix and filter. (Am. Dis.) part extract of monesia, 6 parts alcohol, and

4501. Tincture of St. John's Wort. John's wort, in 1 pint alcohol. Express and

(Am. Dis.)

4502. Compound Tincture of Kino. Take 4 drachms each powdered opium, gum kino, and cochineal; 3 drachus each camphor and cloves; and 4 drachms aromatic spirits of ammonia. Macerate in 4 pints dilute alcohol. Express and filter.

4503. Camphorated Tincture of Soap. There has been some difficulty in preparing this liniment as directed in the dispensatory, The following by placing the iodine in a glass funnel, having formula makes a tineture which remains fluid at all temperatures. Take 4 ounces castile soap, 2 ounces camphor, ½ ounce oil of rosethrough. To prevent evaporation, cover the mary, 16 ounces water, and 20 ounces 95 per cent. alcohol.

4504. Tincture of Chloride of Iron. Introduce 3 troy ounces of iron wire, cut into pieces, into a flask of the capacity of 2 pints; pour upon it 11 troy ounces muriatic acid, and allow the mixture to stand until effervescence has ceased. Then heat it to the boiling point. decant the liquid from the undissolved iron, filter it through paper, and, having rinsed the flask with a little boiling distilled water, add this to it through the filter. Pour the filtrate into a 4-pint capsule, add 61 troy ounces muriatic acid; and, having heated the mixture nearly to the boiling point, add 11 troy ounces nitric acid. When effervescence has ceased, drop in nitric acid, constantly stirring, until it no longer produces effervescence. when the liquid is cold, add sufficient distilled water to make it measure 1 pint, and mix it with 3 pints alcohol. (U.S. Ph.)

4505. Tincture of Guaiac. Reduce 6 troy ounces guaiac to a moderately coarse powder, mix it with an equal bulk of dry sand. pack the mixture moderately in a conical percolator; and, having covered it with a layer of sand, gradually pour alcohol upon it until

2 pints of tincture are obtained. (*U. S. Ph.*)
4506. Tincture of Black Hellebore. Moisten 4 troy ounces black hellebore in moderately fine powder, with 1 fluid ounce diluted alcohol. Pack it in a cylindrical percolator, and gradually pour diluted alcohol upon it until 2 pints of tincture are obtained. $(\overline{U}, S, Ph.)$

4507. Tincture of Mandrake (Podophyllin). Make 1 pint of tincture from 3 ounces mandrake-root in powder, with alcohol, either by maceration or percolation.

4508. 4508. Tincture of Queen's Root (Stillingia). Take 3 ounces queen's root, bruised and cut into small pieces, and make 1 pint with diluted alcohol, either by macera-

tion or displacement. (Am. Dis.)
4509. Tincture of Leopard's Bane (Arnica Flowers). Macerate 2 ounces arnica flowers in 1 pint dilute alcohol; or put the arnica-flowers in a percolator, and with diluted alcohol displace 1 pint. (Am.

4510. Tincture of Hops. Moisten 5 1 pint of tineture from 2 ounces bruised stra- troy ounces hops, in moderately coarse pow-

tincture. (U, S, Ph.)

Tincture of Henbane. Moisten 4511.

tineture are obtained. (U. S. Ph.)

4512. Tineture of Kino. dered kino thoroughly with an equal bulk of (U.S. Ph.) dry sand; introduce the mixture into a coni-

parts alcohol and 1 part water. (U. S. Ph.) diluted alcohol; pack it in a conical percolator, and displace, with diluted alcohol, 2 pints troy ounces lobelia, in fine powder, with 2 of tineture. (U. S. Ph.) fluid ounces diluted alcohol; pack it firmly 4525. Tineture of Serpentaria. Moist-

Root). Black cohosh root, in fine powder, upon it until 2 pints of tineture are obtained. 4 troy ounces; alcohol, 1 pint. Make 1 pint (U.S. Ph.) of tincture by maceration or displacement. (Am. Dis.)

4515. Norwood's Tinesure 5-rum Viride (American Hellebore). Macerate 8 ounces of the recently dried, coarsely powdered root, in 16 ounces of alcohol for 14 days; express and filter through

paper. (Am. Dis.)

4516. Tincture of Chiretta. Macerate 21 ounces (avoirdupois) chiretta, cut small and 2 scruples camphor, in 2 pints diluted and bruised, in 15 Imperial fluid ounces rectified spirit, for 48 hours. Then transfer to a (U. S. Ph.) percolator, pouring on 5 additional fluid ounto 1 Imperial pint. (E. Ph.)

4517. Tincture of Ergot. the same manner as for tincture of chiretta.

ate 3 ounces powdered blue-flag in 1 pint alcohol; or, make 1 pint by percolation. (Am)

4519. Tincture of Lupulin. Pack 4 it until 2 pints of tineture are obtained.

S. Ph.)

4520. Tincture of Nux Vomica. Digest with a gentle heat, 8 troy ounces finely num). Macerate 2½ ounces opium, in modeually pour alcohol upon it until 2 pints of and displace 2 pints tincture by adding dilute tincture are obtained. (U. S. Ph.)

4521. Tincture of Tobacco. Take a 4530. Ammoniated Tincture of

fic for cramps or spasms of the bladder. For dyne. this purpose it is administered in doses of 10 to 20 drops, at intervals of about 2 hours.

der, with 2 fluid ounces diluted alcohol, in moderately fine powder; moisten with 1 Pack it very firmly in a cylindrical percolator, fluid ounce diluted alcohol, pack moderately and displace, with diluted alcohol, 2 pints of in a conical percolator, and displace, with diluted alcohol, 2 pints of tineture. (U. S. Ph.)

Tincture of Rhubarb and 4523. 4 troy ounces henbane leaf, in fine powder, Senna. Reduce to a moderately coarse powwith 2 fluid ounces diluted alcohol. Pack it der, 1 troy ounce rhubarb, 2 drachms senna, 2 firmly in a conical percolator, and gradually drachms red saunders, I drachm each corian-pour diluted alcohol upon it until 2 pints of der and fennel, ½ drachm each saffron and liquorice, and 6 troy ounces raisins deprived Reduce 6 of their seeds. Macerate for 14 days in 3 drachms kine to fine powder. Mix the pow-pints diluted alcohol, and filter through paper.

4524. Tincture of Bloodroot. Moisten cal glass percolator, and displace ½ pint of 4 troy ounces bloodroot (sanguinaria), in tincture, using a menstruum composed of 2 moderately fine powder, with 1 fluid ounce

in a conical percolator, and displace, with dien 4 troy ounces serpentaria (Virginia snakeluted alcohol. 2 pints of tincture. (U. S. Ph.) root), in moderately fine powder, in 1 fluid 4514. Tincture of Cimicifuga Race-ounce diluted alcohol. Pack it in a conical mosa (Black Cohosh, or Black Snake-percolator, and gradually pour diluted alcohol

> 4526. Tincture of Valerian. obtained in the same manner at the tincture of serpentaria. (See last formula.)

4527. Camphorated Tineture of Opium. (Paregoric Elixir). This is a camphorated tincture of opium. Macerate 1 drachm each powdered opium and benzoic acid, 1 fluid drachm oil of anise, 2 ounces clarified honey, alcohol for 7 days, and filter through paper.

Cummings' Quick Method of 4528.ces rectified spirit; press the residuum, and Making Paregoric. Take pulverized opium, filter; lastly, add rectified spirit to make up 1 drachm; camphor gum, 2 scruples; benzoic acid, 1 drachm; oil of aniseed, 1 fluid drachm; Take 5 clarified honey, 2 ounces; hot water and alcoounces (avoirdupois) ergot, and proceed in hol, 1 pint each. Dissolve the camphor and oil of aniseed in the alcohol; triturate the powdered opium in a mortar with some of the 4518. Tincture of Blue-Flag. Macer- hot water for about 10 minutes, filter, and pass the remaining water through the dregs. To the fluid obtained add the alcoholic solution of oil and camphor, and dissolve finally the honey and benzoic acid in the mixture. troy ounces lupulin in a narrow cylindrical By passing this once more through the pulpercolator, and gradually pour alcohol upon verized opium, the latter will become perfectly (U. exhausted. The addition of 10 grains of cantal

powdered nux-vomica in 1 pint alcohol, for rately fine powder, in 1 pint water for 3 days, 24 hours in a close vessel. Then transfer the mixture to a cylindrical percolator, and gradand macerate for 3 days longer. Percolate, and macerate for 3 days longer.

convenient quantity of the expressed juice of Opium. Digest 6 drachms benzoic acid, fresh-gathered tobacco leaves; mix it with an 6 drachms hay saffron, 4 drachms sliced equal quantity of rectified spirits, and filter opium, and 1 drachm oil of aniseed, in 1 the mixture. This tincture, diluted with half quart spirit of ammonia for a week, and its weight of spirits of nitric ether, is a specifilter. Stimulant, anti-spasmodic, and another the half and the spirits of all the spirits of aniseed. Dose, 20 to 80 drops.

4531. Squibb's Compound Tincture of Opium. This mixture is composed of 4522. Tincture of Rhubarb. Mix together 3 troy ounces rhubarb in moderately spirit of camphor, each 1 fluid ounce; puricoarse powder, and ½ troy ounce cardamom fied chloroform, 3 fluid drachms; and a suffi-

the first three ingredients, and 4½ minims or alcohol, and filtering through paper. 18 drops of chloroform. Dose, for persons Ph.) over 18 years of age, a tea-spoonful; 2 to 6, ten to thirty drops; infants, one to ten drops, en 1 troy onnce cantharides, in fine powder, according to age. In time of epidemic cholera with 1 fluid ounce diluted alcohol; pack it in ments of the bowels more than natural within ted alcohol, 2 pints of tincture. (U.S.Ph.) the twenty-four hours, the second one should 4540. Tincture of Cardamom. Moistthe twenty-four hours, the second one should be followed by a dose of this mixture; the en 4 troy ounces cardamom, in fine powder, that follows. If the movements increase in firmly in a cylindrical percolator, and disfrequency or in copiousness after the second place, with diluted alcohol, 2 pints of tincture. dose of the medicine has been taken, a physi- (U. S. Ph.) cian should be sent for at once, and a double dose be taken after each movement, until he 2 troy ounces bruised castor for 7 days in 2 arrives. Immediately after taking the first pints alcohol; express, and filter through dose, the person should go to bed, and remain paper there for twelve hours after the diarrhea has entirely ceased.

4532. Compound Tincture of Pellitory. Take of bruised pellitory, 4 drachms; cam- for 10 days in a closed vessel, and then filter. phor, 3 drachms; oil of cloves, 2 drachms; The tincture, as thus prepared, is of a beauti-powdered opium, 1 drachm; rectified spirit, ful red color with the predominating smell of 6 fluid ounces; digest for 8 days. The pro- the valerian—taste bitter and slightly astring-

drops.

4533. Ethereo-alcoholic Tincture of Pellitory for Tooth and Face-ache. Take ipecacuanha and opium, of each 8 grains; diof bruised pellitory, 1 ounce; pure ether, 2 luted alcohol, 1 fluid ounce. Macerate for 14 fluid ounces; strongest rectified spirit, 3 fluid days and filter; or macerate 6 hours and disounces; digest them together in a stoppered place 1 fluid ounce with diluted alcohol, 1 bottle, in a cool place, for a week, with fre-fluid drachm; equivalent to 10 grains Doquent agitation, then express the tineture, but ver's powder. Used in combination with spirit avoid filtration. Some persons use equal parts of Mindererus effervescing draught, and other of ether and spirit, but the product does not anti-febrile remedies in liquid form. then keep so well. An excellent remedy for 4544. Sweet Tincture of I then keep so well. An excellent remedy for 4544. Sweet Tincture of Red Bark tooth-ache and face-ache, often giving almost (Cinchona). Red cinchona bark, in fine powimmediate relief in the former case.

4534. Decoction of Balm of Gilead. For the decoction, simmer 1 ounce of the

cough is troublesome.

4535. Infuse 2 ounces of the buds in a quart of It greatly relieves cough, pains in the chest, and other pulmonary affections. The tincture and decoction form excellent remedies for cough, asthma, wheezing, &c.

4536. Tincture of Prickly-ash Berries. Macerate 8 ounces prickly-ash berries (Xanthoxylum) for 14 days in 2 pints diluted from 1 to 1 fluid ounce, repeated as often as 2 pints. Macerate for 14 days, express, and required; in ordinary cases from 1 to 4 fluid filter. drachms, given in water. (Am. Dis.)
4537. Tincture of Aloes. Take 1 troy

troy ounces liquorice; macerate for 14 days in ½ pint alcohol and 1½ pints distilled water, and filter through paper. (U. S. Ph.)

4538. Tincture of Aloes and Myrrh. Take 3 troy ounces each socotrine aloes and myrrh, both in moderately fine powder; 1 ment on the preparation in the Prussian Ph., troy ounce saffron in moderately coarse pow- but are in officinal proportions, and yield a der; mix together, moisten with 2 fluid ounces strictly officinal result.

cient quantity of stronger alcohol to make alcohol, pack it moderately in a conical perthe whole measure 5 fluid ounces. Each colator, and displace, with alcohol, 2 pints of fluid drachm, or tea-speonful, contains about the tineture. This tineture may also be pre-100 drops, consisting of 12 minims of each of pared by maceration for 14 days with 2 pints

4539. Tincture of Cantharides. Moistor diarrhea, when any person has two move- a conical percolator, and displace, with dilu-

dose to be repeated after every movement with 2 fluid ounces diluted alcohol; pack it

4542. Acetous Tincture of Valerian. Valerian root, bruised, 4 ounces; acetie acid, 1½ ounces; diluted alcohol, 1½ pints. duct is a most serviceable form of toothache- ent; may be given in doses of a dessert spoon-

ful every 3 hours.
4543. Dove

der, 4 troy ounces; strong alcohol and syrup, sufficient quantity; dilute alcohol (alcohol 3 parts to 1 part water), $1\frac{1}{2}$ fluid drachms. buds in a quart of soft water, down to half a Moisten the cinchona with the dilute alcohol, pint. Take a wine-glassful or more, when the and pack in a glass funnel, in the neck of which sufficient tow (free from tar) has been Tincture of Balm of Gilead. placed, to act as a filter; cover the surface with a piece of perforated paper, and pour on good rum, and 4 ounces of sugar. Digest for alcohol previously mixed with an equal vol-4 days. Take 2 or 3 tea-spoonfuls at a time. ume of syrup until it has reached the tow and the surface of the powder is covered; cork the neck of the funnel and allow it to macerate 48 hours; then remove the cork and continue the percolation with equal parts of alcohol and syrup, mixed, until 16 fluid ounces have been obtained.

4545. Sweet Tincture of Rhubarb. alcohol; or, displace 2 ounces of tincture by Take of rhubarb, bruised, and liquorice root, percolation. This tincture possesses all the bruised, of each 2 ounces; aniseed, bruised, virtues of the berries. In cholera, the dose is and sugar, of each 1 ounce; diluted alcohol,

4546. Aqueous Tincture of Rhubarb: Take of alkaline fluid extract of rhubarb, 3 ounce socotrine aloes in fine powder, and 3 fluid ounces. (See No. 4591.) Neutral carbonate of potassa, 240 grains; cinnamon water, 4 troy ounces; dissolve the carbonate in the cinnamon water; add the fluid extract, and then sufficient water to make the whole weight 14 troy ounces. The above is an improve-

4547. Tincture of Catechu. Take 3 ces of the mixture; pack it moderately in a namon, both in moderately clarse powder, mixture 2 pints of tineture. (U.S. Ph.) Mix. and moisten with 1 fluid ounce diluted 4560. Tincture of Myrrh. Take 3 alcohol; pack it into a conical glass percolatroy ounces myrrh in moderately coarse pow-

measures alcohol with 1 of water; moisten 3

and displace, with diluted alcohol, 2 pints of alcohol, 2 pints of tincture. (U.S. Ph.)
the tincture. (U.S. Ph.)
4563. Tincture of Rhatany. Moisten

4551. Tincture of Cubeb. Percolate 2 (See No. 4549.) (U. S. Ph.)

4552. Tincture of Tar. ounces tar in 16 ounces alcohol, until dis-

solved.

4553. spirit, 12 fluid ounces; mix, macerate for 14 formula. days, and filter.

4554. Tincture of Colocynth.

campane, each 25 drachms; liquorice root, 2 drachms; aniseed and myrrh, of each 4 scrumom. Take 6 drachms cardamom, 2 drachms ples; saffron, 18 grains; dilute alcohol, 22 caraway, 5 drachms cinnamon, 1 drachm coch-

fluid ounces; water, 4 fluid ounces; glycerine, 4 fluid ounces. Mix the alcohol, water, and through paper. (U. S. Ph.) glycerine together, and, having mixed the kino with an equal bulk of clean sand, introly exhaust the drug of its astringent principle,

tures (see No. 35), with the following ingredients . 1 drachm each powdered opium, kino, and cochineal; 11 drachms each camphor and cloves; 1 fluid ounce aromatic spirit of am-

fluid ounces alcohol; pack it firmly in a cylin-the first time as a distinct class of prepara-

troy ounces catechu, and 2 troy ounces cin-cylindrical percolator, and displace with the

Take 3 tor, and displace, with diluted alcohol, 2 pints der; press it moderately into a conical percoof tineture. (U. S. Ph.)

4548. Tineture of Cinnamon. Mix 2 tineture. (U. S. Ph.)

4561. Tincture of Nutgall. Moisten 4 troy ounces finely powdered cinnamon with 1 troy ounces nutgall, in moderately fine powfluid ource of the mixture; pack it in a coni-der, with I fluid ounce diluted alcohol; pack cal percolator, and displace with the mixture it in a glass percolator, and displace, with 2 pints of tineture. (U, S, I') diluted alcohol, 2 pints tineture. (U, S, Ph.) 4549. Tineture of Colenicum. Moist- 4562. Tineture of Quassia. Moisten 2

en 4 troy ounces colchicum seed, in moder- troy ounces quassia, in moderately fine powately fine powder, with 1 fluid ounce diluted der, with 1 fluid ounce diluted alcohol; pack alcohol; pack it in a cylindrical percolator, it in a percolator and displace, with diluted

4550. Tincture of Columbo. moisten 6 troy ounces rhatany, in moderately fine 4 troy ounces columbo, in moderately one powder, with 2 fluid ounces diluted alcohol; powder, and percolate 2 pints tincture in the pack it in a cylindrical glass percolator, and same manner as the colchicum in last formula. displace, with diluted alcohol, 2 pints of tincture. (U, S, Ph.)

4564. Tincture of Squill. Moisten 4 pints tineture from 4 troy ounces cubeb, fol-troy ounces squill, in moderately coarse nowlowing the formula laid down for colchicum. der, with 1 fluid ounce diluted alcohol; pack it in a conical percolator, and displace, with Macerate 2 diluted alcohol, 2 pints tincture. (T. S. Ph.) l, until dis- 4565. Tincture of Stramonium. Take

4 troy ounces stramonium seed, in moderately Hamilton's Tincture of Dog- fine powder, and percolate 2 pints of tincture Wood. Bark of dogwood, I ounce; rectified in the same manner as the squill in the last

formula. (U. S. Ph.)

4566. Tincture of Tolu. Macerate 3
troy ounces balsam of tolu in 2 pints alcohol eynth, 8 parts; star anise, 1 part; alcohol, 96 until it is dissolved; then filter. (U.S. Ph.)

parts. Macerate for 3 days, and filter. Dose, 15 to 20 drops.

4567. Compound Tincture of Benzoin. Macerate 3 troy ounces benzoin. † troy ounce and Benzoin. This is also known as Wedel's troy ounces storax, for 14 days in 2 pints alco-hol; filter through paper. (U. S. Ph.)

fluid ounces. Macerate for 15 days, express ineal, all in moderately fine powder; mix toand filter. Dose, 40 to 60 drops, in catarrh, gether, and moisten with & fluid ounce diluted alcohol; pack it in a cylindrical percolator, 4556. Wood's Tincture of Kino. Kino and displace, with diluted alcohol, 6 fluid in fine powder, 12 ounces; alcohol (.835), 8 ounces of tincture. Lastly mix this with 2 troy ounces clarified honey, and filter

4569. Compound Tincture of Gentian. Mix together 2 troy ounces gentian, 1 troy duce in a percolator and pour on the men-ounce bitter orange peel, & troy ounce cardastruum. This menstruum seems to thorough mom, all in fine powder; moisten with $1\frac{1}{2}$ fluid ounces diluted alcohol; pack it in a conand also makes a nice-looking preparation ical percolator, and displace, with diluted

that will not deteriorate by exposure.

4557. Compound Tincture of Kino.

This is made in the same way as other tine
Dissolve \(\frac{1}{2}\) to unce iodine and 1 of iodide turns (see \(\frac{1}{2}\)). The following is the following in the same way as other tine
Dissolve \(\frac{1}{2}\) to unce iodine and 1 of iodide turns (see \(\frac{1}{2}\)). of potassium in 1 pint alcohol. (U. S. Ph.)

monia, and 1 pint alcohol.

4558. Tincture of Ginger. Moisten 8 the United States Pharmacopaia in 1850, for the first time as a distinct class of preparadrical percolator, and displace, with alcohol, 2 tions. Their distinctive character is the concen-pints of tincture. (U. S. Ph.) tration of the active ingredients of a substance 4559. Tincture of Jalap. Mix 2 meal into a small bulk and in liquid form. Their sures alcohol with 1 water; moisten 6 troy advantages consist in greater convenience of ounces jalap, in fine powder, with 2 fluid oun-administration, and in the fact that, not having

been subjected to excessive evaporation, the ounce of the extract should contain the virhas proposed the use of glycerine, which, es very deliberately, by drops, and it will be while it has the same preservative influence, found that the proportion of the percolate possesses the property of dissolving the mat-which is directed to be reserved will contain increased since 1860, and a regard to economy duced to a powder; and, in order to ensure has probably, in some cases, induced deviather required result, different degrees of finetions in officinal preparations. the next revision of the Pharmacopæia.

4572. cation of the displacement process which may will produce a powder designated as No. be thus stated: Reduce the substance, by 40, &c. contusion, to a powder which will pass through as of the powder. Transfer to a glass funnel with little or much pressure, according to its tenacity or disposition to adhere (more firmly the moistened powder move freely on each other, the packing should be with as much force as a glass vessel will bear, the whole of fluid extracts. the powder being introduced at once, and packed with a pestle or packing-stick. The whole quantity of the menstruum may now be poured on, or to the capacity of the funnel, and the process allowed to proceed to completion, without in any case repassing the first portions of the liquid. By this process, if carefully followed, very concentrated solutions are obtained. Indeed, most of the fluid extracts may be completed with little or no evaporation.

4573. Procter's Classified Formula for Making Fluid Extracts. In order to obtain as great a uniformity in the preparation firmly in a percolator, cover the surface of the of fluid extracts as the nature of the various drugs would permit, the following practical classification was drawn up by Professor William Procter, Jr., and submitted to the American Pharmaceutical Association, by whom the matter had been entrusted to him for investigation. In order to economize 150° Fahr., to 4 fluid ounces; mix this with space, we give it in a somewhat condensed The paramount object in obtaining the fluid extract of a drug, is to extract, as far strength of these extracts is nearly 50 per as possible, all the valuable ingredients; to cent. condense them to some uniform standard

active principles they contain are less liable; tues of, and represent 1 ounce of the drug; to have suffered injury by heat. The main and to leave the fluid in the best possible condifficulty lies in their liquid form increasing dition for retaining in solution the active the liability to undergo spontaneous decomprinciples of the drug. The process of percoposition; this is counteracted in some cases lation is adopted, as best adapted to effect the by the addition of sugar, in others by alcohol, desired objects, and admitting a greater deand in others again by a mixture of both. gree of accuracy than that of maceration. Some fluid extracts have a tendency to deposit matter when combined with sugar, rencylindrical percolators may be employed. In dering the extract turbid or cloudy in appear-either case, if the powder has been properly ance; instead of sugar, Mr. Alfred B. Taylor compacted, the menstruum, when added, passter which would be deposited by the use of nearly all of the most valuable parts of the sugar. Fluid extracts are obtained by perco-drug. In this way the action of the heat and lation, and the menstruum used is alcohol or air is entirely prevented on the most importalcohol and water, the proportions of each ant part of the extracted matter, and where depending on the nature of the substance to volatile oils are concerned this fact is particu-be extracted. The price of alcohol has greatly larly important. The ingredients are first re-This point ness are recommended, suitable to the degree will probably receive due consideration at of solubility and other natural peculiarities of the various drugs employed. This end is at-Grahame's Method of Perco- tained by sifting the powder through sieves lation. Professor Grahame, of the Maryland containing a certain number of meshes to the College of Pharmacy, has proposed a modificilinear inch. A sieve of 40 meshes to the inch

A new class of oleo-resinous fluid extracts a sieve of 40 meshes to the linear inch (if of has been suggested, in which the stronger close texture a sieve of 60 meshes is to be aromatics have been introduced, such as preferred); now add just sufficient of the cloves, cinnamon, cardamom, &c., and which menstruum to dampen the powder without possess, for certain uses, very desirable advanwholly destroying its mobility; this usually tages from their concentration. The number requires about one-fourth as much menstruum of oleo-resins has been considerably increased, on the ground that they represent their rewith a plug of cotton in the neck, and pack it spective sources more completely and in smaller bulks than in any other form of fluid or semi-fluid extracts. On account of their when alcohol or ether is the menstruum than superior strength, they should occupy a diswhen water is to be used); if the particles of tinct position under the name of "Oleo-resins," to distinguish them more particularly from all those preparations which go by the name of

4574. Class No. 1, of Classified Fluid Extracts. The following substances are to be reduced to a powder of No. 60 degree of fineness; with the exception of Buchu, which should be in No. 40 powder.

Aconite Leaves. Belladonna Leaves. Buchu. Thorn-Aj Digitalis (Fox glove). Valerian.

Henbane Leaves. Matico. Thorn-Apple (Stramonium).

The menstruum employed is 2 pints alcohol diluted with 1 pint water. Moisten 16 troy ounces of the powdered drug evenly with 4 fluid ounces of the diluted alcohol; pack it powder with a disc of cloth (muslin, linen, lint, or any insoluble porous tissue, to prevent the disturbance of the powder); then pour on the menstruum gradually, so as to displace 3 pints; reserve the first 12 fluid ounces, and evaporate the remainder on a water-bath at the reserved tincture; and, after standing 24 hours, filter through paper. The alcoholic

4575. Class No. 2, of Classified Fluid strength, so that, for instance, each fluid Extracts. The drugs included under this

Aconite Root. Black Snakeroot (Cimicifuga, or Black Cohosh).
Black Hellebore. Ipecacuanha.

Jalap. May-apple Root (Podo-phyllum or Mandrake). Blood Root (Sanguinaria). American Hellebore (Veratrum viride).

Moisten 16 troy ounces of the drug with 6 fluid ounces of the alcohol; displace 3 pints as directed in class 1, reserving the first 2 pint of percolate; distill the remainder until tillate with the reserved tincture. standing 24 hours, filter through paper.

4576. Class No. 3, of Classified Fluid Extracts. The substances included under this class require to be used in No. 50 powder; except columbo, No. 40; and squill, on account of its gummy nature, No. 30. The extract of colehicum deposits, by standing, a whitish sediment, which is believed to be in no wise connected with the activity of the preparation; it is recommended to allow this deposit to form before proceeding to filtration. Dilute alcohol is employed for making these extracts.

Colchicum Root. Columbo. Chiretta. Boneset (Eupatorium).

Gentian. Squill (Scilla). Seneka. Virginia Snake Root (Serpentaria).

Moisten 16 troy ounces of the substance with 4 fluid ounces dilute alcohol, percolate 3 pints, as in class 1, reserving the first 12 fluid ounces, evaporate the remainder to 4 fluid with the reserved tineture; and, after 24 hours, filter.

charine fluid extracts, the sugar being introadvantage is gained by adding the sugar to the extract before the completion of the evaporation; in some cases it might be better to add the sugar previous to any evaporation. The fluid extracts of pipsissewa, bittersweet, pomegranate, pink-root, and sarsaparilla, fully represent the several drugs; and, combined with 3 times their bulk of simiple syrup, afford syrups of the ordinary strength. The menstruum used in these preparations is dilute alcohol; and the drugs are to be reduced. to No. 50 powder, except galls, which should be No. 40.

(Cinchona Caligaya). Pipsissewa (Chimaphila). Bittersweet (Dulcamara). Cranesbill (Geranium).

Yellow Peruvian Bark Pomegranate-root Bark (Granatum) Blackberry Root (Rubus). Sarsaparilla.
Pink Root (Spigelia).
Bearberry Leaves (Uva Ursi).

Moisten 16 troy ounces of the powdered drug with & pint dilute alcohol; let it stand 30 minutes, then percolate as directed for class 1, until 3 pints have passed through; evaporate at a moderate heat on a water-bath to 1 pint; add 10 ounces sugar, evaporate to 1 pint, and strain while hot.

Extracts. The extracts obtained by this muslin strainer, and keep in a well-stopped process are termed acetic fluid extracts. The bottle. (U. S. Ph).

class should also be in at least No. 60 pow-lacetic acid is introduced to control the tender. Ipecacuanha and jalap may be reduced dency to decomposition, caused by the existto dust with advantage. The fluid to be ence, in the drugs treated in this manner, of a used is alcohol having a specific gravity of salt consisting of an alkaloid and an organic acid. The fluid used is a mixture of 1 fluid ounce acetic acid and 3 pints diluted alcohol; and the drugs should be reduced to a No. 60 powder.

Ergot. Lobelia Leaves. Hemlock (Conium). Moisten 16 troy onnees of the powder with pint of the acetic mixture; pack it in a conical percolator, and displace 3 pints, reserving the first 12 fluid ounces, using dilute alcohol during the last part of the percolation. Evaporate the latter percolate to 4 fluid ounces, reduced to ½ pint, and, while hot, mix the distant a temperature not exceeding 150° Fahr.; mix this with the reserved tineture, and filter through paper

4579. Class No. 6, of Classified Fluid Extracts. Under this division are placed oleoresinous fluid extracts. (See No. 4573.) The menstruum employed is deodorized alcohol, and the drugs are used in No. 50 powder; except canella, Ceylon cinnamon, elecampane, and orris root, used in No. 60, and myrrh in No. 30 powder,

Capsicum. Canella. Cardamom. Cloves (Caryophyllum). Ceylon Cinnamon. Cubeos. Elecampane (Inula). Lupulin.

Orris Root, (Iris Florentina). Myrrh. Pellitory Root (Pyrethrum). Alispice (Pimento). Prickly Ash Bark (Xan-thoxylum).

The oleoresin of the above substances are to be obtained by percolation, and distilling off the alcohol.

This process of obtaining the oleoresins was modified before adoption in the U. S. Ph., by substituting ether for deodorized alcohol as ounces by a water-bath at 150° Fahr.; mix the menstruum employed. The five following

oleoresins are officinal preparations.
4580. Oleoresin of Capsicum. 4577. Class No. 4, of Classified 12 troy ounces capsicum in fine powder, press Fluid Extracts. This class consists of sac- it firmly in a cylindrical percolator, and gradit firmly in a cylindrical percolator, and gradually pour ether on it sufficient to displace 24 duced as a preservative agent. A decided fluid ounces. Recover from this, by distillation on a water-bath, 18 fluid ounces of ether, and expose the residue in a capsule until the remaining ether has evaporated; lastly, remove, by straining, the fatty matter which separates on standing, and keep the oleoresin in a well stopped bottle. (U. S. Ph).

4581. Oleoresin of Cubebs. Moderately press 12 troy ounces cubebs in fine powder into a cylindrical percolator, and treat by the same process as the capsicum in the last formula. (U. S. Ph).

4582. Oleoresin of Lupulin. Press 12 troy ounces lupulin into a narrow cylindrical percolator, and displace with ether 30 fluid ounces; complete the process by distillation and subsequent evaporation in the same way as for capsicum. (See No. 4580.)

4583. Oleoresin of Black Pepper. Treat 12 troy ounces black pepper in fine powder, by ethereal percolation and distillation, in the same manner as laid down in No. 4580; expose the residue after distillation in a capsule, until the remaining ether has evaporated and the deposition of piperin in crystals has ceased. Lastly, separate the oleores-4578. Class No. 5, of Classified Fluid in from the piperin by expression through a

troy ounces ginger in fine powder, press it shallow dish (in summer to a draught of air firmly into a cylindrical percolator, and pour under an open window, in winter on a shelf upon it 12 fluid ounces stronger ether; con- near the top of the room), and allowed to tinue the percolation with alcohol sufficient evaporate spontaneously until it measures 16 to displace 12 fluid ounces in all. Recover fluid ounces; 30 cr 40 grains bicarbonate of from this, by distillation on a water-bath, 9 potassa in powder may then be added, which fluid ounces ether, and expose the residue in retains the extractive in solution, and clears a capsule until the volatile part has evaporated. the liquid without interfering with its proper-Lastly, keep the eleoresin in a well-stoppered

coarse powder in a percolator; displace with result in either case, fluid or solid, possesses 4 imperial pints ether, or until it passes color-in a marked degree the sensible and other proless. Let the ether evaporate on a waterbath, or recover it by distillation, and preserve the oily extract. (Br. Ph.) This prepthe eleoresins; it has long been known and fluid drachm doses. (U. S. Dis.)

4586. Fluid Extract of Rhubarb and Grind or coarsely bruise 2 pounds Potassa. or cinnamon, and 1 pound golden seal; macerate for 24 hours or more in 1 gallon good tity that the first macerated tincture lacks of extract being equivalent to 1 drachm of the powder. (Am. Dis.) A simple alkaline ex

tract of rhubarb is given in No. 4591.
4587. Fluid Extract of Stillingia. Cut fresh root of stillingia, 16 troy ounces, into small pieces; cover with alcohol, and tract of Buchu. Take of buchu, in coarse digest for 24 hours. Then transfer to a perpowder, 12 ounces; alcohol, 3 pints; water, 6 colator, and pack it so as to run slowly; add alcohol gradually, returning the first that passes until it runs clear. Reserve the first 12 fluid ounces percolated; then continue the percolation, with diluted alcohol, until the residuum is nearly exhausted; add 8 ounces white sugar to this dilute percolate, and evaporate by moderate heat to 4 fluid ounces. Add to this the reserved tincture, and 1 fluid drachm oil of caraway, and make 1 pint fluid extract. The dose is from 2 to 5 drops.

4588. Fluid Extract of Yarrow. Take of yarrow (the recently dried herb) in coarse powder, 8 ounces; dilute alcohol (2 parts 95 per cent. alcohol and 1 part water), a sufficient quantity. Pour over the powdered herb 4 ounces of the diluted alcohol, and work through with the hands until thoroughly other displacer and proceed to displace until 24 fluid ounces are obtained, which, if perfectly clear and transparent liquid of a deep formed with proper care, will exhaust the herb, as tested, by tasting the droppings. rhubarb will be found in No. 4586.

4584. Oleoresin of Ginger. Take 12 The resulting liquid should be exposed in a ties. The evaporation of this fluid extract may be continued if desired, with a very genties. bottle. (U. S. Ph.)

4585. Oleoresin of Male Fern. Pack the heat (in a water-bath) until reduced to closely 2 pounds avoirdupois, male fern, in the consistence of an ordinary extract. The perties of the herb, each tea-spoonful representing 30 grains of the herb.

4589. Procter's Fluid Extract of aration by its character decidedly belongs to Wild Cherry Bark. Take of wild cherry bark, 24 ounces; sweet almonds, 3 ounces; much used in Europe, under the name of oil and pure granulated sugar, 36 ounces. Maceof fern, in the treatment of the tapeworm, rate the powdered bark in 2 pints of 88 per It is believed to have all the vermifugal pow-cent, alcohol for 8 hours, introduce it into a ers of the male fern, and may be given in 1 percolator, and pour alcohol on it until 5 pints have passed, observing to regulate the passage of the liquid by a cork or stop-cock. Introduce the tineture into a capsule (or still, avoirdupois best India rhubarb, 1 pound cassia if the alcohol is to be regained), and evaporate it to a syrupy consistence; add 1 pint water, and again evaporate until all the alco-French brandy; express strongly, and add 1 hol is removed. Beat the almonds, without fluid drachm oil of peppermint previously bleaching, into a smooth paste with a little of dissolved in a little 90 per cent. alcohol. the water, and then sufficient to make the Break up the compressed residue, and permission measure 1½ pints, and pour it into a colate with warm water until exhausted, quart bottle, previously containing the solu-Evaporate this solution to 4 pints, and, while tion of the extract of bark; cork it securely warm (not too hot), dissolve in it 2 pounds and agitate occasionally for 24 hours, so as to bicarbonate of potassa, and 3 pounds refined give time for the decomposition of the amygsugar; evaporate, if necessary, to the quan-daline. The mixture is then to be quickly expressed and filtered into a bottle containing 14 gallons. Lastly mix the two together. It the sugar. Water should be added to the is used for the same purposes as the compound dregs and they again expressed till sufficient powder of rhubarb, 2 fluid drachms of the liquor is obtained to make the fluid extract measure 3 pints. The proportion of sugar, though less than that in syrup, is sufficient to preserve the preparation, aided by the presence of hydrocyanic acid.

4590. Parrish's Compound Fluid Expints, or sufficient. Treat the leaves by maceration and displacement, first with a portion of the alcohol, and then with the remainder mixed with the water; evaporate the resulting liquid with a gentle heat to 3 pints, and add 2½ pounds sugar. Continue the heat till it is dissolved, and, after removing from the fire, add cil of cubebs, oil of juniper, of each 1 fluid drachm; spirit of nitric ether, 12 fluid ounces, previously mixed.

gether.

Alkaline Fluid Extract of 4591. Take of fluid extract of rhubarb Rhubarb. (by repercolation), 1 fluid ounce; neutral carbonate of potassa, 80 grains; water, 1 fluid ounce. Dissolve the carbonate in the water; to this add the fluid extract, and let the mixture repose 6 to 12 hours; then strain moistened; allow it to stand in a covered through muslin, and filter, if desirable. The jar for 24 hours. Fack closely in a funnel or alkaline fluid extract of rhubarb can be mixed with water in any proportion, affording a peradd to the alcoholic portion first obtained; to it, then proceed with the evaporation until reduced to 8 fluid ounces, and mix the two pro-

(See No. 4575.) filter.

4593. reserving carefully the first 24 ounces. Evap-Fahr., until reduced to 8 fluid ounces. Mix drachm. it with the reserved tincture, and, after standing, with occasional agitation, for 24 hours, emetic in the water, and mix with the other each fluid ounce of which will represent a ingredients.

4594. Procter's Fluid Extract of Take hops in coarse powder, 16 troy ounces. Mix in 4 ounces dilute alcohol; pack remainder of the tincture in a water-bath still ence. on the filter to make the measure of a pint.

Procter's Fluid Extract of Mix with $\frac{1}{2}$ pint alcohol. (U.S. Ph.)
Take of Calabria liquorice, 8 It is affirmed that syrup made from Liquorice. cover it with cold water, let it stand 12 the extract by repercolation in the same manhours (if in summer in a cool place), pour off ner as the seneka in No. 4598. the dense solution, renew the water, and again sugar, and again evaporate until the measure (sumach) in coarse powder. of 1 pint is obtained.

4592. Moore's Fluid Extract of Cimi- covered the surface with a piece of muslin or cifuga Racemosa (Black Cohosh or perforated paper, pour on the menstruum, Black Snakeroot.) Take of cimicifuga, in and continue the percolation to exhaustion, No. 50 powder, 16 ounces, troy; alcohol 95 reserving 12 ounces of the first runnings, evapper cent., diluted alcohol, of each a sufficient orate the remainder over a water-bath until quantity. Moisten the root with the alcohol, reduced to 9 fluid ounces, to which add 4 pack closely in the displacer, and pour on al- ounces sugar and dissolve. Strain, if neces-cohol gradually until 8 fluid ounces have sary, and add the reserved portion. The dose passed through, which reserve in a covered of the extract is one tea-spoonful, representing vessel to prevent evaporation, then proceed 80 grains of the root. Burdock is one of the with dilute alcohol until the root is thorbest vegetable alteratives, or blood depurents, oughly exhausted. Evaporate over a water- and it is believed t at this fluid extract might bath until all the alcohol is driven off; set it be advantageously substituted for that of saraside to cool, that the resinous portion ex-saparilla, as a more efficient and reliable tracted may be deposited, which separate and alterative, or at least as a valuable addition

4597. Fluid Extract of Chamomile. Take of fresh chamomile flowers, 1 pound; ducts; allow it to stand 48 hours, and then alcohol of specific gravity .871. Moisten the chamomile in coarse powder, with the alcohol, Compound Fluid Extract of then pack in a percolator, and cover with the Squills. This is alcoholic, in which 3 parts alcohol; digest 6 days, and draw off 12 ounalcohol are diluted with 1 part water. Take ces, which set aside. Continue the displace-of squills and seneka, each 16 ounces troy, rement with diluted alcohol, until it is freely duced to a moderately coarse powder. Moist-exhausted of its bitterness, which evaporate en with about 12 ounces of the liquid, and in a vacuum to 4 fluid ounces. Mix and fiter. pack firmly in a conical percolator; cover the 1 drachm of this preparation represents 60 surface with a cloth and pour on of the same grains of chamomile flowers, which is usually menstruum until 6 pints have slowly passed, given in doses of 20 grains, as a tonic, to 1 drachm, as an antiperiodic-making the dose orate the remainder in a water-bath at 150° for like cases from 20 minims to 1 fluid

4598. Fluid Extract of Seneka. The formula for making this extract will be found filter, dropping sufficient of the menstruum in No. 4576, but seneka yields its active prinon the filter to make the whole measure 2 ciples so easily and entirely, that an extract pints. Hive Syrup may now be prepared of it may be obtained of standard strength from this extract by taking: compound fluid without evaporation. If a convenient quanextract of squills, 4 fluid ounces; tartar emetitity of seneka in No. 50 powder be divided ic, 24 grains; simple syrup, 20 fluid ounces; into 3 equal parts, and repercolated with 85 hot water, \(\frac{1}{2}\) fluid ounce. Dissolve the tartar per cent. alcohol, an extract will be obtained,

troy ounce of the root.

4599. Fluid Extract of Ipecacuanha. Moisten 16 troy ounces ipecacuanha in fine powder with 6 fluid ounces alcohol; press it it in a conical percolator, cover the surface firmly into a conical percolator, and displace 3 with cloth, and add dilute alcohol until 3 pints pints of tineture, or until the ipecacuanha is of tincture have slowly passed, carefully re-exhausted. Distill the tincture over a water-serving the first 12 ounces. Evaporate the bath until the residue is of a syrupy consist-Mix with 1 fluid ounce acetic acid to 4 fluid ounces, mix it with the reserved and 10 fluid ounces water; boil until reduced tincture, agitate occasionally during 24 hours, to ½ pint, and the resinous matter has separa-and filter, dropping sufficient dilute alcohol ted. Filter when cold, and add water through the filter to make the filtrate up to ½ pint.

It is affirmed that syrup made from extract troy ounces; and sugar in coarse powder, 10 prepared according to the above formula is troy ounces. Bruise the liquorice till it is reapt to become cloudy. It is proposed to duced to pieces the size of a pea, enclose it avoid this result by dividing ipecacuanha in in a gauze cloth, suspend it in a pint vessel, No. 50 powder into 3 parts, and obtaining

4600. Fluid Extract of Sumach. macerate and decant. Mix the two liquids, Take 4 pints 76 per cent. alcohol, and 1 pound evaporate to 12 fluid ounces, dissolve in it the of the recently dried bark of Rhus Glabrum Moisten the powdered bark with sufficient alcohol and let 4596. Grahame's Fluid Extract of it macerate for 24 hours, then percolate with Burdock. Take of burdock, in No. 50 pow- the remainder of the alcohol, returning the der, 16 ounces; dilute alcohol (alcohol 9 first that passes until it runs clear. Reserve parts, water 7 parts), a sufficient quantity, the first 4 clear fluid ounces of tincture, evap-Dampen the powder with the menstruum and orate the remainder to 4 fluid ounces, and pack it in a suitable glass displacer; having set aside. Then percolate the residuum nearly to exhaustion with hot water, evaporate make the whole measure 16 fluid puncus. it 4 ounces white sugar, evaporate to 8 fluid 2½ ounces of alcohol. (See No. 4577.) ounces, and, while warm, mix it with the reserved 3 ounces of tineture to make 1 pint of gest for 24 hours 1 pound pareira root, in fluid extract. (Am. Dis.)

4601. Fluid Extract of Scullcap. This is prepared from 1 pound of the dried leaves of scullcap (scutellaria) in precisely the same manner as directed for fluid extract

obtained from 1 pound recently dried life-root consequently avoirdupois weight and imperial (senecio aureus) in the same manner as measure are to be used in preparing it. The the sumach in No. 4600. (Am. Dis.)

4603. Fluid Extract of Senna and Jalap. Take 6 pints 76 per cent. alcohol. Mix together 1 pound senna and 1 pound jalap root, both in coarse powder; moisten them with some of the alcohol, and macerate displace with the remainder of the alcohol; reserve the first 6 fluid ounces; evaporate the remainder to 6 fluid ounces and set also aside. alcohol and evaporate it to 12 fluid ounces; drachms carbonate of potassa, 40 minims oil extract, making altogether 12 pints fluid extract. (Am. Dis.)

dampen it with about 6 ounces dilute alcohol, and pack it in a suitable glass percolator; convenient), displace with dilute alcohol. Continue the percolation with diluted alcohol until 2 more pints of liquid have passed; to these add 6 ounces sugar and reduce by evaporation over a water-bath to 6 fluid ounces, adding, while still hot, the 10 ounces of concentrated tincture; on cooling, the mixture of a few drops of alcohol the resinous matter extract which may be filtered if necessary.

4605. Fluid Extract of Cinchona. Take cinchona (calisaya) in powder, 8 troy ounces; simple (officinal) syrup, 4 fluid ounces; glycerine, 4 fluid ounces; alcohol, concentrated and diluted, a sufficient quantity. Moisten the cinchona with 6 fluid ounces of diluted alcohol; allow it to stand in a covered jar for three hours, and then transfer it to a evlindrical percolator. Pack it firmly, and gradually pour upon it diluted alcohol, until 12 fluid ounces of the tineture have been mix I ounce of the essential oil with I quart obtained. Set this aside, and continue the percolation with dilute alcohol, until the cinchona is thoroughly exhausted. To the last percolate add the syrup and glycerine, and evaporate by means of a water-bath to about 10 fluid ounces. To this add the reserve tincture, and continue the evaporation to 14 fluid ounces. Remove from the water-bath,

this aqueous solution to ½ pint, then add to Each pint of the fluid extract contains nearly

4606. Fluid Extract of Pareira. Dicoarse powder, in 1 pint boiling distilled water; then pack it in a percolator, and displace 1 gallon, or until the pareira root is exhausted. Evaporate over a water-bath to 13 fluid ounces; when cold add 3 fluid ounces rectified of snmach in preceding receipt. (Am. Dis.) spirit, and filter through paper. This is the 4602. Fluid Extract of Life-Root is officinal formula of the British Pharmacopæia, dose consists of 1 to 2 fluid drachms.

4607. Moore's Fluid Extract of Vanilla. Take 8 troy ounces vanilla, and an equal weight of crushed loaf sugar. Slit the pods from end to end with a knife; then take them in small bundles, held tightly between for 24 hours. Transfer to a percolator and the fingers, and cut them transversely into very small pieces. Of these, beat small portions at a time in an iron mortar, with a little of the sugar, until reduced to a damp powder, Nearly exhaust the residuum with diluted which must be rubbed with the hand through a No. 20 sieve; any coarse particles which add 8 ounces white sugar; again evaporate will not pass through the sieve must be reto 12 fluid ounces, and, while warm, add 6 turned to the mortar, and, with fresh portions of vanilla and sugar, again treated as before. of cloves dissolved in 12 fluid drachms Hoff- This is to be continued until the whole is reman's anodyne, and the 12 ounces reserved duced to a No. 20 powder. This is then to be mixed with 5 pints of a mixture of 3 parts alcohol and 1 part water, and the whole intro-4604. Fluid Extract of Blessed This-duced into a 1-gallon stone jug, which must be tle. Take 16 troy ounces blessed thistle tightly corked. The jug is then placed in a (carduns benedictus) in No. 40 powder, water-bath, resting upon folds of paper, and the mixture digested for 2 hours at a temperature of from 1600 to 1700 Fahr. The upper having covered the surface with a piece of part of the jug must be kept cool (to prevent muslin or a layer of clean sand (which is more the undue expansion of vapor), by wrapping around it a towel or other cloth kept saturated When 1 pint of liquid shall have passed, put it aside in a warm place for spontaneous a sponge every 15 or 20 minutes. The jug evaporation until reduced to 10 fluid ounces. should also be removed from the bath after each application of the water, and its contents well shaken, keeping the hand upon the cork to prevent its expulsion, and perhaps consequent loss of material. When the digestion has been completed, and the mixture has cooled, it is to be expressed through muslin. becomes slightly turbid, but by the addition Pack the residue, previously rubbed with the hands to a uniform condition, firmly in a glass is redissolved, making a dark brown fluid funnel prepared for percolation, and gradually pour upon it first the expressed liquid, and when this has all disappeared from the surface, continue the percolation with a mixture of 3 parts alcohol and 1 part water, until 8 pints of percolate are obtained.

> Medicinal Essences. The usual rule for making essences, is to of alcohol; although much is sold that contains only 1 ounce, and even 4 ounce of the oil to the quart. A strong essence would consist of 1 ounce of oil to 1 pint of alcohol; from 10 to 30 drops of this would make a

4609. To Color Medicinal Essences. Essence of peppermint is generally colored and, when nearly cold, add sufficient alcohol to with tineture of turmeric; essence of cinna-

of green, which they presume is a proof of its being genuine. The most harmless way is to steep a little of the green peppermint in the not at hand, a little parsley will do equally as well, and in fact improve the flavor.

spirit. This forms the ordinary essence of and sain 12. This camphor and the best spirit of camphor of the as in receipt No. 4616. stores. Added to 15 times its bulk of pure cold water, it forms (by agitation) a transparent. Unbleached, well-bruised Jamaica ginrent solution exactly resembling the camphorjulep. camphor-water, or camphor-mixture digest for 2 weeks, press and filter, used in medicine, and which, either alone or 4620. Oxley's Concentrated Essence wash for the teeth and mouth, as noticed elsewhere. (See No. 1335.)

Disselve 1 avoirdupois ounce camphor in 10 ounces rectified spirit. This forms the Con-sence of Ginger. centrated Essence of Camphor of the druggists. 10 or 12 drops added to 1 fluid ounce of pure cold water form the transparent camphorjulcy or camphor-water before noticed.

4612. Essence of Coltsfoot. Balsam of tolu, 1 ounce; compound tincture of benzoin and rectified spirit of wine, of each 2 ounces; dissolve.

Essence of Chamomile. spirit of wine, 1 pint; mix. White. Or: Gentian root, sliced or bruised, 1 pound; dried orange peel, 1 pound; spirit of wine, 1 gallon; essential oil of chamomile, 5 ounces; macerate a week. Slightly colored. Some persons use ½ pound of quassia wood, instead of the gentian and orange peel. Both the above are stomachic and tonic.

Essence of Spearmint. ounce of essential oil to 1 pint of spirit of wine tinged green. Process, use, and dose, the same as essence of peppermint. (See No. 4610.)

and stomachic.

4616. Essence of Beef. Chop fine 1 41.) pound lean beef, place it with 1 pint of water 4

mon with tineture of red sandal wood; win-levaporate the liquid to the consistence of tergreen with tineture of kino. The best way thin syrup, adding spice, salt, &c., to suit the of coloring an essence is to steep for 12 hours taste, and pour the essence, while boiling hot, the green leaf or other substance from which into bottles (see next receipt), or jars, or (still the oil is made, and then filter. The coloring better) tin cans, which must be closed up air-

is merely a matter of appearance; the essences tight, and kept in a cool place. (See No. 1634.) are just as good without it.

4610. Essence of Peppermint, Oil of peppermint, 1 ounce; herb peppermint, ½ into cold bottles, there is a great risk of the ounce; spirit of wine, 1 pint. Digest for a bottle breaking, involving probably the loss week, or until sufficiently colored. Palish of the contents. To prevent this, stand the green, and very strong of the peppermint, bottles in a wide pen with sufficient cool Essence of peppermint is not conceived to be water to reach nearly to the top of the botgood by the ignorant unless it has a pale tint tles; pour sufficient water in each bottle to prevent it floating, and then let the water in the pan be brought gradually to a boil. As each bottle is to be filled, take it out of the spirit for this purpose (as above), or if this is pan, empty the water out of it, and fill it immediately.

4618. Ellis's Essence of Beef. Take Essence of Camphor, also lean beef, sliced thin, sufficient to fill the body called Liquor of Camphor; Concentra of a porter bottle; cork it loosely, and place it ted Tincture of Camphor; Camphor in a pot of cold water, attaching the neck by Drops. Dissolve 4½ drachms (avoirdupois) means of a string to the handle of the pot; clear camphor, in 1 imperial pint rectified boil for 1½ or 2 hours, then decant the liquid spirit. This forms the ordinary essence of and skim it. This can be seasoned and packed

ger, 4 ounces; rectified spirit of wine, 1 pint;

with a little more water, forms an excellent of Jamaica Ginger. The same as the preceding, with the addition of a very small quantity of essence of cayenne.

4621. Very Strong Concentrated Es-Bruised unbleached Jamaica ginger, 12 pounds; rectified spirit of wine, 2½ gallons; digest 14 days, press, strain, and reduce the essence by distillation to 1 gallon; cool and filter. This produces a gallon; cool and filter. This produces a most beautiful article. It is at once inexpensive and easily performed, as the spirit distilled off may be used with advantage for preparing the common tineture of ginger, and several other articles; 2 ounces of this essence sential oil of chamomile, a cunce to 1 ounce; are regarded as equivalent to 3 ounces of the finest ginger. A single drop swallowed will almost produce suffocation.

4622. Concentrated Essence of Ginger. Ginger and animal charcoal, both in coarse powder, equal parts; add enough rectified spirits of wine to perfectly moisten them, and after 24 hours put the mass into a percolator, return the first runnings 2 or 3 times, then change the receiver, and pour on spirit gradually as required, and at intervals, until as much essence is obtained as there was ginger employed. Quality excellent. The mass remaining in the percolator may be 4615. Bitter Essence. Wormwood, 4 treated with fresh spirit until exhausted, and parts; gentian root, bitter orange peel, and the tineture so obtained may be advantageblessed thistle, of each 1 part; alcohol, 45 ously employed, instead of spirit, in making parts; digest for a week. Dose, ½ drachm to more essence with fresh ginger. The last por-2 drachms, combined with mixtures. Tonic tion of spirit in the mass may be obtained by adding a little water. (See Percolation, No.

4623. Concentrated Essence of Guain a bottle which they will only half fill, and iacum. Guaiacum shavings, from which the agitate violently for half an hour; then throw dust has been sifted, 3 cwt. Exhaust the the whole on a sieve, and receive the liquid wood by boiling with water, as in preparing in a jug. Next, boil the undissolved portion an extract, using as little of that fluid as is in 1 pint of water for 20 minutes; strain, and absolutely necessary; evaporate to exactly mix the decoction with the cold infusion; 14 gallons; let it stand until cold, stirring it

all the time to prevent the deposit of resinous | 4629. Easton's Syrup of Phosphate matter; put the whole into a bottle; add of Iron, Quinine, and Strychnine. Take spirit of wine, 5 pints; agita sepeatedly for of phosphate of iron, 192 grains; phosphate a week, then allow it to settle for 7 or 8 days, of quinia, or quinia prepared as directed in No. and decant the clear into another bottle, 4627, 96 grains; strychnia (in crystals), 3 This preparation is frequently substituted for grains; water, 7 fluid drachms; syrupy phos-guaiacum shavings in the preparation of com-phoric acid (specific gravity 1.5), 9 fluid pound decoction of sarsaparilla. 1 pint of drachms; syrup, 10 fluid ounces. Rub the this essence is considered equivalent to 19

sulphate of quinine, I drachm; rectified spirit, 1 fluid ounce; mix, add of dilute sulphuric acid (specific gravity 1.087 to 1.090), ½ fluid drachm (or less, on no account more), and agitate it thoroughly until solution is complete. A few drops added to water form an excellent wash for foul, spongy, and tender Imperial measure are adopted. gums, loose teeth, &c.; also for weak hair.

Medicated Syrups. Syrup is a concentrated solution of sugar in

Nos. 1356, &c.
4626. Syrup of Phosphate of Zinc. fluid drachm contains 2 grains of zine phosphate and about 18 minims of dilute phosphoric acid. In this formula, avoirdupois weight and Imperial measure are adopted.

4627. Syrup of Phosphate of Quinine. Take of phosphate of quinia, 96 grains; waof phosphate of quinine and acid equal to

The same weight of quinia, prepared by precipitating an acidulated solution of the Imperial measure are adopted. disulphate by solution of ammonia, collecting, washing, and drying at 100° Fahr., may be used, in the absence of the phosphate. In this formula avoirdupois weight and Imperial

syrup, 10 fluid ounces. Rub the powders made in the same manner as the phosphate with the water, add the acid, and filter into of iron, substituting sulphate of manganese the syrup. Each fluid drachm contains 2 for the sulphate of iron. In this formula grains of phosphate of iron and 1 grain of avoirdupois weight and Imperial measure are phosphate of quinine. In the absence of the intended. phosphate of quinia, the same weight of

Imperial measure are adopted.

phosphate of iron with 5 drachms of the wapounds of guaiacum in substance. ter in a glass mortar, dissolve the strychnia 4624. Essence of Quinine. Take dilute and quinia in the acid, previously mixed with ter in a glass mortar, dissolve the strychnia the remaining 2 drachms of water; mix and filter into the syrup. Each fluid drachm contains 2 grains of phosphate of iron, 1 grain of phosphate of quinine, and $\frac{1}{32}$ part of a grain of strychnine.

In this formula avoirdupois weight and

4630. Syrup of Phosphate of Iron and Strychnine may be prepared in the same manner as the last, omitting the phosphate of quinine.

4631. Phosphate of Iron. Dissolve 3 ounces sulphate of iron in 2 pints boiling distilled water, dissolve also I ounce acetate of is a concentrated solution of sugar in soda and $2\frac{1}{2}$ ounces phosphate of soda in watery fluids. If made with pure water, it is another 2 pints boiling distilled water. Mix termed syrup or simple syrup. Where the the 2 solutions, filter the precipitate through water contains one or more medicinal agents, muslin, wash it with hot distilled water till it is called medicated syrup. Full informathe washings no longer form a precipitate tion as to preparation, &c., will be found in with chloride of barium. Dry at a heat not

exceeding 120° Fahr. (Br. Ph).
4632. Syrup of Phosphate of Iron. Phosphate of zinc, 192 grains; water, 11 fluid | Phosphate of iron, 96 grains; water, 9 fluid drachms; syrupy phosphoric acid (specific drachms; syrupy phosphoric acid (specific gravity 1.5), 5 fluid drachms; syrup, 10 fluid gravity 1.5), 7 fluid drachms; syrup, 10 fluid ounces. Rub the phosphate with the water, ounces. Rub the phosphate of iron with the add the acid, and filter into the syrup. Each water in a glass mortar, add the phosphoric acid, and filter the mixture into the syrup. As thus prepared, it contains the same proportion of iron, about 2 minims less of the dilute acid (25 instead of 27), and rather more sugar than when prepared according to the British Pharmacopeia. The phosphate of ter, 13½ fluid drachms; syrupy phosphoric acid (specific gravity 1.5), 2½ fluid drachms; at a temperature not exceeding 100° Fahr. syrup, 10 fluid drachms. Mix the acid with The specimens found in the ordinary course the water, add the quinia, and filter into the of trade are not readily soluble in the acid. syrup. Each fluid drachm contains 1 grain This want of solubility is believed to be due This want of solubility is believed to be due to the length of time they have been kept about 10 minims of the dilute phosphoric before sale, as the best results have been obtained with the phosphate only a few days old. In this formula avoirdupois weight and

4633. Syrup of Phosphate of Manganese may be prepared in a similar man-ner with the following ingredients: Phosphate of manganese, 96 grains; water, 9 fluid measure are intended.

4628. Syrup of Phosphate of Iron
with Quinine. Take of phosphate of iron,
192 grains; phosphate of quinia, 96 grains; ganese, and acid equal to about 25 minims of water, 7 fluid drachms; syrupy phosphoric acid in each fluid acid (specific gravity 1.5), 9 fluid drachms; drachm. The phosphate of manganese is gravity 1.6 fluid course.

4634, Syrup of Phosphate of Iron quinia may be prepared as directed in No. with Manganese. Phosphate of iron, 72 527.
In this formula avoirdupois weight and water, 8 fluid drachms; syrupy phosphoric mperial measure are adopted.

grains; phosphate of manganesc, 48 grains; water, 8 fluid drachms; syrup, 10 fluid ounces. about 30 minims of the dilute phosphoric acid, ing as above. Avoirdupois weight and Imperial measure are understood in the above formula. na.

and Lime. Take of phosphate of iron, 96 1½ ounces cardamom seeds, in 6 pints dilute grains; phosphate of lime, 192 grains; water, alcohol; filter, and evaporate to 3 pints, 8 fluid drachms; syrupy phosphoric acid, Mix 12 ounces of this with syrup made of 2 (specific gravity 1.5). 8 fluid drachms; syrup, pounds sugar evaporated to 12 pints, and mix 10 fluid ounces. Mix the powders with the while hot. This produces a syrup of 30° water in a glass mortar, add the acid, and filter Baumé, which will not ferment. into the syrup. Each fluid drachm contains The phosphate of time is made by precipitation from solutions of chloride of cal-simple syrup cium and phosphate of soda, and dried at! weight and Imperial measure are adopted.

by a gentle heat, and, when perfectly cold, not unpleasant, add the essence of lemon. The syrup of 4642. Hyp add the essence of lemon. The syrup of 4642. Hypophosphite of Iron. Hyphosphate of lime, thus prepared, is colorless, pophosphite of iron is obtained when 128 phoric lemonade, not unpleasant to the faste. on a filter with water. Dose, a tea-spoonful.

advantage in some cases

4638. Syrup of Rhubarb. The officinal method of preparing the fluid extract of mixed salts. hubarb employed for the syrup involves much concentration by evaporation, and reto an objectional resinous precipitation. By a modified process a fluid extract of rhubarb, equal to the officinal in strength, is first ob-

Rub the powders with the water, add the acid, through muslin. The result is splendid. An and alter into the syrup. Each fluid drachm equal product is obtained by mixing the offcontains & grain phosphate of iron, & grain cinal fluid extract with water, letting it rephosphate of manganese, and acid equal to pose some hours, filtering, and then complet-

4639. Syrup of Rhubarb and Sen-Digest for 14 days 6 ounces each 4635. Syrup of Phosphate of Iron bruised rhubarb root and senna leaves, and

Stewart's Simple Syrup of 4640. 1 grain of phosphate of iron, 2 grains of phos. Rhubarb. Macerate 6 ounces bruised rhuphate of lime, and an amount of acid equal to barb in 4 ounces dilute alcohol; press and about 30 minims of the dilute phosphoric acid, filter, and evaporate to 2 pints. Mix 8 fluid ounces of this tincture with 28 fluid ounces

4641. Procter's Compound Syrup of 100° Fahr., and should not be kept too long **Hypophosphites**. Take of hypophosphite before use. In this formula avoirdupois of lime, 256 grains; hyposulphite of soda, 192 grains; hyposulphite of potassa, 128 grains; 4636. Durand's Syrup of Phosphate hyposulphate of iron (recently precipitated), Lime. Take of precipitated phosphate of 96 grains; white sugar, 9 ounces; extract of lime, 128 grains; glacial phosphoric acid, 240 vanilla. 1 ounce. Dissolve the salts of lime, grains; sugar, in coarse powder, 7½ ounces; soda, and potassa, in six ounces of water; put distilled water, 4 fluid ounces; essence of the iron salt in a mortar and gradually add a lemon, 12 drops. Mix the phosphate of lime solution of hypophosphorus acid till it is diswith the water in a porcelain capsule, over a solved. To this add the solution of the other spirit or gas lamp, or in a sand-bath; add salts, after it has been rendered slightly acidgradually the phosphoric acid until the whole ulous with the same acid, and then water, till of the phosphate of lime is dissolved. To this, the whole measures 12 fluid ounces. Dissolve solution add sufficient water to compensate in this the sugar, with heat, and flavor with for the evaporation, then dissolve the sugar the vanilla. Without flavoring, this syrup is

transparent, of an acid taste, and contains grains of hypophorphite of soda, dissolved in two grains of the phosphate of lime, and 2 ounces of water, are decomposed with a nearly four grains of phosphoric acid to each slight excess of solution of persulphate of tea-spoonful. When diluted it forms a phos- iron, and the white precipitate well washed

4643. Parrish's Compound Syrup of 4637. Wiegand's Syrup of Phosphate of Lime. Dissolve I ounce precipitated phosphate of lime in 1 fluid ounce water ounce; hypophosphite of potassa, ½ ounce; by means of 4 fluid drachms muriatic acid; cane sugar, 1 pound, troy; hot water, 20 filter, and add $6\frac{1}{2}$ fluid ounces water; then fluid ounces; orange water, 1 fluid ounce. add 12 fluid ounces sugar, and strain. Dose, Make a solution of the mixed salts in the hot a tea-spoonful. This preparation is not so water, filter through paper, dissolve the sugar acid as Durand's, which is thought to be an in the solution by the aid of heat; strain, and add the orange-flower water. Dose, a teaspoonful, containing nearly five grains of the

4644. Compound Syrup of Phosphate f Iron. Dissolve 10 drachms protosulphate sults in an unsightly preparation, and liable of iron in 2 fluid ounces boiling water; also dissolve 12 drachms phosphate of soda in 4 fluid ounces boiling water; mix the solutions and wash the precipitated phosphate of iron tained by repercolating rhubarb, in moderate-till the washings are tasteless. Dissolve 12 ly fine powder, with a mixture of 3 parts drachms phosphate of lime in 4 fluid ounces officinal alcohol and 1 part water. This boiling water with sufficient muriatic acid to menstruum exhausts rhubarb completely make a clear solution, precipitate it with with the greatest facility. To make the water of ammonia, and wash the precipitate. syrup, take of this fluid extract, 3 fluid oun- To these two precipitates add 20 drachms ces; sugar, 28 troy ounces; water, a sufficient | glacial phosphoric acid dissolved in water; quantity. Add the fluid extract to 12 fluid when clear add 2 scruples carbonate of soda, ounces of water, filter, make up the filtrate to and 1 drachm carbonate of potassa. Next the measure of a pint by adding water add sufficient muriatic acid to dissolve the through the filter, and dissolve in it the sugar precipitate; and lastly 2 drachms powdered with the aid of a gentle heat, and strain cochineal mixed with 3 pounds (troy) sugar; apply heat, and, when the syrup is formed, ter taste, of 35° when cold. strain. It is a question whether a simple ounce contains one grain of santonine. This syrup of phosphate of iron is not equally effi-syrup is an excellent vermifuge. cacious with Professor Parrish's more complicated preparation given above, and known as Parrish's Chemical Food. Each tea-spoonful anha with 30 fluid ounces syrup. (U.S. Ph). contains 1 grain phosphate of iron, 2½ grains This syrup is said to become cloudy occasionphosphate of lime, with smaller quantities ally, and the following preparation claims to of the alkaline phosphates, all in perfect solution.

4645. Chemical Food. This is prepared by the same formula as Professor Parrish's (see No. 4644), omitting the cochineal and muriatic acid, and with this modification was adopted, as well as the two following receipts, by the Newark Pharmaceutical Association.

4646. Compound Syrup of Hypo-grains carbonate of magnesia, in a mortar, phosphites and Iron. Dissolve 256 grains filter, and add sufficient warm water through each of the hypophosphites of soda, lime, and the filter to make the filtrate measure 1 pint; potassa, and 126 grains hypophosphite of then add 29 troy ounces sugar, and dissolve it ounces sugar by gentle heat, to make 21 fluid sure 2 pints when cold. ounces syrup. Each fluid ounce contains 12 grains each of the hypophosphites of soda, of iron. (Newark P. A.)
4647. Compound

as the last, omitting the iron. (Newark

4648. Aitken's Syrup of Iron, Quinia, and Strychnia. Dissolve 5 drachms sulphate of iron in 1 ounce of boiling water, and I ounce phosphate of soda in 2 ounces of the cipitates on strainers until the washings are an eminent degree. tasteless; dissolve 192 grains sulphate of quinia with sufficient sulphuric acid in 2 ounquinia. It is employed mainly as a preparasyrup known as chemical food.

4649. Santonate of Soda. Put into a tilled water. Heat the flask in a sand-bath process is similar to that laid down in the U. or over a store to 70° or 80° Fahr., until the santonine solution is complete; which usually before filtration, this being considered an imrequires about half an hour; then remove provement, as the gummy nature of the squills from the fire, and, when cold, it is convenient renders filtration unsatisfactory without it.

ly evaporated. 4650. Syrup of Santonate of Soda. fluid extracts of squill and of seneka, by mix-Boil 18 fluid ounces syrup until it marks 32° ing 4 fluid ounces of each, evaporating the Baumé; let it cool a few minutes, then add mixture by means of a sand-bath to a syrupy 30 grains santonate of soda dissolved in 1 consistence; triturating this with the carbonate ounce distilled water. You obtain 18 fluid of magnesia, and proceeding precisely as in ounces of a transparent syrup, without a bit-the above formula.

Each fluid

4651. Syrup of Ipecacuanha. Mix 2 fluid ounces officinal fluid extract of ipecacube free from this objection.

Moisten 2 troy ounces ipecacuanha with 1 fluid ounce diluted alcohol, and let it stand for 24 hours. Then transfer it to a conical percolator, and gradually pour upon it diluted alcohol until 1 pint of tineture has passed. Evaporate this by means of a water-bath to 6 fluid ounces, add 10 fluid ounces warm water, and, having rubbed it thoroughly with 45 iron, in 12 ounces water, by means of a with the aid of a gentle heat, and, having water-bath. Filter, and add sufficient water strained the hot syrup, add sufficient warm to make up for the evaporation. Add 18 water, through the strainer, to make it mea-

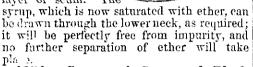
The same advantages are claimed for a grains each of the hypophosphites of soda, syrup made in the following manuer:—To 2 lime, and potassa, and 6 grains hypophosphite fluid ounces of the fluid extract made by repercolation, add 2 fluid ounces water and heat the mixture to the boiling point; then 4647. Compound Syrup of Hypo- heat the mixture to the boiling point; then phosphites. Prepared by the same formula add 12 fluid ounces water, filter, and pour sufficient water through the filter to make the liquid measure 1 pint; in this dissolve 28 troy ounces sugar with the aid of heat, and strain through muslin. Both preparations will be perfectly clear, beautiful, and identical in strength and appearance, the latter possessing same. Mix the solutions and wash the pre- the natural odor and taste of ipecacuanha in

4652. Compound Syrup of Squills. Take 4 troy ounces squill in No. 30 powder, ces of water, precipitate the clear solution by and the same of seneka in No. 50 powder, a very slight excess of water of ammonia, col-mix them together, moisten with ½ pint di-lect and carefully wash it. Dissolve both luted alcohol, and allow it to stand for an precipitates, and also 6 grains strychnia, in 14 hour. Then transfer it to a conical percolaounces dilute phosphoric acid, then add 14 tor and pour diluted alcohol upon it until 3 ounces white sugar, and dissolve the whole pints of tincture have passed. Boil this for without heat. This syrup contains about one a few minutes, evaporate it by means of a wagrain of phosphate of strychnia in each ter-bath to 1 pint, add 6 fluid ounces of boildrachm. The dose might therefore be about ing water, rub the liquid with 1 troy ounce a tea-spoonful 3 times a day. It is perfectly carbonate of mangnesia in a mortar till thormiscible with water, has a strongly styptic oughly mixed, filter, and add through the filand chaly beate taste, and an after-taste of ter sufficient warm water to make the filtrate measure 22 fluid ounces. Dissolve 42 troy tive to the use of cod-liver oil, and in certain ounces sugar in the filtered liquid, and, cases as a concomitant to this food substitute having heated the solution to the boiling in scrofulous diseases, in cases of delicate point, strain it while hot. Then dissolve 48 children, with equal parts of the phosphatic grains tartrate of antimony and potassa in the solution while still hot, and add sufficient boiling water, through the strainer, to make flask, 2 ounces santoninic acid, 4 fluid ounces it measure 3 pints when cold. Lastly, mix pure caustic soda lye, and 12 fluid ounces dis- the whole thoroughly together. The above S. Ph., except in the addition of magnesia renders filtration unsatisfactory without it.

This syrup may also be prepared from the

usually prepared, is very unsatisfactory, displacement apparatus, and pass through the whether for use alone, or mixed with other vapor of 3 pints strong alcohol. Continue separates and floats on the surface of the mixthe strength is exhausted; set aside the 3 ture, bringing with it also some impurities of pints of tineture which first passed, and evapether and scum will come first, unless these be again mixed in by agitating the bottle. The following improvement is taken from the Paris Codex: Provide a bottle which has

upper neck, should have a closely-fitting cork. The bottle must be of a size to contain 1 pint simple syrap and 1 ounce sulphuric ether. Insert these in it and shake well 3 or 4 times a day for 6 days; after which, if allowed to repose, a thin film of ether will rise and float on the surface of the syrup, separated from it by a layer of seum. The



4654. Compound Syrup of Black Cohosh. Macerate 2 ounces black cohosh (black snake-root), 1 ounce seneka root, 1 ounce liquorice root, and 1 ounce ipecacuanha questionable and serious objection. root in dilute alcohol for 24 hours; then water-bath, and convert into a syrup with sufficient quantity of sugar; lastly, treat 2 ounces wild cherry bark with half a pint of cold water, which add to the syrup previously cooled.

4655. Compound Syrup of Sarsaguaiacum wood, 2 ounces each pale rose, senna, and liquorice root. Mix with 3 pints diluted alcohol, and allow the mixture to stand for 24 hours. Transfer to a cylindrical stand for 24 hours. Transfer to a cylindrical percolator, and displace 10 piats with diluted Place in a flask 437½ grains sulphate of iron, alcohol. Evancrate by a water-light to alcohol. Evaporate by a water-bath to 4 5 grains sulphate of soda and 10 minims dipints; filter, and add 96 ounces coarsely lute sulphuric acid with 1½ fluid ounces syrup powdered sugar by the aid of heat, and strain previously heated to nearly boiling point, and while hot. Lastly take 5 minims each of the continue the heat until a ferrous sulphate so-oils of sassafras and anise; and 3 minims oil lution is effected. In another flask place 386 of gaultheria; rub these oils with a small grains chloride of barium, i fluid ounce syrup,

Sarsaparilla. parilla, burdock root and yellow dock; 6 oun-ces stillingia root (queen's root), 2 ounces manner that it may be kept hot. When the turkey pea, 4 ounces false bitter-sweet, 3 ferrous chloride has filtered through, test a ounces dandelion root, 3 ounces juniper beries, 1 ounce prickly-ash berries, 2 ounces rous sulphate; if a white precipitate occurs, a

4653. Syrup of Ether. The combina- and moisten them with alcohol. Let them tion of sulphuric ether with simple syrup, as stand 2 or 3 days, then put them in a steam ingredients; a portion of the ether always the displacement with the steam of water till the syrup. In pouring out a portion from orate the remaining decoctions to 1 quart; the bottle containing it, the floating layer of mix this with the tineture, add 3 quarts sugar-house syrup, and, when cold, add 13 ounces iodide of potassium.

4657. Osborne's Syrup. This is one of the most valuable preparations that can be a small neck inserted in the side close to the made for children. Simmer 114 drachms bottom (see illustration); this, as we'll as the each, rhubarb root, anise seed, and liquorice root, in 45 ounces boiling water over a slow fire till reduced to two-thirds. Then make a syrup with 4% troy pounds white sugar, add 2 18 drachms each manna and compound tineture of opium (paregorie), and 225 grains salt of tartar. In warm weather, add a wineglass of French brandy.

4658. Syrup of Seneka. Evaporate 4 fluid ounces of the fluid extract (sec No. 4598) by means of a sand or water-bath to a syrupy liquid, triturate this with 1 ounce carbonate magnesia, and gradually add 8 fluid ounces of water, constantly stirring; filter, and add sufficient water, through the filter, to make the liquid measure 8 fluid ounces, then dissolve in it 16 troy ounces sugar, with the syrup, which is now saturated with ether, can aid of heat, and strain through muslin while be drawn through the lower neck, as required; hot. The product, for its permanence and it will be perfectly free from impurity, and elegant appearance, cannot be surpassed. To prepare this syrup directly from a fluid extract by merely mixing that with simple syrup, would render the preparation uncommonly thin, and introduce an excessively large proportion of alcohol, which would be an un-

4659. Compound Chloroform Syrup. transfer to a percolator and run through two This formula for an anodyne containing pints; evaporate the excess of alcohol by a chloroform will remain combined and mix readily with either spirit or water. Macerate for 2 or 3 days 16 grains resin of cannabis, 2 grains capsicum, and 8 drops oil of peppermint in 4 drachms chloroform and 1½ drachms ether; filter the product. To about 1 ounce syrup add ½ drachm each of water and perparilla. Reduce the following to moderately chloric acid, and dissolve in this by a watercoarse powder, adopting the troy ounce bath, 16 grains muriate of morphia; when throughout: 24 ounces sarsaparilla, 3 ounces cold add 96 minims Scheele's hydrocyanic acid, add to this the filtrate first made, and syrup sufficient to make the whole up to 4 ounces

portion of the solution, and mix them and I fluid ounce water, and apply heat until thoroughly with the remainder. (U. S. Ph.) dissolved. Pour the two solutions together 4656. Scovill's Compound Syrup of and mix thoroughly by agitation for a few Take 8 ounces each sarsa- minutes, and throw the whole upon a paper guaiacum wood, and 9 ounces bamboo briar few more grains of sulphate of iron must be root. Coarsely bruise the above ingredients, added and refiltered; then add the hydrochloric acid and fill into 4-ounce vials for tar of sufficient capacity with 1 ounce of the

Dose, 2 to 4 tea-spoonfuls.

thoroughly.

Potassium and Iron. Take of iodide of is usually sold in gallon cans, answers well for water, 462 grains; simple syrup (concentratity of ether, and strained, and the other ted), 33½ fluid ounces; dissolve the iodide of allowed to evaporate spontaneously. potassium in the orange-flower water, add the

tion of the syrup.

ide of Iron. Dissolve 286 gruins sesquioxide of iron in 1200 grains hydrochloric acid and 2 liquor are obtained. To this add the remain-

4666. Syrup of Lactucarium. rate 1 troy ounce lactucarium to powder, and each tea-spoonful of which contains nearly 2 heat if with 8 fluid ounces water to the boiling point; maintain the temperature for a few moments, then strain by wringing through monia. muslin; add to the strained liquid gradually, and with constant trituration, 120 grains carpouring sufficient water through the filter to the diluted alcohol, then add the syrup make the filtrate measure 8 fluid ounces, in sufficient to make 1 pint. Dose, a fluid which dissolve 14 troy ounces sugar with drachm containing 2 grains of the valerian etc. heat, and strain through muslin. This makes an excellent syrup and of fine appearance.

tion keeps well.

4668.

be about 3 grains to the ounce.

of tar (strained). 1 ounce (troy); pulverized until 13 pints are obtained, to which add the sugar (refined), 12 ounces; carbonate of magnesia, 3 ounces, rubbed to powder on a sieve; make 18 pints of syrup. It may be flavored alcohol, 2 fluid ounces. Mix the alcohol with with a sufficient quantity of the essence of 6 fluid ounces of water, rub the tar in a mor- sassafras if required. (Am. Dis).

further use. This syrup contains the same sugar, and then with the carbonate of magneamount of metallic iron, minim for minim, as sia, gradually added, until the whole is rethe tincture of chloride of iron of the U.S. duced to a uniform, pulverulent mixture. To Pharmacopæia.

4661. Syrup of Lactate of Iron. which should be continued for 15 or 20 min-Dissolve 1 drachin lactate of iron in 6 fluid utes, 4 fluid ownces of the mixture of alcohol ounces boiling water, and add 12 drachms and water; then strain with strong expression. Return the residue to the mortar, and 4682. Syrup of Bark and Chloride of again triturate, first with 1 ounce of the sugar Iron. Take 1 pint of the saccharine tine- and then with the remaining 4 fluid ounces of ture of red bark, add to this 160 minims each the mixture of alcohol and water, gradually syrup of chloride of iron and hydrochloric added, as before; finally strain and strongly acid. This contains 120 grains of red bark express, and then reduce the dregs by tritura-and 10 drops of syrup chloride iron to each tion to a smooth and uniform condition, and fluid ounce. If it be desirable to mix in any pack firmly in a glass funnel prepared for other proportion, add one measure of hydropercolation, and adjusted to the neck of a chloric acid for each measure of syrup of graduated bottle containing the remainder of chloride of iron. This is a deep red, clear the sugar, and pour upon this the expressed tineture, rather pleasantly bitter; if any doubt exists as to whether it has blackened, the surface, continue the percolation with add dilute alcohol to a small quantity, until it water until the whole measures 1 pint. Agibecomes transparent enough to observe it tate occasionally, until the sugar is dissolved, toroughly.

and strain if necessary. Dose from a dessert to a table-spoonful. The strained tar, such as potassium, 308 grains; iodide of iron (in so-this purpose, but when it is not at hand the lution 1 to 3), 230 grains; orange-flower crude tar may be dissolved in a small quan-

4670. Syrup of Capsicum, other solution and incorporate the syrup.

Preserve it cool and free from light.

4864. Syrup of Tannate of Iron.

Citrate of iron, 2½ drachms dissolved in 1 ounce cayenne pepper first with the carbonate of diluted acetic acid, is added to 12 ounces simmangnesia and sugar, and then with 1 fluid ple syrup, 3 ounces raspberry syrup, and 1 ounce of alcohol, and slowly pour in water drachm extract of galls rubbed up with a por- until 6 fluid ounces have been added. The whole is then to be transferred to a proper 4665. Phillip's Syrup of Sesquichlor-filter; and when the liquor has ceased to pass, to of Iron. Dissolve 286 grains sesquioxide pour on water until 9 fluid ounces of filtered ounces water. Filter, and add 16 ounces der of the sugar, and by a gentle heat form a simple syrup. Dose, a tea-spoonful. pint of syrup. Made in this manner syrup of Tritu- capiscum is a pungent yellowish-brown syrup,

grains of cayeune pepper
4671. Syrup of Valerianate of Ammonia. Take of valerianic acid, 2 fluid drachms; dilute alcohol, & fluid ounce. urate the valerianic acid with carbonate of bonate of magnesia; filter through paper, ammonia, having previously mixed it with

4672. Syrup of Stillingia (Queen's Root). Take of queen's root, 3 pounds; Syrup of Stillingia (Queen's 4867. French Syrup of Balsam of prickly-ash berries, 1½ pounds; refined sugar, Copaiba. Triturate 2½ drachms calcined 18 pounds. Grind and mix the articles magnesia with the yolk of 4 eggs; thoroughly together; place the whole 4½ pounds in a mix with this 5½ ounces balsam copaiba, and convenient vessel, cover them with alcoadd 104 ounces simple syrup. This prepara- hol of 76 per cent., and macerate for three days. Then transfer the whole to a displace-French Syrup of Santonin. ment apparatus, and gradually add alcohol Dissolve 55½ grains santonin in a little until 5 pints of the alcoholic tincture have alcohol, add it to 16 troy ounces boiling been obtained, which retain and set aside. simple syrup. The strength of the syrup will Then continue the percolation with water until the liquor passes almost tasteless, add 4669. Moore's Syrup of Tar. Take the sugar to it, and evaporate by gentle heat (Queen's Root). Take queen's root and flamed bag. This forms a beautiful, clear root of turkey corn, of each 2 pounds; blue syrup, free from turbidness, possessing a deflag-root, elder flowers, and pipsissewa leaves, cided taste of the balsam, with most of its of each 1 pound; coriander seed and prickly-medicinal virtues. ash berries of each ½ pound. Grind and mix
the articles together; place the whole 8 fluid extract of chamomile, 4 ounces; syrup, pounds in a convenient vessel, cover them 12 ounces. Mix wish the syrup moderately have been obtained, which retain and set fluid extract, or from 2 to 4 drachms, aside. Then continue the percolation with 4679. Syrup of Hydrate of Chloral, water, and of this second solution reserve so Mix together 2 scruples hydrate of chloral, 1 much as contains a sensible amount of spirit, drachm water, and 7 drachms simple syrup. of its alcohol, it will make 24 pints. comes to the point of boiling; and if it exceeds 28 pints, evaporate to that point with constant stirring. Then remove from the Bruise well 2 ounces each of water hemlock. reserved alcoholic tineture, and make 4 galcinal virtue. (Am. Dis.)

4674. fluid ounces (see No. 4591); oil of cinnamon, 3 minims; sugar, 36 troy ounces. Mix the times daily. oil of cinnamon with the fluid extract, then the Prussian pharmacopæia, is in officinal proportions, and yields a strictly officinal result.

4675. Alkaline Syrup Rhubarb. Take of alkaline fluid extract of rhubarb, 6 oil of cinnamon with the fluid extract; then add sufficient water to make the whole mix-

percolate with water till 8 fluid ounces of figuid are obtained, in which dissolve the

sam of tolu and carbonate of magnesia, of each, ½ ounce; alcohol, 1 fluid ounce; refined dients. (Am. Dis.)

snoar. 24 nounds. Triturate the balsam of 4684. Corvisart's Syrup of Pepsine. 1 ounce of the sugar, gradually adding the to 70° or 75° Fahr.; mix with 1 part starchy alcohol, and then water enough to make the pepsine, and, after 30 minutes, filter. whole measure 12 fluid ounces. Filter, add

Compound Syrup of Stillingia the syrup, while hot, through a damp cotton-

4678. Syrup of Chamomile. Take of with alcohol of 76 per cent., and macerate for warm, and strain through flannel. The prethree days. Then convey the whole to a paration is as clear as that made from the displacement apparatus, and gradually add flowers, with the convenience of being made alcohol until 4 pints of the alcoholic tincture at will. The dose is one-fourth that of the

and distill or evaporate the alcohol from it. 4680. Syrup of Citric Acid. Discontinue the displacement by water until the solve 60 grains citric acid in fine powder in solution obtained is almost tasteless, and boil sufficient warm or hot water, and add the sodown this weaker infusion until, when added lution to 16 fluid ounces syrup containing 30 to the second solution after the evaporation minims spirits of lemon, shaking them all to-To gether until thoroughly mixed. Syrup made these two solutions combined, add 24 pounds according to this formula has a better appearof refined sugar and dissolve it by heat, care- ance, and retains its brilliance and flavor fully removing any seum which arises as it longer than that prepared according to the U. S. Pharmacoposia.

fire, and, when nearly cold, and the 4 pints of (Phellandrium aquaticum) seeds, queen's root reserved alcoholic tineture, and make 4 gal- (stillingia silvatica), and red Peruvian bark. lons of syrup, each pint of which will be Simmer them with 2 pints boiling water for equal to 4 ounces of the ingredients in medi- 20 minutes; and, when cold, strain. Then German Syrup of Rhubarb. evaporate to 1 pint, add 2 pounds white sugar, dissolve with a gentle heat, removing Take of alkaline fluid extract of rhubarb, 3 any scum that may arise, and strain the mixture while hot. Dose: 1 to 3 drachms 3 or 4

4682. Cadet's Compound Syrup of add sufficient water to make the whole mix-ture weigh 20 troy ounces; in this dissolve ipecacuanha and syrup of poppies, 1 ounce the sugar with the aid of heat, and strain. syrup of orange flowers, and 1½ oxymel of The above formula for syrup of rhubarb, of squill. 2 tea-spoonfuls constitute a dose in whooping-cough.

4683. Compound Syrup of Yellow-dock. Grind and mix together 2 pounds yellow-dock root (rumex), 1 pound bark of false fluid ounces (see No. 4591); oil of cinnamon, bitter-sweet root, ½ pound American ivy bark, 3 minims; sugar, 36 troy ounces. Mix the and ½ pound figwort. Cover them with 76 per cent. alcohol, and let them stand for 2 days. Then displace through a percolator with hot ture weigh 20 troy ounces; in this dissolve water 2 pints extract, which reserve. Conthe sugar, with the aid of heat, and strain.

4676. Syrup of Guaiac. Decidedly serve so much of this second solution as conthe most agreeable manner of administering tains a sensible amount of spirit, distill the guaiae in liquid form, so far as tried, is that alcohol from it, and set it also aside. Continue of a syrup prepared as follows: Take of the displacement with hot water until near guaiae, 1 ounce; solution of potassa, ½ fluid exhaustion, and boil down this until, when ounce; sugar, 14 ounces, troy. Macerate the mixed with the second solution, the two comguaiae in the solution of potassa mixed with bined will make 12 pints. To the mixture of 2 fluid ounces of water for 2 or 3 days; then these two add 16 pounds refined sugar; dissolve by heat, carefully removing the scum, evaporate to 14 pints. When nearly cold add the 2 pints first reserved alcoholic tincture, 4677. Procter's Syrup of Tolu, Bal-making in all 2 gallons syrup. Each pint will contain the virtue of 4 ounces of the ingre-

tolu and carbonate of magnesia together with Heat 15 parts by weight of syrup of cheries

4685. Goddard's Aromatic Blackwater enough to make 1 pint of filtrate, to which add the rest of the sugar, and dissolve ing ingredients: 2 pints blackberry juice, 1 by a very gentle heat. If required, strain pound sugar, 1 pint brandy, 6 nutmegs gent properties of blackberry juice adapt it, troy ounce clarified honey. (U.S. Ph.) A particulary in combination with carminatives, common application in sore gums, mouth, and to the treatment of bowel complaints.

general use of this valuable drug. Rambo, in the Journal of Pharmacy, proposes perties of assafætida with those of wild cherry, clarified honey, 2 ounces; mix without heat and is free from above objections. Take 1 in a glass vessel. Used chiefly as a mouth magnesia; rub these together, gradually add- roses. ing 1 pint infusion of wild cherry bark, and filter. Transfer the filtrate to a bottle, and dissolve in it by agitation 24 ounces white This preparation resembles the syrup of wild cherry in appearance.

4687. Syrup of Milk. Evaporate, with hol in some form. Under clivirs are included constant stirring. 6 pounds of skimmed milk medicated wines, mixtures, &c. to 3 pounds; add 4½ pounds of sugar; dissolve with a gentle heat, and strain. It may by first heating it, and, when cold, charging it with carbonic acid gas.

4688. Grimault's Syrup of Horse-Hager gives the following directions. 50 parts each of fresh scurvy-grass, backbean, and watercress, 60 parts of horseradish, 40 of fresh orange berries, are infused with 3 parts of einnamon in 50 parts white wine, and, after a day, expressed; 250 parts sugar are dissolved in the filtrate.

in an oxymel should preferably be of such character, and such proportions, as to produce a mixture of the proper consistence without further evaporation.

4691. Simple Oxymel. Liquefy by and mix it with 5 imperial fluid ounces each acetic acid and distilled water. (Br. Ph.)

Oxymel of Squills. Mix together 1 imperial pint vinegar of squills and 2 pounds (avoirdupois) clarified honey. Evaporate in a water-bath until it attains, when cold, a specific gravity of 1.32. (Br. Ph.) 4693. Clarified Honey. Melt a con-

venient quantity of honey by means of a water-bath, and then remove the scum. (U.S.

troy ounces red rose, in moderately fine powder, with & fluid ounce diluted alcohol; pack it firmly in a conical glass percolator, and displace 6 fluid drachms with diluted alcohol. Reserve this, and percolate & pint more; evap-25 troy ounces clarified honey. (U. S. Ph.) bismuth, dissolved as directed in No. 4700. Added to water, it makes an elegant astrin- 4702. Elixir of Peruvian Bark and sore mouth, sore throat, relaxed uvula, &c.

grated, ½ ounce bruised cinnamon, 2 drachms | 4695. Honey of Borax. Mix together cloves, and 2 drachms allspice. The astrin- 60 grains borate of soda in fine powder and 1 lips, in thrush, salivation, &c.; also for sore 4686. Compound Syrup of Assafœ- nipples, exceriations, &c., a little being apda. The disagreeable smell and taste of plied on the tip of the finger. Diluted with assafætida prevents to a great extent the water it forms an excellent skin and mouth Mr. wash or lotion.

4696. Honey of Violets. Take of exthe following recipe, which unites the pro- pressed juice of violets (clear), I fluid ounce; ounce assafætida and 2 ounces carbonate of wash, to perfume the breath, as honey of

> Elixirs. A tineture with more than one base; or a compound of various medicinal substances held in solution by alco-

duce to a moderate powder, 8 ounces Calisaya be flavored with the addition of 1 ounce of bark; 4 ounces each orange peel, cinnamon, cherry-laurel water. Milk may be preserved and coriander seed; 1 ounce each anise seed, caraway seed, and cardamoms. Percolate the above ingredients with 4 pints alcohol diluted with 12 pints water, and add 2 pints simple syrup

4699. Ferro-phosphorated Elixir of Calisaya Bark. The percolate obtained in the last receipt, without the syrup, should be digested with fresh hydrated oxide of iron; this is obtained from the solution of tineture of chloride of iron (prepared according to the 4689. Grimault's Iodinized Syrup formula of the U. S. Pharmacopæia, before of Horseradish. This contains 10 parts the alcohol is added), 8 ounces of which soluiodine, and 5 parts iodine of potassium, in tion, precipitated by sufficient ammonia, fur-8000 parts of the above syrup of horseradish. nish the requisite quantity of hydrated oxide of iron. After standing for 12 to 24 hours, with frequent shaking, test a small quantity with a few drops of tineture of iron; if it xymel. An acidulous syrup made blackens with this test, more hydrated oxide of honey and vinegar. The ingredients must be added, until all the cincho-tannic acid is removed, which would otherwise blacken the iron salt hereafter to be added. When the oxide of iron test ceases to blacken, filter the mixture. After which add 2 pints simple syrup, and 2 ounces pyrophosphate of heat 40 ounces (avoirdupois) clarified honey, iron dissolved in the least possible quantity of water. Lastly, after standing for 12 hours, filter the whole. This produces a beautifully clear and pale colored ferro-phosphorate of Calisava bark of an agreeable taste, and free from all blackness.

4700. Ferro-phosphorated Elixir of Calisaya Bark and Bismuth. paration is made according to the last formula, with the addition of 2 ounces create of hismuth, dissolved in a sufficiency of equal parts of water and liquor of ammonia at a gentle 4694. Honey of Roses. Moisten 2 heat. The bismuth solution is added to the clixir at the same time as the pyrophosphate of iron, and the mixture filtered.

4701. Elixir of Calisaya Bark and Bismuth. This may be prepared in the same manner as the ferro-phosphorated elixir orate this last by a water-bath to 10 fluid (see No. 4669); substituting, in the place of drachms, add the reserved liquid, and mix with the pyrophosphate of iron, 2 ounces citrate of

gent wash and gargle for foul and tender gums, Protoxide of Iron. Take 4 ounces Calisaya bark, 1 ounce cinnamon, 1 drachm caraway

precipitate with sufficient liquor of ammonia, don, for the manufacture of quinine. cellent imitation of Nichol's preparation of alone, becomes so by aid of citric acid.

Peruvian bark. 4707. Shinn's Bitter Wine of Iron.

ounces distilled water, and filtering through pint. Dissolve the sulphates and citric acid paper into a flask marked at the point up to in 1½ pints of hot water, and the citrate of which it holds 20 fluid ounces. Meanwhile iron in ½ pint of the same; mix the solutions, shake the iodine and iron with 3 fluid ounces and add the other ingredients. water in a small flask until a clear green 4708. Aromatic Wine of Iron. Diliquid results. Add to this a small portion of gest 1 ounce iron filings for 2 or 3 days in 3 ly, add to the liquid in the bottle enough dis- and will not blacken the iron in the solution. tilled water to make up 20 fluid ounces. Shake it well, and keep it in small bottles,

filled and well stoppered.

4704. Physic's Bitter Wine of Iron. Take of iron filings, 3 ounces; ginger, bruised, gentian, bruised, each, 1 ounce; orangepeel, bruised, ½ ounce; s'rong old cider, 1 pint. Macerate in a bottle loosely corked, acetate of protoxide of iron, with the evolution of hydrogen gas, which swells up the ingredients, and requires that the maceration is made as follows: Dissolve 24 grains sulcapacity of the ingredients. This preparation and filter. Dose, 1 to 4 ounces.

has a dark, almost black color, very bitter aromatic taste, and is a good, though not gest 1 part powdered Peruvian bark in 12 parts an elegant chalybeate, in the dose of a teaspoonfül.

4705. Hubbell's Wine of Iron. Take citrate (of magnetic oxide) of iron, 128 grains; precipitated extract of Calisaya bark, 256 grains. (See next receipt.) White wine ounces. Dissolve the precipitated extract of bark in the wine by aid of a sufficient quanti-ty of citric acid, then add the citrate of iron, filter the solution, and add to it the curaçoa, and miv. The peculiarities of this preparation are, that it consists of iron and cinchona, taste. The label claims for it the presence of ounces. citrate of the magnetic oxide of fron, as the paration is a tea-spoonful.

seed, and 6 ounces orange peel. Reduce 4706. Hubbell's Precipitated Extract them to coarse powder and percolate with 11 of Calisaya Bark. The precipitated extract pints each of alcohol and water. Next dis- of bark employed by Mr. Hubbell is not the solve 4 ounces carbonate of iron in 4 ounces commercial extract, nor yet that of Wetherill, muriatic acid and 2 ounces nitric acid; dilute nor of Ellis, but is made by himself, by a the solution with 8 ounces water, and filter; process based on that of Mr. Herring, of Lonand wash the precipitate. Digest the wet quantity of Calisaya bark is treated with a se-precipitate with the percolated functure for 24 lution of caustic soda (2 parts to 100 of hours, with occasional shaking. This must water), until it has removed the coloring matthen be tested with a few drops of tincture of ter, kinic and tannic acids, and extractive iron, for any cincho-tannic acid that may be matters. The residue is washed with water, left. (See No. 4699.) When all the acid has dried, and extracted with alcohol till exhaustbeen removed, filter, and add 21 pints simple ed, and the alcohol distilled off so as to obtain syrup, and caramel to color; lastly, for every an extract. The extract consists almost fluid ounce add 3 grains pure crystallized sul- wholly of quinia and cinchonia, and is free phuret of iron. This is said to be an ex- from tannin, and, though not soluble in wine

4703. Squibb's Liquor of Iodide of Take of sulphate of cinchona, 6 drackins: Iron. Take of iodine, 2 ounces; iron-wire, sulphate of quinia, 2 drachms; citrate of iron, 5 drachms; sugar, 12 ounces. Make this 4 ounces; citric acid, 1 ounce; sherry wine, sugar into syrup by boiling it up with 8 fluid 4 pints; alcohol, 1 pint; orange syrup, 1

the syrup, and filter the whole through a new fluid ounces lemon juice; add 1 ounce each filter into the syrup, keeping but a small portion of the solution in the filter at a time. Rhenish (or sherry) wine. After 24 hours de-Drain, but do not wash the filter; and, final-cant and filter. Gentian contains no tannin.

4709. To Prevent Sediment in Preparations of Peruvian Bark. The formation of a sediment in this and other simple preparations of Peruvian bark may be avoided by displacing or digesting its powder first with a solution of soda which will extract the tannin, kinovin, &c.; after washing off the last traces of the alkali by means of water, for 2 weeks or longer, then express and filter the alcoholic or vinous tincture may then be for use. A reaction occurs between the iron prepared as usual, and will remain clear, befilings and the acid of the cider, resulting in cause free from the principles extracted by the formation of malate, and perhaps some the alkaline solution. The alkaloids of the bark do not dissolve in weak mineral alkalies.

should be conducted in a bottle of twice the phate of cinchonia in 2 pints Madeira wine,

white wine for 24 hours, and filter. A similar preparation may be made of 20 parts of red wine and 1 part extract of Peruvian bark.

4712. Aromatic Mixture of Iron. grains; precipitated extract of Calisaya bark, Take Peruvian bark in powder, 1 ounce; co-256 grains. (See next receipt.) White wine lumba root in coarse powder, 3 drachms; (sherry). 1 pint; curaçoa (the best). 21 fluid bruised cloves, 2 drachms; filings of iron, separated by a magnet, ½ ounce; digest for 3 days with occasional agitation in a covered vessel, with as much peppermint water as will give 12 ounces of a filtered product, and then add compound tincture of eardamoms, 3 fluid ounces, and tineture of and yet is free from any inky taste or appear-ance, is perfectly transparent, of a light should be kept in a well-stoppered bottle. brown color not very different from that of Properties, tonic, and valuable in various sherry wine, and a bitter, not disagreeable states of debility; dose from ½ to 2 fluid

4713. Procter's Rennet Wine. Take ferruginous ingredient. The dose of this pre- of fresh rennets (about 3), 24 troy ounces; chloride of sodium, 3 ounces; alcohol, 6 fluid

them up, and macerate them for 14 days with meals. frequent agitation in the wine, then add the alcohol, and filter for use. Dose, I tea-spoon-

ful immediately after eating.

4714. Wine of Wild Cherry Bark. Professor Parrish gives the following formula in his "Elements of Pharmacy." Alcoholic extract (from 24 ounces) of wild cherry bark, 5½ ounces; sweet almonds, 3 ounces; water, 1 Macerate 1 part by weight of starchy pepsine, pint; and cherry wine, 2 pints. Beat the and 5 parts sugar, in 2 parts proof spirit, 9 almonds with the water to a paste, rub down the extract with ½ pint of the wine, and mix the two liquids in a bottle of the capacity of 3 pints, stop it closely, and permit it to stand for 3 days, with occasional agitation; then add the remainder of the wine, allow it to stand a week, and filter. By this mode of proceeding, opportunity is afforded for the development of the hydrocyanic acid before the menstruum is made so alcoholic as to retard the reaction which favors its formation. Thus made, wine of wild cherry bark is a transparent, wine-red liquid, having an astringent bitter-almond taste and odor. The dose of this preparation as a tonic and sedative is a tea-spoonful.

4715. Ferrated Wine of Wild Cherry. Exhaust 12 ounces bruised wild cherry bark of its tonic principles with alcohol, and carefully evaporate the alcoholic tincture so as to expel the alcohol; add 6 ounces water and $\frac{1}{2}$ ounce hydrated sesquioxide of iron. Macerate this with occasional agitation for 6 hours. and filter into a bottle containing an emulsion of 2 ounces sweet almonds in 6 ounces water. When reaction has ceased, filter again, and add 12 ounces white sugar, and for every ounce thus prepared, add 24 grains citrate of iron, previously dissolved in water sufficient to make the whole fluid extract measure 24 fluid ounces. The addition of iron to the bitter principle and hydrocyanic acid of the simple extract of wild cherry should render it strychnia, 1/5 grain. (Newark P. A.) much more efficient as a tonic, and greatly 4725. Ferro-Phosphorated Elixir of

add to the value of the preparation.
4716. Ferrated Elixir of Wild Cherry. Take of fluid extract of wild cherry bark, 4 fluid ounces; curaçoa cordial, 11 fluid ounces; pyrophosphate of iron, 256 grains; boiling hol, 4 ounces water, and 2 ounces orange-water, 1 fluid ounce. Mix the fluid extract flower water; displace 10 ounces, dissolve in with the curaçoa cordial. Dissolve the pyrophosphate of iron in the boiling water, and

daily

Elixir de Garus. Digest 2 parts by weight each of aloes and myrrh, and 1 part Spanish saffron, in 24 parts of 60 per cent. alcohol, and 2 of diluted sulphuric acid.

Filter.

Digest for some hours 3 parts by Or: weight each of aloes and myrrh, and 2 parts each of nutmegs and cloves, in 576 parts rectified spirit diluted with an equal weight of seed, 2½ drachms angelica seed, and 1 drachm Then add 864 parts orange-flower syrup, 192 parts orange-flower water and 2 each of cochineal and Spanish saffron. Filter. Dose of either of the above preparations, 1 tea-spoonful 3 or 4 times a day. (Prussian

4718. Elixir of Pepsine. Dissolve 1 part by weight starchy pepsine in 8 parts wa- monia.

ounces; white wine, 16 fluid ounces. Wash of garus and 4 parts syrup of cherries. Dose, the rennets in water until perfectly clean, cut 1, 2 or 3 table-spoonfuls twice during the

4719. Corvisart's Elixir of Pepsine. Saturate 1 part by weight starchy pepsine with 15 parts elixir of garus. Macerate for half an hour in a covered vessel, and filter through wetted paper. Dose, I table-spoonful

before or during meals.

4720. Mialhe's Elixir of Pepsine. parts white wine, and 4 parts water, until the sugar is dissolved; then filter. Dose, 1 tablespoonful before or during meals. This has an agreeable taste.

4721. French Pepsine Wine. This is prepared by macerating starchy pepsine in 20

times its weight of white wine.

4722. Wine of Beef and Iron. Dissolve 1 ounce Liebig's extract of meat in 4 ounces water and 1 drachm bruised allspice; after standing 10 hours add 16 ounces sherry wine and 2 ounces syrup. Then dissolve 96 grains citrate of iron in 2 ounces water. Mix, filter, and add water to make the whole 24 fluid ounces. Each ounce contains 1 ounce fresh beef and 4 grains citrate of iron. Dose, 1 table-spoonful. This and the 6 following formulæ have been adopted by the Newark Pharmaceutical Association.

4723. Nutritive Wine. This is prepared in the same manner as the last receipt,

omitting the citrate of iron. (Newark P. A.)
4724. Elixir of Pepsine, Bismuth, and Strychnia. Triturate 256 grains Hawley's pepsine with 2 ounces glycerine in 4 ounces water; dissolve 64 grains citrate of bismuth, 2 ounces orange-flower water, and add to the pepsine; then add 2 ounces deodorized alcohol, 4 ounces orange-flower water, 2 ounces syrup, and lastly 1 grain strychnia dissolved in a few drops acetic. Each fluid ounce contains: pepsine, 16 grains; citrate of bismuth, 4 grains;

Gentian. Take 1 drachm each coriander and mace; I ounce orange peel, I ounce gentian root. Reduce to powder and percolate with a mixture of 4 ounces deodorized alcoit 256 grains pyrophosphate of iron, add 6 phosphate of iron in the boiling water, and ounces syrup, and filter. Each fluid ounce mix all together. Dose, a tea-spoonful 3 times represents 16 grains pyrophosphate of iron and 30 grains gentian. (Newark P

Wine of Pepsine. Aram te 160 4726. grains Hawley's pepsine in 4 ounces sherry wine and 1 drachm dilute muriatic acid; pour this on a filter and pass 12 ounces more sherry wine through it. Each fluid ounce contains 10 grains pepsine. (Newark P. A.)

4727. Aromatic Elixir. Take 4 drachms orange peel, 2 drachms coriander cochineal. Pulverize and percolate with 12 ounces deodorized alcohol and 10 ounces water. Add 5 ounces glycerine and 6 ounces syrup, to make 2 pints. This is a pleasant vehicle for administering nauseous remedies. (Newark P. A.)

4728. Elixir of Valerianate of Am-nonia. Dissolve 96 grains valerianate of ter; filter the solution, and add 3 parts elixir ammonia in 4 ounces water, and add it to a

mixture composed of 6 drachms syrup of then add the other ingredients, with a suffiorange peel, 2 drachms tincture of prickly cient quantity of caramel to impart a brownash, and ½ ounce each of fluid extract of ish shade to the mixture, and filter through vanilla and compound tineture of cardamoms. paper. Each drachm contains 2 grains valerianate of ammonia.

the syrup and mix them.

4730. Chloroform Elixir. ammonia; 20 drops oil of cinnamon, and 2

for colic. Dose, 1 fluid drachm.

This clixir is also known by the name of acid lesser cardamoms, cloves, galanga root, and ginger, of each 1 ounce; sulphuric acid (spefrequent agitation, then press it out and strain. It should be of a brownish-red color. (Prusnutmeg, of each 3 drachms; lemon peel, 4

as to make 27 ounces. (Austrian Ph.)
4732. Elixir of Valerianate of Ammonia. Extract of valerian, 2 scruples; fluid extract of valerian, 2 fluid drachms; water, 7 fluid ounces. Dissolve the extract in valerianate of ammonia, 2 drachms; orange-flower water and simple syrup, of each ½ fluid ounce. Dose, a tea-spoonful.

4733. Goddard's Elixir of Valerianate of Amme ia. Valerianic acid (from the root), 6 Luid drachms; carbonic acid water, 8 ounces; orange-flower water, 8 fluid ounces; mucilage of gum-arabic, 2 fluid ounces. Saturate the valerianic acid with sufficient caracid water, then add it to the flavoring ingredients and mucilage, and filter. Dose, a teaspoonful.

of Ammonia. Take of valerianie acid, 1 inodorous alcohol, 12 fluid ounces; simple ounces taraxacum root, 4 ounces wild cherry syrup, 12 fluid ounces; peach water, 8 fluid bark, 1 ounce gentian root, 2 ounces orange ounces; saturated tineture of red saunders, 4 peel, 1 ounce cinnamon, 1 ounce coriander seed, monds, 5 minims; and oil of sweet orange, 20 cient alcohol with twice its bulk of water, and carbonate of ammonia to saturate the acid; displace 61 pints with the diluted alcohol.

4735. McMunn's Elixir of Opium. The following receipt is said to have been 4729. Elixir of Taraxacum. Take of found among the effects of the late Dr. Chiltaraxacum root, 6 ounces (or fluid extract of ton: Take 5 pounds of Turkey opium, cut in taraxacum, 6 ounces); liquorice root, 1 ounce; small pieces and dried, and put it into a large simple syrup, 2½ pints. The dry ingredients strong glass jar with a wide mouth, and pour must be reduced to a suitable degree of fine-ness for percolation. Moisten the powder than cover it; then stop the jar tight with a with 6 ounces alcohol diluted with twice its glass stopper, to prevent its evaporation; set it bulk of water, then pack in a conical perco-away in a cool place, and stir it daily with a lator and pour on of the alcohol and water stick, so that all the lumps may be broken. mixture until 61 pints are obtained, then add At the end of a week drain off the ether, and again pour on as much more, and repeat stir-Take 12 ring it every day for a week longer, when it ounces each chloroform, tincture of opium, may be drained off as before. Then stop the tineture of camphor, and aromatic spirit of jar tight, and lay it down on its side, so that all the ether that accumulates near its mouth ounces brandy. This is an excellent mixture may be drained off, and repeat doing so until the opium is all dry. Then expose it to the Mynsicht's Elixir of Vitriol. open air for a few days. The sulphuric ether is also known by the name of acid extracts from the opium the narcotine which aromatic tincture. Take cinnamon, 2 ounces; is its most deleterious principle, and also deprives it of its peculiar noxious odor, so that the elixir will not smell of it thereafter. Now cific gravity 1.845), 1 drachm; rectified spirit, to free the opium of the smell of the ether, (specific gravity .897 to .900), 2 pounds. Mix and to extract its valuable medicinal principles, the acid and spirit, and pour them on the boil it in water, as follows: Pour into a tin other ingredients reduced to a coarse powder; boiler 4 gallons pure soft water, and when hot macerate for 8 days in a close vessel, with | (but not boiling), put in the opium, when a great ebullition will take place, which is owing to the evaporation of the ether. Then let sian Ph.) Another formula directs as follows: it boil 10 or 12 minutes, occasionally stirring Take sweet flag root, and galanga root, of it, so that the lumps of opium may be all each 1 ource; ginger, cinnamon, cloves, and broken and dissolved. Then set it away till the next day, when it should be strained drachms; white sugar, 3 ounces; proof spirit, through a cloth strainer, and if there be not 2 pounds; dilute sulphuric acid, 3 ounces. 4 gallons of the solution, pour on the residue 4 gallons of the solution, pour on the residue Macerate for 6 days, then press and filter, so of opium boiling water enough to make that quantity when it is strained and clear. When in the state of watery solution, it is better to be kept in stone crocks that will hold about 2 or 3 gallons each, and in a cool place; after standing 5 or 6 days the clear solution should the fluid extract and water, filter, and add be carefully dipped off into a large tin can. The skimmings and dregs should be strained, and when clear put with the other. To this 4 gallons of watery solution, add 51 gallons alcohol and stir the mixture thoroughly; then cover the can tight, so as to prevent evapora-tion. After standing a few days, the clear fluid cunces; red Curaçoa cordial, 20 fluid elixir may be carefully dipped off into another can, and the dregs at the bottom strained, and, when clear, poured into the other. After standing undisturbed for a few weeks it will bonate of ammonia diluted with the carbonic be fit to use. It will be equivalent to laudanum, both in its strength and the size of its dose

4736. Compound Elixir of Taraxa-4734. Moore's Elixir of Valerianate cum. As prepared by Mr. Candidus for Dr. Cochran, of Mobile. Reduce the following fluid ounce; distilled water, 24 fluid ounces; ingredients to a moderately fine powder: 6 fluid drachms; saturated tineture of recent 2 drachms each anise, caraway and cardamom orange peel, I fluid ounce; oil of bitter al- seeds, and I ounce liquorice root. Dilute suffiminims. Mix the valerianic acid and the moisten the powdered ingredients with 6 distilled water, and a sufficient quantity of ounces of it, pack in a conical percolator and Add to this 2½ pints simple syrup. Dose, lastly, add 6 pounds finest white sugar broken from \(\frac{1}{2}\) to 1 ounce. vehicle for quinine, the taste of which it com-

pletely destroys.

4737. Squibb's Ammonio-Pyrophosphate of Iron. Take of pyrophosphate of soda, 4 parts by weight; solution of tersulphate phate of soda (which is prepared by first drying and then calcining common phosphate of soda) in 60 parts water by means of heat; cool the solution to 50° Fahr, and filter it into a bottle of the capacity of 250 parts. Then add the solution of tersulphate of iron (see No. 4816), shake the mixture well, fill the bottle up with water, again agitate it, and set it aside for 24 hours to settle. Decant the clear liquid from the precipitate by means of a syphon, and repeat the washing and decantation twice. Then pour the precipitate upon a strainer, drain it basin. Upon the citric acid, contained in a suitable vessel, pour the solution of ammonia, tion of the liquid for a few minutes, and rea little at a time, with constant stirring, till the crystals are dissolved and the acid accurately saturated. Then add this solution to the precipitate in the basin, and apply heat. rapidly through of Stir the mixture constantly till perfectly disastonee run clear. solved, and evaporate the solution to 24 parts; 4740. Elixin then filter through paper. Finally pour the solution upon plates, dry the salt by a moderate heat, and keep it in well-closed bottles. The yield is a little more than 7½ parts. The salt is deliquescent, in the form of pale vellowish green scales.

4738. Ammonio-Ferric Alum. This elegant styptic remedy has recently been much prescribed, especially in leucorrhœa; it is made as follows: Take of crystallized protosulof ammonia, 18 drachms. Boil the sulphate of iron in 2 pints water and add to it the sulphuric acid; when dissolved, add the nitric acid gradually, boiling for a minute or two after each addition, until the nitric acid ceases to produce a black color; boil violently, to separate deutoxide of nitrogen, and reduce the liquid to about one half, then add the sulphate of ammonia and a little surprise acre internally reingerant, and set it aside to crystallize. Wash the crystals thoroughly in a little cold water to which ternally caustic. As a refrigerant, it is administered in doses of ‡ fluid drachm to 1 phate of ammonia and a little sulphuric acid crystals. Its peculiar merit consists in its marked astringency without the stimulating properties of some of this class of salts. It is easily assimilated when taken internally. excessive discharges, is often useful in correcting their cause. Though called an alum, the double sulphate of potassa and iron, which is called iron alum, but is more soluble.

4739. Concentrated Infusion Roses. Rose petals or leaves, 3 pounds; boiling water, 2 gallons; infuse 2 hours, with constant agitation, then press out the liquor Collodion. To 10 troy ounces nitrate of poin a very clean tineture press, strain through tassa, add 15½ troy ounces sulphuric acid, and flannel or a hair sieve, add diluted sulphuric stir until uniformly mixed. acid, 24 fluid ounces, agitate well, and filter below 122° Fahr., add ½ troy ounce cotton, through paper supported on coarse muslin; freed from impurities, stirring with a glass

This elixir is an excellent up into small lumps, but perfectly free from dust and dirt. When dissolved, put the infusion into clean, stoppered green glass bottles, and keep it from the light in a cool place.

Product very superior.

Or: Take rose leaves, acid, and cold water, of iron, 8 parts; citric acid, 22 parts; water of as last, mix, and infuse for 48 hours in a ammonia, 62 parts. Dissolve the pyrophos-clean, covered, earthenware vessel, then press clean, covered, earthenware vessel, then press out the liquid with the hands, filter, and add the sugar as before. Product very fine, and. keeps well. In employing the first formula, care should be taken that the utensils be perfectly clean, especially the press, and earthenware glazed with lead should be avoided. The pressing should also be conducted as rapidly as possible, to avoid the color being injured by the iron, though clean iron does not readily injure infusion of roses before the addition of the acid. Should not the infusion filter quite clear through paper, the addition for 24 hours and transfer to a tarred porcelain of the whites of 2 or 3 eggs, diluted with 2 or 3 ounces of water, followed by violent agitapose for 1 or 2 hours, will usually render it fine, when it may either be decanted or fil-tered should it require it. It will now pass rapidly through ordinary filtering paper, and

4740. Elixir of Vitriol. Called also aromatic sulphuric acid. In order that elixir of vitriol may be miscible with water without precipitation, aromatics of an oleo-resinous nature cannot be used. Add gradually 3 troy ounces sulphuric acid to 1 pint alcohol, and pour 1 fluid ounce boiling water on 2 drachms red rose leaves; when both liquids have become cool, add 1 fluid ounce fluid extract of orange-peel, and add alcohol enough to make the whole up to 18 fluid ounces. Mix and filter. Elixir of vitriol thus prepared phate of iron, 8 ounces; sulphuric acid, 7 fluid Mix and filter. Elixir of vitriol thus prepared drachms; nitric acid, 11 fluid ounces; sulphate has a pleasant aromatic odor and flavor, and the beautiful red color of the rose leaves, heightened by the presence of the acid. It is miscible with water without turbidity, and a specimen, after long keeping, has deposited but a trace of sediment.

Alcoholized Sulphuric Acid. 4741. To 3 parts rectified spirits, add, very gradually, 1 part sulphuric acid. It is usually colored

4742. Cantharidal Collodion. Take 8 troy ounces finely powdered cantharides, press it firmly in a cylindrical percolator, and pour on it 1½ pints stronger ether. When 15 Dose, 3 to 6 grains, and while it controls fluid ounces have passed, set the liquid aside in a close vessel, and continue percolation with stronger alcohol until 1 pint more liquid this salt contains no alumina; it is similar to is obtained. Set this last aside to evaporate spontaneously until reduced to 1 fluid ounce; then mix it with the reserved liquid. Next add 100 grains dry collodion cotton (see next receipt), and agitate until dissolved. (U. S. Ph.)

4743. To Prepare Gun Cotton for When cooled

vessel, and wash it, first with cold water until evaporate the resulting product over a water-the washings cease to have an acid taste, and bath until it is of nearly the required consistdry as possible with the hand, pack it tightly in a conical percolator, and pour on it stronger alcohol until the remaining water is displaced. Lastly, press it as dry as possible mixed with the extractive portion; is much with the hand. The cotton thus prepared, and dried at a temperature of 212°, weighs tions, and contains all the active ingredients 336 grains.

To Prepare Collodion. Mix 21 fluid ounces stronger ether with 6 fluid ounces stronger alcohol in a suitable bottle, add the quantity of moist prepared cotton (as prepared in the preceding receipt), and shake

occasionally until dissolved.

4745. Morphia Collodion. Collodion, 30 parts; muriate of morphia, 1 part. Applied to the affected parts in obstinate neu-

ralgia.

4746. To Administer Hydrate of Chloral. Physicians should prescribe only the crystals, and should be very certain that they are pure. The taste of hydrate of chloral is quite unpleasant, but orange-juice comwater or essence of peppermint. If taken in 4 times their weight of olive oil for some aqueous solution, let the patient be directed days, or they are gently boiled in it until after swallowing the dose, or mix with the salt towards the end of the process solution a little peppermint water, with syrup is not greater than that of boiling water. As of tolu. The following is a good formula: soon as either process is complete, the oil is water, 1 ounce; syrup tolu, 1 ounce; water, 2 ounces. Dose, from ½ ounce to 2 ounces, as of a press. The product is usually strained prepared in large quantities, nor be kept for any length of time.

Mixture. To obviate unpleasant and dangerous souring of chalk mixture as commonly prepared, glycerine may be substituted for the sugar, according to the following formula: Take of prepared chalk and glycerine, of each 1 ounce; pure gum acacia, 2 drachms; cinnamon water and pure water, of each 4 ounces. Rub well together until thoroughly mixed. This mixture will keep during a whole suming effect upon the bowels, as well as in some

degree arresting fermentation.

mint; when dissolved add sulphuric ether, ½ John's wort flowers; fresh tobacco leaves. fluid ounce; mix well. Dose, 2 to 6 drops. Others are used dry, and reduced to pow-This was recommended by Augustin in epilepsy, paralysis, and other like nervous affections.

4749. Compound Spirit of Ether. This preparation is known by the name of Hoffmann's Anodyne, and consists of ½ pint ether, 1 pint alcohol, and 6 fluid drachms ethereal oil

4750. Moore's Extract of Black Co-osh. Moisten black cohosh root (black the alcohol until the resinous portion is exhausted; evaporate the alcoholic portion to dryness, powder the product and pass it through a fine sieve. Proceed to displace grains camphor in a mortar with 40 minims

rod: cover the vessel closely, and, after stand- | with diluted alcohol (1 part alcohol to 2 of ing 24 hours, transfer the cotton to a larger water) until the root is perfectly exhausted. then wash with boiling water. Press it as ence of a good extract, then mix the powdered resinous portion, while the fluid is still warm, and stir constantly until cold. In this way the resin is intimately and smoothly of the root; but, however carefully prepared, change of temperature is liable to separate the resin more or less from the extract.

4751. Procter's Alcoholic Extract of Arnica. Take arnica flowers, 12 ounces, troy; alcohol, 3 pints; water, 1 pint. Mix the alcohol and water, and pour 2 pints of the mixture over the arnica, previously finely bruised. Allow it to stand for 48 hours, pack it firmly in a percolator, and pour on the remainder of the mixture until 3 pints are obtained. Evaporate this tincture in a waterbath (or still) till reduced to a soft resinous

extract.

4752. Medicated Oils. These are prepared by infusion or decoction. The bruised pletely covers it, and so does peppermint ingredients are either simply digested in 2 to to suck the juice of an orange immediately they become dry and crisp, care being taken Take chloral hydrate, I drachm; peppermint allowed to drain from the ingredients, which may be, if necessary, submitted to the action may be required. The mixture should not be through flannel or a hair sieve while still warm, and, after standing a week or 10 days to settle, the clear portion is decanted from 4747. Improved Formula for Chalk the dregs. Green plants are usually employed for this purpose, but in many cases the dried plants, reduced to powder, and digested for 6 8 hours in the oil at the heat of hot water,

ith frequent agitation, yield a much more valuable product. These oils are nearly all employed as external applications only.

The oil is obtained from the following, in the green state: Balsam apple, the seeds first taken out; belladonna leaves; elder The glycerine exerts a positively sooth-ffeet upon the bowels, as well as in some e arresting fermentation. | lock leaves; fox glove leaves; garden night-lock leaves; fox glove leaves; garden night-lock leaves; henbane leaves; juniper berries, 4748. Phosphorated Ether. Dissolve crushed; white lilies; poison oak leaves; 2 grains phosphorus in ½ drachm oil of pepper-roses, the petals of the flowers; fresh rue; St.

der, such as: Cantharides (Spanish flies); capsicums; dried chamomile flowers; fenugreek seeds; marsh-mallow root; mudar bark; opium; pellitory root; black pepper, &c.

Medicated Waters. These are aqueous solutions of different subsnake-root, or cimicifuga racemosa) in No. 50 stances for medicinal and other purposes. powder, with 95 per cent. alcohol, and pack The methods of preparing them generally closely in a displacer; add gradually more of require special arrangements to dissolve the

alcohol; triturate it first with ½ troy ounce then poured on, the first part of the filtrate is carbonate of magnesia, then with 2 pints dis- rejected, and the latter portion is kept for use. tilled water, added gradually. Filter through

paper. (U. S. Ph.)
4755. Bitter Almond Water. Rub 16 minims oil of bitter almonds with 1 drachm carbonate of magnesia, adding 2 pints wa-

ter gradually. Filter through paper. (U. S.

4756. Cinnamon Water. Treat 1

pints of the distillate. (U.S. Ph.)

4757. Fennel Water. Treat ½ fluid drachm oil of fennel in the same way as last

coarse powder. (U. S. Ph.)

4758. Peppermint Water. Same as last, using 1 fluid drachm oil of peppermint, or 18 troy ounces peppermint. (U.S. Ph.)

4759. ` Spearmint Water. Same as

last, from oil of spearmint.

4760. Lime Water. Take of lime, 2 ounces; distilled water, 2 quarts. Slack the lime with a little of the water; pour on the remainder of the water and stir them to-gether; then immediately cover the vessel and let it rest for 4 hours. Keep the solution, with the undissolved lime, in glass-stoppered bottles, and when wanted for use, pour off the clear liquor. It is an anti-acid tonic, kills worms, and frees the bowels from slimy and morbific matter. It promotes digestion; it is valuable in looseness, scrofula, diabetes, and whites. Mixed with a decoction of Peruvian bark, it wonderfully strengthens the debilitated, and those threatened with atrophy.

4761. Lobelia Water. Lobelia leaves and capsules, or powder, 1 ounce; boiling water, 1 pint; brandy, 1 pint. Infuse a week. Good for sore and inflained eyes, erysipelas,

ringworms, &c.

4762. Fever Drink. The juice of a lemon; cream of tartar, 1 tea-spoonful; water, 1 pint. Sweeten with loaf sugar. When

the patient is thirsty, let him drink freely.
4763. Saline Mixture. Take fresh lemon juice, 12 ounces; carbonate of potassa, drops. Mix. A tea-cupful to be taken often

in inflammatory fevers and sore throat.
4764. Tar Water. Take of tar, 2 pints; water, 1 gallon. Mix, by stirring them with a wooden rod for a quarter of an hour, and, after the tar has subsided, strain the liquor, and keep it in well-corked-phials. Tar-water the precipitate at first thrown down is very should have the color of white wine, and an empyreumatic taste. It is frequently used as a remedy in chronic bronchitis. It acts as in combination with which it forms a yellow a stimulant, raising the pulse and increasing the discharge by the skin and kidneys. It may be drunk to the extent of a pint or two in the course of a day.

4765. Tar Water. M. Magnes Lahens

He uses 1 ounce tar and 26 ounces of sand to obtain 2 pints of the medicated water, which corresponds in strength with that of the Paris codex

4766. Camphor Water. Take 1 ounce of camphor and enclose it with a glass marble in a muslin bag; put this into a wide-mouthed bottle, such a one as is used for preserved fluid drachm oil of cinnamon in the same fruit. Now fill up the bottle with water that manner as in the last receipt. Or, by distilling has boiled a few minutes and has been allowed 18 troy onness coarsely powdered cinnamon to become cold. The glass marble is used to in 16 pints water, preserving only the first 8 keep the camphor from floating, which it otherwise would do. After about 3 days the water will become saturated with the camphor, and may be poured off as required. A winereceipt. Or, by distillation from fennel in glassful is a dose. It is very useful as an anti-spasmodic in hysteric and nervous affections.

4767. Barley Water. Wash away with cold water all extraneous matter from 2 ounces pearl barley; then boil for a short time in pint water, throw this away, and boil the parboiled barley in 4 pints water down to 2

pints, and strain.

4768. Distilled Water. Take 10 gallons of spring water; distill it, rejecting the first quart that comes over, and preserving the next 8 gallons of the remainder.

Solutions. In pharmacy, a solution consists of water in which a certain fixed quantity of a soluble substance has been dissolved. (See No. 29). (See No. 29).

Solution of Acetate of Mor-4770. phia. Mix 4 drachms acetate of morphia with 15 drops acetic acid, 1 pint distilled water, and ½ pint proof spirit. Dose, from 5 to 20 drops.

4771. Solution of Sulphate of Morphia. Dissolve 1 grain sulphate of morphia in 1 fluid ounce distilled water. Dose, 1 teaspoonful, used in the same cases as opium

Compound Solution of Alum. Rub together I ounce each alum and sulphate of zinc; dissolve in 3 pints boiling water. If 1 drachm; white sugar, 3 drachms; pure wancessary, filter. This is detergent and ter, 12 ounces; essence of peppermint, 30 astringent, and is used as a lotion for old ulcers, excoriations &c.; and, largely diluted with wa-

ter, as an eye-wash and injection.
4773. Solution of Ammonio-Nitrate of Silver. Dissolve 44 grains pure crystallized nitrate of silver in 1 fluid ounce distilled water; add gradually ammonia water until nearly, but not entirely, redissolved. This solution is used as a test for arsenious acid,

precipitate, arsenite of silver.

4774. Solution of Chloride of Barium. Dissolve 1 drachm chloride of barium in 1 fluid ounce water, and filter the solution. Dose, 5 drops, gradually increased to 10 or 12 drops, 2 or 3 times a day, for scrofula, scirsuggests a method of preparing this water, drops, 2 or 3 times a day, for scrofula, scirwhich is more expeditious and convenient rhous affections, and worms. Is used externalthan the plan commonly followed. He mixes ly, largely diluted, as a lotion in scrofulous ophthe tar with sand, previously washed and thalmia; also as a test for sulphuric acid and dried, throws the mixture into a percolator, the soluble sulphates, in contact with which it and shakes the instrument gently to secure makes a heavy white precipitate, insoluble proper adjustment of the mixture. Water is in either hydrochloric or nitric acid. It is said to detect the presence of 10000 part of sulphuric acid.

4775. Solution of Diacetate of Lead -sometimes called Extract of Lead. Boil 27 ounces acetate of lead, and 16 ounces finely powdered litharge, in 3 quarts water for 1 an hour, constantly stirring; then add sufficient distilled water to make up 3 quarts. If required, filter, and keep in a closed vessel. This solution is almost the same in strength and preparation as the solution of subacetate of lead of the U.S. Pharmacopæia.

4776. Goulard's Water or Lotion. Mix 11 fluid drachms diacetate of lead with 2 fluid drachms proof spirits and 1 pint distilled This lotion is sedative, refrigerant. and astringent. This is the dilute solution of

diacetate (or subacetate) of lead.

Donovan's Arsenic and Mer-Triturate 6 grains finely cury Solution. powdered pure arsenic, 16 grains pure mercury, and 50½ grains pure iodine, with ½ fluid drachm alcohol, until dry; then add gradually 8 fluid ounces water, triturating constantly; heat the mixture in a flask until it begins to boil, and, when cold and filtered, add sufficient water to make up to 8 fluid ounces 6 fluid drachms. Dose 10 to 30 drops, 2 or 3 times a day, soon after a meal, for scaly skin diseases.

4778. Standard Solution of Chloride of Calcium. Dissolve carefully 2 grains pure carbonate of lime in a little pure hydro-chloric acid; evaporate the solution to dryness, and dissolve the residuum in 1 pint pure This forms the standard solution of water. 16° of hardness. 1 measure of this solution mixed with 15 of water constitutes a solution of 1° of hardness; 2 measures of it with 14 of water make a solution of 2° of hardness &c. This solution is the standard used in testing the hardness of water.

Solution of Iodide of Potassium. Dissolve 10 grains iodide of potassium and 5 grains iodine in 1 pint water. Dose, 2 to 6 grains in the usual case where

iodine is employed.

4780. Solution of Chloride of Cal-Dissolve 4 ounces fused (or 8 ounces crystallized) chloride of calcium, in 12 ounces water, and filter. Dose from 10 drops to 2 drachms, for scrofulous tumors, &c.; also used as a test for sulphuric acid, in contact with which it throws down a white precipitate insoluble in nitric acid.

Solution of Sulphate of Morphia. Dissolve 16 grains sulphate of morphia in 4 drops dilute sulphuric acid, 1 fluid ounce water, and 1 fluid drachm rectified spirit. Dose, 5 to 10 drops.

4782. Solution of Nitrate of Baryta. Dissolve 4 grains nitrate of baryta in 80 grains water. This is used in the same manner as chloride of barium (see No. 4774) for testing sulphuric acid, with the same results.

Solution of Nitrate of Silver. Dissolve 1 drachm crystals of nitrate of silver in 1 fluid ounce distilled water. It must be in contact with it. (See No. 104.) A better protected from the action of light. This is plan of filtering the above is as follows: The employed as a test for soluble chlorides, any of which, slightly acidulated with nitric acid, some fragments of broken glass, over which

4784. Liquor of Potassa; Solution of Potash; Soft-Soap Lye. Take 1 gallon boiling distilled water; use sufficient of this to slack 8 ounces recently burnt lime in an earthen vessel; in the remainder of the water dissolve 15 ounces carbonate of potassa, and add the slacked lime. Cork the mixture closely in a vessel, and shake it frequently until cold, then allow it to settle and decant the clear liquid into clean, well-stoppered greenglass bottles. Liquor of potassa is antacid, diuretic, and resolvent. In indigestion, acid eructations, heartburn, &c., it may be taken with great benefit. It neutralizes the acid, and counteracts the morbid tendency of the stomach to acid secretion. Dose, 10 drops, gradually increased to 40. It is powerfully poisonous, and should be greatly diluted in anything not acidulous. When pure, it does not effervesce with acids, nor give a precipi-

tate with lime-water, or with a solution of oxalate of ammonia. (See No. 101).

4785. Liquor of Soda; Solution of Soda; Soda Lye; Hard-Soap Lye; &c.
The proportions are, crystallized carbonate of soda? soda, 32 ounces (troy); recent quicklime, 9 ounces (troy); boiling water, 1 gallon; the lime being slacked with a little of the water. The product is stated to have specific gravity 1.061, and to contain about 5 per cent. of pure caustic soda. The process by which the above is made is similar to that noticed under "Liquor of Potassa." The test of its purity, and uses, are also the same. (See Nos.

4784 and 102.)

4786. Solution of Chloride of Lime. This solution, usually called bleaching liquor, is prepared of 1 part chloride of lime to 10 parts of distilled water (both by weight). That is, 2 ounces to the pint, or 1 pound to the gallon. This is the ordinary strength of that of the shops; but in that which is sold as Concentrated Solution of Chloride of Lime. the proportions are usually 3 parts of the chloride to 20 of water. That is, 1½ pounds per gallon. The British Pharmacopæia directs the chloride to be triturated with the water in a wedgwood-ware or porcelain mortar, and having transferred the whole to a stoppered bottle, to be well shaken, several times, for the space of 3 hours; lastly, the solution is to be filtered through muslin, and preserved in a stoppered bottle. The specific gravity of that of the Pharmacopæia is 1.035. On the large scale, the ingredients are usually placed in a carboy, or a stone-ware bottle, which they will only $\frac{2}{3}$ or $\frac{3}{2}$ fill, and, after being corked or bunged close, agitated frequently for a day or two. A cork or bung of bees'-wax or gutta-percha should be used for the purpose, unless the vessel is a stoppered one. After repose for 2 or 3 days, the clear portion is decanted through a funnel choked with crushed glass into bottles. The last should be closely corked (preferably stoppered), and kept in a cool and dark place. Nothing metallic should be allowed to come neck of the funnel should be choked with will give a white, curdy precipitate (chloride a layer of smaller ones should be placed, and, of silver) when brought in contact with dilu-ted nitrate of silver.

is much superior to that ordered in the Phar-should be stirred occasionally with a glass macopæia, as the contact with the muslin, rod; and, when the solution is complete. and the longer exposure, weaken the solution. The U.S. Pharmacopeia directs the solution of chloride of lime to be prepared by mixing 12 troy ounces muriatic acid with 1 pint distilled water; gradually adding 6 troy ounces decomposition of the indigo, which would marble in small pieces. Towards the close of result in the formation of sulphurous acid the effervesence, apply a gentle heat, and, and indigo green. This is the sulphate of

4787. Solution of Chloride of Potash. This solution is also known as Javelle's Bleaching Liquid: Eau de Javelle, &c. This is best part sublimed carbonate of ammonia in 3 made by passing gaseous chlorine into a solu- parts water, and adding 1 part ammoniation of 1 part of carbonate of potash in 10 water. Used in chemical analyses, and as parts of water, until the gas ceases to be a very delicate test for the presence of lime. absorbed. It may also be made by adding from a solution of which it forms a white prea solution of carbonate of potash to a solution of chloride of lime, with agitation, as long as a precipitate forms; the liquid being after-wards decanted or filtered. These processes are precisely similar to that for the soda solution, an equivalent portion of carbonate of bottles securely stoppered.

potash being used. (See Nos. 4788, &c.)
4788. Solution of Chloride of Soda. Also variously called Solution of Chlorinated Soda; Solution of Hypochlorite of Soda; Labarraque's Disinfecting Fluid; Eau de Labarraque. Take of crystallized carbonate of soda, 12 ounces avoirdupois; distilled wafrom a mixture of common salt, 4 ounces; binoxide of manganese, 3 ounces; sulphuric acid, 21 fluid cunces, previously diluted with 3 fluid ounces water, heated in a retort together, and the gas purified by passing through a wash bottle containing 5 ounces water, before it enters the soda solution.

4789. Solution of Chloride of Soda. To a solution of chloride of lime (formed of in Boettger's Notizblatt recommends that in preparing this solution from chloride of lime. form by decantation.

4790. Solution of Ammonio-Sulphate of Copper. Dissolve 1 drachm of the ammonio-sulphate in 1 pint water, and filter. This is stimulant and detergent. plied as a lotion to indolent ulcers; and, cornea. Also used as a test for arsenical compounds, with which it throws down a green precipitate.

allow it to repose for 48 hours. Then dilute with twice its weight of seft water, adding this also very gradually, to prevent heating. This precaution is necessary to prevent partial when the action has ceased, pour off the clear liquid, and evaporate to dryness. Dissolve the residue in 1½ times its weight of distilled water, and filter through paper.

A797 Solution and the sulphate of the sulphate of indigo or liquid blue of trade. This solution is preferably prepared by using 5 parts fuming sulphuric acid instead of the 8 parts oil of vitriol. (See No. 98.)

vitriol. (See No. 98.) 4792. Solution (Solution of Carbonate of Amcipitate soluble in nitrie or hydrochloric acid.

4793. Solution of Sulphuretted Hydrogen. Pass sulphuretted hydrogen gas through cold distilled water, recently boiled, until it will absorb no more. Keep in small

4794. Solution of Santonin. The insolubility of santonin in water impairs its utility as a vermifuge. Water, cold or warm, takes up the merest trace. Chloroform, absolute alcohol, the strongest acetic acid, turpentine, hot olive oil, and hot glycerine, are the only simple fluids that dissolve any apter, 1 Imperial quart; dissolve, and pass preciable quantity. But it separates from the through the solution the chlorine evolved oil and glycerine on cooling; and water added to the other solutions produces the same result. By the use of the following formula, however, a useful and effective solution may be obtained. Put 20 grains bicarbonate of soda and 3 ounces distilled water into a flask; keep the liquid near the boiling point and add 12 grains santonin, finely powdered, about 2 grains at a time, until the whole has dissolved. Solution is effected in about half chloride of lime, 1 pound; water, 3 pints), an hour, during which time the water is readd a solution of carbonate of soda (formed duced to 2 ounces, or, if not, may be reduced of carbonate of soda, crystallized, 7 ounces; to that bulk, when 1 ounce will contain a full water, 1 pint), and, after agitation for about dose—6 grains of santonin. The solution is 10 minutes, decant or filter, and preserve the filtrate in a well-stoppered bottle, and in a cool and dark place. This is the formula of the Dallin Places are in the formula of the places. the Dublin Pharmacopæia, and often more acid, an equally bright and permanent soluconvenient than the preceding one. A writer tion is formed. Both may be diluted to any extent with hot or cold water without impairing the solution of santonin. The whole, bicarbonate of soda be used in place of sal-soda. There is no question but that the pre-cipitate will be much less bulky, and more of rectangular plates, with bevelled edges, imthe liquid will be recovered in a concentrated mediately by mineral acids, and after some

hours by excess of acetic acid.
4795. Miscible Copaiba. parent balsam of copaiba with half its volume of strong liquid of potassa of double strength. Different samples often require slightly dif-ferent quantities of the solution of potassa; it largely diluted, to remove specks on the is therefore best to mix them gradually and cautiously together. Should the mixture be opaque, a little more of one or other of the ingredients, as the case may be, will render 4791. Solution of Indigo. Place a it clear. No heat should be used. This artistone-ware vessel containing 8 parts oil of cle is miscible with water, with which it vitriol in a tub of very cold water; add 1 part forms a kind of milk; and, from containing fine powdered indigo very gradually, to prevent the mixture from heating. The mixture valuable preparation. Its activity is considered equal to the balsam itself, and is causes more ready solubility, before the addi-

given in similar doses.

M. Leconte prepares this solution Potassa. in the following manner: Caustic potassa, 6 drachms; chlorate of potassa, 5 drachms; binoxide of manganese, 5 drachms. Dissolve the caustic potassa and the chlorate in a small quantity of water, and add the manganese; get rid of the water by evaporation, stirring constantly, and calcine the dry mass to a dark red for an hour in an untinned iron cup; allow to cool, and add a quart of plain water. Then boil for 5 minutes in a china capsule, and you will obtain a fluid of a slightly purplish tint; decant the solution, and wash the residue with such a quantity of water as to thought necessary, the liquid should be passed, not through paper, but through very fine sand. For dressing foul wounds, or for injection, use 1 drachm of this solution to from 3 drachms to 5 of spring water.

4797. Reveil's Solution of Permanganate of Potassa. The officinal solution of the British pharmacopæia consists of 80 grains of the permanganate dissolved in 1 imperial pint distilled water. This is about 1 part by weight to 110 parts water. M. Reveil recommends a standard solution of 10 parts permanganate to 90 of water, so that the solution contains 10 per cent. of permanganate. This latter strength is endorsed by the U.S. Dispensatory, which also recommends extreme cleanliness in its preparation and use, and of the bottles containing it, as organic matter more or less neutralizes its disinfecting and cleansing powers. The same authority orders the pencil or brush used for its application to be made of amianthus, or asbestos, in order to

ensure its fullest effects. (See No. 1701.)
4798. Directions for Using Permanganate of Potassa. Reveil's standard solution (see No. 4797) may be used at its full strength for dressing cancerous sores and ulcers, applied with a pencil made of asbestos, or sprinkled over a dressing of the same material. For simple wounds or for injections, I fluid ounce of the solution may be diluted with 1 pint of water. For gangrenous wounds and scrofulous ulcers, or as a gargle in unhealthy ulcers of the mouth and throat, 1 in croup and diphtheria, or as a wash for the place. This solution contains 60 grains of hands after dissecting, 2 fluid ounces to the citrate of magnesia to the ounce of fluid. pint. A dose administered internally may consist of 10 to 30 drops of the standard solu-(U. S. Disp.)

4799. Aceto-Carbolic Solution. Acetic acid (pyroligneous) 8°, 20 parts; pure carbolic acid, 5 parts; water, 75 parts. Mix the two acids and add the water. The acetic acid favors penetration through the epidermis. the diseased parts by means of a brush. scalies, sponge all the parts. The clothes,

better to slack the carbolic acid with four serves its solubility for a long time. times its bulk of hot water, and then to add a 4807. Solution of Tartrate of Soda.

tion of cold water. Water will not dissolve 4796. Solution of Permanganate of more than one-twentieth of its bulk of carbolic

acid.

4801. Frank's Specific Solution of Copaiba. Boil 2 parts balsam of copaiba, 3 parts liquor of potassa, and 7 parts water together for 2 or 3 minutes; put the mixture into a separator, and let it stand for 5 or 6 days; then draw it off from the bottom, avoiding the upper stratum of oil, and add to the clear liquid 1 part sweet spirits of nitre, perfectly free from acid; should it turn milky, a very little liquor of potassa will usually brighten it; but if it does not, place it in a clean separator, and let it stand, closely covered, for a few days, then draw it off from make altogether 2 quarts. When filtering is the bottom as before, and it will be perfectly transparent.

4602. Mackenzie's Solution of Nitrate of Silver. This is used for sponging the throat and fauces, for affections of those parts. Dissolve 20 grains nitrate of silver in

I fluid ounce distilled water.

4803. Solution of Hydrosulphuret of Ammonia. Saturate strong water of ammonia with sulphuretted hydrogen gas, then add a second portion of water of ammonia, equal to that first used, and put into well-stoppered bottles.

4804. Fowler's Solution; Solution of Arsenite of Potassa. Boil 64 grains arsenious acid (in small pieces), and 64 grains bicarbonate of potassa, in 12 fluid ounces water, until the acid is entirely dissolved. When cold, add ½ fluid ounce compound spirit of lavender, and sufficient distilled water to make the whole mixture measure a pint. (U. S. Ph.)

4805. Solution of Citrate of Magnesia. Crystallized citric acid, 37 drachms; water, 268 drachms; carbonate of magnesia, 22 drachms. Dissolve the acid in the water, and mix the magnesia with it under constant stirring; filter, and add to the filtrate so much water as to bring the weight of the whole to 40 ounces. To prepare the lemonade, take of aromatized simple syrup, 4 ounces; pulverized citric acid, 48 grains; bi-Fill into botcarbonate of soda, 64 grains. tles of suitable size, add water and so much of the magnesia solution as is required, and fluid ounce to a pint of water. For a gargle cork and tie immediately. Keep in a cool

4806. Parisel's Solution of Citrate of Magnesia. M. Parisel recommends the following method of preparing this article, which he has followed during two years, as being both simple and effectual: Take of powdered and well dried citric acid, 20 parts by weight; carbonate of magnesia, 12 parts; mix accurately, and enclose the powder in a For tinea, apply the liquid once a day over slightly warmed and well-dried bottle, which must be kept well stopped. The mixture thus made is rapidly dissolved in three times &c., of the affected individual should also be its weight of water at the ordinary temperatreated with the liquid. (Lemaire.) ture; and, if the water be pure, the solution 4800. Solution of Carbolic Acid in a few minutes becomes perfectly transpar-Water. To obtain uniform solution, it is ent, without any precipitate. The salt pre-

sufficiency of cold water; or the carbolic acid Take of carbonate of soda, 1\frac{1}{2} pounds; tartaric may be first mingled with alcohol, which acid, 1\frac{1}{2} pounds; crushed sugar, 2 pounds;

hot water, 2 gallons. Dissolve the soda in 12 oughly washed from nitrate of soda, or until gallons of the water; the sugar in 1 quart; the water passes tasteless; then, after drainand the acid in 1 quart. When all have dis- ing, transfer to bibulous paper, and dry by solved and cooled down, add the acid slowly gentle heat. to the soda solution, and mix with the sugar. Filter into strong 12-ounce bottles, to each of of Bismuth. Dissolve 1 troy ounce subwhich must be added a few drops of strong carbonate of bismuth in 720 grains nitric essence of lemon, and 35 grains of bicarbonate acid; after effervescence has ceased, gradualof soda. Cork immediately and tie or wire the bottles; will keep for any length of time. This is considered a good substitute for soluton of citrate of magnesia.

4808. Solution of Citrate of Potassa. Take of citric acid, & ounce, troy; bicarbonate of potassa, 330 grains; water, ½ pint. Dissolve the acid and bicarbonate in the water, and strain the solution through muslin. (U.S.

Ph.)

4809. Effervescing Citrate of Mag-esia. Take of citric acid, dried and powdered, 7 parts; heavy carbonate of magnesia, 5 parts; mix, and preserve in well-corked

bottles.

4810. Effervescing Citrate of Magnesia. Take of powdered citric acid, 2½ the fir cunces; powdered sugar, 8 ounces; mix and turbid. triturate to a fine powder, and drive off the water of crystallization by the heat of a water-bath. Add citrate of magnesia (prepared by fusion), 4 ounces; oil of lemon, 10 drops; and mix immediately; then add bicarbonate of soda, 3 ounces; and again triturate until the whole forms a fine powder, which must be preserved in well-stoppered it, and put half of it in a porcelain capsule on bottles. From 1 to 3 table-spoonfuls, mixed in a tumbler of water, furnishes an effervescing draught, in which the undissolved portion is so nicely suspended that it can be taken without inconvenience.

4811. Effervescing Citrate of Mag-Take of crystallized citric acid, 20 grains; carbonate of magnesia, 14 grains; mix in a tumbler of cold water and drink the

mixture whilst effervescing.
4812. Solution of Citrate of Bismuth. with a glass rod, until a further addition produces milkiness, or until the whole measures ounces. (U. S. Dis.)

1½ pints. Filter and set aside.

Next, dissolve 3 ounces citric acid in 1 pints water, and exactly neutralize the acid with carbonate of soda dissolved in water. It is important that there shall be no excess of soda, as the resulting citrate of bismuth would be contaminated with the oxide after decomposition. Put the bismuth solution in a suitable vessel, and add, stirring constantly with a glass rod, sufficient of the solution citrate soda exactly to decompose; the precise quantity is known to have been added, when, after placing the whole upon a cloth filter, the washings, after having been suffered to narcotic lotions to relieve pain; stimulant lorun awhile until clear, first, fail to precipitate to assist the ripening of tumors, &c.; bismuth when dropped into water, and, second, show no precipitate upon the addition of repellant and resolvent lotions to disperse a few drops of ternitrate of bismuth, a small tumors, remove eruptions, &c. Lotions are quantity of which should be reserved for this usually applied by wetting a piece of linen purpose. When the liquid portion has mostly with them, and keeping it on the part affected,

4813. Bartlett's Preparation of Citrate ly introduce 11 fluid ounces distilled water; add to this slowly, and with constant stirring, a solution of 600 grains citrate of potassa in 2 pints distilled water. Nitrate of potassa and citrate of bismuth are formed; the latter, being insoluble, is precipitated, and, being thoroughly washed with distilled water, may be dried on bibulous paper with a gentle heat

4814. Solution of Citrate of Bismuth and Ammonia. Rub some citrate of bismuth with sufficient distilled water to reduce it to a uniform pasty consistence, and add cautiously, with constant trituration, strong water of ammonia until a solution is obtained. observing to avoid an excess of ammonia. Filter the liquid through paper, returning the first portions that pass, should they be

4815. Solution of Citrate of Iron. Dilute 1 pint of solution of tersulphate of iron with 2 pints distilled water; precipitate with water of ammonia in slight excess, constantly stirring. Transfer the precipitate to a muslin strainer, and wash it with water until the washings are nearly tasteless. Drain a water-bath heated to 150° Fahr., add 54 troy ounces citric acid in coarse powder, and stir until the precipitate is nearly dissolved; then add sufficient of the reserved precipitate to fully saturate the acid. Lastly, filter the liquid, evaporate it at a temperature not over 150° Fahr., until it measures a pint. (U. S. Dis.

4816. Styptic Solution of Perchloride of Iron. Mix together 12 fluid ounces muriatic acid and 5 fluid ounces water; pour the Put 2 ounces pure sub-nitrate of bismuth into mixture, a small portion at a time, on 2 ouna porcelain dish, add 1450 grains nitric acid of ces avoirdupois of iron wire; aiding the comspecific gravity 1.44; heat over a spirit lamp plete solution of the wire by a gentle heat until the bismuth is dissolved; then add one Add 6 fluid drachms nitric acid, previously fluid ounce water, and let stand until cold; mixed with 2 ounces water; and evaporate then gradually add water, constantly stirring the whole to 5 fluid onness. Lastly, add water sufficient to make the whole up to 10 fluid

otions. Solutions of medicinal substances in water, employed for external application. They may be made of any soluble medicaments that are capable of exerting their action by contact with the skin. Lotions have been divided into classes, as sedative, anodyne, stimulant, &c. Sedative and refrigerant lotions are commonly employed to allay inflammation; anodyne and passed, pour water upon the filter until thor- or by moistening the part with the fingers previously dipped into them. Lotions are Vineger is often substituted for the whole or more agreeable if made with rose water. A a part of the water, and sometimes $\frac{1}{2}$ or $\frac{1}{6}$ number of these preparations are here given, part of rectified spirit, or some brandy or rum and others will be found by referring to the is added.

index, under their respective headings

water. This lotion is stimulating and cleansand feetid ulcers; it is likewise of considerable, and other scaly skin diseases. value in ulceration of the bone and threatened inflammation. It was the favorite lotion of Dissolve crystallized nitrate of silver, 1 to 2 Sir Astley Cooper in cases of unhealthy ul-drachms avoird apois; concentrated nitric acid, cerations requiring the application of a stimu-

4819. Anodyne Lotion. Crude opium, This is an excellent wash for painful and irritable ulcers and swellings.

4820. Astringent Lotion. Sulphate the filtrate in a stoppered bottle. of zine, 2 drachms; water, 1 pint; camphor- 4831. Lotion of Chloride of Soda. ated spirit of wine, 2 drachms; mixed together. This is an excellent lotion for piles.

used night and morning.

4821. Compound Alum Lotion. Λ detergent and astringent lotion for old ulcers, ounce each of alum and sulphate of zinc before. in 3 pints boiling water; filter, if necessary.

4822. Camphorated Lotion. Diluted

solution of diacetate of lead, 8 fluid ounces; spirit of camphor, 2 drachms; mix, and shake soda well. Refrigerant and anodyne. Employed in erysipelatous inflammations, burns, contu-

sions, sprains, excoriations, &c.

4823. Spackman's Lotion for Inflamed Parts. Mix 1 drachm tineture of 4823. myrrh; 3 drachms tineture of camphor; 1 ounce rectified spirits of wine; 1 drachm Goulard's extract; 1 ounce solution of sul-phate of morphia; 2 ounces tincture of arnica, is poisonous. and 4 ounces water.

4824. Lotion of Acetate of Lead. Dissolve sugar of lead, & ounce avoirdupois, in distilled or soft water, 1 Imperial pint. Sometimes a little vinegar is added, a like exceriations, burns, sprains, contusions, &c.; also as an occasional cosmetic wash by per-

sons troubled with eruptions.

washes intended to prevent infection from personal contact with those laboring under contagious diseases. Most of the nostrums of this character are mere weak solutions of chloride of lime, corrosive sublimate, potassa, or acetate or diacetate of lead. (See No. 4830.)

4826. Lotion of Muriate of Ammonia. Dissolve sal-ammoniac in coarse powder, 1 to 4 drachms (avoirdupois), in water, 1 Imperial pint. A useful wash in itch, old ulcers, tender feet, sweaty feet and hands, swelled

4827. Strong Lotion of Hydrochlorate of Ammonia. Dissolve sal-ammoniac, 1 to 2 avoirdupois ounces, in water, 1 Imperial pint. In bruises and contusions, extravasations, glandular swellings and indurations. chilblains, &c., when the skin is not broken. lent preparation to have in the house.

4828. Lotion of Muriatic Acid. 4818. Lotion of Nitric Acid. Mix to-hydrochloric acid (specific gravity 1.16), 1 gether 2 drachms dilute nitric acid and 1 pint fluid ounce, with water, 19 fluid ounces. For unbroken chilblains. Diluted with an equal It is very useful when applied to foul bulk of water, it forms a useful lotion in lepra

> 20 drops; in distilled water, 1 ounce. Used as a liquid caustic to destroy corns and warts.

4830. Lotion of Chloride of Lime. 2 drachms; warm water, 1 pint. Rub the opium for a few minutes in a mortar with a avoirdupois; pure water, 1 Imperial pint; little of the warm water, then pour in the remix in a bottle, and agitate, occasionally, for mainder of the water and mix them well. 2 or 3 hours; after repose, filter the clear portion through a piece of calico that has been previously moistened with water, and preserve

As the last, but substituting chloride of soda for chloride of lime. Or: Take of chloride of lime, ½ ounce avoirdupois; water, ¼ Imperial pint; mix, &c., as before; then add of crystallized carbonate of soda, 31 drachms; prechilblains, excoriations, &c., and, largely diluviously dissolved in water, ‡ pint; agitate the ted, as an eye-wash and injection. Dissolve 1 whole for 12 or 15 minutes, and filter, &c., as

> 4832. Lotion of Chloride of Potassa. As the last, but substituting 3 drachms dry carbonate of potassa for the carbonate of

4833. Lotion of Prussic Acid. Mix medicinal prussic acid, & fluid drachm, with rectified spirit, 1 fluid ounce, and distilled water, 2 fluid ounces; cover the bottle with thick purple paper, and keep it in the shade. Recommended by Dr. Elliotson as a lotion to moisten the face both before and after shaving.

4834. Sulphuretted Lotion. Dissolve sulphuret of potassium, 1 drachm avoirdupois, in distilled water, 1 pint Imperial. Used to render the skin soft, white, and smooth, particularly when there is a tendency to slight quantity of water being omitted. Used in eruptions of a pustular or vesicular character. The addition of 1 to 1 ounce of glycerine im-

proves it for present use.

4835. Carbolic Acid Lotion. Dissolve 4825. Preventive Lotions. These are 5 grains carbolic acid in crystals, in 1 ounce water. As a lotion for foul ulcers, carbuncles, scabies, and lepra.

4836. Carbolic Acid Lotion for Burns. Mix 1 drachm liquid carbolic acid with 3 ounces linseed oil and 3 ounces lime-water.

4837. Lotion of Arnica for Bruises, Sprains, Burns, &c. Take 1 ounce of arnica flowers dried, and put them in a wide-mouthed bottle; pour just enough scalding water over them to moisten them, and afterwards about 1 or 11 pirts spirits of wine. In case of a burn or bruise, &c., wet a cloth in the arnica and lay it on the part affected. Renew the application occasionally, and the pain will soon be removed.

4838. Balm of Gilead Lotion, Balmgilead buds, bottled up in new rum, are very healing to fresh cuts or wounds. An excel-

of the Skin. Mix 1 ounce of glycerine with ments. 1 pint water. It allays itching and removes dryness, &c., in various skin diseases. With Sulphuret of potassium, 1 drachm; soft soap the addition of 2 or 3 drachms of borax, it removes chaps from the lips, hands, and nip-

4840. Startin's Glycerine Lotion to Allay Irritation. Take & drachm trisnitrate of bismuth; 1 fluid drachm tincture of foxglove; 1 fluid drachm dilute nitric acid; 4 drachms glycerine; and 8 fluid ounces rosewater. To allay the irritation in itch and some other skin diseases.

4841. Glycerine Lotion for Burns, Scalds, &c. Take 1 ounce glycerine, 2 ounces thick mucilage (gum-arabic dissolved in water), and 7 ounces lime water. For burns, sealds, chaps, excoriations, &c.

4842. Startin's Glycerine Lotion for Bruises, &c. Triturate together 1 ounce glycerine, 1 drachm extract of belladonna, and 3 ounces soap liniment. (See No. 4869.) For bruises, sprains, and swelled joints; also gouty, neuralgic, and rheumatic pains.

4843. Evaporating Lotions. These lotions are soothing and refrigerant if allowed to evaporate by free exposure; and stimulant, if the evaporation is prevented by covering the part with the hand, or a piece of oiled headaches, restlessness, irritability of the skin, cuts, bruises, swellings, sores, and inflamed &c. Mix 1½ fluid ounces each of sulphuric and pained parts. ether, rectified spirit, and solution of acetate 4854. Lotion for Mange. of ammonia, with 3½ fluid ounces rose-water. with 1 part rectified spirit, and 4 to 6 parts water.

Camphorated Evaporating 4844. Lotion. Dissolve 1 drachm camphor in 4 ounces rectified spirit and 1 ounce elder flowers; digest 24 hours and strain. This

is a good calming lotion.

Tar Lotion. Quicklime, 6 ounces; **484**5. solution of pyrolignite of lime and pyrogenous oil and resin. It may be advantageously employed in various chronic skin diseases, especially those affecting the heads of children

4846. Lotion of Galls. Bruised galls. 2 drachms; boiling water, 1 pint; infuse an hour, and strain. Astringent. An excellent application to sore nipples, or to strengthen them before suckling; spirit of wine, 3 ources, may be advantageously added, and a like portion of water omitted.

4847. Mercurial Lotion; or Black Wash. Calomel, 1 drachm; lime water, 1 pint; mix, and shake well. These are the Mercurial Lotion; or Black lips. usual proportions. The bottle should be well shaken before the lotion is applied. Black wash is a favorite application to all kinds of

syphilitic sores.

4848. Yellow Lotion or Wash, Sometimes called Red Wash, Corrosive sublimate (in powder), ½ drachm; lime water, 1 pint; mix, and shake well. It should be well tion is not always observed. Liniments are syphilitic and scrofulous sores.

4839. Glycerine Lotion for Irritation | Applied to tumors and glandular enlarge-

4850. Cazenave's Antipsoric Lotion. (pure), 2 drachms; water, 8 ounces; dissolve. An excellent remedy for the itch. It leaves but little smell behind, and does not soil the

4851, Iodine Lotion. Tincture of iodine, & fluid ounce; iodide of iron, 12 grains; chloride of antimony, 1 ounce. Mix for a wash. It is a remedy for corns. Apply with a small brush. Or: Iodine, 1½ grains; spirits of wine, 3 tea-spoonfuls. Dissolve, and add 1 pint of water. A most excellent wash for scrofulous sores.

4852. Disinfecting Lotion. Liquor of common salt, I fluid ounce; water, & pint; Or: Chloride of lime, 3 drachms; water, 1 pint; Both are good washes for foul dissolve. ulcers, the itch, the teeth, to sweeten the breath and remove the smell of tobacco smoke, and for various similar purposes.

4853. Valuable Lotion for Wounds, &c. Camphor, 5 drachus, cut into small pieces, and dissolved in half a pint of spirits of wine in a closely corked bottle; when fully dissolved, add 1 pint of ox-gall and 60 drops of laudanum. Shake it well, and bottle for use. This has been a patent medicine, and They are useful applications in nervous is very efficacious in the cure of fresh wounds,

sublimate, & ounce; spirits of salt (muriatic A simple evaporating lotion may be made acid), & ounce; water, 1 quart. Or: Corrosive sublimate, 1 drachm; sal-ammoniac, 1 ounce; water, 1 pint Or: To the last add strong decoction of white hellebore, ½ pint. Used for mange in horses, cattle, and dogs, when sulphur ointment fails.

4855. Lotion for Galls. Vinegar and spirit of wine, of each 4 ounces; sugar of lead, 4 ounce; water, 1 pint; mix. Or: Soap liniwater, 48 ounces; slack, add tar 4 ounces, and ment and solution of acetate of ammonia, boil to one half. This liquid consists of a equal parts. Or: Sal-ammoniac, 1 ounce; solution of pyrolignite of lime and pyrogemuriatic acid, 3 drachms; water, 1 pint. Used by farriers for saddle-galls or warbles.

4856. Lotion of Chlorate of Potassa. -sometimes called Cosmetic Solution of Potassa-for bad breath. Dissolve powdered chlorate of potassa, ¿ ounce, in distilled water, 12 ounces, and rose-water, 2½ ounces. Used as a wash in foul mouth, gums, &c., particularly where there is a scorbutic or syphilitic taint; also extensively by smokers, to deodorize the breath. Its daily use is said to give a rich healthy hue to the gums and

iniments. A semi-fluid oint-ment or soapy application for painful joints, swellings, burns, &c. The term is also occasionally extended to various spirituous and stimulating external applications. When they are of a thinner consistency they are called embrocations, although this distincshaken before use. A common application to generally applied by friction with the hand or fingers, or with some substance, such as a 4849. Lotion of Belladonna. Extract piece of flannel, capable of producing some of deadly night-shade, 1 drachm; diluted solution of diacetate of lead, 1 pint; dissolve. a piece of linen rag dipped in them is simply

laid on the part. The greater number of: 4866. Valuable Embrocation. Take cerates and ointments may be converted into \frac{1}{2} ounce camphor, cut it into small pieces, and liniments by reducing their substance with dissolve it in a pint spirits of wine in a closely almond or olive oil, or oil of turpentine, corked bottle; when completely dissolved, Besides those here given, others will be add I pint ox-gall (which can be had of any found in the index under their proper heads.

Relief from Pain. Take 2 quarts of 95 per dipped into it. cent. alcohol, and add to it the following 4867. Hungarian Counter-Irritant articles: Oils of sassafras, hemlock, spirits of Liniment. Macerate for a week 1 drachm tergreen, ½ ounce, and gum camphor, ½ ounce. strong vinegar and 12 fluid ounces rectified The above is a noble liniment, and may be spirit; then filter. successfully employed in rheumatism, bruises,

affections.

4859. Hemlock Liniment. Oil of salt. When dissolved the imment is ready hemlock, ½ ounce; camphor, in gum, ½ for use, and is a magical remedy.

ounce; opium, ½ ounce; spirits of wine, 1
pint. Mix. It is a first-rate rubefacient in Liniment. White eastile soap, cut small, 2
midammatory rheumatism, gout, quinsy, inpounds; camphor, 5 ounces; oil of rosemary,

4860. Morphia Liniment. An exalmonds; when the morphia is dissolved, add very fine, solid and transparent, when cold. 1 ounce camphor liniment. (Sec No. 4880).

ounces; oil of origanum, 2 ounces; sweet oil, ounce camphor, ½ ounce oil rosemary, and 2 1 ounce. For cuts or calks in horses or cattle ounces spirits hartshorn. in winter it has no equal; but it must be apfound superior to it.

4862. Spirits of Camphor. The gum resin camphor readily dissolves in alcohol, camphor are generally dissolved in about 1 pint spirits. It is used as an external appli-It is applied by rubbing with the hand upon flammation the painful part. To secure the full benefit

for the purpose of restraining evaporation.

4863. Camphorated Oil. This is a terials to a moderate heat. As an external than the spirits; and to obtain its full influ-ence, the part treated should be also covered gury. with flannel and oil silk. It forms a valuable

or the leaves may be heated in the oil over a slew fire. Good for wounds, stiff joints, rheu- if the cost be an object. matism, and all injuries.

1 ounce; acetate of morphia, 10 grains. Mix, anum, and ½ ounce tincture of cayenne pepper. and use as other liniments. Very valuable. | For rheumatic pains.

butcher), and about 40 or 50 drops laudanum; 4858. Good Samaritan, or Immediate shake it well and bottle it for use. Apply lint

turpentine, balsam of fir, chloroform, and tinc- powdered cantharides, I drachm sliced garlie, ture of eatechu and guaiacum, of each 1 4 drachms each camphor, bruised mustard ounce; oil of origanum, 2 ounces; oil of win-seed, and black pepper, in 6 fluid ounces

4868. Liniment for Wounds. In 1 neuralgia, sprains, headache, burns, and spinal quart alcohol dissolve 1 ounce each saltpetre and gum camphor, and 1 table-spoonful of Oil of salt. When dissolved the liniment is ready

1 ounce; oil of origanum, 2 ounces; rectified spirit, 1 gallon; dissolve in a corked bottle by cellent anodyne, which often allays pain the heat of a water-bath; and when consider-when other means have failed. Put 3 grains ably cool, strain, then add liquor of ammonia, pure morphia into a mortar; add gradually, 11 ounces; immediately put it in bottles, cork during trituration. I fluid ounce warm oil of close, and tie over with bladder. It will be

ounce camphor liniment. (See No. 4880). 4870. Liquid Opodeldoc. Take 2 oun-4861. Magic Liniment. Alcohol, 1 ces castile soap shavings, and dissolve it in 1 quart; gum camphor, 4 ounces; turpentine, 2 quart alcohol, with gentle heat, then add 1

4871. Belladonna Liniment for Skin plied often. For human flesh use twice the Diseases. Take 4 drachms extract of bellaamount of alcohol, and no liniment will be donna, 1 ounce glycerine, and 6 ounces soap liniment. (See No. 4869.) For rheumatism,

neuralgia, painful swellings, &c.
4872. Black Oils. Best alcohol, tincforming spirits of camphor. About 2 ounces ture of arnica, British oil, and oil of tar, of each 2 ounces; and slowly add sulphuric acid, a ounce. Extensively used as a liniment, cation for sprains, local pains, and stitches, particularly in cases where there is much in-

4873. Factitious Oil of Spike. Oil of of the application, the part should be after turpentine, 3 pints; oil of lavender, 1 pint; wards covered with a piece of flannel of suit-mix. Used by enamelers to mix their colors able size, more or less wetted with the in. Or: Oil of turpentine, 1 gallon; Barbaspirits, and the whole covered with oil silk does tar, 4 ounces; alkanet root, 2 ounces;

digest a week. Used as a liniment for horses. 4874. Liniment of Cantharides. Powcamphor liniment. The proportions are the dered Spanish flies, 1 drachm; oil of turpensame as in the preceding formula, substituting tine, 1 fluid ounce; digest 2 hours and filter. olive oil for the alcohol, and exposing the mator. Tincture of cantharides and soap liniment (see No. 4869), equal parts; mix. Both the stimulant application it is even more powerful above are irritant and stimulant, but should

4875. Hydrochloric Acid Liniment. liniment in chronic rheumatism, and other painful affections, and is specially valuable as a counter-irritant in sore or inflamed throats, and diseased bowels.

4864. Arnica Liniment. Add to 1 pint chloric acid, and stir until quite cold. An appear all 2 table specially valuable as gentle heat, add ½ fluid ounce hydrochloric acid, and stir until quite cold. An appear all 2 table specially valuable as gentle heat, add ½ fluid ounce hydrochloric acid, and stir until quite cold. An sweet oil, 2 table-spoonfuls tineture of arnica; excellent friction for chilblains before they break. The balsam of Peru may be omitted

atism, and all injuries.

4876. Compound Chloroform Lini4865. London Liniment. Take chloment. This is composed of 1 ounce each roform, olive oil, and aqua-ammonia, of each chloroform, ether, spirit of camphor, and laud-

and } drachm alcohol.

4878. Opium Liniment. Mix 2 ounces No. 4869.) It constitutes an excellent soothother painful affections.

Colic. Take 40 grains extract of belladonna, 1 cherry-laurel water.

abdomen in lead colic.

4880. Compound Camphor Liniment, or Essence for Headache. Take of cam-(specific gravity .882-.880). 5 fluid ounces, and shake them until mixed. It is powerfully stimulant, rubefacient, and counter-irritant. mation, rheumatism, gout, sore throat, numb-A piece of folded linen wetted with it applied ness, neuralgia, &c. to the part, and then covered with a towel, and pressed with the hand, or covered with a piece of oiled silk, will generally relieve su- ing salts) as much distilled vinegar as will perficial pains.

4881. Pain Killer. Spirit of hartshorn, 1 ounce; olive oil, 1½ ounces; cayenne pepper, 2 drachms; laudanum, 2 drachms; 1 table spoonful of salt and 2 of brandy. Shake well in a bottle. Rub the affected part with it, apply afterwards a rag saturated with it. It removes pains and swellings. It is a magic

4882. Instantaneous Pain Killer. Another and even more instant cure of pain is made as follows: Take aqua-ammonia, sulphuric ether, and alcohol, equal parts, and

apply over the pain.

4883. Chilblain Liniment. liquor of subacetate of lead. Mix and apply 3 or 4 times a day. This is Sir Astley Cooper's prescription, and a very efficacious remedy

for chilblains.

4884. Rheumatic Liniment. Tincture of cavenne, oil of turpentine, plive oil, hemlock oil, gum camphor, sassafras oil, tineture of prickly ash, of each 1 ounce; powdered 2 quarts; vinegar, 1 quart; ammonia, 1 quart; add 2 ounces gum camphor. Mix, put in a vessel, and stir occasionally till mixed and dissolved. This is a magic liniment, soon giving ease in rheumatic pains, gout, orains, &c., &c. It seldom or "Good Samaritan" is also an neuralgia, sprains, &c., &c. It never fails. excellent remedy for rheumatism. (See No.) 4858.) Bathe the parts affected freely, and wet a piece of flannel and bind on the parts.

4885. Good Liniment for Rheumat-s. Take 1 gill each of alcohol, beef's gall, spirits of turpentine and sweet oil, and 4 ounces gum camphor. Put them all in a bottle liniments ever made for human ailments, and shake it up; use it 2 or 3 times a day, a tea-spoonful at a time. Apply it to the parts affected, before the fire. It is good, also,

for frost-bites.

4886. Liniment for Old Rheumatic matic pains, especially when affecting the origanum, and 2 ounces oil of camphortoins, is the following: Camphorated oil and This is said to be an excellent preparation.

4877. Petroleum Liniment. Mix to-| spirits of turpentine, of each 2 parts; water gether 1 ounce petroleum, a ounce camphor, of ammonia, I part; laudanum, I part; to be

well shaken together.

4887. Gebhard's Liniment for Sprains laudanum with 6 ounces soap liniment. (See and Bruises. Mix together 2 ounces each oil of spike and British oil; 1 pint tanner's ing application in rheumatism, sprains, and oil; 1 pint spirits of turpentine; put it into an iron or copper kettle placed over a fire, and 4879. Belladonna Liniment for Lead carefully stir in 1 ounce sulphuric acid. When the whole becomes quite hot, cool and drachm rectified ether, and 2 fluid ounces bottle. This is an excellent liniment for all As a friction to the kinds of sprains and bruises, and for horses or cattle it cannot be surpassed.

4888. Stimulating Liniment. enne, 1½ ounces; salt, 1 table-spoonful; phor, 2½ ounces avoirdupois; oil of lavender, spirits of wine, 2 ounces; camphor, ½ ounce; 1 fluid drachm: rectified spirit, 15 fluid ounspirits of turpentine, 4 pint. Bottle, and ces; dissolve, then add of liquor of ammonia shake now and then during one day. Then add ½ pint vinegar. It is excellent for sponging the body in cases of pain, debility, inflam-

4889. Embrocation for Bruises. Pour upon 2 ounces carbonate of aminonia (smelldissolve it, then add 11 pints common recti-Liniment Volatile, or Magic fied spirit, and shake the whole together in a bottle. It is a good remedy for sprains and bruises.

4890. Cajeput Liniment, gether 7 ounces soap liniment (see No. 4869), i ounce camphor, and I ounce oil of cajeput.

Cantharides Liniment for Chil-4891. Mix together 2 ounces soap liniblains. ment and 1 ounce tincture of Spanish flies. Apply at intervals during the day

4892. Compound Mustard Liniment. Take of oil of mustard, 1 fluid drachm; ethereal extract of mezereon, 40 grains; camphor, 120 grains; castor-oil, 5 fluid drachms; alco-Take 1 hol, 4 fluid ounces; dissolve the extract of ounce of camphorated spirit, & ounce of the mezereon and camphor in the alcohol, and add the oil of mustard and castor-oil.

4893. Nerve and Bone Liniment. Take 1 ounce spirits of turpentine, 1 pint brandy, and 1 gill neat's-foot oil. Simmer over a fire till mixed; then put it into bottles

for use.

4894. Mustard Oil Ointment. Crude mustard-seed oil, 16 fluid ounces; ethereal capsicum, or cayenne, 1 ounce; spirit of wine, oil of mustard, 30 drops; water of ammonia, 4 fluid ounces, or a sufficient quantity to form into a scap. Mix and bottle in broad-mouthed phials containing about 2 ounces.

4895. Wonderful Ointment. The following liniment is good for all sprains, bruises, lameness, &c.: Mix together 2 ounces oil of spike; 2 ounces origanum; 2 ounces hemlock; 2 ounces wormwood; 4 ounces sweet oil; 2 ounces spirit of ammonia; 2 ounces gum camphor; 2 ounces spirits turpentine. Add 1 quart 95 per cent. alcohol, mix well together, and bottle tight. This is an unequaled horse liniment, and, by omitting the turpentine, it constitutes one of the best such as rheumatism, sprains, &c.

Horse Embrocation. 4896. ounce each of oil of spike, oil of monarda (horsemint), and strong ammonia water; 1 ounce acetate of opium, 1 ounce chloroform, Pains. A powerful liniment for old rheu- 2 ounces tineture of camphor, 1 ounce oil of

ticularly adapted for administering nau- will contain 1 grain of quinine. seous substances, and such as operate in small doses. Extracts may be made into pills either termittent Fever. Mix 20 grains sulphate der, as that of liquorice, to increase their consistence. Powders are usually beaten up with syrup, mucilage, conserve of roses, or extract of liquorice. Castile soap is frequently used for substances that are not decomposed by alkalies. When the mixed ingredients are bladder placed in a covered stone pot, and pills occasionally moistened with a little spirit, or spirit and water, to prevent it getting hard, In all cases the dry ingredients should be reduced to fine powder, and the whole beaten into a uniform mass of a proper consistence for rolling into pills. This is effected by roll-ing it on a slak into a convenient thickness, and dividing into pieces of the requisite weight, lastly rolling them between the thumb and finger, to give them a globular form. A pill machine is usually employed for dividing the roll and shaping the pills. In ordinary cases, rolling the pills in carbonate of magnesia or powdered starch is usually adopted, to prevent them sticking together while moist. For other pills not under this heading, see Index.

4898. To Sugar-coat Pills. To sugarcoat, place the pills dry and smooth in a round copper pan or porcelain dish. In another pan dissolve white sugar in water in the same proportion as for making simple syrup; and, when dissolved, slowly evaporate the syrup until it feathers; that is, when a small portion taken out with a ladle and drawn up between two fingers forms a thread. The pan with the pills is next suspended over a slow fire, a little fine flour is sprinkled over them, and immediately after a spoonful of the syrup is poured on, or enough to cover. The pan is now kept swinging or moving over the fire, care being taken not to burn the sugar by too much heat, until it is reduced to a fine dust. Then more sugar is added, and the swinging and drying continued until a coat of sufficient thickness is obtained.

4899. To Silver or Gild Pills. Pills are gilded and silvered by rolling them between the fingers slightly moistened with mucilage, and then shaking them up in a small gallipot covered with a piece of paper, along with a little gold or silver leaf, or a little powdered gold or silver.

4900. Aloes Pills. Make 1 ounce aloes and I ounce soap into a mass with water. Divide into 240 pills.

Aloes and Assafcetida Pills. Take ½ ounce each powdered aloes, assafætida, and soap, made into a mass with water. Divide into 180 pills.

4902. Aloes and Myrrh Pills. Mix 1 ounce aloes, 1 ounce myrrh, and 1 ounce saffron, with sufficient syrup to make a mass. This is sufficient for 240 pills.

4903. Assafœtida Pills. Mix into a mass with water # ounce assafeetida and # ounce soap. Make into 120 pills.

powdered gum-arabic, and make into a mass pills.

MARRI Character propries

This form of medicine is par- with honey. To make 240 pills, each of which

alone or with the addition of any simple pow- of quinia. 2 grains powdered opium, and 5 minims oleo-resin of pepper, with sufficient syrup of gum-arabic to make a mass. Make into 20 pills. Dose, 2 pills every hour in the morning of an expected chill.

4906. Alterative Pills. Take 24 grains blue mass, 3 grains pulverized opium, and 3 made into a mass, it should be preserved in a grains powdered ipecacuanha. Make into 24

> 4907. Vegetable Anti-bilious Pills. Take 54 grains pulverized compound extract of colocynth, and 6 grains podophyllin (extract of may-apple or mandrake root). Make into 24 pills.

> 4908. Anti-chill Pills. Take 20 grains chinoidine, 40 grains ferrocyanuret of iron, 20 grains oil of black pepper, and 1 grain arsenic. Make up into 20 pills.

> 4909. Aperient Pills. Take 8 grains nux-vomica, 12 grains extract of henbane, and 48 grains compound extract of colocynth. Make into 24 pills.

> 4910. Diuretic Pills. Take 40 grains powdered eastile soap, 40 grains dry carbonate of soda, and 20 drops oil of juniper. Make into 20 pills.

> 4911. Gonorrhea Pills. Take 48 grains powdered cubebs, 24 grains solid balsam of copaiba (powdered), 12 grains sulphate of iron, and 36 grains Venice turpentine. Make into 24 pills.

> **491**2. Mandrake Mercurial Pills. Take 6 grains podophyllin (extract of mandrake or may apple), and 48 grains blue pill. Make into 24 pills.

4913. Podophyllin, Aloes, and Iron Pills. Take 3 grains podophyllin, 15 grains socotrine aloes, 15 grains extract of nuxvomica, 45 grains dry sulphate of iron, 10 drops oil of cloves, and sufficient syrup of gum-arabic to make into a mass. Divide into 30 pills. Dose, 1 pill immediately before each meal. A good remedy for indigestion, with costiveness

4914. Opium Pills. Mix 2 drachms opium and 24 grains soap with water, to make 120 pills.

Iodide of Iron Pills. Mix 1 drachm sulphate of iron, 4 scruples iodide of potassium, 10 grains tragacanth, and 1 drachm sugar with syrup. Make into 40 pills.

4916. Compound Iron Pills. Triturate together 2 drachms myrrh and 1 drachm carbonate of soda; then add 1 drachm sniphate of iron, and make up with syrup into 80 pills.
4917. Compound Cathartic Pills. Take

drachms extract of jalap, 3 drachms mild chloride of mercury, and 2 scruples gamboge; mix with water to make 180 pills.

4918. Copaiba Pills. Mix. 2 ounces copaiba with 1 drachm fresh magnesia; set it aside to dry, and, when the mass is of proper

consistency, make into 200 pills.

4919. Mercurial Pills. These are commonly known as blue pills. Rub 1 ounce mer-4904. Sulphate of Quinine Pills. Mix cury with 1½ ounces confection of roses; 2 ounce sulphate of quinine with 1 drachm add ½ ounce liquorice root, and divide into 480

Calomel Pills. mild chloride of mercury with 1 drachm powdered gum-arabic. Make up with syrup, into 240 pills.

4921. Compound Galbanum Pills. 6 drachms myrrh, and 2 drachms assafeetida,

water to make 60 pills.

Compound Rhubarb Pills. 4923. Form into a mass with sufficient water; 1 ounce rhubarb, 6 drachms aloes, 1 ounce myrrh, and ½ fluid drachm oil of peppermint. imitation of Blancard's Pills. (U. S. Dis.) Divide into 240 pills.

4924. Compound Pills of Squill. Mix 1 drachm powdered squill, 2 drachms ammoniae, and 2 drachms ginger, with 3 drachms soap. Make up with syrup into 120 pills.

4925. Compound Storax Pills. Take opium, and 2 drachms of saffron; work up to the proper consistency of a pill mass. Dose, from 5 to 10 grains.

4926. Sulphur Pills. The following formulæ furnish a convenient and neat method of administering sulphur when this useful medicine is required to be given as an alterative in chronic rheumatism and certain dis-

blood diseases, recommends the following formula: Take powdered sulphite of soda, 36 becomes putrescent. The sulphite of magnethan sulphite of soda. Sulphur obtained by non, an English Physician, to be a most tism.

Pepsine and Iron Pills. Mix together 2 drachms 34 grains starchy pepsine, and half that weight of iodide of iron in 8 ounces lard, and 4 ounces white wax, stircrystals, with sufficient syrup to make 100 ring constantly until cold. (U. S. Ph.) pills. Cover them with $2\frac{1}{2}$ drachms reduced 4933. Spermaceti Cerate. Me fron, and finish with sugar-coating.

Take ½ drachm extract of taraxacum, and 10 duously until cold. This is used as a soft grains blue pill. Make into 10 pills. Dose, 1 cooling dressing. As soon as the materials pill three times a day, in dropsy with disease are melted, they should be moved from the of the liver.

troy ounce iodine with 1 fluid ounce water in sel may be placed in cold water or a current a tain glass bottle; add 2 drachms iron wire of cold air. This will render the product in small pieces, and shake together until a both whiter and finer than when allowed to clear green solution is formed. Mix 1 troy could be performed in a water-bath. On drachm gum-arabic, and 1 drachm reduced the large scale lard or suet is substituted for

Mix ½ ounce the green solution, heated, and afterwards 2 fluid drachms water. Evaporate over a waterbath with constant stirring, to a mass, and divide it into 300 pills. Dissolve 60 grains balsam of tolu in 1 fluid drachm ether, shake the pills in the solution until uniformly coated, mixed with sufficient syrup. Make 240 pills. and place them on a plate, occasionally stir-4922. Rhubarb Pills. Mix 3 drachms ring them until dry. Keep in a well steppowdered rhubarb and 1 drachm soap with pered bottle. (U. S. Ph.) The iodide of iron pills, as ordinarily prepared, crumble by time and exposure; but, made according to the above formula, they will undergo no change. This is the plan proposed by Prof. Procter in

intments, Salves, and Cerates. Ointments are unc-6 drachms of storax, 2 drachms of powdered tuous preparations, that merely differ from cerates in consistence, being made and used in a similar manner. Their solidity should not exceed that of good butter, at the ordinary temperature of the atmosphere. When the active ingredients are pulverulent substances, nothing can be more suitable to form the mass of the ointment than good lard, free from salt; but when they are fluid, or semieases of the skin: Take sulphur, 42 grains; fluid, prepared suet, or a mixture of suet and castile soap, 18 grains. Mix and divide into 12 lard, will be necessary to give a proper conpills. 1 to 3 pills for a dose, morning and night. Or: Take sulphur and acetate of postances wax is ordered for this purpose. tassa, of each 24 grains. Make up with suffi- Glycerine is now frequently prescribed in cient confection of roses into 12 pills. 1 or ointments, and is difficult to mix. Suppose 2 twice a day in scorbutic and scrofulous it be ordered with zinc ointment, as is often cases, and when sulphur generally is indicated. the case, do not use ready-made zinc ointment, 4927. Sulphite of Soda Pills. Dr. but weigh the proper quantity of oxide, rub Polli, who introduced the sulphites to the the glycerine with it, and then add the lard. notice of the medical profession in certain This makes a good smooth ointment which does not separate. Of course, the same plan formula: Take powdered sulphite of soda, 36 can be adopted with any other powder. If grains; powdered ginger, 12 grains. Make there be no powder, melt the ointment, but up with mucilage into 12 pills. Dose, 1 to 3 do not let it get too hot, and beat the glycersoon after eating. These are given when the stomach is foul, and the food ferments and better; but still, if there be a large proportion of glycerine, it will separate after a time. sia, Dr. Polli says, is better for this purpose (See No. 5009, &c.) Unctuous preparations may be prevented from getting rancid, by disdecomposing precipitated sulphide of copper, solving in the fat a little gum-benzoin or bencalled brown sulphur, is stated by Dr. J. Han- zoic acid. The term cerate is applied to those unguents which contain wax. A number of powerful remedy against gout and rheuma- these preparations are given here, and others will be found, by referring to the Index, under their respective headings.

4932. Simple Cerate. Melt together

Spermaceti Cerate. Melt together 2 ounces spermaceti, 8 ounces white 4929. Compound Taraxacum Pills. wax, and 1 pint warm olive oil, and stir assifire, strained into a clean vessel, and stirred 4930. Pills of Iodide of Iron. Mix ½ until cold. To facilitate the cooling, the vesiron, all in fine powder, in a porcelain capsule. oil, by which means less wax is required. Filter upon them, through a small filter, first The following is a good form where a cheap

4934. Chilblain Ointment. Take of gall-nuts, in very fine powder, 1 drachm avoirdupois; spermaceti cérate (see No. 4933), 7 drachms; mix, add pure glycerine,

cerate ordered above. (See No. 5006.) is sufficient to melt 4935. Family Salve. Take the root of sary loss of ammonia. yellow dock and dandelion, equal parts; add sweet cream, or fresh butter and mutton with fat. Melt 4 ounces resin in ½ pint olive tallow, or sweet oil and mutton tallow. oil; add 1 ounce alum and 3 ounces catechu, Simmer together until no appearance of the both finely powdered. liquid remains. Before it is quite cold, put it into boxes. This is one of the most soothing and healing preparations for burns, scalds,

pound hog's lard, 3 ounces white lead, 3 oungive it a gentle boil afterwards. This is an diseases, paintle piles, ulcers, burns and excellent cure for burns, sores, or ulcers, as it scalds. It is probably the best ointment that first draws, then heals afterwards; it is excelcan be kept in a family for general use.

This is simple lard ointment.

4938. Savine Ointment. Savine tops, dried and in fine powder, 1 drachm; ointment of white wax (simple ointment), 7 drachms;

mix by trituration.

4939. Simple Ointment of White Olive oil, 51 fluid ounces; white wax, 2 ounces; melted together and stirred

while cooling.

pound white wax, and from 3 to 6 pounds 4 months. pure lard.

4941. Camphor Ointment. Camphor, finely powdered, 1 ounce; lar, 2 ounces.

Mix. It is designed to ripen indolent tumors.

4942. Compound Iodine Ointment.

Mix 1 drachm iodide of potassium in very fine powder, with 2 ounces lard; then add 1 drachm iodine dissolved in 1 fluid drachm

rectified spirit.

Fresh fard cannot always be got, and as with white wax, an already rancid body, it It also forms an excellent lip-salve. A drop happens very often that an ointment of of neroli, or 1 drop of otto of roses, renders it iodide of potassium gets yellow, instead of being perfectly white. A few grains of hyposulphite of soda dissolved in a little water, Borax. To the borax ointment, as prepared of turning it snow-white.

article is wanted: Clarified mutton suet, 5½ 4943. Compound Belladonna Ointpounds; white wax and spermaceti, of each 1 ladonna with 7 drachms of compound iodine ladonna with 7 drachms of compound iodine Take of ointment. (See No. 4942.) For dispersing glandular tumors, &c., which it is not desirable to mature.

4944. Ammoniacal Ointment. 2 drachms, and rub the whole to a uniform 1 ounce each of suet and lard, in a strong mass. An excellent application to obstinate wide-mouthed bottle; add 2 ounces liquor of broken chilllains, particularly when used as a ammonia of specific gravity .923, and close dressing. When the parts are very painful, 1 the bottle immediately. Then mix, by shaounce of compound ointment of galls may be king the bottle, until the contents harden. advantageously substituted for the galls and The fat should not be heated any more than is sufficient to melt it, to prevent unneces-

4945. Catechu Ointment for Tropical good proportion of celandine and plantain. Climates. An astringent outment may be Extract the juices by steeping or pressing, prepared, which is not likely to become soon Strain carefully, and simmer the liquid with rancid, as is the case with ointments made

4946. Stramonium Ointment. Mash bushel of green stramonium, or jimson leaves, to a pulp (this is best done by mashcuts, and sores of every every description. ing a few leaves at a time), put the pulp in 4936. Salve for All Wounds. Take 1 an iron kettle over a slow fire. Add 21 pounds fresh lard, and simmer to a crisp. ces red lead, 3 ounces bees'-wax, 2 ounces Strain and box for use. Or: Take extract of black resin, and 4 ounces common turpentine; stramonium, 1 drachm; lard, 1 ounce, and mix all these ingredients must be put together in by trituration. This ointment is excellent a pan, and boil 4 of an hour; the turpentine for strengthening broken limbs after the to be put in just before it is done enough, and bones have healed. It is also good for skin

lent for all wounds.

4937. Lard Ointment. Melt 2 pounds pure lard, add 3 fluid ounces rose-water, and beat them well together while hot. When cold, separate the congealed fat from the to 15 ounces lard and 32 fluid ounces olive to 15 ounces lard and 32 fluid ounces olive to 15 ounces lard and 32 fluid ounces olive to 15 ounces lard and 32 fluid ounces olive to 15 ounces lard and 32 fluid ounces olive to 15 ounces lard and 32 fluid ounces olive the large lar oil; stir together, increasing the heat until the mixture froths. Keep it in air-tight earthen-

ware or glass vessels.

4948. Mild Mercurial Ointment. This is made by mixing 1 pound mercurial ointment with 2 pounds lard.

4949. Magnetic Adeps. This is a prepared fat used for making mercurial ointment, as it will reduce 30 to 40 times its weight of 4940. Spermaceti Ointment. Melt quicksilver to salve. It is made by pouring together 5 ounces spermaceti, 14 drachms melted lard, in a small stream, into cold water, white wax, and about 1 pint olive oil. The placing the thin fragments thus obtained in a article commonly sold as spermaceti oint-ment is composed of 1 pound spermaceti, ½ apparatus, and exposing it to the air for 3 or

4950. Ointment of Iodide of Sulphur, Reduce 30 grains iodide of sulphur to a fine powder, rub it with a small portion taken from 1 troy ounce lard, then add the remainder of the ounce of lard, and mix them thoroughly. (U. S. Ph.)

4951. Cintment of Borax. This is

also called Pomade de Toscanie. borax in very fine powder, 1 drachm avoirdupois; spermaceti ointment, 1 ounce; mix long as simple cerate is directed to be made by trituration. In exceriations, chaps, &c.

Glycerinated Ointment of added to such ointment, will have the effect in the foregoing receipt, add I drachm avoirdupois pure glycerine, using a slightly

warmed mortar for the mixture. This is a skin diseases. It is also good for piles, bruisvery effective ointment.

4953. Ointment of Creosote, or Creosote Pomade. Take of creosote, 1 fluid ounces resin, 4 ounces yellow wax, and 16 drachm; spermaceti ointment (see No. 4940), ounces lard; melt them together, strain 1 ounce avoirdupois; triturate them together through muslin, and stir constantly until in a slightly warmed mortar until perfectly cool. This is the resin ointment of the U.S. united, and subsequently until nearly cold. Pharmacopæia. The British officinal pre-It is used as a dressing for scalds and burns, paration contains only 3 ounces resin, and chilblains, &c. It is very useful in ringworm substitutes simple ointment for the lard. and some other skin diseases; also as a friction in facial neuralgia or tic-douloureux.

4954. Ointment for the Itch. The usual treatment of itch has been noticed The elsewhere, and various lotions, ointments and pomades, of more or less value in its treatment, will be found under the names of their leading ingredients. Here are two additional

formulæ:

4955. French Hospital Lookent. Take of chloride of lime, 1 drachm spirit 2 fluid drachms; avoirdupois; rectified spirit, 2 fluid drachms; rub them together, add 1 fluid ounce sweetoil; soft-soap, 2 ounces aviordupois; oil of lemon, ½ fluid drachm; mix perfectly, and then further add common salt and sulphur, of each 1 ounce. Cheap, very effective, and much less offensive than sulphur ointment.

4956. Stavesacre Ointment. Melt together 1 ounce powdered stavesacre (staphisagria), and 3 ounces lard; digest for 3 or 4 hours, and strain. A cleanly remedy for

itch, and for destroying body vermin.
4957. Ointment for Baker's Itch. Mix well together & ounce ointment of nitrate of mercury (see No. 4947), and 1 ounce palm

4958. Venice Turpentine Ointment. Venice turpentine, 2 ounces; tar, 1 ounce; butter, 4 ounces. Simmer until they are well add them to the fir mixed. This is very good for scald-head, heat. Used for inversing worm, &c. First wash the head well lous, and other sores. with soap and water, and then apply the ointment.

4959. Brown Ointment. Extract of henbane, 1 drachm; yellow wax, ½ ounce; red precipitate, 2½ drachms; pure zinc, powdered, 11 dracams; fresh butter, 3 ounces. Melt and mix, and add 1½ drachms camphor dissolved in olive oil. This ointment is good olive oil, 1 pint; common resin, ½ ounce; for ringworn, all cutaneous eruptions, for bees'-wax, ½ ounce; Venice turpentine, ½ ulcers, sore line, itch chronic outballing for onnee. Melt reight of the chronic outballing for onnee.

4961. Tobacco Ointment. Fresh tobacco leaves, chopped small, 1 ounce; lard, 1 cold. This is a first-rate healing salve, supepound; boil till crisp, and strain through lime. rior to most; is wonderful in burns, scalds, Used for ringworm, irritable ulcers, and other scrofulous, fistulous, and all other ulcers. diseases of the skin. It should be used with Spread on linen, and renew daily. caution.

into the mixture 1 ounce prepared chalk turpentine. Good for all inflamed sores, and 4 table-spoonful spirits of turpentine. 4973. Green Salve. White pine

es, and cuts.

4964. Basilicon Ointment. Take 10

Yellow Basilicon Ointment. 4965. Yellow wax, 8 ounces; burgundy pitch, 3 ounces; Venice turpentine, 4 ounces; linseed oil, 10 ounces. First melt the resin, to which add the wax and the burgundy pitch. When the whole is melted, remove from the fire, and slowly put in the oil, stirring well till it is cold. For healing cuts, abscesses, &c. 4966. Black Basilicon Ointment.

Black basilicon, yellow wax, and yellow resin, 10 ounces; common pitch, 5 ounces. Melt as before, and add 10 ounces linseed oil

when taken from the fire.

4967. Green Basilicon Ointment. Yellow wax and yellow resin, of each 3 onnees; Venice turpentine, 6 ounces, powdered verdigris, 1 ounce; lard, 6 ounces. Melt first the resin, &c., as before. Very efficacious in healing cuts, abscesses, and local affections of any kind.

4968. Saturnine Cerate. acetate of lead, 2 drachms; white wax, 2 ounces; olive oil, ½ pint. Melt the wax in the oil, and add gradually the acetate of lead, separately rubbed down with a portion of the

oil reserved for that purpose.
4969. Hemlock Salve. Hemlock ointment, 12 ounces; spermaceti, 2 ounces; white wax, 3 ounces; melt the last two, then add them to the first, softened by a gentle heat. Used for inveterate cancerous, scrofu-

4970. Green Stick Salve. According to the American Dispensatory, this is prepared by taking white gum turpentine, bayberry wax, of each 2 ounces; melt together, strain, and stir till cold; adding olive oil will give it the

consistence of an ointment.

suet, equal parts; melt together, and stir till ces powdered red lead while on the fire; do cold. This is an excellent remedy for scald-not burn it; boil slowly till it had and ringworm. dark brown; remove from the fire, and add 1 drachm powdered camphor when it is nearly

4972. Red Salve. Red salve, 1 pound; 4962. Salt Rheum Cintment. Mix in bees'-wax and resin, of each 2 ounces; linsced an earthen vessel, I ounce aqua-fortis, with 1 and sweet oils, of each 3 table-spoonfuls; ounce quicksilver; when effervescence has spirits of turpentine, 1 tea-spoonful; melt all, ceased, incorporate with it I pound lard and except the first and last, together, then stir I ounce dissolved hard soap; then work in the lead and stir until cool, adding the

White pine tur-4983. Magnetic Ointment. Lard, raipentine and lard, † pound each; honey and sins cut in pieces, and fine-cut tobacco, equal bees'-wax, † pound each; melt all together weights; simmer well together, then strain and stir in a ounce of very finely pulverized and press out all from the dregs. This is an verdigris. This ointment cannot be surpassed excellent ointment for salt-rheum and other when used for deep wounds. It prevents proud flesh from forming, and keeps up a tips of the fingers and gentle friction, in neu-

healthy discharge.

4974. Green Ointment. Take prepared subacetate of copper, & drachm; ointment of Glycerine, rose-water, and tannin, equal white wax (see No. 4939), 7½ drachms. Trit-weights, rubbed together into an ointment, urate the subacetate of copper with the oint- is very highly recommended for sore or ment until they are intimately mixed. mild caustic, applied to venereal ulcers of the mouth and tonsils, and to the ulcerated sore Tannin, 2 drachms; water, 2 fluid drachms; throat of scarletina.

4975. Cod-Liver Oil Ointment. Melt together 1 part white wax, 1 part spermaceti, ophthalmia, scrofulous sores, rheumatism, stiff joints, and some skin diseases, including ringworm. Scented with oil of nutmeg and balsam of Peru it forms an excellent pomade for strengthening and restoring the hair.

precipitate, ½ ounce; sugar of lead. ½ ounce; burnt alum, 1 ounce; white vitriol, 1 ounce or a little less; all to be very finely pulverized: have mutton tallow made warm, is is cool. pound; stir all in, and stir until cool. Good.

4977. Bitter-Sweet Ointment. Bark spirits of wine, and add, unsalted butter, 8 ounces. Simmer and strain. Excellent for prudent in your diet. swelled breasts, tumors, ulcers, &c. It may

be applied twice a day.

4978. Astringent Ointment. Triturate 1½ drachms powdered catechu with 2 fluid drachms boiling water; add, gradually, 11 ounces spermaceti ointment, continuing the trituration until the mass concretes. This is an excellent dressing for sores and ulcers, especially during hot weather.

4979. Neuralgia Ointment. Take 2 drachms each of cyanide of potassium, and chloroform, and make into a salve with 1

cunce lard, for external application.
4980. Ointment of Lead. Take of olive oil, ½ pint; white wax, 2 ounces; sugar of lead, 3 drachms. Let the sugar of lead, reduced to a fine powder, be rubbed with some of the oil, and added to the other inointment may be used in all cases where the scalding, &c.

4981. Zinc Ointment. Mix 1 ounce oxide of zinc and 6 ounces lard. This is excellent and useful application for burns, excoriations, and skin diseases attended by

discharges.

4982. Chloroform Ointment for Neuralgic Pains. Mix 1 drachm chloroform with 1 ounce spermaceti ointment. (See No. This should be kept in a widemouthed, stoppered phial.

Belladonna Anodyne Ointment. Mix 3 drachms fresh and good extract of belladonna, ½ drachm powdered opium, and 3 drachms lard. For neuralgia, &c., ap-

ply with friction for 6 to 8 minutes. 4984. Aconitine Ointment. Aconitine, 16 grains; alcohol, 12 drops; olive oil, ½ 4994. Ointment of Tannate of Mandrachm; lard, 1 ounce. Rub the aconitine gamese. Mix 3 grains tannate of manganese with the spirit, then add the oil by drops, and, after it is thoroughly mixed, pour in the lard rendered nearly liquid by heat; stir well

ralgie and rheumatic affections, &c

4985. Ointment for Sore Nipples.

A cracked nipples. the 4986. Tannin Ointment for Piles. triturate together, and add lard, 11 drachms.

An excellent application for piles.

4987. Spackman's Pile Ointment. and 7 parts pale cod-liveroil. Used for Mix together 14 ounces carbonate of lead; 6 grains sulphate of morphia; 1 ounce stramonium ointment (see No. 4946); and sufficient olive oil to make into a salve.

4988. Ointment for Piles. Triturate 8 grains morphia in 1 ounce melted sperma-4976. Ointment for Old Sores. Red ceti ointment (see No. 4940), until the morphia is dissolved; then add 11 drachms of galls in impalpable powder, 12 to 15 drops essential oil of almonds, and stir until the mass

4989. Pile Salve. Take 1 scruple powdered opium, 2 scruples flour of sulphur, and of bitter-sweet root, 2 ounces; cover with 1 ounce of simple cerate. (See No. 4932.) Keep the affected parts well anointed. Be

4990. Salve for Sore Breasts. Take 1 pound tobacco, 1 pound spikenard, 1 pound of cumfrey, and boil them in 3 quarts chamber-lye till almost dry; squeeze out the juice, add to it pitch and bees'-wax, and simmer it over a moderate heat to the consistence of

salve. Apply it to the part affected.
4991. Iodide of Lead Ointment. ointment of iodide of lead composed of 4 parts iodide of lead, 4 parts chloride of ammonium, and 50 of lard, is either of a yellow or white color, according to the manner in which these ingredients are brought together. When rubbed together dry, the color of the mixture is yellow; but when the chloride of ammonium, in order to facilitate the mixing, is first liquefied in a small quantity of water before being added to the jodide of lead, the vellow gredients, previously melted together, stirring color of the latter disappears, owing to the them till quite cold. This cooling astringent formation of two colorless salts, the chloride of lead and iodide of ammonium. It is well intention is to dry and skin over the part, in in cases like these to adhere strictly to the

directions of the prescription. (Eymael.)
4992. Ingall's Iodoform Ointment. Dissolve drachm iodoform in sufficient recastringent, desiccative, and stimulant; an tified alcohol, and make into an ointment with 7½ drachms lard. Iodoform is extensively and successfully used in the treatment of syphilitic ulcers and rupia. The above formula is the one adopted by Dr. Ingalls, attending surgeon of the Boston city hospital.

4993. Carbolic Cerate. Melt together 5 ounces lard, and 2½ ounces white wax; add 2 ounce balsam of fir, and when it begins to cool, stir in a ounce carbolic acid. The addition of balsam fir to this preparation corrects the disagreeable odor of the acid, and renders it slightly adhesive, which is quite desirable when used as a dressing for burns, old sores, (See No. 4996.) άc.

with 1 troy ounce cold cream. (See No. 1125.)

This is a good application for bad wounds.

4995. Tartar Emetic Ointment. Take until cold. A small portion is applied by the 2 drachms potassio-tartrate of antimony, and rub it well into 1 ounce lard. This will pro- | Deshler's Salve, should be kept well protected duce an eruption on the skin very similar to from the air, as it is liable to become tough

small-pox in appearance.

4996. Carbolic Salve. There are different formulæ recommended for this salve, containing different amounts of carbolic acid; the character of the disease will determine mate, all in powder; boil over a slow fire which to use. The carbolic acid employed is with 2½ ounces vinegar and ½ pound honey the crystallized article, sold in bottles, and taken out by warming the latter in hot water, or the fluid resulting from the crystals, which are melted in warm weather, or are dissolved by absorbing a little water, when the bottles are not perfectly stoppered.

I. Take carbolic acid, \(\frac{1}{2} \) fluid drachm, and lard, I ounce. Triturate together in a porce-

lain mortar.

lard, 3 ounces. Melt the lard at a gentle heat, add the carbolic acid, and triturate until the mixture is cold.

III. Take carbolic acid, 1 fluid drachm, and ointment of white wax (see No. 4939), 7 drachms. Prepare as No. II. (See No.

4997. Cerate of Savine. Moisten 3 troy ounces savine in fine powder with finely powdered gum benzoin, or a less ether; pack it firmly in a cylindrical per-quantity of benzoic acid dissolved in the ether; pack it firmly in a cylindrical per-quantity of benzoic acid dissolved in the colator, and displace with ether until the fatty matter by heat, will greatly retard, percolate passes nearly colorless. Evaporate if not wholly prevent, the ointment from spontaneously to the consistence of syrup, turning rancid. add it to 12 troy ounces resin cerate softened by a gentle heat, and mix thoroughly.

4998. Sulphur Ointment. Mix together 1 ounce sublimed sulphur and 2 ounces

lard.

4999. Washed sul-Itch Ointment. phur, 11 ounces; chloride of lime, 2 drachms;

maceti, 18 drachms; white wax, 5 drachms; macerate in their own liquor for 12 hours, powder. These are mixed while cold, and express and strain; melt the almond oil, then gradually heated to about 240° Fahr., liquor, stirring constantly so as to incorporate (an ice-chest preferred) till it becomes hard, then beat with a wooden spoon, so as to separate the watery portion of the cucumbers from the ointment; pour off the liquor thus materials that are soluble in water, and there-obtained, and mix the glycerine with the ointment without the aid of heat, by work-most favorable for absorption; and, lastly, it ing it with the hands until it becomes thorjars, cover with a layer of rose-water, and set aside in a cool place.

Venice turpentine, 4 ounces of each; melt and add 1 ounce blue vitriol. Good for cows

or sheep.

5002. Cracked Hoof Ointment. and tallow, equal parts inelted together.

5003. Compound Resin Cerate. Melt together 12 troy ounces each of resin, suet, extract, and mix with the plasma, using the and yellow wax; 6 troy ounces turpentine, same proportions as laid down for cantharides and 7 troy ounces flax-seed oil. Strain ointment. (See No. 5017.) through muslin, and stir constantly till cool. (U. S. Ph.) This preparation, also known as Mix 14 drachms starch with 6 fluid ounces

by exposure. (U. S. Dis.)

5004. Egyptiacum Salve. ounces verdigris, 1½ ounces alum, ½ ounce sulphate of copper, ¼ ounce corrosive subliuntil of a proper consistence. Stir up well before using.

5005. Egyptian Cintment. A detergent application for foul ulcers, &c. Mix by heat and agitation, 10 parts verdigris, 1 part calcined alum, 14 parts strong vinegar, and

32 parts thick purified honey.

Compound Gall Ointment. 5006. Rub together 6 drachms very finely pow-II. Take carbolic acid, 1 fluid drachm, and dered gall-nuts, 11 drachms powdered opium,

and 6 ounces lard.

5007. German Black Salve. 24 parts; white oxide of zinc and Peruvian balsam, of each 3 parts; nitrate of silver, finely pulverized, 1 part. This formula is taken from the Hamburg Pharmacopæia.

5008. To Keep Ointment from Becoming Rancid. About 2 per cent. of

5009. Schacht's Glycerine of Starch, or Plasma. The use of fatty matter as the vehicle for drugs in preparing ointments and cerates is sometimes open to objection. The remedies introduced are frequently insoluble in fat, which consequently acts to a certain extent in defending the skin from, instead of hog's lard, 4 ounces. Mix and make into an facilitating the perfect action of the remedy. Aqueous remedies are difficult to mix with 5000. Cucumber Ointment. Take of fat without soap or some otherwise needless oil of sweet almonds, 7 fluid ounces; sper-addition. Another strong objection is the Another strong objection is the tendency of fatty matter to become rancid glycerine, 1 fluid ounce; green cucumbers, 4 in contact with the skin. Mr. G. F. Schacht pounds. Cut the cucumbers in small pieces, proposes a substitute consisting of 1 fluid mash them in a wedgwood mortar, let them ounce pure glycerine and 70 grains starch spermaceti, and wax together, by means constantly stirring; he gives this preparation of a water-bath; add to it the strained the name of plasma. This constitutes a basis whose consistence is good, and does not vary the whole together. Set aside in a cool place with changes of temperature; it is soluble in water, and may consequently be removed from tender surfaces with the greatest case; it dissolves and thoroughly mingles with all is not liable to rancidity. With plasma suboughly incorporated. Put up in 4-ounce stituted for fat, may be produced preparations corresponding to most of the cerates and ointments of the Pharmacopæia, but free from 5001. Foot-Rot Ointment. Lard and the special objections before alluded to. The plasma should be kept in a closely corked bottle. The following plasmas are proposed by Mr. Schacht as improvements on the corresponding ointments of the Pharmacopæia.

5010. Schacht's Cantharides Plasma. Evaporate the decoction of Spanish flies to an

5011. Schacht's Mercurial Plasma. Fahr., constantly stirring.

5012. Schacht's Glycerinated Nitrate thickness of common paste. of Mercury. Take 1 drachm terbasic nitrate of mercury, and 1 ounce plasma.

of Potassium. Dissolve 2 drachms iodide increase the irritating power of the mustard. of potassium in 2 fluid ounces glycerine; 5022. Strong Mustard Poultice. Mix

gradually 1 fluid ounce glycerine.

5015. Glycerinated Iodine. This is recommended for loss of voice, and is composed of 16 grains of iodine in 1 ounce inodor- Gradually sprinkle the powder into, and stir ous glycerine. The addition of starch to this is not advisable, as it would convert the jodine night for many cases. It is preferable to the into iodide of starch.

extract of opium, 4 parts extract of bella- obstinate inflammation, &c.

donna, and 60 parts glycerine.

and add I ounce melted yellow wax, stirring irritable kind, and many other inveterate ulconstantly till cool. (Br. Ph.)

Doubtices. External applications, used to promote suppuration, allay pain and inflammation, resolve tumors, &c. They are generally prepared with substances capable of absorbing much water, and assuming a pulpy consistence, so as to admit of their application to any surface, however irregular.

Their curative action principally depends on the liquids with which they are moistened, and the heat retained by the mass. The adpoultices, but others may be found by referring to the Index.

5019. Bread Poultice. bread in crumbs, pour boiling water over it, and boil till soft, stirring it well; then take it blood-warm, 1 pint; yeast, 1 gill. Stir in from the fire, and gradually stir in a little fine slippery elm bark, to form a poultice.

elm bark; stir it in hot or warm milk and aries. It is also very serviceable in other water, to the consistence of a poultice. This species of inflammation. is a most efficacious poultice; is of almost carbuncles, &c.

glycerine, gradually adding 12 ounces mercury, | 5021. Mustard Poultice. Take equal and stirring till the globules disappear. Then parts of ground mustard and ground flax-seed, add 6 fluid ounces glycerine, and heat to 240° and mix them thoroughly together, with barely enough of water to make them of the To prevent sticking, a little glycerine or sweet oil is to be added. The addition of bread crumbs 5013. Schacht's Glycerinated Iodide serves to diminish, that of a little vinegar to

add 140 grains starch, and heat to 240° Fahr, the best English ground mustard with strong 5014. Schacht's Glycerinated Petro-vinegar; spread it on a piece of book or leum. Rub 1 drachm petroleum with 70 tarleton muslin, to prevent its adhesion to the grains starch until quite smooth, then add skin. Wet the part first with vinegar, and

apply the poultice.
5023. Linseed Poultice. Take of linseed, powdered, 4 ounces; hot water, ½ pint. well with a spoon. This is good and convebread and milk poultice so much in use, as it 5016. Narcotic Glycerole, for external is not so liable to become brittle and hard use, applied on lint. Take 1 part aqueous when dry. It is very useful in carbuncle,

onna, and 60 parts glycerine. 5024. Carrot Poultice. Take of boiled 5017. Cantharides Ointment. Infuse carrots, bruised, 1 pound; flour, 1 ounce; butfor 12 hours 1 ounce avoirdupois of cantharter, & ounce. Mix them with a sufficient ides in 6 imperial fluid ounces olive oil in a quantity of hot water to form a pulp. This covered vessel. Place the vessel in boiling will be found a valuable application in ulcera-water for 15 minutes, press through muslin, ted sores and swellings, scrofulous sores of an

5025. Poultice for Sprains and Bruises. Carbonate ammonia, 2 ounces; vinegar, 2 pints; proof spirits, 3 pints. Mix the ammonia and vinegar; when the effervescence ceases, add the spirit. For inflammation of the joints, of some standing, mix with aniseed meal, and use as a poultice twice a day. It is also valuable for sprains, bruises, and

other injuries.

5026. Charcoal Poultice. Linseed meal, ½ pound; charcoal powder, 2 ounces; hot water, sufficient to give it the necessary consistence. Or: Soak 2 ounces bread in 1 pint boiling water; add to this, by degrees, 10 drachms linseed meal; and, afterwards, 2 dition of a little lard, olive oil, or, still better, drachms powdered fresh charcoal; then springlycerine, to a poultice, promotes emollient kle 1 drachm powdered charcoal on the suraction and retards hardening. A fold or two face of the poultice. This poultice is highly of lint dipped in hot water, either simple or antiseptic; that is to say, it has great power medicated, and covered with a thin sheet of in cleansing alcers and correcting a tendency gutta-percha, or India-rubber cloth, to prevent to mortification. The power is derived from evaporation, may often be conveniently cut- the charcoal, which is remarkable for its puriployed instead of a poultice. Spongio-piline fying energy. It should be frequently re-(see No. 5039) is still better for this purpose newed. Dr. Bird, in his work on the medical than lint. The following are the principal uses of charcoal, gives numerous proofs of the efficacy of this application. Besides purifying and healing, it conteracts the offensive Take stale smell arising from putrid sores.

glycerine or sweet oil, so as to render the This is a good antiseptic and refrigerant poulpoultice pliable when applied.

5020. Slippery Elm Poultice. Take more clicacious than any others; it sooner a sufficient quantity of pulverized slippery arrests mortification, used with proper auxili-

5028. Indian Turnip Poultice. Take universal application, and removes inflamma- of the tops and roots of Indian turnip, if tion sooner than any other. If tincture of green; if dry, the roots only; simmer in wamyrrh be added, it is valuable in boils, ulcers, ter, and add slippery elm bark sufficient to ter, and add slippery elm bark sufficient to form a poultice. This poultice is used in the treatment of scrofula with the best effect. It either of the purposes referred to. It retains is superior to every other poultice in scrofula, heat for a considerable time, and vinegar, in a state of swelling and inflammation.

5029. Potato Poultice. Boil the common potato, mash or bruise soft, and then stir in finely pulverized slippery elm bark. This and with greater cleanliness, than by means poultice has been used with success in oph-thalmia (inflammation of the eyes) of an acute character, when other means have failed.

5030. Goulard's Poultice. It is thus ade: Take 1½ drachms extract of lead (solution of acetate of lead); rectified spirit of wine, 2 ounces; water, 12 ounces; breadcrumb, sufficient to make the whole into a proper consistence. This poultice is an excellent application to reduce swelling and inflammation, and to allay irritation.
5031. Lobelia Poultice. Linseed meal,

ounce; slippery elm, 1 ounce; powdered lobelia, 12 ounces; ginger, 1 ounce; whiskey sufficient to make it. Good for all inflamed parts, as the side in pleurisy, liver complaints. rheumatism, lumbago.

5032. Poultice for a Fester. bread in lees of strong beer; apply the poul-tice in the general manner. This has saved many a limb from amputation.

5033. Alum Poultice. Take of alum, in fine powder, 1 drachm avoirdupois, and the white of 2 eggs; shake them together until they coagulate. Formerly much used in broken chilblains, chaps, sore nipples, chronic inflammation of the eyes, &c., applied on linen, and covered with a piece of

and syphilitic sores, tumors, &c.
5035. Gout Poultice. Dissolve 6
drachms balm of Mecca in 16 ounces rectified spirit; next digest for 48 hours, 1 ounce each of red cinchona bark, sarsaparilla, and sage, and 1 ounce saffron, in 32 ounces rectified spirits; filter this, mix it with the solution of balm of Mecca, and add twice their weight of lime-water. Sprinkle 2 fluid ounces on the surface of a hot linseed meal poultice, large enough to surround the affected part.

5036. Soap Poultice. Dissolve 1 ounce scraped or sliced white scap in 4 pint boiling water, and mix with sufficient bread to make a poultice. This is good for scalds and burns

5037. Vinegar Poultice. Soak bread in vinegar and apply cold; for bruises, extravasations, black-eyes, &c

Chlorinated Poultice. gradually 42 ounces linseed meal with 6 fluid ounces boiling water; add 2 fluid ounces of a solution of chlorinated soda (chloride of sodium), applied to foul ulcers, &c.

Spongio-piline. This is the name of a very ingenious contrivance, recently introduced abroad, which may be used either as a poultice or as a means of fomentation. It consists of wool and small particles tion. It consists of wool and small particles by adding to the litharge and water ‡ pint of sponge, apparently felted together, and colorless vinegar, for each pound of litharge attached to a skin of India-rubber. It is about half an inch in thickness. It will be found of great value and convenience for Boil together 1 pound pure carbonate of lead,

laudanum, camphor, hartshorn, etc., can be. by its means, placed on the skin, accompanied by heat and moisture, much more readily, of ordinary poultices.

lasters. External applications that possess sufficient consistence not to adhere to the fingers when cold, but which become soft and adhesive at the temperature of the human body. Plasters are chiefly composed of unctuous substances united to metallic oxides, or to powders, wax, or resin. They are usually formed whilst warm, into $\frac{1}{4}$ pound rolls about 8 or 9 inches long, and wrapped in paper. When required for use, a little is melted off the roll by means of a heated iron spatula, and spread upon leather, linen, or silk. The less adhesive plasters, when spread, are usually surrounded with a margin of resin plaster, to cause them to adhere. In the preparation of plasters, the heat of a water-bath, or steam, should be alone employed.

5041. To Spread Plasters. In spreading plasters convenience requires and neutness demands an uncoated marginal edge. This is usually secured by pasting strips of paper along the edges of the skin or other material used, and removing them after the spreading of the plaster is affected. It is 5034. Hemlock Poultice. Make a just here that a practical difficulty frequently poultice of 4½ ounces linseed meal in ½ pint arises. The paper edges are liable, from dryboiling water; spread on its surface I ounce ing of the paste, to adhere so strongly that extract of hemlock softened with a little hot either paper or skin will give way upon an water. This is an anodyne application for attempt at their removal; the application of irritable and painful cancerous, scrofulous, water will then be necessary to soften the attachment, and the final results may be expected to present a daubed and uncleanly aspect. This difficulty may be entirely avoided by applying to the paste brush a little glycerine before the adjustment of the

marginal strips. (Ebert).
5042. To Prevent Plasters from Adhering to Paper. It is recommended to dust the latter over with powdered French chalk. If a piece of thin paper, moistened with olive oil and then wiped dry, be laid over a plaster, it will prevent adhesion to the

wrapping paper. 5043. Litharge, Lead, or Diachylon Plaster. Take 5 pounds litharge in very fine powder, 1 gallon elive oil, and 1 quart water. Or: 5 ounces litharge, 12 fluid ounces olive oil, and 8 fluid ounces water. Unless the oil is fully 21 times the weight of the litharge, the plaster soon gets hard and nonadhesive. Put the water and litharge into a perfectly clean and well polished tinned copper or copper pan, mix them together with a spatula, add the oil, and boil, stirring constantly until the plaster is sufficiently hard when thoroughly cold. This process usually occupies from 4 to 5 hours. The operation may be completed in from 20 to 30 minutes

surfaces, bed-sores, burns, &c.

piece of fine muslin, linen, or silk, to a flat warm water. This is said to be superior to

the ordinary court plaster.

5046. Adhesive Resin Plaster. Resin plaster, spread upon muslin, forms the wellknown Strapping or adhesive plaster, so extensively used for protecting raw surfaces, &c. It is gently stimulant, and is thought to assist the healing process; it is also employed dered cantharides. as a basis for other plasters. Mix by a moderate heat, 1 ounce resin with 5 ounces litharge plaster. (See No. 5043.) Or: 4 ounces resin, and 2 ounces powdered castile soap, with 2 pounds litharge plaster. 5047. Cancer Plaster.

White oakbark, 4 ounces; bruise it well, and add urine mustard and black pepper. sufficient to cover it. Infuse four days, boil add 2 drachms white vitriol. Spread on soft leather or linen. It may be applied to all in ordinary coughs and whooping-cough, kinds of ulcers and white swellings. For can-

cers it is invaluable.

5048. Anodyne Plaster. Melt an No. 5043), and, whilst cooling, add a drachm This soon relieves an acute local pain. Or: fir, powdered, 3 ounces; lead plaster, 1 pound. Melt the plaster and resin together, then add the opium and mix the whole. Useful for rheumatic pains.

5049. Strengthening Plaster. Litharge plaster, 24 parts; white resin, 6 parts; yellow wax and olive oil, of each 3 parts; red oxide of iron, 8 parts. Let the oxide be rubbed with the oil, the other ingredients added, melted, and mix the whole well together. This is an excellent plaster for relaxation of the muscles and weakness of the joints arising from sprains and bruises. The plaster spread over leather should be cut into strips 2 inches wide, and strapped firmly round the joints,

5050. Cough Plaster. Castile soap, 1 ounce; lead plaster, 2 drachms; sal-ammoniac, 1 drachm. Melt the soap and lead plaster together, and add the ammoniac when the mixture is nearly cold. This plaster must be applied to the chest immediately after it is spread, and must be renewed every 24 hours. It is often of great service in whooping-cough and coughs of an asthmatic character.

Resolvent Plaster. Purified

32 fluid ounces olive oil, and sufficient water, ted oil till the globules disappear, and the constantly stirring until perfectly incorporational ammoniae, previously melted, added gradually, ted; then add 4 ounces yellow wax, and 1½ and the whole mixed together. This plaster pounds lead plaster; when these are melted, has great efficacy in promoting the absorption and the mass somewhat cooled, stir in 9 of glandular swellings and indolent tumors, onnees powdered orris root. This is an applied it is of much use also as an application to cation much used for inflamed and exceriated corns and bunions. It can be obtained from the apothecary, and is usually known as the **Deschamp's Plaster.** Fasten a plaster of ammoniae and mercury.

5052. Burgundy Pitch Plaster. Melt board; give it a thin coating of smooth, together 2 pounds strained burgundy pitch, strained flour paste. When dry, apply 2 coats 1 pound prepared frankincense, and 4 ounces of colorless gelatine, made into size with each yellow resin and bees'-wax; add 2 fluid ounces each olive oil and water, and I ounce expressed oil of nutmeg; stir constantly until

evaporated to a proper consistence.

5053. Blister or Cantharides Plaster. Melt together 72 ounces each yellow wax and suet; 6 ounces lard, and 3 ounces supporting parts, dressing ulcers, retaining resin; when mixed, remove from the fire, and, the lips of recent cuts and wounds in contact, a little before they concrete, sprinkle in and mix thoroughly I pound very finely pow-

> 5054. Strong Blistering, or Cantharides Plaster. Mix at a heat below 2120 Fahr., 4½ ounces Venice turpentine, 3 ounces each of burgundy pitch and cantharides, I ounce bees wax, ½ ounce finely powdered verdigris, and 2 drachms each of powdered

5955. Warm Plaster. For this plasit till it becomes as thick as molasses. Add ter, take 1 part of blistering plaster, and of 2 ounces honey and 2 ounces strained turburgundy pitch 14 parts; mix them by means pentine gum. To make this plaster caustic, of a moderate heat. This plaster is stimulated and the strained to the strained turburgundy pitch 14 parts; mix them by means pentine gum. lant, slightly irritating the skin, and is of use

sciatica, and other local pains.

5056. Homeopathic Mustard Plas-For chronic inflammation, colds, sore ter. ounce of adhesive plaster, or diachylon (see throats, inflammations of the lungs, liver, and bowels, sprains, &c. Take 1 part by measure of powdered opium, and the same quantity of of mustard; 5 parts flour; and 5 of Indian camphor, previously dissolved in a small meal. Mix the mustard in a little hot water, quantity of olive oil. Spread on leather, and, when smooth, add about 2 parts boiling water, and when all is dissolved stir in the Powdered opium, ½ ounce; resin of the spruce flour, and then the meal, thoroughly; adding more boiling water if necessary. Spread on a thick cloth double folded, to retain heat and moisture. Cover with mosquito netting, or lace, and nothing closer, sew around the edges, apply to the painful spot; fasten with bandages, and wear till dry, or for 24 hours, and then put on a fresh one. Continue to renew these for 1 or 2 weeks. When the skin becomes too tender, add 1 more spoonful of flour and meal each. When these plasters can no longer be borne, use powdered ginger instead of mustard, and then finish with plain Indian meal poultice alone. (Leggett.

The Best Mustard Plaster. 5057. Take a piece of waste linen, and, if crumpled, iron it smooth; or paper will do. Procure a small quantity of black mustard seed, and bruise it to a coarse powder, in a pestle and mortar or otherwise. Spread over the linen a thin solution of gum, and sprinkle the powder equally over it. Dry in a warm place. When wanted, plasters may be cut of any size or shape; and when applied should be momentarily dipped in tepid water, and tied over the affected part with a bandage. These plasters ammoniac, 1 pound; purified mercury, 3 are more simple, cleanly, and effective than ounces; sulphuretted oil, 1 fluid drachm. The mercury must be rubbed with the sulphuret- paration may be had at the drug stores, are more simple, cleanly, and effective than made in 3 different strengths, No. 1 being turnip. Stir these into the melted tar, &c.,

the most powerful.

Court Plaster. 5058. is merely a kind of varnished silk, and its is to be wiped with a dry cloth, to remove manufacture is very easy. Bruise a sufficient matter, &c. The sore must not be wetted. quantity of isinglass, and let it soak in a little This is a powerful counter-irritant, for rewarm water for 24 hours; expose it to heat moving internal pains, and in other cases over the fire till the greater part of the water where an irritating plaster is necessary. is dissipated, and supply its place by proof spirits of wine, which will combine with the isinglass. Strain the whole through a piece of open linen, taking care that the consistence of the mixture shall be such that, when cool, it may form a trembling jelly. Extend a piece of black or flesh-colored silk on a hair (badgers' is the best). As soon as this particular purpose for which they are required first coating is dried, which will not be long, ought to be kept in view in their preparation. apply a second; and afterwards, if the article with spurious articles sold under that name.

5059. De Rheims' Healing Paper. Make a strong tincture of capsicum-pods by steeping them for several days, in a warm place, in twice their weight of rectified spirits about the consistency of molasses. Add to this an equal quantity of the tineture, stirring it together with a small brush or a large camel's-hair pencil, until they are well incor-porated. The mixture will be cloudy and the severity of the case. opaque. Take sheets of silk or tissue-paper; give them with the brush a coat of the mix-ture; let them dry, and then give another; let that dry, and, if the surface is shining, there is enough of the peppered gum; if not, give a third coat. This paper, applied in the same way as court plaster to chilblains that are not broken, and burns that Mix. are not blistered, speedily relieves the itching and the pain. It acts like a charm, and effects a rapid cure. The same with cuts and discolored bruises. It likewise allays rheumatic pains in the joints. Its great value is that, besides acting as ordinary sticking-plaster, it abates suffering and hastens the process of healing.

Cooley's Corn Plaster. In a piece of card, cut a round hole the size of the ents, and the gargle is ready for use. A decentral portion of the corn; lay the card on a coction of the leaves of the black current piece of adhesive plaster, and warm the spot may, with good effect, be added instead of of plaster exposed by the hole in the card, by the warm water. This makes both a pleasant two; then remove the card and sprinkle some finely powdered nitrate of silver on the warm spot of the plaster. When cold, shake off the loose powder, and apply to the corn. Two or three applications seldom fail to cure.

5061. Carbolic Pleater Carbolic - Carbolic holding a hot iron near it for a second or and most useful gargle.

Carbolic Plaster. Carbolic glycerine, 34 parts by weight; prepared chalk, 94 parts. Mix well by kneading, and enclose in closely-stoppered jars.

Irritating Plaster. Boil together 1 pound tar, ½ ounce burgundy pitch, lounce white pine turpentine, and 2 ounces resin. Finely powder 1 ounce each mantion. Barley water and infusion of linseed. drake root, blood root, poke root, and Indian This gargle is to be used warm. It must be

before it cools. This plaster, spread on mus-This plaster lin and renewed daily, will raise a sore, which

Cargles are simple remedies well adapted to domestic practice in sore throats of various kinds. According to the wooden frame, and fix it in that position by nature of the ingredients of which they are means of tacks or twine. Then apply the made, they allay irritation and inflammation, isinglass (after it has been rendered liquid by invigorate the membrane lining the mouth a gentle heat) to the silk with a brush of fine and throat, and promote suppuration. The

ought to be kept in view in their preparation.
5064. Potassa Gargle for Sore is to be very superior, a third. When the whole is dry, cover it with two or three coatings of the balsam of Peru. This is the later than the superior of the balsam of Peru. This is the later than the superior court place. The superior court place is the superior court place in the superior court place in the superior court place is the superior court place in the superior court place in the superior court place is the superior court place in the superior court place in the superior court place is the superior court place in the superior court place in the superior court place is to be very superior, a third. When the superior court place is to be very superior, a third. When the superior court place is to be very superior, a third. When the superior court place is to be very superior, a third. When the superior court place is to be very superior, a third. When the superior court place is to be very superior, a third. When the superior court place is to be very superior court place in the superior court place is to be very superior court place in the superior court place is to be very superior court place in the superior court place is to be very superior court place in the superior court place is to be very superior court place in the superior court place is to be very superior court place in the superior court place is to be very superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place in the superior court place is the superior court place is the superior court place in the superior court place genuine court plaster. It is pliable, and cessary, being careful to shake before using. never breaks, which is far from being the case Also poultice the throat with hops and warm Also poultice the throat with hops and warm vinegar. Brewers' yeast substituted for the chlorate of potassa makes a very effectual gargle.

5065. Gargle for Sore Throat. Very strong sage tea, 2 pint; so ained honey, comof wine. Dissolve gum-arabic in water to mon salt, and strong vinegar, of each 2 tablespoonfuls; cayenne (pulverized), 1 rounding tea-spoonful; steeping the cayenne with the sage, strain, mix, and bottle for use, gargling from four to a dozen times daily, according to

> 5066. Carbolic Acid Gargle. Used as a gargle for sore throat, attended with foul breath. Take 2 grains of the crystals to 1 ounce of water

> 5067. Gargle for Ulcerated Sore Throat. Water, ½ pint; decoction of Peruvian bark, ½ pint: sulphate of zine, 1 drachm.

5068. Gargle for Inflammation of the Throat. Purified nitre, 2 drachms; barley water, 7 ounces; acetate of honey, 7 drachms; mix the ingredients. To be used frequently.

5069. Gargle for General Domestic Use in Sore Throat. Take 3 tea-spoonfuls vinegar, 2 tea-spoonfuls tineture of myrrh, 2 of honey, a glass of port wine, and 3 or 4 wineglasses of warm water; mix all these ingredi-

5071. Gargle for Threatened Mortification of the Throat. Tineture of capsicum, 6 drachms; honey of roses, 3 drachms; infusion of roses, ½ pint. Mix. Or: Tincture of capsicum, 6 drachms; infusion of Peruvian

kept in view that this mild gargle acts by softening the parts of the throat, and hastenrequisite, therefore, that the temperature of

the gargle be kept up.

5073. Carbolized Gargle for Diphtheria, Tonsilitis, &c. Carbolic acid, 20 minims; acetic acid, 2 drachm; honey, 2 fluid ounces; tincture of myrrh, 2 fluid drachms; water, 3 fluid ounces. The carbolic and acetic acids to be well shaken together before the other ingredients are added. (Charles Sedgwick.)

\austics. Subtances that corrode or destroy the texture of the skin and organized bodies. Their action is commonly called burning. The principal caustics emcaustic potassa, sulphate of copper, red oxide of mercury, and the nitric and acetic acids.

5075 Vaccatable Communication of silver, burney and the nitric and acetic acids.

thicker than cream; the evaporation may be continued in the sun. Spread on leather when used. It is valuable in cancers, fistulas, scrofulous and indolent ulcers, where there is proud flesh.

30 grains nitrate of silver in 1 fluid ounce distilled water; saturate 1 ounce of dry lint with lavender; mix and spread as above. the solution, and expose it in a saucer to the light and air until it becomes black and dry.

5077. Iodine Paint; Iodine Caustic. Take of iodide of potassium, † ounce avoirdu-pois; iodine, † ounce; proof-spirit, 3 ounces; dissolve by agitation. Used as a paint in cases in which it is desired to apply iodine, in a strong form, locally; also as a caustic for as in No. 5084; then add corns, warts, &c. (Soubeiran.) The tincture of iodine of the Pharmacopæia is, however, more generally employed; but it is only of Spread the plaster thinly or about one-third the strength of the above.

5078. To Prevent Iodine from Staining. By adding a few drops of liquid carbolic acid to the iodine tincture, the latter will not stain. According to Dr. Bogs, of the Indian of tincture of iodine more certain. He recommends the following formula, whenever injections of the latter are indicated: Alcoholic tincture of iodine, 45 drops; pure liquid carbolic acid, 6 drops; glycerine, 1 ounce; distilled water, 5 ounces. In blennorrheea and leucorrhœa, this mixture is said to be superior to tar-water.

5079. Caustic for Corns. Take of liquid terchloride of antimony and tineture of iodine, of each 2 drachms avoirdupois; prot-Two to four applications are said to effect a

have adopted the plan of dissolving nitrate zoic acid, as the balsam of copaiba, &c.; and of silver in nitrous ether; it can then be spread with a camel's-hair brush over a surther that they possess balsamic qualities, have also face, and the ether immediately evaporates.

Qubefacients. Substances or agents, which, when applied for a cering the suppuration by its heat; and it is tain time to the skin, occasion a redness and increase of heat without blistering. act as counter-irritants. Mustard or powdered ginger, made into a paste with water, hartshorn and oil, and other or alcohol (when their evaporation is prevented), are among this class of remedies

5082. Counter-Irritants, Substances applied to the surface of the body to establish a secondary morbid action, with the view of relieving one already existing. Those best known are blisters, mustard poultices, hartshorn and oil, and liniment of ammonia.

5083. Blistering Tissue. These blistering compositions are superior to the common cantharides blisters, from their greater cleanliness, efficiency, and ease of application, and their being less liable to produce excess-

ive irritation.

y, and the nitric and acetic acids. phuric ether by percolation (see No. 41), and Vegetable Caustic. Burn oak the resulting tincture reduced to the consistor beech wood to ashes. Make a lye from ence of molasses by distillation; the extract them, and simmer it till it becomes rather is then mixed with twice its weight of yellow is then mixed with twice its weight of yellow wax, melted by a very gentle heat, and spread on wazed cloth.

5085. Blistering Tissue. Digest 3 drachms powdered cantharides in 1 ounce ether for a day or two; decant and add 4 5076. Medicated Lint. Dissolve 20 to drachms sandarach, 2 drachms mastic, drachm turpentine, and 10 or 12 drops oil of

5086. Blistering Tissue. Mix 2 parts acetic extract of cantharides, and 1 part each of resin cerate and bees'-wax; use as

before.

5087. Blistering Plaster. Infuse 3 drachms powdered cantharides in 4 ounces acetic ether for 8 days; decant and evaporate as in No. 5084; then add 4 drachms resin,

5088. Management of Blisters. Spread the plaster thinly on paper, or linen, and rub over it a few drops of olive oil. In this way the blister acts speedily, and with

less irritation than usual.

5089. To Camphorate Blisters. M. Deschamps d'Avallon has suggested, when it Service, carbolic acid also renders the efficacy is desirable to camphorate a blister, it may be readily accomplished by dropping on its surface a few drops of a saturated solution of camphor in chloroform, made by adding 2 parts of the latter to 4 of the former.

Balsams. Balsams are semi-liquid resinous substances, having for the most part the consistence of honey. Some, however, are solid, and the greater number iodide of iron, 7 grains; mix, and preserve it harden by exposure to the air and age. They in a well-stoppered phial. Applied, with care, are generally aromatic, soluble in alcohol, are generally aromatic, soluble in alcohol, partly soluble in ether, and not at all so in Their usual constituents are resin water. 5080. Convenient Vehicle for the and benzoic acid, mixed with a large portion Application of Nitrate of Silver. At of aromatic essential oil. Some of the sub-University College Hospital (London) they stances falsely called balsams contain no benreceived this name.

Friar's Balsam, or Jesuit's mix. As a pectoral in coughs and colds. Take gum benzoin, 6 ounces; Dose, 1 tea-spoonful. Drops. strained storax, 2 ounces; pulverized aloes and myrrh, each ½ ounce; balsam Peru, 1 ounce; balsam tolu, 2 ounces; extract of liquorice, 2 ounces; alcohol, 2 quarts. Let it digest them together by a gentle heat for 3 stand for 2 weeks, with occasional agitation, days; then strain off the liquor, and add to it and filter the whole through paper. A good 3 drachms of camphor. This balsam is of was very effectual in the hands of the old friars. Internally, it is stimulant, expectorasthma, catarrh, consumption, and languid circulation. Dose, ½ a drachm on loaf sugar.

5092. Balsam of Horehound. Dissolve 2 ounces each extract of horehound and extract of liquorice, in 1 pint hot water; tine, 1 pint. when cold, add 2 pint paregoric, 6 ounces oxymel of squills, 2 ounces tincture of benzoin, and 10 ounces honey. Mix well and strain through flannel. Dose for an adult, ½ to 1½ tea-spoonfuls, accompanied by a dose or

two of aperient medicine.

5093. F. Isam of Honey. Balsam of tolu, 1 ounce; gum storax, 1 drachm; purified opium, 15 grains; best honey, 4 ounces; habitual coughs, unaccompanied by feverish some of the properties of the genuine balsam.

symptoms. The dose is from 1 to 3 teaspoonfuls occasionally.

5094. Balsam Riga. Young shoots of gallon of oil of turpentine; then add ½ pint of pale linseed oil, and ½ ounce each of essence of line gentine balsam.

5101. Factitious Canada Balsam.

Dissolve 3 pounds of clear yellow resin in 1 gallon of oil of turpentine; then add ½ pint of pale linseed oil, and ½ ounce each of essence of line gentine balsam. fir-shoots and macerate in the spirit and water ulant and diuretic; also used for sprains and

5095. Glycerine Balsam. This is designed to whiten and soften the skin, remove of tolu, 4 ounces; white resin, 16 ounces; roughness, chaps, chilblains, and irritations sheep's suet, 1½ ounces, or sufficient to make from common causes. Take pure white wax, it soft enough, according to climate or season. 1 ounce; spermaceti, 2 ounces; oil of almonds, 9 ounces. Melt together by a moder- of Tolu. monds, 9 ounces. Melt together by a moder- of Tolu. The genuine balsam is perfectly ate heat in a glazed earthenware vessel, and soluble in alcohol, forming a transparent soadd pure glycerine, 3 ounces; balsam of Peru, lution. By exposure to the air it becomes hard donnee. nearly cold, and then poured into pots. Instead of balsam of Peru, 12 or 15 drops of

tolu, in powder, 3 ounces; gum storax, 2 1 gallon; yellow resin, 3 pounds; balsam of ounces; frankincense, in powder, 2 ounces; Canada, 2 pounds; oil of juniper, 2 ounces; gum myrrh, in powder, 2 ounces; socotrine oil of savine, 1 ounce; essences of orange and aloes, in powder, 3 ounces; alcohol, 1 gallon, lemon, of each & ounce. Melt the resin, then Mix them all together and put them in a add a little of the castor oil and the powdered digester, and give them a gentle heat for 3 or benzoin, and withdraw the heat; when well 4 days; then strain. 30 or 40 drops on a mixed add the remainder of the easter oil, lump of sugar may be taken at any time, for and, when nearly cold, the essences; mix flatulency or pain at the stomach; and in old age, where nature requires stimulation. This valuable remedy should be kept in every family ready for use; it cannot be surpassed as an application for cuts and recent wounds, and is pounds; castor oil, 3 pounds; oil of juniper, equally good for man or animals.

5097. Pectoral Balsam. Tincture of oil of savine, 20 drops. As above. tolu and compound tincture of benzoin, of each 2 ounces; rectified spirit, 4 ounces; Balsam of copaiba, 4 pounds; castor oil, 3

5098. Anodyne Balsam. white soap, 1 ounce; opium, unprepared, 2 drachms; rectified spirit of wine, 9 ounces; application for wounds and cuts; and as such service in violent sprains and rheumatic complaints, when not attended with inflammation. It must be rubbed with a warm hand ant, and anti-spasmodic, and is useful in on the part affected, or a linen rag moistened with it, and renewed every third hour till the pain abates.

5099. Balsam of Turpentine. Melt by a gentle heat black resin, I pound; remove the vessel from the fire and add oil of turpen-

5100. Canada Balsam. This balsam is the product of the Canadian balsam fir, a tree of very common growth in Canada and the State of Maine. When fresh, it has the consistence of thin honey, an agreeable odor, an acid taste, and a pale yellow color, nearly white. It should be perfectly transparent, and soluble in rectified oil of turpentine, with which it forms a beautiful glassy and colorrectified spirits of wine, 1 pint. Digest them less varnish, which is much used for preparing together for a week, and strain the liquor, a semi-transparent copying-paper. A facti-This prescription is of great use in colds and tious kind is sold, but is wholly deficient of

5102. Factitious Balsam of Tolu. for 3 or 4 days, then distill 1 gallon. O:: Mix Dissolve orange shellae and gum benzoin, of together rectified spirit, 8 ounces; oil of ju-niper and compound tincture of benzoin, of each 1 ounce; agitate well and filter. Stim-distill off the spirit until the residuum has a proper consistence, then add a few drops of the oils of cassia and nutmeg, dissolved in a little essence of vanilla. Or: Take of balsam

> 5103. To Detect Factitious Balsam The mixture is to be stirred until and brittle. It is frequently adulterated, in which case it has a weaker smell, is less soluble in alcohol, and the tineture formed with

attar of rose may be employed.

5096. Universal Wound Balsam.
Gum benzoin, in powder, 6 ounces; balsam of Powdered gum benzoin, 4 ounces; castor oil, well, and filter through a Canton flannel bag, adding a little coarsely powdered charcoal.

5105. Imitation Balsam of Copaiba. lounce; essential oil of almonds, 15 drops;

pounds; mix. Or: Balsam of copaiba, 7 sufficient quantity, till of proper consistence, pounds; castor oil, 4 pounds; yellow resin, 2 Or: 4 ounces gum benzoin may be dissolved pounds. Or: Equal parts of balsam of co- by heat in 1 pound Canada balsam, and to Or: To the last add 2 pounds of Venice tur- oils of rosemary, lemon, and cassia, added. pentine. Or: Balsams of Canada and copaiba, the pure balsam, see next receipt.

5107. To Detect Factitious or Rebalsam on a piece of unsized paper, and heat from each it until all the essential oil be expelled; it of the oils. should then form a semi-transparent, well-defined spot; but if the balsam has been adulterated with a fat oil, it will be surrounded pared ox-marrow, of each 4 ounces melted by an oily areola. According to Planche, the together; oil of rosemary, 2 drachms; oil of pure balsam, when shaken with liquid ammo-cloves, 1 drachm; camphor, 1 drachm; balnia specific gravity .965, becomes clear and sam of tolu, 2 drachms; the last two dissolved transparent in a few moments. Vigne says: in rectified spirit, 4 fluid drachms; and the 2½ parts pure balsam with 1 part liquor of whole stirred till cold. ammonia, form a transparent mixture, which weight.

Dr. Hager recommends the following simple mode as very reliable for detecting adulteration of copaiba balsam with turpentine oil: 5 or 5 drops of water and about 1 drachm of the balsam are mixed in a small porcelain dish with as much litharge as will make a thin ointment. This mass, at the common summer temperature, exhales the characteristic odor of oil of turpentine, even if the balsam is adulterated with only 10 per cent. of the oil. 5108. Factitious Balsam of Peru.

and storax, adding as much spirit as is necessary to reduce it to a proper consistence

5109. Balsam of Peru, 3 pounds; balsam of tolu, 2 pounds; rectified spirit enough to reduce it to a proper consistence. As above. Or: Balsam of Peru, 3 pounds; gum benzoin dissolved in the least quantity of spirit possible,

1 pound. As above.

appearance resembling molasses, and an aronilla. It should be entirely soluble in alcohol. a most valuable tonic. It should undergo no diminution in volume 5119. Stomachic Elixir. Gentian root, when agitated with water. 1000 parts of the 2 ounces; bitter oranges, sliced, 1 ounce; Vir-

Factitious Balm of Gilead. want of appetite, &c.

1 Raume de la Mecque. Gum 5120. Tonic Infusion. Gentian root, 5111. Also called Baume de la Mecque. benzoin, 1 pound; resin, 4 pounds; oil lemon, sliced, ½ ounce; dried orange peel, bruised, rosemary, caraway, of each 4 ounces; alcohol, coriander seeds, bruised, of each 1 drachm;

paiba and balsam of Canada mixed together, the mixture, when cold, ‡ ounce each of the

5112. Hoffmann's Life Balsam, found and nut or castor oil, equal parts. Or: Co- in Continental Pharmacopaias under the name paiba, 7 pounds; nut oil, 3 pounds; yellow Mistura olcoso-balsamica, and other titles, is resin, 2 pounds; balsam of Canada, 1 pound. prepared as follows: Take 1 fluid ounce each The above are the forms for the reduction of of the oils of lavender, cloves, cinnamon, copaiba balsam, that have from time to time been circulated in the drug trade. For the mode of distinguishing such compounds from pints alcohol. The oils and balsam are gradually added to the alcohol, the whole well shaken and allowed to rest for a few days in a duced Balsam Copaiba. Chevallier recom-mends the following test: Place a drop of the use. Different European Pharmacoparias vary from each other somewhat in the proportion

5114. Balsam of Sulphur. Boil tomay be heated to 212° without becoming gether in a vessel, tightly covered, 1 part flowopaque. Boiled with 50 times its weight of ers of sulphur and 4 parts olive oil, until water for 1 hour, it should lose at least half its they assume the consistence of a thick bal-

5115. Balm of Rakasiri. Oil of rose-

mary dissolved in common gin.

5116. Balsam de Malta. Gum benzoin. ounces; gum aloes, 1 ounce; alcohol, 2 pints.

onics. Medicines that increase the tone of the muscular fibre, and impart vigor to the system. The principal mineral Balsam of tolu, 1 pound; gum benzoin, 3 tonics are iron, zinc, copper, silver, arsenic, pounds; liquid storax, 1 ounce; sufficient bismuth, mercury, and the mineral acids. The rectified spirit. The gum benzoin in coarse principal vegetable tonics are cinchona or rectified spirit. The gum benzoin in coarse principal vegetable tonics are cinchona or powder is dissolved in a little of the spirit, Peruvian bark, cinchonine, quinine, the vegetand then mixed up with the balsam of tolu table bitters, and some of the aromatics. Of the above, iron, bark, and its preparations, and the aromatic bitters, are those generally em-Reduced Balsam of Peru. ployed, and which prove most genial to the constitution.

5118. Stomachic Elixir. Pare off the thin yellow rinds of 6 large oranges, and put them in a quart bottle with 1 ounce gentian root, scraped and sliced, and 1 drachin cochineal. Pour over these ingredients a pint of 5110. To Detect Factitious or Reduced Balsam of Peru. Genuine balsam during that and the following day; let it stand 2 days more to settle, and clear it off teristics: It should have a consistence and into bottles for use. Take 1 or 2 tea-spoonfuls morning and afternoon, in a glass of wine or matic odor between that of benzoin and valin a cup of tea. This elegant preparation is

balsam should saturate exactly 75 grains of ginia snake-root, ½ ounce. Bruise, and infuse pure crystallized carbonate of soda. Its specifor 4 days in 1 pint of brandy; then add 1 pint of water. A wine-glassful to be taken more than 1.160.

boiling water, 12 ounces. Macerate for an hour in a lightly covered vessel, and strain the liquor. This infusion is often most beneficially employed in general debility, chronic gout, indigestion, and other ailments. The dose is from 1 to 2 ounces taken 3 or 4 times

Infusion of Calumba. Calumba root, 1 drachm; boiling water, ½ pint. Macerate for 4 hours and strain, adding afterwards to ounce of spirit of cinnamon. The dose is 11 or 2 ounces. It is an excellent tonic, and is held in high esteem by many eminent physicians, who employ it in the latter stage of diarrhea, bilious intermittent fever, and puerperal fever. It is also a good preparation for allaying the nausea and vomiting which often accompany pregnancy.

5122. Orange Tonic. Orange peel, 1 ounce; chamomile flowers, 11 ounces, and a little ginger. Fut in 1 pint of boiling water. Add 2 a wine-glassful of brandy. Take a

wine-glassful at a time.

5123. Spackman's Tonic and Nervine Mixture. Take & drachm sulphate of quinine, 6 grains tannin, 1 ounce ginger syrup, 6 drachms fluid extract of valerian, and 2 drachms compound tincture of cardamoms.

Dose, a tea-spoonful 4 times a day

Tonic Aromatic Mixture. Di 5124 gest in a close vessel for 3 days, agitating frequently, 1 ounce powdered pale cinchona bark, 3 drachms powdered calumba root, 2 drachms bruised cloves, and ½ ounce iron filings in 16 fluid ounces peppermint water; strain, and add 3 fluid ounces compound tineture of cardamoms, and 3 fluid drachms tincture of orange peel. Dose, 1 or 2 table-spoonfuls or more, 3 or 4 times a day. 5125. Tonic Pills. Extract of gentian,

2 scruples; sulphate of iron, 16 grains; sulphate of quinine, 10 grains. Mix, and form into pills. Take 1 pill three times a day. into pills. Take 1 pill three times a day.
5126. Tonic Tincture. Peruvian bark,

bruised, 1½ ounces; orange peel, bruised, 1 ounce; brandy, or proof spirit, 1 pint. Infuse 10 days; shake the bottle every day. Pour off the liquor, and strain. Take a tea-spoonful in a wine-glassful of water twice a day, when you feel languid.

5127. Decoction of Red or Peruvian Bark. Bruised red bark, 1 ounce; water, 1 pint. Boil for 10 minutes in a covered vessel,

and strain the liquor while hot.

5128. Infusion of Red or Peruvian Bark. Red bark, bruised, 1 ounce; boiling water, 1 pint. Macerate for 2 hours in a covered vessel, and strain. This is of great use in convalescence from acute diseases. It con-mallow, spearmint, and arnica-flowers, with 1 tains a considerable amount of the febrifuge and strengthening qualities of the quinine.

water from a pound of the bark, to which drachms lemon syrup. Dose for an adult, add sugar, 31 pounds; nerve powder, 21 ounces; while hot, strain, and add best Malaga wine, 32 gallons; tincture of meadow-fern, 1 A less quantity may be made by observing the proper proportions. Dose, from Infuse 1 ounce pleurisy root for 30 minutes in half to a wine glassful twice a day. These 1½ pints water. A tea-spoonful taken warm bitters are excellent. They are sure to correct as often as the stomach will bear it. the bile, and create an appetite by giving tone to the digestive powers.

Anodynes. Medicines which allay pain. Some act by actually assuaging pain; others by inducing sleep; a third class give ease by stupefying the senses, or lessening the susceptibility to pain. Among the principal anodynes are opium, morphia, camphor, ether, chloroform, nitrous oxide or laughing gas, &c.

5131. Anodyne Powder. ounce; camphor, 3 drachms; valerian, 1 ounce; cayenne pepper, 1 ounce. Put the opium and camphor into a close bag; place it on the oven top to harden. Powder and mix. Take 1 tea-spoonful at a time. Most valua-

ble in colic, cramp, and severe pains.

5132. Anodyne Substitute for Opium. Take 2½ drachms each tineture of lupuline (hops), and tincture of henbane; 5 drachms camphor water. A tea-spoonful of the mixture may be given every 2 hours in cases where opium cannot be administered.

5133. Anodyne Cigars. The leaves of the belladonna (deadly nightshade), 4 parts, moistened with I part tincture of opium, dried and made into cigarettes of 1 drachm each; or the leaves alone, without the addition of opium, form an effective anodyne in troublesome coughs, tooth-ache, sore throat, &c.

Diaphoretics. Medicines that increase the perspiration. Those that produce this effect in a powerful degree are generally called sudorifics. The principal diaphoretics are warm diluents, as gruel, tea, barley-water, &c.; salts of the alkalies, as the citrates of potassa and soda, acetate and carbonate of ammonia, sal-ammoniac, nitre, &c.; preparations of antimony, as tartar emetic, antimonial powder, &c.; also Dover's powder, opium, camphor, ipecacuanha, alcohol, wine, &c. The use of diaphoretics is indicated in most diseases accompanied by fever and a dry skin.

5135. Balm Tea. Balm leaves, 1 ounce; fine sugar, 1 spoonful; lemon juice, 1 ounce; infused in a pint of boiling water for 20 minutes. This forms a useful drink in colds or fevers. Or it may be made just like common tea, without the lemon. Let the patient drink it frequently, especially the last thing at night, and keep himself warm during the

perspiration.

5136. Herb Drink for Fevers. Infuse 1 ounce each of balm, elder-flowers, marsh-

ounce anise-seed, in boiling water.

5137. Fever Mixture. Mix 2 scruples 5129. Dr. Thompson's Bitters. Balmitrate of potash with 3 drachms sweet spirits
mony bark, 1 part; poplar bark, 5 parts. Boil
in water from a control of the delivered potash with 3 drachms sweet spirits
of nitre, 3 ounces solution of acetate of amin water from a control of the delivered potash with 3 drachms sweet spirits
of nitre, 3 ounces solution of acetate of amin water from a control of the delivered potash with 3 drachms sweet spirits
of nitrate of potash with 3 drachms sweet spirits
of nitre, 3 ounces camphor water, and 2 2 table-spoonfuls every 4 hours. Children in proportion. This mixture is excellent where the fever affects the head.

5138. Infusion to Produce Sweating.

5139. Boneset Tea. Infuse 1 ounce boneset in 1 pint boiling water for 30 minutes.

A wine-glassful as hot as possible every half: hour will produce a profuse perspiration.

nausea, will have a similar effect.

Febrifuge Wine. The following mixture is highly recommended for fever

this the best medicine for fever and ague of of the same. any with which he is acquainted. In two where other remedies failed.

5143. Spirit of Mindererus, or Solution of Acetate of Ammonia. Add the carbonate of ammonia gradually to nereal complaints. the acid, until it is saturated. This is a valuable diaphoretic, and is much employed in

fevers and inflammatory diseases.

5144. Houseleek for Fevers. used as a cooling application to sores, ulcers, &c. The juice mixed with cream is good for inflammation of the eyes, and erysipelas. Taken inwardly it is good for fevers, cooling them down wonderfully. First give a purgative to cleanse the stomach and bowels; then bruise the houseleek; adding to the juice its weight in fine sugar to form a syrup. A table-spoonful every 2 hours. Drink balm or catnip tea. This receipt is worth gold.

5145. Sudorific, or Fever Powder. Crawley root, 1 ounce; lobelia herb, ½ ounce; plearisy root, 1 ounce; skunk cabbage, 1 It may be given in balm or common tea. In through magnesia. fevers, inflammations, influenza, and colds, this powder is invaluable. It subdues irritation, corrects the pulse, improves respiration, and promotes sound natural sleep. It is sure, if properly administered, to arrest a fever. Keep it in a bottle, well corked.

iuretics. Medicines which promote the secretion of urine. The principal diuretics are aqueous fluids, which act by increasing the watery portion of the blood, secretion of urine, by stimulating the kidneys. Among the former may be classed nearly all aqueous liquids, as most of them produce diuresis, if the skin be kept cool. Among the latter may be mentioned the nitrate, acetate, and bitartrate of potassa; oils of juniper, turpentine, cajeput, and copaiba; dilute spirit and sweet spirits of nitre; decoction of common broom, &c.

5147. Diuretic Drops. Tincture of kino, & ounce; balsam ef copaiba, spirits of 5140. Blessed Thistle Tea. The turpentine, of each I ounce; sweet spirits of leaves of the blessed thistle prepared and nitre, 2 ounces; queen of the meadow, 1 administered in the same way as Loneset (see ounce. Mix, and add 1 scrupte of camphor. last receipt), but not sufficient to produce Take nearly a tea-spoonful in mucilage. Most valuable for scalding urine, inflamma-

tion of the kidneys, &c. 5148. Diuretic Diuretic Infusion. and ague: quinine, 25 grains; water, 1 pint; Epsem salts, 2 ounces; brandy, 1 gill; sulspending acid, 12 drops; loaf sugar, 2 ounces. Take a vine-glassful three times a day.

5142. Dittrette Initision. Farsley seeds, ½ ounce; cleavers, ½ ounce; burdock seeds, ½ ounce; coolwort, ½ ounce; spearmint, phuric acid, 12 drops; loaf sugar, 2 ounces. Take a ounce; gum arabic, ½ ounce. Pour upon these 2 quarts boiling water; infuse 2 or 3 hours, covering the vessel. Strain, and add hours, covering the vessel. phor, saffron, ipecacuanha, opium, and Virginia snake-root, 1 ounce each; Holland
table-spoonfuls of slippery elm. This is a
gin, 12 pints; infuse 2 or 3 days. A wondermost valuable diuretic; it is cooling, allays fully efficacious cure for fever and ague, after all urinary affections, gravel, scalding of suitable evacuants. Dr. Beach says he finds urine, and causes an easy and sufficient flow

5149. Diuretic Pills. Calcined magcases this tineture removed the paroxysms nesia, 1 drachm; solidified copaiba, 2 ounces; extract of cubebs, 1 ounce; oil of turpentine, 4 drops; oil of juniper, 6 drops; form into Take of 3-grain pills. Take 1 or 2 a few times a day. diluted acetic acid, 2 pints; carbonate of A sovereign remedy for diseases of the kid-ammonia, in powder, a sufficient quantity. neys, bladder, urethra, gravel, whites, and ve-

5150. Buchu Leaves. They are diuretic and tonic, and a most valuable remedy They are diuin rheumatism, irritable bladder, gravel, stric-It is ture, &c. They are given in infusion and ulcers, tincture. Infuse ½ ounce of leaves in ½ pint of boiling water, for 3 or 4 hours. A wineglassful for a dose 2 or 3 times a day; or from 1 drachm to 1 ounce of the tincture.

5151. Compound Spirit of Juniper. Stimulant and diuretic, administered in doses of 2 to 4 drachms. This spirit, when mixed with 2 or 3 times its weight of proof spirit, makes a fair imitation of Holland gin. 15 ounces bruised juniper berries, 2 ounces each of bruised caraway and fennel, 1 gailon proof spirit, and about 1 quart water. Distill 1 gallon. The wholesale preparation is a ounce. Powder, and mix them together. solution of 2 drachms oil of juniper, ½ drachm Dose, from ½ to ½ tea-spoonful every one each of the oils of caraway and sweet fennel, hour and a half till perspiration is produced. in 5 quarts proof spirit. If not clear, filter

> lectuaries. These are chiefly mixtures of vegetable substances combined with syrup or honey, so as to be of a moderate consistence, neither liquid nor solid. The object of such preparations is to secure a vehicle by which medicines may be administered, so that their taste may be covered by the mixture with which they are combined.

5153. Aperient Electuary. Cream of and certain substances which promote the tartar, 1 ounce; milk of sulphur, 1 ounce; sub-borate of soda, 21 drachms; syrup of ginger, of sufficient quantity to give the required consistence. The dose is 1 or 2 teaspoonfuls at bedtime. This will be found a mild and excellent laxative, and often is of great use in uterine obstructions.

5154. Lenitive Electuary. of preparing this electuary is the following: Take of the best senna leaves reduced to a

oil of caraway, 2 drachms. Boil the pulps perly administered, are among the most with the molasses to the consistence of honey, useful and generally employed alteratives. add the senna, and when the mixture is nearly cold, add the oil of caraway, and 2 drachms; mandrake, 2 drachms; blue flag. lastly, mix the compound thoroughly. This 2 drachms; blood root, 2 drachms; cayenne preparation is a mild aperient, suited to consti-pepper, 1 drachm; gum guiacum, 2 drachms; pation from whatever cause. It is admir-extract of dandelion, 6 drachms; oil of perably suited to children and delicate persons. United with an equal quantity of flowers of sulphur, it is an admirable remedy for piles. Dose, from 1 to 3 tea-spoonfuls at bed-time.

omentations. In domestic practice hot fomentations are, although a simple, yet a very useful remedy for allaying pain, relieving irritation, relaxing and removing spasms, and inducing not only local, but even general perspiration. Cloths dipped in very hot water, wrung out and instantly applied on the seat of the pain, will be frequently of very great service. But in some cases it adds to the efficacy of the application to employ substances possessing medical properties in addition to the mere application of heat. In every process of fomentation there should be two flannels, each (say) three yards long, with the ends sewed together, to admit of the boiling water being wrung out of them, and the one flannel should be got ready whilst the other is applied.

5156. Anodyne Fomentation. White poppy heads, 3 ounces; elder flowers, ½ ounce; water, 3 pints. Boil until the liquor is reduced to 3 of its original quantity, and strain it; 2 or 3 tea-spoonfuls tincture of opium or laudanum, and 30 drops tincture of cavenne, may in some cases be added to it. This formentation relaxes spasm, and relieves acute pain.

5157. Fomentation for Ordinary Occasions. Dried mallows, 1 ounce; chamomile flowers, dried, ½ ounce; water, 1 pint. Boil for ½ hour, and strain the liquor.

5158. Strengthening Fomentation. to weak parts.

5159. Arnica Fomentation. Flowers of arnica, 2 ounces; rue leaves, 1 ounce; 5159. boiling water sufficient to strain 6 fluid ouneyes.

5160. Stimulating Fomentation. Cayenne pepper, 3 ounces; mustard seed just bruised, 2 ounces; whiskey, 2 quarts. Simmer all together a few minutes. Excellent external application in cholera, paralysis, palsy, rheumatism, &c. A less quantity may be made.

quality of the vital action, and occasion a change in the habit or constitution, establish-

fine powder, 4 ounces; pulp of prunes, 1 out producing any sensible evacuation by pound; pulp of cassia, 1 pound; pulp of tam- perspiration, vomiting, or purging. The proarinds, 3 ounces; molasses, 12 pints; essential parations of mercury and iodine, when pro-

> 5162. Alterative Pills. Lobelia seeds, permint, 3 or 4 drops; simple syrup to form into pills. Dose, 2 pills twice or thrice a day. These pills are of great service in bilious and liver complaints, diseased joints, boils, carbuncles, cutaneous eruptions, scrofula, syphilis, &c.

> 5163. Alterative Syrup. Tineture of cayenne, ‡ ounce; tineture of lobelia and tincture of myrrh, of each 2 ounces; molasses, ½ pound. Mix. A tea-spoonful 2 or 3 times a day. Noted for its effectual cure of cutaneous sores, boils, indigestion, and some chronic complaints.

> 5164. Dandelion Alterative. A useful alterative medicine, especially in cases where the function of the liver is at fault. Dose, fluid extract of dandelion, a dessert-spoonful, twice daily, with or without a little water.

> 5165. Blood Maker and Purifier. Mix ½ ounce sulphate of manganese with 1 pint water. Dose, a wine-glassful 3 times a day. This can be used in the place of iron tonic, or in connection with it.

> Pancoast's Alterative and 5166. Tonic Pills. 1 scruple extract of Ignatia amara (the bean of St. Ignatius). 1½ drachms bromide of potassa, & drachm saccharine carbonate of iron, 1 scruple piperine, and 1 scruple extract of henbane. Make into 60 pills, and take 2, fifteen minutes after each meal.

Emetics. Medicines which induce vomiting. The principal emetics are ipecacuanha and tartarized antimony, and their preparations; and the sulphates of zinc Decoction of oak bark, 2 pints; alum, 3 and copper. Ipocacuanha is usually adminisdrachms. Mix. This is a powerful astrintered in substance or infused in wine. The tered in substance or infused in wine. The gent, and often of great use when applied use of tartar emetic and antimonial wine is generally followed by nausea, relaxation of muscular power and of the circulation. Sulphate of zine acts promptly and energetically, and its effects cease as soon as ejected from ces of infusion after an hour's maceration at the stomach; hence it is employed to eject nearly boiling temperature. Used in contu-sions, especially as an application to black and disagreeable, and its intense metallic taste is a great objection to its use. The operation of emetics is powerfully promoted by drinking copiously of diluents, especially of warm or tepid water. This latter is itself an emetic when taken in quantity. Its use prevents, in a great degree, excessive straining accompanying vomiting.

5168. Emetic Mixture. Ipecacuanha wine, ½ ounce; water, 1 ounce; simple syrup, ½ ounce. Mix. For a child, 20 drops or Alteratives. Medicines which effect more, every quarter of an hour until vomit-some alteration in the nature or the ing ensues. An adult may take from 1 to 1 ounce.

5169. Eclectic Emetic Powder. Ipeing the healthy functions of the body with cacuanha and lobelia, of each 2 ounces; blood

operates.

warm water, I heaping tea-spoonful of salt, ration and another of mustard. These materials 517 are usually to be had at a moment's notice, and form a very efficient emetic.

atent and Proprietary Medicines. The following receipts embrace a variety of domestic, popular, and proprietary remedies, and include many compounds which, without being proprietary, are better known by the names of the practitioners who have brought them into prominent notice than by any other title. A variety of articles not included in this place are noticed along with other preparations of the class to which they belong, or under the names of their proprietors.

5172. Dalby's Carminative Take oils of caraway. fennel, and peppermint, each 10 drops; rub them up with 10 ounces white sugar and 5 ounces carbonate or lump magnesia, then add 1½ drachms sal-tartar and 2 ounces laudanum. Mix with 31 pints of wa-

ter.

syrup, 1 drachm by weight; mix, and divide into 40 pills. Dose, 2, 3, or more. From 2 motion within 12 hours. The best time to take them is early in the morning.

5174. Barclay's Antibilious Pills. mass with syrup, and form into pills of 5 Extract of colocynth, 2 drachms; extract of grains each.
jalap, 1 drachm; almond soap, 1½ drachms;
5185. Peter's Pills. Aloes, jalap, gamguiaeum, 3 drachms; tartarized antimony, 8 grains; oil of juniper, 4 drops; oil of cara-

way, 4 drops; oil of resemary, 4 drops. 5175. Lee's Antibilious Pills. Take pulverzed jalap, aloes, and rhubarb, each 1 ounce; calomel, 3 drachms; pulverized gambogs, 1 drachm; form the whole into a mass

make into pills.
5176. Dover's Powder. Ipecacuanha, in powder, I drachm; powdered opium, drachm; powdered saltpetre, 1 ounce. well mixed. Dose, from 8 to 20 grains.

The U.S. Pharmacopœia directs 1 ounce sulphate of potassa instead of the saltpetre

put these into a jug, shake several times a and 10 grains powdered ipecacuanha. Mix, day for 8 days, when it is fit for use. This is and make into 60 pills. a stimulant and tonic.

Thompson's Composition Pow-Take bayberry, 8 ounces; ginger, 8 ounces; poplar bark, 4 ounces; white oak bark, 4 ounces; cayenne pepper, 3½ ounces; molasses. Mix, and make into 240 pills. Cloves, ½ ounce. Powder and mix intimately. Dissolve a tea-spoonful in a cup of boiling drake Pills. Take ½ drachm compound experiences. influenza, fever, relax, pain in the bowels, phyllin. Mix, and make into 12 pills. cold extremities. As a sudorific, or for re- 2 at bed-time.

root, 1 ounce. Powder, and mix well. Take moving morbific matter, the cause of disease. half a tea-spoonful every 20 minutes till it it is invaluable. When taken, the patient should go to bed, and make use of any of 5170. Simple Emetic. Half a glass of the various appliances for promoting perspi-

> 5179. Thompson's Hot Drops. myrrh, 2 ounces; cayenne pepper, 1½ drachms; spirit of wine. 1 pint. Put in a bottle, and shake several times a day for a week. Take a tea-spoonful or more in a little warm tea. It is a fine remedy for rheumatism. It will relieve the headache by taking a dose, bathing the head with it, and snuffing it up the nose. It is good for bruises, sprains, swollen joints and old sores, &c., &c.

5180. Anderson's Scott's Pills. Barbadoes aloes, 24 ounces; colocynth, 1 ounce; gamboge, 1 ounce; Spanish soap, 4 ounces oil of anise, 1 ounce; water, a sufficient To be made into 3-grain pills.

quantity. To be made into 3-grain pills.
5181. Marshall Hall's Dinner Pills. Take of powdered Barbadoes aloes, soap, and powdered extract of liquorice, of each equal parts. Make a mass with molasses, and form into pills of 4 grains each.

5182. White's Gout Pills. Take of

calomel, powdered socotrine aloes, powdered ipecacuanha, and acetic extract of colchicum, of each 1 drachm. Make a mass with

syrup, and form into 60 pills

5183. Abernethy's Pills. Take of powdered socotrine aloes, 48 grains; pow-5173. Kitchener's Peristaltic Persuadered ipecacuanha, 20 grains; extract of ders. Turkey rhubarb, in powder, 2 drachms; oil of caraway, 10 drops; simple grains. Make a mass with water, and form into 24 pills. 5184.

Triplex Pills. Take of powto 4 will generally produce one additional dered socotrine aloes, 2 ounces; powdered scammony, 1 ounce; blue pill mass, 2 ounces; oil of caraway, 3 drachms. Make a

5185. Peter's Pills. Aloes, jalap, gamboge, and seammony, of each 2 drachms;

calomel, 1 drachm.

5186. Walter's Indian Vegetable Pills. Socotrine aloes, 1 pound; powdered gamboge, 6 ounces; compound extract of colocynth, castile soap, and Aleppo scammony, of each 3 ounces; extract of butterwith shavings of castile soap and syrup; then nut, 2 ounces; African cayenne, 1 ounce; oil of cloves, 1 drachm. Mix and make into 4-grain pills.

a, 1 5187. Becquerel's Gout Pills. Mix All together 106 grains sulphate of quinine, 151 grains extract of digitalis (fox-glove), and 381 grains of colchicum seeds. Make into 38½ grains of colchicum seeds. 50 pills. Dose, from 1 to 3 daily for several

(nitrate of potassa); in other respects the days in succession. formula is the same as the above.

5188. Health Pills. Pill salutis. Take
5177. Thompson's "Number Six." 2 drachms socotrine aloes, 1 drachm extract Gum myrrh, I pound; golden seal, 4 ounces; of henbane, 16 grains extract of nux-vomica,

5189. Leake's Pill of Health. Pill dutaria. Take 2 drachms calomel, 2 salutaria. drachms precipitated sulphuret of antimony,

water, sweetened. Valuable to remove colds, tract of colocynth, and 3 grains resin of podo-

of podophyllin, and 4 minims oleo-resin of phia, and hydrocyanic acid, nor can there be ginger. Mix, and make into 24 pills. Dose, about oil of peppermint and molasses. The as a laxative, 1 pill; as a purgative, 2 or 3 question is whether anything else exists in

Dr. Reece's pills. Extract of chirayta (chiretta), 2 drachms; dried soda, 20 grains; ginger, 15 grains; mix, and divide into 36 pills. Two twice a day. Mixture: Infusion of chirayta, 8 ounces; subcarbonate of soda, 1 drachm; 2 table-spoonfuls 3 times a day.

Bateman's Pectoral Drops. Compound spirit of aniseed, 16 fluid ounces; opium, 1 drachm; camphor, 1 drachm; oil of fennel, 20 drops; cochineal, 2 drachms.

Or: Proof spirit, 4 gallons; red saunders, 2 ounces; digest 24 hours, filter, and add powdered opium, 2 ounces; camphor, 2 ounces; catechu, 2 ounces; oil of aniseed, 4 fluid morphia, 2 fluid drachms rectified ether, 8 drachms; digest for 10 days. (Philadelphia minims oil of peppermint, 4 fluid drachms di-College of Pharmacy.) The old wine gallon is here intended.

5194. Clutton's Febrifuge Spirit. The original formula is: oil of sulphur by the bell, oil of vitriol and sea salt, of each 1 ounce; rectified spirit, 3 ounces; mix, digest for a month, and distill to dryness.

5195. Clutton's Febrifuge Tincture. Febrifuge spirit, 8 fluid ounces; angelica root, serpentary, cardamom seed, of each 1½ drachms; digest and strain. Water acidulated with these, and sweetened to the taste, forms a cooling diuretic and diaphoretic julep. Though never admitted into the Pharmacopeia, these preparations are favorites with some practitioners.

5196. Lartigue's Gout Pills. Compound extract of colocynth, 20 grains; extract of colchicum, 60 grains; extract of opium, 1 grain; mix, and divide into 18 pills. Dose, one or more, according to their purgative effect.

5197. Baillie's Pills. Compound extract of colocynth, 1½ druchms; extract of aloes, 1½ drachms; castile soap, ½ drachm; oil of cloves, 15 drops. Make into 33 pills. 3 at bed-time occasionally

5198. Marseilles Vinegar. Also called vinaigre de quatre voleurs, or thieves' vinegar. Dried tops of large and small wormwood, rosemary, sage, mint, rue. lavender-flowers, of each 2 ounces; calamus root, cinnamon, cloves, nutmeg, garlic, of each ‡ ounce; camphor, ½ ounce; concentrated acetic acid, 2 ounces; strong vinegar, 8 pounds. Macerate the herbs, &c., in the vinegar for 2 weeks, strain, press, and add the camphor dissolved in the acetic acid. It is said that this medicated vinegar was invented by four thieves of Marseilles, who successfully employed it as a disinfectant during a visitation of pestilence.

5199. Collier's Wine of Quinine. Take disulphate of quinine, 18 grains; citric acid, 15 grains; sound orange wine, 1 bottle, or 24 fluid ounces.

5200. Chlorodyne. The composition of this well known secret remedy has excited much attention among chemists; many formulæ have been published, but it is difficult to determine which of them approaches nearest to the chlorodyne of J. Collis Browne, its extract of cannabis indica, 10 drops oil of

5191. Parrish's Aloes and Mandrake originator. There can be no doubt about the ills. Take 24 grains aloin, 12 grains resin three important ingredients, chloroform, morlls.

18.

192. Chirayta Pills and Mixture. which have been published, two—one by Dr. Ogden, the other by Mr. Squire—have attracted most attention. The difference between these lay essentially in the presence of Indian hemp and capsicum as indicated by Ogden, their absence in the formula given by Squire. But besides this, the proportion of morphia, as given by the two authorities. differed greatly. Mr. Edward Smith has recently investigated the question, and published the result in the London Pharmaceutical Journal. He puts the composition of chlorodyne as follows: Mix together 4 fluid drachms chloroform, 20 grains muriate of luted hydrocyanic acid, 6 fluid drachms tineture of capsicum, 1 fluid ounce acacia mixture, and add 4 fluid ounces molasses. This does not give as dark a compound as the original, because the latter contains caramel; but as this has no medicinal or other value, he omits it, making up to the required volume with the molasses. Mr. Smith thinks there is no Indian hemp, because the alcoholic extract is soluble in water; but then there is capsicum, as, after the chloroform and ether (which also give pungency to the mixture) have been distilled off, the substance left behind has a hot, peppery taste. He seems to have taken much pains with the analysis.

5201. Ogden's Chlorodyne. The following receipt will furnish a preparation having the pharmaceutical properties of chlorodyne, according to Dr. Ogden: To 8 grains muriate of morphia and 1 fluid drachm water, add 20 drops perchloric acid of 25° Baumé, and heat until a clear solution is obtained; then add 1 fluid ounce molasses, previously warmed to render it fluid; heat the mixture and agitate well. When cold, add 11 fluid drachms chloroform, 12 drops hydrecyanic acid, I fluid drachm tincture of Indian hemp.

2 drops oil of peppermint, and 1 drop oleo-resin of capsicum. Mix thoroughly.

5202. Groves' Chlorodyne. The fol-lowing is an improvement by Mr. Groves, on the receipt of Dr. Ogden. Take chloroform, 4 drachms; ether, 11 drachms; oil of peppermint, 8 drops; resin of Indian hemp, 16 grains; capsicum, 2 grains; macerate for 2 or 3 days, and filter. Then dissolve hydrochlorate of morphia, 16 grains, in 1 ounce of syrup; add perchlorie acid and water, i drachm each, assisting the solution by a water-bath; then, when cold, add hydrocyanic acid (Scheele's), 96 drops. Mix the solutions. 96 drops.

5203. Squire's Chlorodyne. Dissolve 8 grains muriate of morphia, and 16 minims oil of peppermint, in 4 ounces rectified spirit; add 4 ounces chloroform and 1 ounce ether; next dissolve 21 ounces extract of liquorice in $17\frac{1}{2}$ ounces syrup, and add 4 ounces molasses. Mix these 2 solutions together, and add 2 ounces prussic acid.

peppermint, 15 drops tincture of capsicum, 2 3 hours. This preparation is of a clear greenish color.

5205. Horsley's Chlorodyne. The following formula is the result of an analysis made by Mr. Horsley. Burnt sugar, 1 drachm; muriate of morphia, ½ grain; distilled water, 2 drachms; oil of peppermint, 6 minims; dilute prussic acid, 5 minims; tineture of capsicum, 7 minims; and chloroform, 1 drachm. Mix. It must be observed that the with the chloroform, which will be found on bromide of potassium, and omitting the color. the bottom of the bottle.

Chlorodyne. 5206. ether, 8 drops oil of peppermint, 8 drops tle, 1 drachm; mix, and divide into 4-grain resin of Indian hemp (cannabis Indica), and pills. 2 drops capsicum; shake the mixture occasionally and allow it to stand for a few days. Dissolve 16 grains muriate of morphia, by minims Scheele's hydrocyanic acid, 1 fluid drachin perchloric acid, and 2 fluid ounces to make the whole measure 4 fluid ounces. Dose, 30 minims.

5207. Chlorodyne. Mix together 6 fluid drachms chlorotorm, 1 fluid drachm chlor pepper, 2 drops oil of peppermint, 8 grains and brandy coloring if required. muriate of morphia, 24 drops dilute hydro-cyanic acid, 20 drops perchloric acid, 1 fluid Mix together 4 grains extract of belladonna, drachm molasses. Dose, 20 drops, as a sopo-rific; 30 drops to 1 fluid drachm, as an anodyne in cholera or violent paroxysms of ing the paroxysms.

nin. (Cooley.) 5208. Eau Médicinale d'Husson. It quantity of brandy; mix, and, after standing a few days, decant into small bottles. But it drachms camphor. was more probably made from the root, as prescribed in the following formula:

Dry colchieum, C0 parts; in sherry, 125 parts. 20 drops for a dose. (Paris Codex.) 4 ounces of the fresh root, sliced, macerated

in ½ pint of proof spirit. (Want.)
5209. Bates' Anodyne Balsam. Soap liniment, 2 parts; tineture of opium, 1 part.
5210. Delamott's Golden Drops. Mu-

riate of iron, 1 ounce; spirit of sulphuric ether, 7 ounces; dissolve and expose to sunshine in a closely-stopped bottle till it becomes

divested of color.

Gregory's Powder. Calcined magnesia, 2½ ounces; powdered Turkey rhubarb, 1 ounce; powdered ginger, ½ ounce. Mix. The above is Dr. Gregory's formula. Some receipts add powdered chamomile. Rhubarb, 1 ounce; ginger, 1 ounce; powdered chamomile, ½ ounce; magnesia, 2 ounces. 5224. Allen's Nerve and Bone Lini-Mix. Some druggists prepare it with the ment. Take oil of origanum, oil of roseheavy carbonate of magnesia, instead of the calcined. (See No. 5414.)

Black Draught. 5212. Infusion of senna, 10 drachms; sulphate of magnesia, 3 drachms; syrup of ginger, 1 drachm; aro-

matic spirit of ammonia, 20 drops,

peppermint, 15 drops tineture of capsicum, 2 5213. Standert's Red Mixture. Cardrachms chloroform, and 1 ounce each of 98 bonate of magnesia, 4 drachms; powdered per cent. alcohol and pure glycerine. Dose, rhubarb, 2 drachms; tincture of rhubarb, 1 10 to 30 drops in a wine-glass of water every ounces; tincture of opium, 1 drachm; oil of aniseed, 24 drops; essence of peppermint, 30 drops; water, 1½ pints; mix. A popular remedy for bowel complaints in the west of England.

5214. Graves' Gout Preventive. Orange peel, 2 ounces; rhubarb, 1 ounce; hiera piera, 2 ounces; brandy, 1 quart. Digest for

a week.

5215. Elixir of Bromide of Sodium. Prepare this like elixir of bromide of potaswater is perhaps an error, as it will not mix sium, substituting bromide of sodium for

Mix together ½ 5216. Bacher's Tonic Pills. Alkaline extract of black hellebore, 2 drachms; extract fluid ounce chloroform, 90 minims sulphuric of myrrh, 2 drachms; powder of holy this-

5217. Daffy's Elixir. This is similar to the compound tineture of senna; but different makers have their peculiar formulæ. heat, in 2 drachms water; when cold, add 65 The following is one of them. Avoirdupois minims Scheele's hydrocyanic acid, 1 fluid weight seems to be intended. Senna leaves, drachin perchloric acid, and 2 fluid ounces 34 pounds; jalap, axiseed, caraway seed, of molasses. Add this gradually to the first each 20 ounces; rectified spirit, 18 pints; mixture, and then add sufficient molasses sugar, 5 pounds. Infuse the senna 2 or 3 times in sufficient boiling water to yield, when strained with pressure, 4 gallons in the whole. Add to this the tineture made with jalap and fluid drachms chloroform, 1 fluid drachm chloric ether, 2 fluid drachm tineture of cayenne Pour off the clear liquor and add the sugar

drachm tineture of Indian hemp, and 1 fluid 6 fluid ounces ammonia water, ½ fluid ounce oil of turpentine, & fluid ounce olive oil, and 2 fluid ounces tincture of opium. Apply dur-

5219. Hayes' Pile Liniment. Melt 1 pint lard to the consistence of honey; stir in is prepared, according to Dr. Williams, from briskly 1 ounce muriatic acid until thoroughly the juice of colchicum flower with half the incorporated; and add 1 ounce tincture of opium, 2 ounces oil of turpentine, and 2

> 5220. Graham's Neuralgic Liniment. Mix together 1 fluid ounce chloroform, 2 fluid drachms oil of cajeput, 11 ounces camphor, 12 grains veratrine, and 11 fluid ounces tincture of

aconite root.

5221. Mexican Mustang Liniment. Take 2 fluid ounces petroloum, 1 fluid ounce ammovia water, and I fluid drachm brandy.

Heyle's Horse Embrocation. Mix together I ounce oil of spike, I cunce ammonia water, 2 ounces oil of camphor, 1 ounce oil of origanum, i ounce tincture of opium, 1 ounce spirits of turpentine, and 2 ounces olive oil.

5223. Barrell's Indian Liniment. Alcohol, 1 quart; tineture of capsicum, 1 ounce; oils of origanum, sassaíras, pennyroyal, hem-

lock, of each & ounce, and mix.

mary, oil of amber, oil of hemlock, of each 4 ounces; spirits of turpentine, 2 gallons; linseed oil, 3 gallons. Mix, and color with anchusa root.

5225. Glycerine Jelly. Used as an application to chaps and roughened parts of

the skin. It may be made of pure glycerine As soon as the first effervescence is over, thickened with tragacanth powder and scented with otto of roses. An imitation may be prepared in the following manner: Mix 1 drachm from the fire and stir rapidly, to remove the good soft soap intimately with 2 drachms purified honey; gradually add 5 ounces pale olive oil, stirring without intermission until all is taken up. Care must be taken not to mix in the oil too fast. Finally perfume as must have been prepared a week earlier with desired.

Glycerine Paste. A stiff glutinous compound, recommended by Dr. Tilt as a basis for plaster. It is made by boiling 100 or 150 grains common starch in 1 ounce of glycerine. This is similar to Schacht's plasma.

pint of proof spirits, 1½ drachms each of the lead) in oil. It is also laid on with a brush oils of caraway and cinnamon; extract the stones from 3 pounds of black observed. stones from 3 pounds of black cherries, and mash the fruit in a pan; grate 1 nutmeg; take 2 quarts of Madeira wine, 2 quarts of brandy, and 1 gallon of syrup; mix all to-gether, and color with red saunders wood.

5229. Squire's Elixir. Opium, 1 ounce; camphor. 1 ounce; spirit of aniseed (compound), 4 pints; tincture of serpentaria, 1 pint; water, 4 pints; tincture of ginger, 1 ounce. Some receipts add a little aurum mus-

5229. Ward's Essence for the Headache. Spirit of wine, 2 pounds; roche alum in fine powder, 2 ounces; camphor, 4 ounces; essence of lemon, 1 ounce; strong water of ammonia, 4 ounces; stop the bottle close, and shake it daily for 3 or 4 days.

5230. Henry's Magnesia. A solution of Epsom salts is precipitated by one of carbonate of potash in the cold; the precipitate is well washed, rose water being used for the cantharides to 4 pounds of lard; No. 2 of 1

sam of tolu, 2 ounces; styrax, 2 drachms; opium, ½ drachm; honey, 8 ounces; spirit of wine, 32 fluid ounces.

5232. Battley's Senna Powder. Senna leaves heated until they become light in color, reduced to powder, and mixed with some fine-

ly powdered charcoal.

5233. Munro's Cough Medicine. 4 drachms paregoric with 2 drachms sulphuric ether and 2 drachms of tincture of tolu. Dose, I tea-spoonful in some warm water.

5234. Griffin's Tincture for Coughs. Oil of caraway and anise, each 2 drachms; satiron, ½ ounce; benzoic acid, ¼ ounce; opium, 5 drachans; camphor, ½ ounce; spirit, 6 ounces; honey, 6 ounces. When mixed and dissolved color with home. dissolved, color with burnt sugar.

Derbyshire's Patent Embrocation for Preventing Sea-Sickness. 2 ounces opium, 2 drachms extract of henbane, 10 grains mace, and 2 ounces mottled soap, in 3 pints of water for 1 hour. When

drachms spirit of ammonia.
5236. Papier Fayard et Blayn. This preparation is now made officinal in the Paris Codex, under the name of Papier dit Chimique. Heat 200 parts olive oil in a capacious dish

continue to stir and heat the mixture until it begins again to effervesce. Then remove white scum on the surface, and at once add 6 parts white wax. This is applied to paper

or muslin with a sponge or brush.

Before spreading on the paper or muslin, it the following varnish, to make it impenetrable: olive oil, 100 parts, and garlic, 10 parts, are heated together over the open fire until the moisture of the latter is dispelled and they turn a brown color, after which they are strained. To this mixture are added 80 parts

5237. Fapier Fayard. Gout paper. Euphorbium, 3 drachms; cantharides, 6 drachms; powdered and digested with 4 ounces alcohol; and 3 drachms Venice turpentine added to the strained tincture. Fine paper is dipped into it and dried in the air. Mohr directs 4 drachms eantharides and 1 drachm euphorbium to be digested in 5 ounces of highly rectified spirit; filter, and add 11 ounces Venice turpentine previously liquefied with 2 ounces resin. To be spread on the paper

while warm.

5238. Papier Epispastique de Vée. This is of three strengths, distinguished by the colors white, green, and red. The composition is made by boiling cantharides for an hour with water and lard green circument or hour with water, and lard, green ointment, or lard colored with alkanet; adding white wax to the strained fats, and spreading on paper, silk, or linen. No. 1 is made with 10 ounces last washing; it is then made up while drying into large or small cubes.

Balcolored lard; and to each are added 2 pounds of white wax

5239. Bateman's Itch Ointment. Carbonate of potassa, 1 ounce; red sulphuret of mercury, 1 drachm; hog's lard and flowers of sulphur, each 11 ounces; bergamot, 30 drops; rose water, 1 ounce. Mix the potassa and powders with a little of the lard, and rub them well together; then add the remainder of the lard, previously softened by heat, after-wards add the rose water, gently warmed. Stir till cold.

5240. Smith's Itch Ointment. Flowers of sulphur, 2 ounces; sulphate of zinc, 2 drachms; powdered hellebore, 4 drachms; soft soap, 4 ounces; lard, 8 ounces. Mix.

5241. Wiegand's Tetter Ointment. Powder and mix 2 drachms submuriate of roca-mercury (calomel) with 1 drachm acetate of Boil lead, and 1 drachm red precipitate. Make 42 grains of the above powder into an ointment with 2 drachms of lard or simple cerate.

5242. Wiegand's Tetter Salve. Take cold, add 1 quart of rectified spirit and 3 8 grains of the powder in the last receipt, mix with 20 drops glycerine, 5 grains powdered camphor, 1 ounce simple cerate, and 2

drops oil of lemon.

5243. Bailey's Itch Ointment. Sweet oil, 1 pound; suet, 1 pound; root alkanet, 2 ever an open fire, until vapors begin to be given off. Then add gradually, with stirring, colored, then add powdered nitre, 3 ounces; 100 parts finely powdered minium (red lead). powdered alum, 3 ounces; powdered sulphate

origanum to periume.

5244. Beddoe's Pills, for gravel, &c. Carbonate of soda, dried without heat, drachm; soap, 4 scruples; oil of juniper, 10 drops; syrup of ginger, sufficient quantity for morning. 30 pills.

¿ ounce; resinous extract of jalap, 1 drachm; sulphate of potassa, 1 drachm; noney to form an electuary. A tea-spoonful every 3 hours for 2 days; then substitute the following: Spermaceti ointment, 8 ounces; powdered galls, 1 ounce; powdered opium, 1 drachm; and of diagetate of lead, 12 ounces. Mix ples; scammony, 1 scruple; gamboge, 10 solution of diacetate of lead, 12 ounces. Mix grains; made into an electuary with honey, well. and given in the same dose.

5246. Swaim's Vermifuge. seed, 2 ounces; valerian, rhubarb, pink-root, white agaric, of each 1½ ounces; boil in sufficient water to yield 3 quarts of decoction, and add to it 30 drops oil of tansy, and 45 (hemlock). drops oil of cloves, dissolved in a quart of

night.

5247. Dissolve 1 ounce pure mannite in 10 ounces to flavor. To be drunk cold or iced. Mannite is a peculiar saccharine principle obtained

in crystalline form from manna.

Iron. Take 12 drachms gum myrrh in tears, 6 drops oil of wintergreen, 2 drops oil of nutmeg, 2 scruples carbonate of potash, 1 ounce loaf sugar, ½ drachm sulphate of iron, and 7 ounces distilled water. Rub down the myrrh with the oils, add gradually a portion of the pills. water, making a milk of myrrh; then add the potash and sugar. Dissolve the iron in the formed of the root of henbane, and used as remainder of the water, and mix the two mixnecklaces, to allay the pain of teething. tures by trituration. To be bottled and well corked directly.

5249. Mialhe's Syrup for Hoarseness.

sweet balm tea, in short draughts.

5250. Dewees' Carminative. Take ½ frachm carbonate of magnesia, 1 drachm loaf sugar, 60 drops tincture of assafætida, 20 drops tincture of opium, and 1 fluid ounce tartaric acid, 15 or 20 drops, or 1 scruple water. Dissolve the sugar in half the water; make 1 pint. Dose, 2 spoonfuls every 2 hours add this to the tinctures previously mixed in in absence of fever. the bottle. Rub the magnesia with the reshaken before used.

ender.

ether, 1 ounce; laudanum, 1 ounce; chloroing to circumstances. It makes an excellent most excellent receipt. local application in neuralgia and other painful affections.

Ipecacuanha, 30 grains; powdered squills dered acacia, I drachm sugar, 4 fluid ounces

of zinc, 3 ounces; powdered vermilion, to and ammoniac, of each 40 grains; mucilage color; oil of aniseed, oil of spike, and oil of to mix; divide into 24 pills. It is said that the above was a favorite remedy with the first Emperor of France for difficulty of breathing, bronchitis, and various affections of the organs of respiration. Dose, 2 pills night and

pills. 5254. Gedding's Piles Ointment. 5245. Mathieu's Vermifuge. Tin fil- Carbonate of lead, 4 drachms; sulphate of ings, 1 ounce; fern root, \(\frac{2}{3}\) ounce; worm-seed, morphia, 15 grains; stramonium ointment, 1 ounce; olive oil, sufficient to make into an

5256. Brown's Bronchial Troches. Take 1 pound pulverized extract of liquorice, 1½ pounds pulverized sugar, 4 ounces pulverized cubebs, 4 ounces pulverized gum-arabic, and 1 ounce pulverized extract of conium

Mix.

drops oil of cloves, dissolved in a quart of rectified spirits. Dose, 1 table-spoonful at Whooping Cough Liniment. Olive oil, 8 ounces; oil of amber, 4 ounces; oil of Calvetti's Manna Lemonade. cloves, a sufficient quantity to give it a strong scent. Mix. Rubbed on the chest it stimuboiling water, and add sufficient lemon juice lates the skin; it is useful in general for the coughs of children; in whooping-cough, however, it ought not to be used for the first ten days of the disease. This liniment is under-5248. Bond's Compound Mixture of stood to be the same as the celebrated embrocation of Roche.

> 5258. Dupuytren's Pills. Take 120 grains powdered guaiacum, 4 grains corrosive chloride of mercury (corrosive sublimate) and 5 grains powdered opium; make into 40

5259. Anodyne Necklaces.

5260. Digestive, or Live-long Candy. Powdered rhubarb, 60 grains; heavy magnesia, 1 ounce; bicarbonate of soda, 1 drachm; Take 15 parts syrup of gum-arabic, 5 parts finely-powdered ginger, 20 grains; cinnamon syrup of tolu, 5 parts maiden-hair, 1 part powder, 15 grains; powdered white sugar, 2 nitrate of potassa, and 1 part cherry-laurel ounces; mucilage of tragacauth, sufficient water. Dose, a table-spoonful in a cup of quantity; beat together and divide into square, flat cakes of 20 grains each.

5262. Malone's Mixture for a Cough mainder of the water; then mix together the or Cold. Take 1 tea-cupful of flaxseed, soak two preparations. Direct the mixture to be all night. In the morning put in a kettle 2 quarts water, 1 handful of liquorice root (split 5251. Golden Tincture. Take 3 parts up), 2 pound good raisins (cut in half). Boil sulphuric ether, 2 parts acetated tincture of them until the strength is thoroughly exopium, and 1 part compound spirit of lav-tracted, then add the flaxseed, which has been previously soaked. Let all boil about Golden Tincture. Sulphuric half an hour more, watching and stirring, that the mixture may not burn. Then strain form, 4 ounce; alcohol, 1 ounce. Mix. This and add lemon-juice and sugar to taste. Take preparation is extensively used by the German any quantity, cold, through the day, and half physicians. Dose, from 3 to 30 drops, accordate thimbleful, warm, at night. The above is a

> 5263. Chapman's Copaiba Mixture. Make a mixture of \(\frac{1}{2}\) ounce copaida, \(\frac{1}{2}\) fluid ounce sweet spirits of nitre, 2 drachms pow-

day. A specific remedy for gonorrhea.
5264. Morton's Copaiba Mixture. Take 1 ounce each copaiba and powdered cubebs, 2 drachms each acacia and sugar, 7 fluid ounces water, and 1 fluid ounce camphorated tincture of opium. Make into a mixture. Dose, a table-spoonful every 3 hours. An child, 10 drops to 1 tea-spoonful, according to efficacious remedy for obstinate gonorrhea.

Jackson's Pectoral Syrup. 5265. Macerate 1 drachm sassafras pith and 1 Break 1 ounce sulphur, and pour over it 1 ounce acacia in 1 pint water for 12 hours; quart of boiling water; allow it to infuse for add 21 ounces sugar, dissolve the sugar in it 12 or 14 hours, and apply it to the face 2 without heat, filter, and then add 8 grains or 3 times a day, for a few weeks. This apmuriate of morphia. Dose, 1 tea-spoonful plication is equally useful in removing that every 3 hours.

5266. Ayer's Wild Cherry Expectorant. Mix together 3 grains acctate of morphia, 2 fluid drachms tineture of blood-root, 3 fluid drachms each antimonial wine and

blood-root, 2 drachms; sweet spirits of nitre,

5268. Donovan's Mixture of Cyanide it off, and washing with warm water and soap. of Potassium. Mix together 1 grain cyanide of potassium, 3½ fluid ounces distilled water, and ½ fluid ounce lemon syrup. Dose, ounces. To be melted together and spread a table-spoonful every 2 hours. Useful to check vomiting, and allay cough; and, in children.

5269. Regnault's Pectoral Paste. Flowers of mailow, flowers of cudweed, drachms tineture of tolu; dissolve, strain, and evaporate to the proper consistence.

5270. Dennis' Patent Anti-spasmodic Tincture. Take 1 ounce each tincture has been melted and well mixed, add 2 of scullcap, valerian, myrrh, and capsicum; drachms camphor, previously dissolved in a 2 ounces tincture of lobelia; a little soda; little olive oil. Pour it out into suitable and sufficient water.

5271. Goitre Jelly. Better known, perhaps, under the French name Gelée pour le Goitre. Dissolve 1 ounce white soap in 21

and essential oil may be added.
5272. Mettauer's Aperient Solution. Take of socotrine aloes, 2½ ounces; super-scruple crude alum. Mix well. This plaster carbonate of soda, 6 drachms; water, 4 pints; was much used by an old surgeon of Morello, compound spirits of lavender, 2 ounces. After digesting 14 days, the clear liquor may be either decanted or allowed to remain. Age is said to improve both the pow-the world by M. Escorihuela. He obtained ers and taste of the solution. The common the secret from one of the heirs.

distilled water, 2 fluid drachms compound dose is 1 drachm, which may be increased, if spirit of lavender, and 1 fluid drachm tincture necessary, to an ounce. It is recommended as of opium. Dose, a table-spoonful 3 times a a valuable remedy in most forms of constination, taken soon after meals.

5273. Coxe's Hive Syrup. ounce each squills and Seneca snake-root into I pint water; boil down to one-half and strain. Then add ½ pound clarified honey containing 12 grains tartrate of antimony. Dose for a 12 grains tartrate of antimony. age. An excellent remedy for croup. 5274. Bateman's Sulphur

roughness of the skin which generally suc-

ceeds pimples

5275. Allcock's Porous Plaster. The only difference between this plaster and ordinary adhesive plasters is, that rubber is ipecacuanha wine, and 3 fluid ounces syrup used in the place of lead plaster. It is a good of wild cherry bark. Dose, 1 tea-spoonful in addition, and very generally recognized by makers of adhesive plasters. Take rubber, 1 5267. Ayer's Cherry Pectoral. The pound; pitch, & pound; thus, & pound; and following receipt is said to be somewhat near capsicum, 30 grains. The plaster, as offered to, if not exactly identical with the receipt after for sale, is spread upon muslin or linen, in which this well known article is compounded: which small holes have been punched out, Take of syrup of wild cherry, 6 drachms; allowing vent for perspiration, and affording syrup of squils, 3 drachms; tincture of increased flexibility. These plasters adhere very firmly, frequently requiring the applica-2 drachms; antimonial wine, 3 drachms; tion of heat (by means of a hot towel or wine of ipecacuanha, 3 drachms; simple warm flat-iron), for their removal. The skin syrup, 11 ounces; acetate of morphine, 2 may be cleansed after the removal of the grains. Mix, and add oil of bitter almonds, plaster, by rubbing with sweet oil, until the 2 drops; dissolved in alcohol, 1 drachm.

on paper or muslin.

5277. Universal Plaster. A plaster much smaller doses, for whooping cough in is officinal in several of the European Pharmacopæias, under different names, which appears to be identical with Keyser's Universal Plaster, which is sold extensively in this flowers of coltsfoot, and flowers of red country as a nostrum. The following is the poppy, 1 ounce of each; boil in a quart formula of the Prussian Pharmacopæia: Take of water, strain, then add 30 ounces of gumof red-lead, in very fine powder, 8 ounces; arabic, 20 ounces of white sugar, and 2 olive oil, 16 ounces. Boil them in a proper vessel with constant agitation until the whole has assumed a blackish-brown color, then add yellow wax, 4 ounces; and after this boxes, or into paper capsules, to be cut into square cakes when cold.

5278. Devil Plaster. Cases of severe wounds are said to have healed without supounces of proof spirit by a gentle heat; and puration after 17 or more days by the use of add to it, while still warm, a warm solution of this plaster. It has also been successfully 5 drachms iodide of potassium in 21 ounces applied to fractures and tumors. Take 15 proof spirit. A few drops of any fragrant drachms black pitch, 15 drachms dry resin, 2½ drachms dried earth-worms in powder, 8 drachms essential oil of turpentine, and 1 and by his sons, for the cure of wounds with-out the loss of substance. The composition, which they kept secret, is now published to

5279. Wallace's Pills. Take socotrine and evaporate the decoction over a warm bath 1 scruple each, to make 20 pills.

Take water 5280. Canada Liniment. of ammonia, olive oil, oil of turpentine, and alcohol, of each 1 ounce; oil of peppermint, $\frac{1}{2}$

5281. St. John Long's Liniment. White and yolk of 1 egg; oil of turpentine, 6 ounces; acetic acid, I ounce; oil of lemon, 12 drops; and rose-water, 5 ounces. Mix.

5282. Brodie's Liniment. Take of sulphuric acid, 1 drachm; olive oil and oil of turpentine, of each 1 ounce. Add the acid gradually to the olive oil, stirring it in a mortar; when cool, add the oil of turpentine and mix

5283. Good Old Samaritan Liniment. Mix together 2 gallons alcohol, 12 ounces oil origanum, 4 ounces oil hemlock, and 2 ounces each of oil of cedar, balsam of fir, spearmint, balsam of life (see No. 5112), oil of sassafras, oil of wintergreen, spirits of turpen-

tine, and sulphuric ether. Mix. 5284. Physic's Issue Powdered cantharides, ½ ounce; rose water, 2 fluid ounces; tartar emetic, 15 grains. Apply heat and evaporate the rose-water one-half; strain, and add olive oil, 3 ounces; white wax, 1½ ounces; spermaceti, 1 ounce. Mix, and apply a gentle heat until all the water has light in color.

5285. Beach's Black Plaster or Healing Salve. Take of olive oil, 3 quarts; common resin, 3 ounces; bees'-wax, 3 ounces. Melt these articles together, and raise the oil almost to boiling heat; then gradually add of pulverized red lead 2½ pounds, if in the summer; if in the winter, 1 pound less. In a short time after the lead is taken up by the oil, and the mixture becomes brown or a shining black, remove from the fire, and, when nearly cold, add 1 ounce pulverized camphor.

5286. M'Kenzie's Ointment. Powdered sulphate of zinc, 4 ounces; liquid storax, 1 ounce; melted lard, 16 onnces. Mix by means of heat and triturate over a water-bath for about an hour. A useful application for tetter and scald-head. Apply night and morning, first washing the part with Castile soap and

5287. Conklin's Salve. Take resin, 12 ounces; bees'-wax, mutton suet, and tallow, of each 1 ounce. Melt together, strain the

in a bath of cold water.

5288. Newell's Compound Tar Ointment. Lard and mutton suet, of each 12 ounces; tar, 6 ounces; bees'-wax, 3 ounces; powdered black hellebore, 4 drachms; melt and strain, then add flowers of sulphur, 4 ounces. Used for tetters, salt rheum, itch, &c.

5289. Turner's Cerate. Take of sweet oil, 2 pounds; yellow wax, carbonate of zine, powdered, of each 1 pound. Mix at a low

heat.

5290. Allison's Tobacco Cintment for Gathered Breasts. Tobacco leaves (fresh and sliced), 10 ounces; dilute acetic acid, 4 ounces. Boil the tobacco in the acid, strain parts.

aloes, scammony, and soap, all in powder, to 4 fluid ounces; add this to the basilicon blue mass and compound extract of colocynth, outment, heated, and stir the whole together until cold. Apply spread upon linen or soft kid skin.

5291. Allison's Acetated Ointment of Tobacco. Tobacco leaves, sliced, 10 ounces; cider vinegar (or officinal dilute acetic acid), 4 pints; basilicon ointment (see No. 4964), 13 ounces. Boil the tobacco in vinegar to 1 pint. strain, reduce in a water-bath to 6 fluid ounces, and add this fluid extract to the melted ointment, stirring constantly till it is cool. A fine remedy for gathered breasts.

5292. Parrish's Compound Ointment of Tobacco. Basilicon ointment (see No. 4964), 13 ounces troy; powdered camphor, 29 drachms; extract of belladonna, 2 ounces; fluid extract of tobacco (made as in the above formula), 6 ounces. Dissolve the extract of belladonna in the fluid extract of tobacco and add to the melted ointment, in which the camphor should be previously dissolved. Stir constantly till cool. Dr. Parrish has stated, in the New Jersey Medical Reporter, that he uses this ointment in nearly every case of

mammary abscess, with entire satisfaction. 5293. Mege's Rheumatic Ointment. Take 160 parts lard, 6 parts each of the extracts of opium, belladonna, and cinchona, 7

parts ammonia water.

5294. Mitchell's Ointment of Three. been driven off. When the manipulations Mix together equal parts of tar ointment, have been conducted with care, the cerate is sulphur ointment, and red oxide of mercury

ointment.

5295. Berthold's Chilblain Wash. Boil for 15 minutes 1½ ounces bruised nut-galls in 1 pint water, and strain. Apply to the chil-blains 2 or 3 times a day. Tannic acid dissolved in glycerine has a very similar effect,

but in a neater form for application.

5296. Lapis Divinus. This preparation. called also cuprum aluminatum, is the pierre divine of the French codex. It is made by mixing in powder, 3 ounces each of sulphate of copper, nitrate of potassa, and alum; heating the mixture in a crucible so as to produce watery fusion; then mixing in 1 drachm powdered camphor; and finally pouring out the whole on an oiled stone to congeal. The mass, when cold, is broken into pieces, and kept in a well-stopped bottle. When this preparation is used as an eye lotion, a filtered solution is made, of the average strength of 30 grains to

a pint of water.
5297. Lapis Miraculosus. Fuse together sulphate of copper, 3 parts; sulphate mixture through muslin, and work into rolls of iron, 6 parts; verdigris and alum, of each 1 part; sal-ammoniae, 1 part. It is used for ul-

cers only.

5298. Biett's Solution. This is a solution of 1 grain of arseniate (not arsenite) of ammonia in 1 troy ounce of water. It is not as safe a preparation as either Fowler's or Pearson's solution, owing to the ready decomposition of the ammonia salt.
5299. Pearson's Arsenical Solution.

This is an aqueous solution of arsenite of soda, containing I grain of the salt in a fluid

ounce.

5300. Sampson's New York Pills. The 12 grain pills consist of powdered coca, pints; basilicon ointment (see No. 4964), 13 25; extract of coca, 30; powdered iron, 35

5301. Oil of Stone. Take crude American petroleum, and Barbadoes petroleum, of each 2 pints; oil of turpentine, 6 pints.

5302. Chelsea Pensioner. Take powdered rhubarb, 2 drachms; cream of tartar, 1 ounce; guaiacum, 1 drachm; sulphur, 2 ounces; 1 nutmeg grated fine; clarified honey, 16 ounces. Mix. Dose, 2 tea-spoonfuls night dered cayenne pepper, and 1 drachm chloride and morning. A very good remedy for chronic of sodium (table salt) for 1 hour in 8 fluid rheumatism.

5303. Indian Cathartic Pills. Reduce to a fine powder, 1 ounce each aloes and and myrrh; 1½ drachms camphor (see No. 4358) and cayenne; with 4 ounces ginger. Mix thoroughly and make into ordinary-sized

5304. Turlington's Balsam is much like the compound tineture of benzoin of the in gouty affections. Pharmacopeia of the U.S., though it is somewhat more complicated. To make it, take benzoin, 12 ounces; liquid storax, 4 ounces; balsam of Peru, 2 ounces; myrrh and aloes, liquorice, each 4 ounces; angelica root, ½ gleet. ounce; alcohol, 8 pints. Digest for 10 days, 53 and strain.

5305. Thibault's Balsam. Myrrh, aloes, and dragon's blood, of each 1 drachm; Myrrh. flowers of Saint John's wort, 1 handful; spirit of wine, ½ pint; Canada balsam, ounce. Digest the flowers in the spirit for 3 days, then express the liquor and dissolve the other ingredients therein. To heal cuts and given in gonorrhœa.

5306. Locatelle's Balsam. Yellow

ointment, and strain.

Or: Yellow wax, 4 ounces; olive oil and Venice turpentine, of each 1 pound; alkanet root, 2 ounces; as last. Used as a pectoral in coughs and colds. Dose, ½ to 1 tea-spoonful mixed with the same quantity of conserve pills. Dose, 1 pill every 3 hours. of roses.

5307. Bell's Gargle. Take of pure borax, 2 drachms; yeast and honey, of each

† ounce; boiling water, 7 ounces. Mix. 5308. Mrs. Wheeler's Nursing Syrup. Mix together 35 ounces sugar, 4 ounces limewater, ½ ounce aqueous extract of podophyllin, 4 ounces fluid extract of poppy, and 1 drachm oil of anise in 2 ounces rectified spirit. The aqueous extract of podophyllin is of the same strength as the ordinary fluid extracts, 16 troy ounces to the pint. The above syrup will be found to contain about 2 drops fluid extract of poppy in each tea-spoonful.
5309. Mrs. Wheeler's Worm Confec-

tion. Triturate to a fine powder, 1 drachm hemlock bark, 1 pound ginger, 2 ounces cay-mild chloride of mercury and 10 drachms enne pepper, and 2 ounces cloves. Mix them sugar; add 25 ounces sugar and 6 drachms together. This is an excellent remedy for santonin; mix all together and make into 360 tablets. Each tablet will therefore contain grain of calomel and 1 grain santonin.

5310. Brodie's Decoction of Pareira Brava. Take 1 ounce bruised pareira root, and 3 pints boiling water; boil down gently chronic inflammation of the bladder.

5311. Hufeland's Diuretic Drops. Take ½ fluid drachm oil of juniper, and 3 fluid drachms each sweet spirits of nitre and tineture of digitalis. Dose, 30 drops every 3 hours

5312. Stephens' Infusion of Cayenne Pepper and Salt. Macerate ½ ounce powounces each boiling vinegar and boiling water. Filter. Dose, 1 table-spoonful every 2 hours. This has been administered with great success gamboge; founce each mandrake, blood-root, in malignant searlet fever; used both internally and as a gargle.

5313. Magendie's Acid Solution of Veratria. Dissolve 1 grain veratria in 2 pills with thick mucilage. Dose, 2 to 4 pills. fluid ounces distilled water and 5 drops aromatic sulphuric acid. Dose, 1 tea-spoonful,

5314. Ryan's Gleet Powder. Take 2 scruples powdered ergot, 1 ounce powdered cubebs, ½ drachm powdered cinnamon, and 1 drachm sugar. Make into 8 powders. Dose, each 1 ounce; balsam of tolu and extract of 1 powder 3 times a day, for leucorrhœa and

5315. Channing's Mixture. Dissolve 3½ grains iodide of potassium in 1 fluid ounce distilled water; then add 4½ grains red iodide of mercury. Dose, from 2 to 5 drops, in cases of secondary symptoms, and obstinate skin

diseases.

5316. Thomas's Cathartic Pills. Take 1 drachm compound extract of coloeynth, and 3 grains resin of podophyllin. wounds, and to stop bleeding. Internally Make into 12 pills. Dose, 1 or 2 at bed-time. diuretic, in doses of 1 to 2 tea-spoonfuls; 1 pill acts as a laxative; 3 as a free pur-

5317. Parrish's Cathartic Pills. Take resin, olive oil, and Venice turpentine, of each 24 grains aloin, 12 grains resin of podophyllin, 1 pound; shavings of red saunders wood, 1 and 4 minims oleo-resin of ginger. Make Boil to the consistence of a thin into 24 pills. Dose, the same as directed in

the last receipt.

5318. Becquerel's Anti-Gout Pills. Take 2 drachms sulphate of quinine, 15 grains alcoholic extract of digitalis, and 2 scruples acetic extract of colchicum. Make into 50

5319. Butternut Pills. drachm extract of butternut, 1 scruple powdered jalap and 10 grains soap. Make into 15 pills. Dose, 3 pills, and, if these do not operate, administer 2 more. Butternut is highly recommended as a cathartic in fevers, Butternut is

dysentery, &c.
5320. Chapman's Peristaltic Persuaders. Take 1 drachm powdered rhubarb, 10 grains powdered ipecacuanha, and 10 drops oil of caraway. Make up with sufficient powdered acacia into 20 pills. Dose, 2 pills at

bed-time, in obstinate constipation.

5321. Composition Powder. Finely pulverize 2 pounds bayberry bark, 1 pound weak stomach, dyspepsia, &c. Put 1 teaspoonful of the mixture with a tea-spoonful of sugar into a cup of boiling water. After standing for a few moments, drink the contents.

5322. Le Gros's Itch Ointment. Take to 1 pint, and filter. Dose, 1 wine-glassful of iodide of potassium, 2 drachm avoirdupois; every 2 hours. An excellent remedy for lard, 1 ounce; mix. Cleanly harmless, and

effective.

5323. Stokes' Liniment. The formula adopted by the Maryland College of Pharmacy, and is believed to be as originally prescribed by Dr. Stokes. Take 3 fluid ounces as the head. oil of turpentine, i fluid ounce strong acetic acid, the yolk of 1 egg, 3 fluid ounces rosewater, and 1 fluid drachm oil of lemon.

5324. Mother's Cordial. Take 4 ounces each of starwort (helonias dioica), high cranberry bark (viburnum opulus), and blue mom, sweetened with sugar. cohosh (caulophyllum thalictroides), and 1 pound of partridge-berry (mitchella repens). Bruise or grind the ingredients, and macerate for 3 days with enough strong alcohol to alcohol 3 pints of tincture, which are set aside and the ingredients exhausted with hot water until it passes tasteless. Add 2 pounds sugar and evaporate with a gentle heat to 5 pints; then mix with the 3 pints of tineture and flavor with sassafras.

5325. Wyndham's Pills. Gamboge, 3 sam of copaiba, 6 ounces; gum guaiacum, 1 ounces; aloes, 2 ounces; Castile soap, 1 ounce; Chio turpentine, ½ ounce; subcarbonate ounce; mitre, ½ ounce; extract of cowoff potash, ½ ounce; cochineal, 1 drachm; recounce; nitre, a ounce; extract of con-parsnip, 1 ounce. In pills of 5 grains each. tified spirit, 1 quart. 5339. Molinari's Remedy for Sea-

5326. Anderson's Pills. aloes, 24 ounces; soap, 4 ounces; colocynth, 1 ounce; gamboge, 1 ounce; oil of aniseed, a fluid ounce. Mix, and divide into pills of 3 grains each.

5327. Morrison's Pills. No. 1 consists of equal parts of aloes and cream of tartar;

made into pills with syrup.

5328. Ayer's Sarsaparilla. Take 3 podophyllin; 1 ounce sugar, 90 grains iodide of potassium, and 10 grains iodide of iron. This is from a receipt given by Dr. Ayer himself.

5329. Henderson's Lotion for Corns. Take tincture of iodine, ½ ounce; iodide of iron, 12 grains; chloride of antimony, ½ Pare the corn, and apply with a camel's-hair pencil. This lotion has been much commended for destroying corns.

Velpeau's Black Caustic. turate in a porcelain mortar 1 ounce powdered liquorice root, and add sulphuric acid in small quantities until a mass is obtained neither too hard nor too liquid. This preparation forms a well-marked hard black scab.

5331. Jarave Spanish. Pour 4 gallons of boiling water on 2 pounds Rio Negro sarsaparilla, 8 ounces powdered guaiacum bark, 4 ounces each of rasped guaiacum wood, anise seed, and liquorice root, 2 ounces of bark of bruised cloves. Shake it thrice a day, and keep it in a warm place. When fermentation has set in, it is fit for use. Dose, a small tumblerful.

5332. Bouyer's Syrop de Lait Iodique. Take cow's milk 200 parts; cane sugar, 60 little soda. Mix, and evaporate to 100 parts. 5333. Cephalic Snuff. Dried asarabacea

flowers, 1 part; rub together to a powder.

5334. Boeli's Cephalic Snuff consists here given for this preparation is the one of 2 drachms valerian, 2 drachms snuff. 3

> 5335. Radway's Ready Relief, according to Peckolt, is an ethereal tincture of 5335. capsicum, with alcohol and camphor.

> 5336. Radway's Renovating Resolvent. A vinous tincture of ginger and carda-(Hager and Jacobsen.)

5337. Swedish Essence of Life is made in this country, under various names. As usually made by apothecaries, it is a tinccover; then displace from them with more ture prepared from 4 parts aloes, 1 each of agaric, rhubarb, zedoary, gentian, myrrh, and theriac, with 100 to 120 parts dilute alcohol. The medicine manufacturers usually substitute cheaper articles for the high-priced saffron and rhubarb. (See No. 5365.)

5338. Walker's Jesuits' Drops. Bal-

Barbadoes Sickness. Digest for 12 hours in 13 Imperial pints of wine vinegar, 1 ounce each of rue, thyme, mint, rosemary, absinthe, turmeric, and green walnut rind; † ounce annatto; † ounce pearlash; and 1 poppy-head. After digestion boil for half an hour; then strain through linen; in this decoction are moistened No. 2 consists of 2 parts of gamboge, 3 of or dipped some 4 or 5 strips of filtering paper aloes, 1 of colocynth, and 4 of cream of tartar, 7 or 8 inches long, and then dried; upon one side of these strips some light stuff is fastened by the corners and some loose wadding placed fluid ounces each of alcohol, fluid extracts of inside. Strings are next fastened to the bandsarsaparilla and of stillingia; 2 fluid ounces age and it is then tied around the body so as each fluid extracts of yellow-dock and of to cover the region of the heart. This preventive of sea-sickness has been patented in England.

5340. Redwood's Nervine Balsam. Melt together 4 ounces oil of mace and 4 ounces beef marrow. Dissolve in 4 drachms alcohol, 2 drachms each oil of rosemary and balsam of tolu, and 1 drachm each of camphor and oil of cloves. Mix all together. A good

liniment in rheumatism.

5341. Chaussier's Obstetric Ointment.

Extract belladonna, 2 drachms; water and lard, each 2 drachms. Mix well.

5342. Dutch Drops, or Haerlem Drops. There is considerable difference in the ingredients and quality of these long-celebrated drops; but the most common preparation, perhaps, is made according to the following formula: Take balsam of turpentine, 2 ounces; oil of turpentine, 10 ounces. Mix. The following is also one of the imitations of it made in this country: Linseed oil, 1 quart; mezereon root, 2 pounds of molasses, and 12 resin, 2 pounds; sulphur, 1 pound; boil together over a slow fire; when combined remove from the fire, and add 1 pint oil of turpentine, and 50 drops liquor of ammonia; stir well together and bottle. The genuine drops are the residuum of the rectification of oil of turpentine. Dutch drops are of course stimuparts; iodide of potassium, † part; and a lant and diuretic in their therapeutical effects; little soda. Mix, and evaporate to 100 parts. but they have been regarded by the common people as possessed of many other virtues, and leaves, 3 parts; marjoram, 1 part; lavender have been much applied to wounds and other external injuries of the surface.

of yellow wax and sweet oil, melt slowly, gentian, cinchona, and cardamoms. carefully stirring; when cooling, stir in a small quantity of glycerine. Good for all kinds of tive.

wounds, &c.

oil of hemlock, 1 ounce; linseed oil 1 quart. 2 pounds resin, † pound Burgundy pitch, † 5353. Boyle's Fuming Liquor. Take pound bees'-wax. † pound mutton tallow; quicklime and sulphur, each 3 parts. Triturmelt them slowly. When not too warm, add 1 ounce oil hemlock, I ounce balsam fir, 1 a paste, and incorporate 7 parts sulphate of ounce oil origanum, 1 ounce oil of red cedar, ammonia dissolved in water; let the whole 1 ounce Venice turpentine, 1 ounce oil wormstand, then decant, wash the residuum, rub-1 ounce Venice turpentine, 1 ounce oil wormwood, ½ ounce verdigris. The verdigris must be very finely pulverized and mixed with the the solutions, and filter. This is the sulphuoils, then add as above and work all in cold water until cold enough to roll. This salve in medicine as a powerful alterative in constihas no equal for rheumatic pains or weakness tutional diseases. in the side, back, shoulders, or any place where pain may locate itself. Where the skin is broken, as in ulcers, bruises, &c., use without

the verdigris. Keating's Cough Lozenges. 5346. These are said to be composed of lactucarium, 2 drachms; ipecacuanha, 1 drachm; squills, 4 drachm; extract of liquorice, 2 drachms; sugar, 6 ounces. Made into a mass with mucilage of tragacanth, and divided into

20-grain lozenges.

5347. Milburn's Mixture. Precipitated prepared chalk, loaf sugar, and gum-arabic, of each 2 drachms; green mint water, 44 ounces; laudanum, 10 minims; spirits of lavender, 2 drachms; simple syrup, 11 ounces: tincture of kino, 1 ounce. Mix. Useful in loose bowels in children, and can be given to them after each evacuation, regardless of number. Dose, from ½ to 1 table-spoonful. Shake the mixture well each time before using it.

rue, sage, hyssop, lavender, absinth, rose-leaves, thyme, and elder flowers, of each 4 ounces. Digest for 2 weeks in 9 pints claret. Then add tannic acid, alum, wine of opium,

of each 9 ounces.

water. This solution is used as a wash for chancres, and spontaneously or artificially size and depth, and show no signs of cicatrization. It is applied twice a day by means of lint moistened with it. As soon as the vitality of the parts becomes favorably modified, Dr. Beyran replaces this wash by Ricord's wine of einchona or aromatic wine. (See No. **5348.**)

5350. Charta Epispastica. wax, 4 parts; spermaceti, 1½ parts; olive oil, 2 parts; resin, ½ parts; Canada balsam. part; cantharides in powder, 1 part; distilled water, 6 parts. Digest all the ingredients excepting the Canada balsam in a waterbath for 2 hours, stirring them constantly; then strain, and separate the plaster from the watery liquid. Mix the Canada balsam with the plaster melted in a shallow vessel, and receive a thin coating of plaster.

Brodum's Nervous Cordial.

5343. Russia Salve. Take equal parts sprits of lavender, tinctures of calumba,

5352. Atkinson's Infant Preserva-Carbonate of magnesia, 6 drachms; ounds, &c.

5344. James' Oil of Gladness. Take lof hemlock, 1 ounce; linseed oi' 1 quart. laudanum, 1 drachm; syrup of saffron, 1 5345. Green Mountain Salve. Take ounce; caraway water to make a pint.

bing it with a small portion of water, unite retted hydrosulphate of ammonia, and is used

5354. Hall's Solution of Strychnia. Take pure crystals of strychnia, 16 grains; water and alcohol, of each 7½ ounces; acetic acid and compound tincture of cardamoms, of each 1 ounce. Mix for solution. Dose, 20 to

30 drops, once or twice a day.

5355. Flemming's Solution of Strych-Take of strychnia, 2 grains; distilled water, 5 fluid crachms; muriatic acid, 1 drop, or sufficient to dissolve the strychnia. Dissolve by trituration, and add diluted alcohol enough to make 10 fluid drachms. Dose, in

the beginning, 10 minims.

5356. Brandish's Alkaline Tincture of Rhuharb. Coarsely powdered rhubarb, 1 ounce; Brandish's alkaline solution, 32 fluid ounces. The original formula directs only 12 ounce rhubarb, but as smaller doses than were given by Dr. Brandish are now usually prescribed, the quantity of rhubarb is here increased. Or an alkaline infusion of rhubarb may be made by pouring boiling water, 8 5348. Ricord's Aromatic Wine. Take parts, on rhubarb, 3 parts, and carbonate of potash, 1 part. 5357. Bra

Brandish's Alkaline Solution, or Caustic Alkali. American pearl-ashes, 6 pounds; quicklime, 2 pounds; wood ashes prepared by burning the branches of the ash, 5349. Beyran's Wash. Dissolve chlo- 2 pounds; boiling water, 6 gallons; slack the ride of zinc in 100 times its weight of pure lime, add the rest of the water and the pearlashes, and lastly stir in the wood-ashes; let it stand in a covered vessel for 24 hours, and opened buboes that are extending both in decant. To each pint add I drop of true oil of juniper berries. Keep it in stoppered bottles of green glass. The common liquor of potassa is usually sold for the above solu-

> 5**8**58. Coating for Pills. recommends collodion as a covering for pills; others, a solution of gutta percha in chloro-White form; but the ready solubility of these materials in the stomach may be questioned. Blanchard uses balsam of tolu dissolved in Baildon recommends chloroform instead of ether for dissolving the balsam.

5359. Garrot's Covering for Pills. Soak 1 ounce purified gelatine in 2 or 3 drachms water; keep it liquefied in a saltwater bath. The pills are stuck on long pins, and dipped in the solution; when cold the pass slips of paper over the surface of the hot pins are withdrawn, after being heated by a liquid, so that one surface of the paper shall small flame, which melts the gelatine and closes the hole.

5360. Bochet's Syrup. Take equal parts of iron wine, compound syrup of sarsaparilla, with scnna, and 1 per cent, of iodide of potassium. Used for scrofulous affections

5361. Betton's British Oil. Oil of turpentine, 8 ounces; Barbadoes tar, 4 oun-

ces; oil of rosemary, 4 drachms; mix.

5362. British Oil, or Oil of Stone. Take oils of turpentine and linseed, each 8 ounces; oils of amber and juniper, each 4 ounces. Barbadoes tar, 3 ounces; seneca (petroleum) oil, 1 ounce. Mix. This is an excel-lent application to cuts and bruises, swellings and sores of almost any description whatever.

This consists of an acidulated syrup of

5364. Godfrey's Cordial. The Philadelphia College of Pharmacy, to prevent the mischief arising from the different strength of potash in 26 pints of water, add 16 pints mothey simmer, remove the scum, and, when itary hospitals. sufficiently cool, add ½ ounce oil of sas-afras 5372. Kit dissolved in 2 pints of rectified spirit, and 24 fluid ounces of tincture of opium, previously in each fluid ounce.

5365. Baume de Vie. Socotrine aloes, 2 drachms; rhubarb, 6 drachms; saffron, 2 The original Swedish form is this: Aloes, 9 drachms; rhubarb, gentian, zedoary, saffron, on the human body as well as on animals. theriaca, agaric, of each 1 drachm; proof

spirit, 2 pints. (See No. 5337.)

stomach would be more able to digest than the crude article. To this end he proposed to himself to oxidize the copaiba, which he ac-complishes by mixing nitric acid with it. The complishes by mixing nitric acid with it. The 5374. Elixir of Bromide of Ammoessential oil is acted on, and hyponitrous acid nium. Prepared from bromide of ammonium gas escapes into the atmosphere. The copai- as in No. 5449, without the coloring. ba thus treated is then washed with water, until it no longer reddens litmus paper, and one-tenth part of cubebs in fine powder are added to it, the same proportion of carbonate little oil of anise. of soda, and one-sixteenth part of calcined magnesia. The mixture is allowed to stand until it is quite solidified, and in that state it is made into small masses, which are then carefully covered with sugar.

5367. Ford's Balsam of Horehound is said to be prepared according to the following formula: horehound herb, 31 pounds; liquorice root, 3½ pounds; water, 8 pints. Infuse for 12 hours, then strain off 6 pints, to which add camphor, 10 drachms; opium and benzoin, of each 1 ounce; dried squills, 2 ounces; oil of aniseed, I ounce; proof spirit, the preservation of the teeth. 12 pints. Macerate for 1 week, then add honey, 3½ pounds. Mix and strain.

5368. Holloway's Ointment. Take butter, 12 ounces; bees'-wax, 4 ounces; yellow resin, 3 ounces. Melt, and add vinegar of cantharides, 1 ounce. (See No. 1178.) Evapmace, ½ drachm; balsam Peru, 15 drops.

5369. Holloway's Pills. Take aloes,

parts; myrrh, jalap, and ginger, of each 2 parts. Mucilage to mix.

5370. Sydenham's Laudanum. cording to the Paris Codex this is prepared Oil of as follows: opium, 2 ounces; saffron, 1 ounce; bruised cinnamon and bruised cloves, each 1 drachm; sherry wine, I pint. Mix and macerate for 15 days and filter. Twenty drops are equal to one grain of opium.

5371. Riegler's Fever Tincture. Take of aloes, 1 ounce; camphor, 4 scruples; orange peel and elecampane root, of each 8 ounces. Bruise and digest with 10 pints alcohol (80 per cent.) for 8 days. Then express, add 5363. Cochrane's Cough Medicine. 12 ounces dilute sulphuric acid, 6 ounces sulphate of quinine, and 11 ounces Sydenham's laudanum. (See last receipt.) After the use of a purgative or emetic if required, 2 drachms of this tincture are given 3 hours before the paroxysm is expected, with short diet. On this compound, directs it to be prepared as the seventh, fourteenth, and eighteenth follows: Dissolve 2½ ounces carbonate of day, after the last attack, the same dose is given. This remedy fails only in very exceplasses; heat together over a gentle fire till tional cases. It is in use in the Austrian mil-

5372. Kitridge's Salve. Make a decoction in rain water of 1½ pounds each bittersweet root and sweet elder root; ½ pound mixed. It contains about 16 minims of laudeach hop vines, hop leaves, and garden plananum, or rather more than 1 grain of opium tain tops, with 1 pound of the root of the last named plant, and 1 ounce plug tobacco. Strain, and press through a thick cloth, and evaporate to ½ pint. Then mix with 1 pound drachms; liquorice root, 1 ounce; proof sweet butter and 1 ounce each resin and bees'spirit, 8 ounces. Digest for 8 days and filter. wax. Heat gently until the water has all evaporated. This is a good curative salve for sores

5373. Thirlault's Glycero-pomade of Iodide of Potassium. Melt glycerine (of 5366. Jozeau's Copahine-mege. The 28° to 30° Baumé), 100 parts; powdered aniintention of M. Jozeau in devising this form mal soap, 50 parts, powdered iodide of po-of copaiba was to furnish an article that the tassium, 130 parts; in a warm bath; then pour out into a warm porcelain mortar, and triturate well for 1 hour. Then flavor with 2 parts oil of bitter almonds.

5375. Patent Dysentery Cordial. Take of rhubarb, catechu, and camphor, 2 parts each; laudanum, 4 parts; and a little oil of anise. Dose, 15 to 60 drops after each operation.

5376. Whitwith's Red Drops. Take oil of thyme, 4 drachms; tineture of myrrh, 2 ounces; tineture of camphor, 2 drachms; compound spirits of lavender, 2 ounces; alcohol, 8 ounces. Mix. Dose, 25 drops in some suitable vehicle, two, three, or four times a day. This is the original receipt, but it has been varied in many ways.

5377. George's Myrrhine. Glycerine, 38 parts; myrrh, 7 parts; arrow-root, 5 parts; chalk, 54 parts; oil of cinnamon, 1 part. For

5378. Kirkland's Neutral Cerate. Mix together 4 ounces litharge plaster, 13 Take drachms acetate of lead, and 2 ounces each olive oil, precipitated chalk, and acetic acid.

Hufeland's Zinc Cerate. For sore nipples, ulcerations of the breast, &c. orate and add Canada balsam, 1 ounce; oil of Mix 15 grains each oxide of zine and lycopodium, with a ounce simple cerate and about

1 ounce of spermaceti cerate.
5380. Deschamps' Fuligokali Oint-*5*380. ment. This cintment has been considerably as a detersive, resolvent, and stimulant application, and is made by taking of fuligokali, water, and 6 fluid drachms orange-flower water, and 6 fluid drachms simple syrup.

16 to 30 parts (see next receipt); lard, 1

Dose, 1 tea-spoonful 3 or 4 times a day. Rub together.

5381. potassa, 20 parts; bright soot, 100 parts; water, sufficient; boil for an hour, cool, dilute with water, evaporate to dryness, and keep in

well-stoppered bottles.

5382. Hooper's Female Pills. Take 1 drachm dry sulphate of iron, 15 grains powdered jalap, 1 drachm powdered aloes and cinnamon, and 8 grains myrrh. Mix with syrup, and make into 30 pills. Dose, 2 or 3 at bedtime for several nights in succession. They purge smartly, and act beneficially as an emmenagogue. According to a recent analysis, the iron is in a peroxidized state; probably the sulphate is partially calcined. The Philadelphia College of Pharmacy gives the following formula: Barbadoes aloes, 8 ounces; dried sulphate of iron, 91 drachms; extract of black hellebore, 2 ounces; myrrh and soap, each 2 ounces; canella, 1 ounce; ginger, 1 ounce; water sufficient to form a mass. Divide into pills of 2½ grains each.

Nuremberg Plaster. ounces red lead with 1 pound olive oil, and 1 ounce bicarbonate of potash. Put the ma-expose to a heat until the mixture recomes brown or blackish; add ½ ounce resin, 1½ oun-water; let it stand till cold, and then add ½ brown or blackish; add ½ ounce resin, 1½ ounces yellow wax, and 2 drachms camphor. The red lead should not be added to the oil until so far heated as to scorch a feather dipped

5384. Green Coloring Powder. Mix Mix together 12 parts sulphate of quinine, together 1 part indigo and 10 parts curcuma 2 parts muriatic acid, and 200 parts lard. root, and reduce to a fine powder. (Hager.)

5385. Green Oil. Digest for 2 days, with frequent agitation, 1 part green coloring fresh plantain in 8 parts olive oil, until crisp; press and filter. (Hager.)

Either of these will produce an oil whose appearance is identical with the oil of hen-

bane, and is probably sometimes sold for it.
5386. Plunket's Ointment for Cancer. White arsenic, sulphur, powdered flowers of lesser spearwort and stinking chamomile, levigated together, and formed into a paste with white of egg.

5387. Hope's Camphor Mixture. Take 4 ounces camphor water, 30 drops fuming nitric acid, and 20 to 40 drops tineture of

opium. Dose, a table-spoonful every 2 hours.
5388. Murphy's Carminative. Take pint tincture of valerian, 10 fluid drachms acetated tincture of opium, 128 grains pulverized camphor, 248 grains carbonate of potassa, 2 ounces carbonate of magnesia, 40 minims each oil of anise and oil of mint, and 1½ pints water. Dose for an infant, 20 to 25 drops. This is said to be an improvement on Dewees' carminative. (Sec No. 5435.)

5389. Eisenmann's Opiated Wine of Colchicum. This consists of a mixture of 6 parts wine of colchicum seed and 1 part wine

of opium.

5390. Pierlot's Solution of Valerianate of Ammonia. Dissolve 3 scruples extract of valerian in 7 fluid ounces spring water; add 3 fluid drachms fluid extract of vale- aromatic spirits of ammonia, and 1 pint pep-

nsed in obstinate chronic diseases of the skin rian, and filter; then add 2 drachms valerianate

Brandreth's Pills. 5391. According To Obtain Fuligokali. Take of to Dr. Huger's analysis, these consist of 10 grains extract of may-apple, 30 grains poke berry juice, 10 grains saffron, 10 grains powdered may apple root, 15 grains powdered cloves, and 3 drops oil of peppermint. This is made into 30 pills with powdered liquorice root.

5392. Foucher's Dressing for Wounds. Dissolve 2 drachms chlorate of potassa in 4 fluid ounces glycerine, and add 21 ounces alcohol. This forms a clear liquid which is readily absorbed by linen, and does not soil the clothing. It keeps the dressings moist for 24 hours, is easily washed off with lukewarm water, and is well adapted for soft granula-

5393. Atler's Nipple Wash. Take the drachm powdered gum-arabic, 10 grains borate of soda, and 1 drachm tineture of

myrrh.

5394. Beach's Neutralizing Cordial. Mix together 1 ounce coarsely powdered Tur-Mix 8 key rhubarb, ½ ounce peppermint leaves, and pint best brandy and 1 pound loaf sugar. Digest for a day or two, and strain through flannel. Bottle for use. 5395. Hager's

Hager's Vermin Ointment.

5396. Mayes' Substitute for Osgood's Indian Cholagogue. Dr. Mayes, of Mayesville, S. C., gives the following receipt, which powder (see last receipt) in 20 parts olive oil. he declares to be very similar to, if not iden-Decant the clear, and filter. Keep in glass tically the same, in taste, smell and effects, as bottles carefully stopped. Or: Boil 1 part Osgood's Indian cholagogue. Take 2 drachms sulphate of quinine; 1 drachm Tildens' fluid extract of leptandra; 4 ounces saturated tinc-ture of queens' root; 3 drachms Tilden's extract of podophyllin (may-apple); 10 drops each of oil of sassafras and oil of wintergreen; and sufficient best New Orleans molasses to make the whole up to 8 ounces. This mixture to be well shaken up before a dose is measured; as the quinine (not being dissolved) will settle to the bottom of the bottle. The dose for adults is from 1 to 3 tea-spoonfuls 3 times a day. The dose is, however, a matter dependent entirely upon the nature of the case; and may be less or more, according to circumstances. It usually requires at least one 8-ounce bottle of the mixture to insure a permanent cure. When Tilden's fluid extracts cannot be had, saturated tinctures may be used, but in increased quantities; say rather more than double the quantity given of the fluid extract. In order, then, to preserve the due balance, the mixture must be made to measure 10 ounces, and a corresponding increase of dose must be made.

5397. Norris's Soda Mint. Soda mint, so much employed as an antacid and carminative for over-fed infants and dyspeptics, was originally a favorite prescription of Dr. Geo. Norris. His formula was the following: Mix together I ounce bicarbonate of soda, I ounce tea-spoonful for infants.

5398. Foy's Muriatic Acid Chilblain otion. Muriatic acid, 1 part; water, 16 Lotion. parts. To be used occasionally as a wash.

5399. Foy's Sulphuric Acid Chilblain Liniment. Sulphuric acid, 2 drachms; olive oil, 2½ ounces: and oil of turpentine, 1 ounce. Mix. Applied with gentle friction where the skin is not broken.

Balsam of Peru, ½ drachm; Chilblains. muriatic ether, 2 drachms; and laudanum, 2

drachms. To be used as a friction.

5401. Gassicourt's Turpentine Chilblain Lotion. Oil of turpentine, 4 parts; sulphuric acid, 1 part; olive oil, 10 parts. To tilled water. This quantity constitutes a be applied to the affected part night and morn-dose; a little milk to be swallowed before

5402. Saunders' Petroleum Chilblain

5403. Radius' Camphor Chilblain Ointment. Lard, suet. oil of bayberries, and camphor, 1 drachm.
5404. Compound Creosote Ointment

for Chilblains. Creosote, 10 drops; solution of subacetate of lead, 10 drops; extract of

opium, 11 grains; lard, 1 ounce

5405. Deschamps' Pastils for Bad Breath. Take of dry hypochlorite of lime, 2 drachms; sugar, 8½ ounces; starch, 8 drachms; gum tragacanth, 1 drachm; and carmine, 2½ grains. The pastils should be made so as to weigh about 2½ grains; 5 or 6 may be taken in the space of 2 hours. By employing starch in the preparation of the lorsers. Pastiles for Bad Grains of Copaiba, Take 270 grammes (4167 grains) balsam of copaiba, 60 grammes (926 grains) subnitrate of bismuth, and 18 grammes (277½ grains) calcined magnesia. This is sufficient for 600 gelatine capsules. Dose, employing starch in the preparation of the lorsers. Pastiles for 18 capsules a day. lozenges, Deschamps wishes to prevent the yellow color which they would otherwise as-

Take 15 grains veratria, dissolve it in sufficient dilute muriatic acid, and add 5

drachms glycerine.

5407. Noble's Tonic Elixir. Take 1 ounce each of rhubarb root, orange peel, and caraway (or fennel) seed; percolate with 1 pint brandy. Dose, a tea-spoonful 3 times a and 1 part coriander. day, after each meal.

Ludlam's Specific. **5409**. Take drachms extract of rhatany, 1 drachm alum, 1 ounce cubebs, all in powder; 1 fluid ounce weeks; then filter. balsam of capaiba, and sufficient carbonate of magnesia. Dose, a small piece every 3 or 4

5410. Davis' Pain Killer. This preparation is said to be prepared as follows: Take 20 pounds powdered guaiac, 2 pounds camphor, 6 pounds powdered cayenne pepper, 1 pound caustic liquor of ammonia, and ½ fluid ounces distilled water and 1½ fluid pound powdered opium; digest these ingre- ounces rose-water, adding sufficient aqua amdients in 32 gallons alcohol for 2 weeks, and monia to produce a perfect solution. Mix filter.

5411. Hunter's Red Drop. in a glass mortar, 10 grains corrosive sublimital perfectly clear; if not bright, add about ate in 12 drops muriatic acid, and add gradu 2 fluid drachms more alcohol. This is a fine

permint water. Dose, from a dessert-spoonful ally 1 fluid ounce compound spirit of lavento a table-spoonful for adults; from 1 to 1 der. Dose, 5 to 20 drops in wine. A powerful alterative in syphilitic diseases, and will not salivate

5412. Battley's Sedative Solution of Opium. Take 6 ounces sliced opium, 14 ounces bruised nutmegs, 1 ounce Spanish saffron, and 4 pounds verjuice. Boil together, and add 4 drachms yeast; let the whole ferment 6 weeks, in a warm place. Decant, filter, and bottle; add a little sugar to each bot-5400. Balsam of Peru Liniment for tle. One drop of this sedative is equivalent to 3 drops of black drop.

Nimmo's Solution of Croton **5413**. Oil. Mix together ½ drachm alcoholic solution of eroton oil, 2 drachms each simple syrup and guaiae mucilage, and a ounce dis-

and after.

The alcoholic solution referred to is formed Embrocation. Min together petroleum, ½ by adding 8 drops croton oil to 1 fluid ounce ounce; alcohol, ½ ounce.

Gregory's Powder. 5414. drachms calcined magnesia, 3 gether 6 wax, of each ½ ounce. Melt together and add drachms powdered rhubarb, and I drachm powdered ginger. (See No. 5211.)

Remoussin's Anti-Syphilitic 5415. Take 1 ounce of a decoction of Gargle. black nightshade and hemlock, and 3 grains

bichloride of mercury.

5416. Ricord and Favrot's Capsules

5417. Ricord and Favrot's Capsules of Copaiba and Tar. Take 220 grammes (3395 grains) balsam of copaiba, 20 gram-Soubeiran's Lotion of Verames (308\frac{1}{2} grains) Norwegian tar, and 15 e 15 grains veratria, dissolve it in grammes (231\frac{1}{2} grains) calcined magnesia. dilute muriatic acid, and add 5 To make 400 gelatine capsules. Dose, 15

every day.

5418. Hamburg Tea. This formula for Hamburger Thee is given by Hager. Mix together 8 parts senna leaves, 4 parts manna,

day, after each meal.

5408. Delioux's Wine for Rheumatism, Gout, and Neuralgia. Take 5 parts
tineture of colchicum seed, 2 parts tineture of
aconite leaves, 1 part tineture of fox-glove,
and 900 parts white wine. Dose to compints 80 per cent. alcohol. Strain, and digest
mith 1 counce each gum myrrh and gum olibanum. Then add 6 ounces each balsam of tolu and gum benzoin; macerate for 2

> 5420. Grahame's Elixir of Bismuth. Dissolve 10 minims oil of orange flowers, 1 drop oil of cinnamon, 1 drop oil of cloves, and 2 drops oil of anise, in 11 fluid drachms deodorized alcohol; add 2 fluid drachms syrup, and shake the mixture well. Dissolve 136 grains ammonio-citrate of bismuth in 2

the two solutions, add 1; fluid ounces alcohol. Triturate and, after standing for a short time, filter un-

about 2 grains of bismuth salt.

iodide of potassium and 20 parts water. The water to make up to 12 fluid ounces. solution of this strength is the one generally understood as Lugol's solution.

Caustic solution, consisting of 1 part iodine.

pulverized liquorice, and 17 grains sulphate cotton, moistened with the liquid, to the of morphine. Dose, from 1 to 10 grains, gums around the tooth for 1 or 2 minutes. It used in all kinds of fevers, and as an ano-must not be swallowed.

soda; 2 pounds white sugar, and 2 ounces becomes a thick paste. Then divide rapidly essence of peppermint, with sufficient brandy into the required number of pills. A 3-grain and water to make up to 2 pints. Dose, 1 to pill made in this manner will not be incon-

2 tea-spoonfuls.

5425. German Tea for the Chest. The compound known as German Brust-Thee foot leaves; 1 ounce each red poppy flowers, matico. mullein flowers, and star anise seed. 5426. Frey's Vermifuge.

Take 1 rhubarb, 30 drops oil of Baltimore wormseed,

water. Apply to the part affected every 2 or 3 hours.

morning, until purging takes place.

5429. Laurence's Hemorrhage Solu-

If the solid perchloride of iron be kept in a affords relief in local pain, and diminution of bottle, a small portion deliquesces after a time, forming a thick brown liquid. This, applied to a bleeding surface by means of a Take 20 grains each sulphate of zinc and ace-

5431. Monsel's Styrtic Solution. This consists of a solution of subsulphate of drachm permanganate of potassa in 1 pint iron, and is applicable for the same purpose water. This is an excellent lotion for burns, as Laurence's hemorrhage solution. (See No. ulcers, and suppurating surfaces, relieving the 5429.) The preparation of the solution of subsulphate of iron is thus given in the U.S. Ph. Mix 510 grains sulphuric acid and 780 Digest for a few days 4 ounces powdered grains nitric acid with 1 pint distilled water; gum-guaiac, 11 drachms carbonate of soda heat to the boiling point, and add, 4 part (or of potassa), and I ounce powdered all spice. at a time, 12 troy ounces sulphate of iron, in | in 1 pint dilute alcohol. Add 1 or 2 drachms

preparation, each tea-spoonful containing until effervescence ceases. Boil the solution until nitrous vapors are no longer perceptible. 5421. Lugol's Iodine Solution. This and the color assumes a deep ruby tint. consists of 1 part iodine dissolved in 2 parts. When nearly cold, add sufficient distilled

5432. Patterson's Emulsion of Pumpiderstood as Lugol's solution.

Kin-Seeds. This is a good preparation for 5422. Iodine Solution for External expelling tape-worms. Take 2 ounces pump-Use. Lugol devised two other solutions of kin seeds, peel and pound to a paste with 1 different degrees of strength from the one ounce sugar; then add by degrees 8 fluid given in No. 5421. As follows:

Ounces water. The whole to be taken in 2 or Rubefacient solution, containing 1 part io- 3 draughts, at short intervals, fasting. Dr. dine to 2 parts iodide of potassium and 12 H.S. Patterson has prescribed this repeatedly with success

5433. Teft's Dental Anæsthetic. Mix 1 part iodide of potassium, and 2 parts water. 1 fluid ounce each tincture of aconite root. 5423. Camphorated Dover's Powder. purified chloroform, and alcohol, with 6 Pulverize 5 drachms camphor with ether, grains morphia. Used to diminish the pain add 5 drachms prepared chalk, 5 drachms in extracting teeth, by applying two plugs of

5434. Parrish's Quinine Pills. Place 5424. Davis' Neutralizing Cordial. 20 grains sulphate of quinia on a slab, drop Take 8 ounces rhubarb, 2 ounces each saf- upon it 15 minims aromatic sulphuric acid, fron, cardamoms, nutmeg, and carbonate of triturating it with a bone spatula until it

veniently large.

5435. Grimault's Matico Injection. The matico injection, used by Grimault, of is composed of the following ingredients, cut Paris, for gonorrhea, is prepared, according up small and mixed together: Take 4 ounces to Bjoerklund, by dissolving 4 grains sulphate marsh-mallow root. 1½ ounces liquorice-root, of copper in 8 ounces infusion of matico. The ½ ounce Florentine orris root, 2 ounces colt's 8 ounces of infusion are made from ½ ounce

5436. Storm's Specific. Take 2 ounces sweet spirits of nitre, 1½ drachms oil of cuounce castor oil, I ounce aromatic syrup of bebs, 2 ounces balsam of copaiba, 1 drachm oil of turpentine, 20 drops oil of cinnamon, and 5 drops croton oil.

5427. Velpeau's Erysipelas Lotion.

Dissolve 1 ounce sulphate of iron in 1 pint preparation is preferred by many to the capsules

5437. Milhau's Emulsion of Cod-5428. Procter's Vermifuge. To expel Liver Oil. Take 1 fluid ounce syrup constomach worms from young children. Mix taining sufficient saccharate of lime to repre-16 grains santonin with 2 fluid ounces fluid sent 6 grains of the hydrate of lime; 5 fluid extract of pink-root and senna. Dose, for a ounces water, 9 fluid ounces cod-liver oil, and child 2 years old, 1 tea-spoonful night and 6 drops essential oil of almonds. Make into an emulsion.

5438. Bumstead's Opium Injection tion. Dissolve 2 drachms chloride of iron in for Gonorrhea. An injection, composed of 1 fluid ounce water. Apply with a brush, 1 seruple extract of opium, 1 fluid ounce glyto prevent gangrene and arrest homorrhage. cerine and 3 fluid ounces water, passed into Laurence's Styptic Solution. the urethra after every passage of urine, discharge.

5439. Ricord's Gonorrhœa Injection. brush of spun glass, arrests the flow of blood almost immediately.

tate of lead, and 4 fluid ounces rose-water.

The bottle to be well shaken before using.

Condy's Fluid. **5440.** Dissolve pain and removing the fetid odor.

5441. Dewees' Tincture of Guaiacum. coarse powder, stirring after each addition volatile spirit of ammonia to every 4 cances of the tincture. To be administered in doses; of 1 tea-spoonful in a little sweetened milk, Lotions. cellent and well-tried remedy.

phor, 21 ounces; oil of rosemary, 21 drachms; while warm into wide-mouthed bottles.

II. Rectified spirits, 8 pints; white soap, phor spirit. 20 ounces; camphor, 8 ounces; water of am-

5444. This alterative has been found a valuable tion remedy in secondary syphilis and other disorders. Macerate for 7 days 1 ounce powdered Lotion. For sore lips, chapped hands, &c. guaiac. I ounce Canadian balsam, and 2 fluid Take ½ drachm borax, ½ fluid ounce glycerine, drachms oil of sassafras, in 8 fluid ounces alcohol. Filter, and add 1 scruple corrosive 5453. Brainard's Solution for Exterened water, night and morning.

5445. Hufeland's Pectoral Elixir. root, Florentine orris-root, and squill-bulbs;

myrrh, and gum-guaiacum; add 4 parts particularly useful for the delicate. bruised rhubarb-root, 2 parts bruised saffron, 5455. Da Costa's Chronic Constipabruised rhubarb-root, 2 parts bruised saffron, 8 parts carbonate of potassa, 8 parts muriate tion Pill. Take 1 grain podophyllin, 1 grain podophyllin, 1 grain podophyllin, 1 grain podophyllin, 1 grain podophyllin, 1 grain podophyllin, 1 grain podophyllin, 1 grain podophyllin, 1 grain podophyllin, 1 grain podophyllin, 2 gra root, and 144 parts distilled water. Macerate the ingredients for a few days, frequently stirring, then filter. (Hager.)

5447. Hufeland's Anticatarrh Elixir. Take 60 parts extract of blessed-thistle, 20 parts extract of bitter-sweet, dissolve them in 480 parts fennel water and 60 parts bitteralmond water. Dose, 60 drops 4 times a day.

Meyer's Water of Life. Take **544**8. 18 parts fresh myrtle-berries, 12 parts orangepeel, 8 parts cinnamon, 2 parts galanga-root, 2 parts zedoary-root, and 1 part cardamoms. Reduce them by bruising and cutting, and di-|Divide into 100 capsules. gest them for 3 days with frequent agitation, in 600 parts rectified spirit and 680 parts water; white sugar. (Hager.) 5449. Elixir of Bromide of Potassi-

officinal formula for preparing bromide of potassium is given in No. 4198.

Take 2 ounces valerian root; 3 ounces orris ment root; 1 ounce aniseed; 2 drachms saffron, all

Granville's Counter-Irritant 5451. These consist of three ingredients, or in sherry wine, morning, noon and night, viz.: strong water of ammonia (specific gravin cases of suppressed menses. This is an exity .872) more than 3 times the strength of officinal liquor ammonia; of spirit of rose-5442. Powell's Cough Balsam. Mix mary, made by infusing 2 pounds of the fresh together 2 drachms syrup of tolu. 1 ounce tops of rosemary in 8 pints alcohol for 24 paregoric elixir, and 2 ounce: liquorice juice.

5443. Steer's Opodeldoc. I. Rectified camphor, composed of 4 ounces camphor disspirit, 1 quart; eastle soap, 5 ounces; cam-solved in 2 pints alcohol.

The lotion is prepared of two different oil of origanum, 5 drachms; weaker ammo-strengths; the milder lotion consists of 4 nia, 4 ounces; digest till dissolved, and pour drachms of the ammonia, 3 drachms of the spirit of rosemary, and 1 drachm of the cam-

The stronger lotion contains 5 drachms of monia, 4 ounces: oil of rosemary, 1 ounce; the ammonia, 2 of the spirit of rosemary, and oil of horsemint, I ounce; dissolve the soap I of the camphor. The milder is generally in the spirit by a gentle heat, and add the sufficient to produce full vesication in from 3 other ingredients. Bottle whilst warm. | to 10 minutes. The stronger is seldom used Falk's Antacrid Tincture. except in apoplexy, and to produce cauteriza-

sublimate. Dose, 20 drops in wine or sweet- nal Use. Dissolve 16 grains lactate of iron in 2 fluid drachms distilled water.

5454. Birch's Pills for Habitual Con-Take 3 parts saffron, 4 parts each benzoin, stipation. Take ½ drachm alcoholic extract myrrh, gum-ammoniac, aniseseed, and puriof rhubarb, 24 grains extract of faraxacum, fied liquorice-juice; 8 parts each sneezewort and 2 grains sulphate of quinine. Mix to-root, Florentine orris-root, and squill-bulbs; gether and make into 12 pills. One to be macerate for a week in 93 parts rectified taken either on rising in the morning or at spirit, stirring frequently, then filter. spirit, stirring frequently, then filter.

5446. Hufeland's Aperient Elixir. dinner time, or even at both per the constipation is very obstinate. Reduce to coarse powder 4 parts each of aloes, very gentle stomachic and tonic evacuant,

of ammonia, 48 parts spirit of horse-radish extract belladonna, 5 grains capsicum, and 20 grains powdered rhubarb; mix and divide into 20 pills. One pill to be taken 3 times a

> Birch's Constipation 5456. Take 12½ grains compound extract of colocynth and 40 grains extract of henbane. Mix and divide into 20 pills. This is an excellent pill for occasional use, especially for constipation in old age.

> 5457. Ricord's Copaiba and Pepsine Pills. Take 11½ drachms balsam of copaiba, 2½ drachms neutral pepsine, 31 grains nitrate of bismuth, and 46 grains calcined magnesia. Administer 15 to 18 daily.

Lime Juice and Glycerine. **5458**. then strain with pressure, and let it settle; Lime (or lemon) juice, ½ pint. Heat in a decant the clear, filter it, and add 120 parts porcelain mortar to near the boiling point, and add gradually rose water, elder-flower water, and rectified spirit, of each 2 ounces. um. Dissolve 1 ounce bromide of potassium Agitate the whole well together. After 24 and 1 ounce sugar in 1 pint simple elixir; add hours' repose, decant or filter through calico 20 minims solution of oil of crange and 10 or muslin, then add pure glycerine, 21 minims of solution of oil of bitter almonds, ounces; oil of lemons. 1 drachm. Again and filter; color with cochineal color. The agitate them together for some time, and by careful manipulation you will have a somewhat milky liquid; but it should be quite 5450. Hufeland's Infant Powder. free from any coarse floating matter or sedi-

5459. Boudault's Pepsine Pills. Mix in powder, and 2 ounces carbonate of mag- 2 drachus and 34 grains starchy pepsine, with sufficient powdered tragacauth to make 60 pills. Dose, 3 pills before and 3 after one of which is to be taken occasionally in each meal, and sometimes 3 during the catarrh and bronchial affections.

5460. Hogg's Pepsine Pills. Mix 2 drachms 34 grains starchy pepsine, 1 drachm drachm; syrup, 5 ounces. Mix. 17 grains nitrate of bismuth, and 38½ grains oceanically when expectoration lactic acid. Make into 100 pills, and coat 5467. Kermes Mineral. with sugar and balsam of tolu. Dose, 4 to 12

pills 1 hour after meals.

5461. Angelot's Remedy for Ulcerated Gums. Take of hypochlorite of lime, from 10 to 25 grains; mucilage of gum-arabic, 1½ to 4 drachms; syrup of orange peel, 24 hours decant the fluid, drain the precipi-1½ to 2 drachms. Mix thoroughly. This tate on a filter, wash it with cold water (premixture is employed as a lotion to the ulcerated gums.

5462. Angelot's Pastils for Bad Breath. These preparations are better adapted than liquids for carrying on the person. Take of hypochlorite of lime, 7 drachms; sugar flavored with vanilla, 3 drachms; gumarabic, 5 drachms. The pastils are made so as to weigh from 10 to 11 grains. 2 or 3 of these pastils are sufficient to remove from the breath the disagreeable odor produced by tobacco smoke. The pastils thus prepared have a grey color and become quite

If pastils of whiter color are required the following substances are employed: Take of dry hypochlorite of lime, 20 grains; pulverized sugar, 1 ounce; gum tragacanth, 16 grains. The hypochlorite of lime is triturated in a glass mortar, and a small quantity of water is poured uponit; it is then left to repose. decanted, and a second quantity of water milk is thus prepared: Take 10,000 parts fresh added; the two liquids are filtered, and the gum cows' milk, 50 parts white sugar, and 2 parts and sugar added so as to form a paste. is divided into pastils weighing from 12 to 16 grains. If it is desired to aromatize the paste, 1 or 2 drops of any essential oil may be added to the sugar and gum before the paste is formed.

5463. Santonin Lozenges. Take 5 troy ounces white sugar in powder, 1 troy white of 5 eggs previously beaten to a dense froth; place in a porcelain dish over the water-bath, and, with constant stirring, keep at a temperature not exceeding 100° Fahr. until a sample taken from the mixture no longer runs from the spatula. An intimate mixture heat of 95° to 110° Fahr. (Hager.) of 50 grains powdered santonin and 100 grains powdered sugar is incorporated with the mass, and the whole, by means of a syringe, formed into 100 lozenges, each containing 1 grain of santonin. They are deposited on smooth or waxed paper, and when lint and apply to the wound. (Hager. hard are to be placed between cotton-wadding and protected from the light.

5464. Quesneville's Ferruginous Powder. Bicarbonate of soda, 4 parts; tartaric acid, 7 parts; pure sulphate of iron, 4 parts; sugar, 8 parts. Powder each fine, then mix and keep the powder in a well-corked bottle. Dose, 1 spoonful in 6 or 7 ounces of sweet-

ened water.

5465. Tronchin's Cough Syrup. Powdered gum-arabic, 8 ounces; precipitated root. sulphuret of antimony, 4 scruples; anise, 4 scruples; extract of liquorice, 2 ounces; ex- drachm each sago, jalap, and tragacanth, all tract of opium, 12 grains; white sugar, 2 in powder; 1 scruple prepared syster shell, pounds. Mix, and form lozenges of 6 grains, and sufficient cochineal to color Boil 1

5466. Pierquin's Cough Syrt Kermes mineral, 2 grains; gum-arabic, A spoonful

occasionally when expectoration is difficult.

5467. Kermes Mineral. Dissolve Dissolve 23 troy ounces carbonate of soda in 16 pints boiling water; add 1 troy ounce finely powdered sulphuret of antimony, and boil for an hour. Filter rapidly into a warm earthen vessel, cover closely and cool slowly. viously boiled), and dry without heat. Keep in a well-stopped bottle, protected from the light. (U. S. Ph.) This is the oxysulphuret

of antimony.

5468. Rousseau's Laudanum.

honey in 3 p solve 12 ounces white honey in 3 pounds warm water, and set it aside in a warm place. When fermentation begins add to it a solution of 4 ounces selected opium in 12 ounces water. Let the mixture stand for a month at a temperature of 86° Fahr.; then strain, filter, and evaporate to 10 ounces; finally strain and add 4½ ounces proof alcohol. Seven drops of this preparation contain about 1 grain

of opium.

5469. Bonnamy's Dentifrice. Take prepared chalk, 1 part; burned hartshorn, 1 part; hydrate of alumina, 1 part; perfume with oil of cinnamon. This is an excellent

dentifrice.

5470. Extract of Milk. Condensed pure carbonate of soda. Place them in a porcelain vessel, and, with constant stirring evaporate to the consistence of a thick extract, either in a vacuum or by the heat of a vapor bath of 140° to 160° Fahr. One part of the extract will represent 10 parts of fresh milk.

5471. Milk Powder. Take 10,000 parts ounce fine starch, 10 grains finely powdered fresh cows' milk, 2 parts dry caustic potassa, tragacanth; the whole well mixed with the and 2 parts borax. Evaporate these in a vacuum to about 2000 parts. Then mix in thoroughly 50 parts precipitated phosphate of lime, 15 parts table salt, 100 parts powdered gum-arabic, and 200 parts powdered sugar. Evaporate the whole to a dry powder at a

5472. Schwarz's Liniment for Scalds and Burns. Take 16 parts linseed oil, 8 parts white of egg, and 1 part tincture of opium; mix them thoroughly by trituration with 2 parts acctate of lead. Spread upon

5473. Hungarian Liniment. Pulverize 5 parts cantharides, 20 parts each mustard seed, black pepper, and camphor; macerate for 2 days in 200 parts wine vinegar, then add 400 parts rectified spirits. Strain with pres-

sure, and filter. (Hager.)
5474. Bland's Ferruginous Pills. Take equal weights of sulphate of iron and carbonate of potassa; make into a mass with mucilage of tragacanth and powdered liquorice

5475. Castillon's Powders. Take 1

affections.

gradually pour in 21 fluid ounces solution of ture of iodine.

skin in 10 minutes if properly prepared.

fic remedies for ailments of every-day occur- ence. rence; it being understood that, in all serious the efficacy of each receipt being the primary consideration in inserting it. The list includes with prescriptions of celebrated and leading the disease. physicians.

5479. Years' Itch. Use plenty of eastile soap and simple cerate; sulphuric acid, † pound; mix water, and afterwards freely apply iodide of together, and it will be ready for use. sulphur ointment; or take any given quantity of simple sulphur ointment and color it to a light-brown or chocolate color with the subcarbonate of iron, and perfume it. Apply this freely; and, if the case is severe, admin-

5489. Sulphur Bath. The bath may an excellent remedy. be prepared either by adding I ounce sulphuret of potassium for every 10 or 12 gallons phur bath is a powerful remedy in every dethe ashes of a good Havana segar. Simple as scription of skin disease. Leprosy (the most this remedy may appear, it has cured the obstinate of all) has been completely cured most obstinate eases. by it; the common itch requires only 1 or 2 moist skin affections, &c., speedily yield to its influence.

has been highly recommended.

5482. To Cure Salt Rheum. Wash 5 5482. To Cure Salt Rheum. Wash 5489. Cure for Ring-worm. Wash the part affected with castile soap and water, the head with soft-soap every morning, and dry with a soft cloth; then wet with tincture apply the following lotion every make: I

drachm of this mixture in a pint of milk, and of iodine, and let it dry; after which apply a use the decoction as a diet in chronic bowel little citrine ointment. (Sec No. 4947.) When the cruption is on an exposed part, a wash 5476. Goulard's Cerate. This is the composed of 1 drachm corrosive sublimate, 2 same preparation as the cerate of subacetate scruples white vitriol (sulphate of zine), 3 of lead of the U.S. Pharmacopoia. Mix 4 drachms sal-ammoniac, 2 drachms salt, and 3 troy ounces melted white wax with 7 troy ounces sugar of lead, mixed with 1 pint soft ounces olive oil. When it begins to thicken, water, may be used alternately with the tinc-

subacetate of lead, stirring constantly with a 5483. Salt Rheum from Photographic wooden spatula until cool. Then mix in 30 Chemicals. Make a salve by steeping 5483. Salt Rheum from Photographic grains camphor dissolved in 1 fluid ounce olive queen of the meadow root over a slow heat in fresh hog's lard for from 2 to 6 hours—the 5477. Gondret's Ammoniacal Oint-longer the more powerful the salve. Apply ment. Take 32 parts lard and 2 parts oil of this to the cruptions as often as convenient, sweet almonds. Melt together by a gentle and in a short time there will be a decided heat, and pour the mixture into a wide-improvement and a cure will be effected in mouthed bottle. Add 17 parts of a solution of from 1 to 6 weeks. If the stomach or blood mouthed bottle. Add 17 parts of a solution of from 1 to 6 weeks. If the stomach or blood ammonia of 25° Baumé, and mix thorough- should seem out of order, take Winchester's ly until cold. Keep it in a cool place, and hypophosphites of lime and soda. Use this in a bottle with an accurately fitting stopper, medicine and no other, as it acts without fail It will vesicate, or raise a blister under the and to the point, not being in any way injurious. Avoid using either iron or mercury, as they do no good and are very apt to do injury. Where the disease is not hereditary a cure will be effected in a short time; where it has become a chronic difficulty the cure will be slower. When buying the root, ask for Medical Receipts. The scope queen of the meadow root. Be careful not to get queen's root, commonly called stilingertion of much beyond general and specilingia, many druggists not knowing the differqueen of the meadow root. Be careful not

5484. Baker's Itch. This disease is of cases, the guidance of a physician is indispen-common occurrence on the hands of bakers; sable. Advice and directions are given for hence the vulgar name. The treatment is as the treatment of some severe cases requiring follows: Frequent ablution in warm water, prompt action, that may be followed with keeping the bowels open with saline purgabenefit until the arrival of the doctor. No tives, and the nightly use of the ointment particular school of medicine is adhered to, given in No. 4957 will generally effect a cure. Salt food should be avoided as much as possible, as well as keeping the hands covered with many popular and domestic remedies, together dough and flour; the latter being the cause of

To Cure Prairie or Seven worm, and Scald-Head. Take I pound

5486. Remedy for the Tetter. solve I ounce sulphuret of potash in I quart of cold soft water; put it into a bottle and keep it tightly corked. Bathe the cruption 5 or 6 times a day, with a sponge dipped in a litister mild alteratives in conjunction with the tle of this solution. If the tetter reappear in outward application. Cold weather, repeat the treatment. This is

5487. Remedy for Barber's Itch and Tetter. A simple and effectual cure. Moistof water used, or 1 onnce sulphuret of callen the part affected with saliva (spittle) and cium for every 15 gallons of water. The sul- rub it over thoroughly three times a day with

5488. To Cure Ring-worm. applications to eradicate it; all scurfy and part sulphuric acid, add 16 to 20 parts water. Use a brush or feather, and apply it to the parts night and morning. A few dressings 5481. Benzine for Itch. Benzine, it is will generally cure. If the solution is too said, will effect a cure for scables in the course strong, dilute it with more water; and if the of half an hour, after which the patient irritation is excessive, rub on a little oil or should take a warm bath for 30 minutes. This other softening application; but always avoid

drachm sub-carbonate of soda, dissolved in ½ pint of vinegar.

5490. To Cure Pimples and other Eruptions of the Skin. Never tamper laudanum. Mix, and rub well in before a hot with any breaking-out on the skin; even fire. though it be a single red spot, do not apply to it so simple a thing as water, hot or cold, thing is rest; take night and morning 15 or but let it alone, and omit a meal or two; if it 20 drops of the balsam of copaiba. If the does not abate, consult a physician. If one part is inflamed, apply cold water cloths. is not at hand, then live on half allowance Let the bowels be kept gently open by aperiuntil it disappears.

5491. ĜÎyconine, or Glycerine Varnish for Cutaneous Affections. Take yolk of egg, 4 parts by weight; rub in a laid exposed to the air for 3 years unchanged), and is quickly removed by water. These properties render it serviceable for erysipelas and splinters finding their way under the the action. It is also very valuable for soothing the irritation resulting from burns.

5492. Cure for Eruptions of the Skin. Take 2 ounces rasped sarsaparilla root, 1½ ounces solanum dulcamara (bitter-sweet, or antimony.

5493. Treatment of Sprains. warm fomentations at the time of accident, to prevent or reduce the swelling and pain, and the skin is not broken, about 20 to 30 drops, or even, in severe cases, 60 drops may be added to a wine-glassful of water. If the skin is strength of the tincture must be considerably reduced; from 5 to 10 drops will then be sufof using the lotion, leave it off at once and use only cold water. A firm bandage will be useful to support the part. Walking should, for a considerable time, be only sparingly indulged in after a severe sprain.

5494. Remedy for a Sprain or Bruise. keep the sprain moist. This is an invaluable remedy.

5495. Sprains of the Wrist and Ankle. As soon as possible after the accident, get a muslin bandage 1 or 2 yards long, and 2 or 3 inches wide; wet it in cold water, and roll it smoothly and firmly around the injured part. Keep the limb at rest, exposed to the air, and continually damp with cold bandage is applied, the less pain and swelling there will be; but if pain becomes excessive, care must be taken to slightly loosen the ban- face, it almost instantly forms a pliable, wadage.

5496. Sprains of the Muscles of the Back. Take of Canada turpentine, ½ ounce; Back. soap liniment, 6 ounces; and 1 drachm of

5497. Sprain in the Back. The first the part with stimulating liniment. (See No. 4888.) When the inflammation is gone, rub

5498. Treatment of Scratches. Do mortar with 5 parts glycerine. Applied to not neglect them. Wash them in cold water; the skin it forms a varnish which effectually close them as much as you can, and cover excludes the air, and prevents its irritating with diachylon plaster. If there is inflammaeffects. It is unalterable (a specimen having tion, apply a bread poultice, or one of slippery elm.

5499. To Extract Splinters. Thorns and cutaneous affections, of which it allays skin frequently give considerable pain, and, unless extracted, the annoyance may be very great, as inflammation will in all probability ensue, which is the process nature adopts for getting rid of the cause of irritation. splinter or thorn cannot be immediately exwoody nightshade), 1½ ounces mezereon tracted, for which purpose a needle will be bark, ½ ounce rasped guaiacum wood, and ½ found in most cases a sufficient surgical inounce sassafras bark. Pour on these 1 quart strument, linen dipped in hot water ought boiling water, let it stand 24 hours, and then to be bound around the place, or the part may boil away slowly to 1½ pints; press, strain, be bathed in hot water. In the event of in-and add 2 pounds sugar and 1 ounce diluted flammation, which may probably issue on the spirits of wine. Take a wine-glassful 3 times production of an ulcer, the steam of hot water a day with 1 grain precipitated sulphuret of should be applied, and afterwards a poultice of bread and milk.

5500. Treatment of Cuts. The divigreat remedy is rest; when severe, rest for ded parts should be drawn close together, and days, to save weeks; the best treatment is held so with small pieces of strapping or adhesive plaster stretched across the wound, or by the application of collodion. If the part arnica, applied by means of rags, to prevent be covered with blood, it should be first wiped pain and give strength to the part. The off with a sponge. When the wound is large, tineture of arnica is the preparation used. If and the parts much exposed, a good method is to sew it up. The application of a little creosote will generally stop local bleeding, proed to a wine-glassful of water. If the skin is broken, or any abrasion is present, the the wounded vessels. A good way is to place a piece of lint, moistened with creosote, on the wound previously wiped clean, or to pour ficient, and if any redness or inflammation a drop or two of that liquid upon it. Friar's occurs in or about the sprain, in consequence balsam, quick-drying copal varnish, tincture of using the lotion, leave it off at once and of galls, copperas water, black ink, &c., are popular remedies applied in the same way. A bit of the fur plucked from a black beaver hat is an excellent remedy to stop the bleeding from a cut produced by the razor in shaving. For light cuts with a knife, or any Wormwood boiled in vinegar, and applied sharp instrument, the Riga balsam usually hot, with enough cloths wrapped around to stops the bleeding immediately. (See Lock-

> 5501. Artificial Skin for Cuts, &c. A small quantity of collodion applied with a brush to a cut or wound will produce a perfect artificial covering which is more elastic than plaster, and sufficiently insoluble in cold water.

5502. Traumaticine, or Water-proof This' article is Covering for Wounds. The sooner after the accident the simply a solution of white and dry pure unmanufactured gutta-percha in bisulphuret of carbon. Dropped on a wound or raw surter-proof, and air-tight defensive covering to

beater's skin. which has an agreeable odor, may be used as the solvent, but is very much more expensive

than the bisulphuret of carbon.

5503. Treatment of Bed-Sores. Remove the excessive discharge by gently pressing the part with a bit of cotton wadding; then paint the sore over with prepared collodion (see No. 4744), using a soft camel-hair pencil. The application may be repeated daily, and when it has well dried place a bit of soft lint or cotton wadding over the part for protection.

5504. Detergents. Deterge means to cleanse. matters adhering to and obstructing the vessels; usually applied to fout uncers, a.c., times a day.
as tincture of myrrh, honey, alum, water, times a day.

5510. Treatment of Running Sores

Treatment of Ulcers. An ulcer on the Legs. 5505. and protected from the atmosphere, especially in frosty or cold weather. It should be washed now and then with warm soap-water. Put Sores. Dr. Schreber, of Leipzic, recomdressing is the saturnine cerate. (See No. 4968.) Poultices made of the oak bark or sumach bark may be used alternately

5506. Treatment of Severe Ulcers. a little spirit. elm, mixed with a strong decoction of poplar bark, and a trifle of salt. Repeat as required. If the ulcer or ulcers are indolent, steam as mixed with it; or, sprinkle the ulcer with powdered blood-root. Sometimes ulcers become very much inflamed, and assume a livid color; they are covered with small vesicles or blisters, as in mortification. Wash the ulcer with tincture of myrrh, and apply a poultice made of charcoal, yeast, slippery elm, ginger, and a minute portion of tincture of cayenne. Bear it as long as possible. Then apply the saturnine cerate. (See No.

5507. Beach's Remedy for Ulcers. The following is recommended by Dr. Beach: Take sweet clover tops and stalks, burdock pound of resin and 1 pound of fresh butter; simmer until of a proper consistence. A cold water cloth constantly applied is a good remgiving tonics.

5508, To Disinfect and Deodorize Foul Ulcers. Permanganate of potassa of equal parts linseed oil and limewater, and disinfects rapidly the most fetid ulcers, in should be well shaken before using.

the part, resembling, in appearance, gold-the proportion of 2 scruples of the salt to The fetid odor of the bisul- 8 ounces of water as a lotion or injection. phuret is lost in a few seconds. Chloroform, The most favorable method is to cover the wound with lint soaked with that substance, and to place above this a layer of raw cotton, the latter having the property of filtering the air, and to retain the germs which determine putrid fermentation. In cancers of the womb it is necessary to repeat the injections several times a day,

Ulcers in the Mouth. If the 5509. ulcers are not of a syphilitic origin, a local wash of carbolic acid or permanganate of potassa will speedily cure them; say 1 part of acid or permanganate to 100 of water. If Detergents. Deterge means to they are, however, syphilitic, the wash of Detergents remove unwholesome carbolic acid, perhaps 2 or 3 times as strong, in combination with internal treatment, will

Wash them in brandy, and is an injury done to the flesh, from which spely elder leaves, changing twice a day. issues matter, or some kind of discharge, with This will dry up all the sores, though the more or less pain and inflammation. The legs were like a honey-comb. Or, poultice common ulcer should be kept clean and cool, them with rotten apples. But take also a

purge once or twice every week.

upon it a little lint, wet occasionally with mends the use of clay as the most energetic, salt and water, and put over it the black most innocent, simple, and economical of salve. (See No. 4971.) Perhaps the best palliative applications to surfaces yielding most innocent, simple, and economical of palliative applications to surfaces yielding foul and moist discharges. He moreover considers that it has a specific action in accelerating the cure. Clay softened down in water, and freed from all gritty particles, is Sometimes ulcers are very irritable, tender, laid, layer by layer, over the affected part, and painful, and discharge a thin acrid fluid. If it becomes dry and falls off, fresh layers are They should be steamed every night with a applied to the cleansed surface. The irritabitter decoction, and occasionally washed ting secretion is rapidly absorbed by the clay, with an infusion of chamomile flowers, or and the contact of air prevented. The cure a strong decoction of wild cherry bark, with thus goes on rapidly. This clay ointment Apply a poultice of slippery has a decisive action in cases of fetid perspiration of the feet or armpits. A single layer applied in the morning will destroy all odor in the day. It remains a long before, and apply the cancer plaster (see No. time supple, and the pieces which fall off in 5047,) with only a trifle of the white vitriol fine powder produce no inconvenience. mixed with it; or, sprinkle the ulcer with (Brit. Med. Journ.) We can corroborate Dr. Schreber's observations, having used fine clay poultices for several years, chiefly, however, in cases of local inflammation requiring the application of cold. Rags wet in water, or Goulard water, so rapidly become dry and hot that the benefit from the cold application is completely lost. There is no dirt when the clay is enveloped in a piece of fine linen, and is not too fluid in consistence. (Braithwaite.)

5512. Treatment of Burns. In regard to the treatment of burns there is a great diversity of opinion, scarcely any two surgeons leaves, and parsley, a handful of each; get agreeing as to the remedies. All of them are the strength out by boiling; strain, and add 1 doubtless valuable, but there is one which has a great reputation (namely, carron oil, see No. 5513). The great objection to it is its offensive odor, rendering an entire hospiedy. Put a little cerate on the ulcer previously. Attend to the general health by and scalds, it is necessary to observe that, if cleansing the stomach and bowels, and then fever should ensue, laxative medicines ought

to be given; as castor oil, or salts and senna. 5513. Carron Oil. This is composed

Treatment of Recent Burns. When recently inflicted, nothing tends more In cases of scalding the mouth with hot lidecidedly to soothe or deaden the suffering than cold water; the burnt part should, then hold in the mouth a mucilage of slippery therefore, be immediately placed in cold water, or thin cloths dipped in cold water should has been scalded; the slippery elm bark may be applied and frequently renewed over the be mixed with olive oil. Some recommend injured surface. After the lapse of a short soap liniment, but the latter must not be swaltime, when the cold fails to relieve, rags dipped in carron oil (see No. 5513) are to be be applied from the first if it is at hand; but, cold water being nearly always to be had, will be found very grateful until assistance arrives. A large bottle of carron oil should and apply it to the affected part. For very label being affixed to it, with plain directions

Burns. When the burn is very superficial, linen rag, and bind it over lightly. simply inflaming or vesicating the part, covering it up with flour, and then placing a layer of cotton over it, so as to exclude the Scalds. air, makes a very comfortable dressing. Another method consists in applying cold water; and another, warm water covered with oiled silk and a bandage. Glyconine or glycerine varnish (see No. 5491) is also a valuable remedy. Lard, deprived of salt, and simple cerate, make pleasant applications.

5516. Gross' Treatment of Burns. The profession is indebted to Prof. Gross for the introduction of white lead and linseed oil very best applications which can be used, effectually excluding the air, and being always grateful to the patient. In all cases, no matter whether merely the skin or the deeper structures are involved, white lead, magnesia.

5517. Burns and Scalds. Every family should have a preparation of flaxseed oil, chalk, and vinegar, about the consistency of he has used it in hospital and private practice application can compare with it, as regards relief of pain and curative results.

5518. Remedy for Scalding. Apply a in the hip joints are designated sciatica. poultice of slippery elm bark and milk, and, when the inflammation has left, apply black causes of rheumatism are various. Vicissisalve. (See No. 4971.) For very slight burns, the black salve alone will cure. The slippery elm poultice is a sovereign remedy, and has effected the greatest cures. Dr. Beach relates a case of severe scalding, in which a poultice of slippery elm bark and olive oil alone very victims to the complaint. Miners and persoon arrested the inflammation and acute sons employed in smelting furnaces are often sufferings of the patient, to the astonishment severe sufferers. There is likewise a heredof all who witnessed the cure.

*5*519. Remedy for Scalded Mouth. quids, gargle with a solution of borax, and elm, swallowing it slowly, if the throat also lowed.

5520. To Cure Slight Burns. substituted for the water, care being taken burn is only trifling, and causes no blister, it is to keep the rags moist with the oily mixture sufficient to apply a compress of several folds until the burn heals; this is the main point of soft linen upon it, dipped in cold water in in the treatment; the rag or linen must not which has been dissolved a little carbonate of be removed or changed. The carron oil may soda; to be renewed every 15 minutes until the pain is removed. Dr. Tissot says, in cases of blisters, beat up an egg with 2 table-spoonfuls olive oil or linseed oil, spread it on soft linen, be kept in every nursery cupboard, or in slight burns or scalds, the black salve alone is every house, in a place easy of access, a large sufficient to remove the pain and inflammation. (See No. 4971.) If the skn is not broken, cover the part with a layer of flour Treatment of Superficial or starch, place cotton wool over it, or a

blister has been burst or cut, use a cerate.
5521. Carbolic Acid for Burns or The best application in cases of burns or sealds is a mixture of 1 part of carbolic acid to 8 of olive oil. Lint or linen rags are to be saturated in the lotion, and spread smoothly over the burned part, which should then be covered with oiled silk or gutta-percha tissue, to exclude the air. The dressing may be left on from 2 to 3 days, and should then be reapplied, exposing the burn as short a time as possible to the air.

5522. Oil of Brown Paper. Dip a

in the treatment of burns. It is one of the piece of thick brown paper into the best salad oil. Set the paper on fire upon a plate, and the oil that drops from it is a good remedy for burns.

5523. Treatment of Burns and Disdeeper structures are mixed deeper structures are mixed paste or paint, and placed on with a brush, will be found productive of great relief. There does not appear to be any risk from the constitutional influence of the lead, though it has been suggested, to counteract though it has been suggested, to counteract tion was very great, the patient looking more like a mummy than a living being. It entirely above treatment. colorations Caused by Gunpowder. Dr. subsided in a month by the above treatment.

5524. Nature of Rheumatism. Rheumatism is a diseased condition of the fibrous and muscular tissues, chiefly affecting the thick paint, constantly on hand for burns and larger joints; the heart and diaphragm are scalds. A noted retired physician states that also liable to be affected by it. It is a promoting cause of heart disease. The principal for the past forty years, and believes that no forms of rheumatism are these: When the joints about the back and loins are affected the complaint is known as lumbago; pains

> tudes of temperature are the most common; occupying a damp bed for a single night is sufficient to engender the disease. Such persons as blacksmiths, who are exposed to severe changes of temperature, are generally itary tendency to the malady, which a

slight cold will develop. Rheumatism | poison engendered has not yet been fully ascertained. It is generally believed to be lactic acid.

some persons not only describe them as increasing the quantity gradually each day.

quite distinct, but introduce a variety be-

a refreshing saline drink will be beneficial; tervals until the pain and inflammation discold water may be freely allowed, but acid appear. drinks must not be given without consulting juice, while laboring under the paroxysms of rheumatism. By persistent use of the above simple acid for the space of 3 days, avoiding all stimulating liquids, the most confirmed tism. rheumatism will, he says, relax, and the tone for a fe of the muscular and nervous system will be restored to its usual character.

5528. Local Remedies for Rheumatism. Unless anything else is ordered, cotjoints, and covered with oil silk, will be found the stomach will bear it. grateful; a kind of local vapor bath is promay be dipped in a saturated solution of to keep them moist; oiled silk should be ap-

plied round these as well.

Treatment of Chronic Rheumatism. When rheumatism becomes chronic, the general health, particularly the diet in connection with the digestive powers, must be attended to with great care. The attacks often arise from pure debility, and will then be best cured by tonics and good food

5530. Simple Remedy for Rheumatism. Bathe the parts affected with water can be borne, just before going to bed; by the next morning the pain will be much relieved, if not removed. One application of this simple remedy has cured the most obstinate

rheumatic pains.

and intimately mix with the rest. This powder is recommended by Dr. Dover as an effectual remedy for rheumatism. The dose is from 2 to 5 grains, repeated. Avoid much emetic.

5532. Remedy for Rheumatism. proceeds from a vitiated condition of the Take tounce each black cohosh root, golden blood. A hereditary taint in the circulating seal, and nerve powder; 1 pint of rum. Mix. fluid may be developed by a slight cold, but Dose, & table-spoonful 3 times a day. The more commonly the blood becomes vitiated most obstinate cases of rheumatism have

5526. Premonitory Symptoms of dose of tartar emetic (1½ to 2 grains), and Rheumatism. An attack of rheumatism is when this has operated, 5 drops landanum Rheumatism. An attack of rheumatism is when this has operated, 5 drops laudanum imminent when a stiffness is felt in the joints, and 5 drops tincture of colchicum, every 3 combined with a dryness of the skin and a or 4 hours, and a tea-spoonful of a half-pint burning thirst. The variety of the complaint mixture, containing 4 drachms acetate of poof which these signs are the precursors is tassa, every hour. When the patient becomes termed acute. The other variety is chronic very hungry, and is quite free from pain, rheumatism. The latter may be described as having fasted several days, he allows 2 tablean aggravated condition of the former, though spoonfuls of milk or 1 oyster 3 times a day,

tween them.

5527. Treatment of Rheumatism.
In the early stages, when there is much thirst, remedy. The dose should be repeated at in-

5535. Rheumatic Alterative. Macethe doctor, as they may not agree with his rate for 3 or 4 days ½ onnce each colchicum medicines. A correspondent of the Medical seed and black cohosh root, both well bruised, Circular vouches for the relief he has experienced in the liberal use of lime (or lemon) at 1 pint best rye whiskey. A dessert-spoon-rienced in the liberal use of lime (or lemon) at 3 times a day, before meals, has been found a valuable remedy in chronic rheumatism.

5536. Indian Remedy for Rheumasm. Macerate the following ingredients for a few days in 1 quart rye whiskey: 1 ounce bark of wahoo root, 1 ounce blood root, 2 ounces black cohosh root, ½ ounce swamp hellebore, 1 ounce prickly ash bark, and 1 ounce pole root cut fine. Dose, 1 tea-spoonton-wadding wrapped around the swollen ful every 3 or 4 hours, increasing the dose as

5537. Spanish Cure for Chronic and duced by it. If this is not agreeable, rags Syphilitic Rheumatism. Take 4 ounces sarsaparilla, 1 ounce rasped guaiacum wood, nitre in water, and applied, care being taken 2 ounces extract of sarsaparilla, ½ ounce crude antimony. Tie them in a linen rag with 10 drachms English walnut hulls (or black walnut), and boil in 3 pints water down to 2 pints; strain. Dose, a wine-glassful every hour.

5538. Jackson's Cure for Chronic Rheumatism. 1 drachm cajeput oil; ½ ounce syrup of myrrh; 3½ ounces syrup of gum-arabic. Dose, 1 tea-spoonful 3 times a

5539. Caution to Painters. Painters should seldom wash their hands in turpentine, in which potatoes have been boiled, as hot as as the practice, if persisted in, will lead to the most serious results, even to the loss of power in the wrist joints. It has a tendency to enlarge the finger joints, renders the hands more sensitive to cold in winter, and lays the foundation of rheumatism.

der. Ipecacuanha powder, and purified snake-root, 1 drachm; sarsaparma m pomac, opium, of each 1 part; sulphate of potassa, 6 drachms; burdock seed, 2 drachms; poke root, 2 drachms; wine-pine bark, 2 drachms; root, 2 drachms; wine-pine bark, 2 drachms; 5540. Rheumatic Decoction. Virginia cayenne pepper, ½ drachm. Powder them, and add 3 quarts of water. Boil down to 2 quarts. A cupful 2 or 3 times a day. It is most valuable in chronic rheumatism.

5541. Lumbago. It is a species of drinking after taking it, or it might act as an chronic rheumatism, which affects the muscles of the lower part of the back, causing great

pain and stiffness. The patient can scarcely | poultice of powdered hops is very effectual to loins generally. Its attacks are generally by giving aperients, tonics, and nutritious sudden, immediately after or in stooping, or cooling diet. rising from bed. Lumbago is connected with derangement of the stomach, bowels, and kidnevs

5542. Remedy for Lumbago. Rectified oil of turpentine, 25 drops; sulphuric ether, 1 scruple; mucilage of gum-arabic, 3 drachms; syrup of poppies, 1 drachm; rosewater, 11 ounces; make into a draught; take son.

at bed-time.

5543. Remedy for a Weak Back. Take a beef's gall, pour it into 1 pint alcohol,

and bathe frequently.

5544. Remedy for Neuralgia. A remedy said to be efficacious consists in applying bruised horse-radish to the wrist on the

side of the body where the pain is.

5545. Excellent Remedy for Neuralgia. A remedy, which is sometimes instantaneously successful, is mixing equal parts of sweet oil, spirits of hartshorn, and chloroform; shake it well, and before time is allowed for its particles to separate, wet a bit of rag or like granulated honey. Wrap a good coating lint, place it on the painful spot for about a of it round the finger with a cloth. If the lint, place it on the painful spot for about a minute, or less if relieved sooner, but hold a felon is only recent, the pain will be removed handkerchief on the lint, so as to confine the in 6 hours. volatile ingredients; if kept on too long, the skin may be taken off.

5546. Effective Cure for Neuralgia. Apply a blister of Spanish flies, and let it remain until it draws the skin red (not longer); then take it off, and apply a morphine powder.

This is often very effectual.

5547. Jackson's Neuralgia Remedy. Mix 1½ drachms iodide of potassa, 15 grains sulphate of quinine, 1 ounce ginger syrup,

every 3 hours.

5548. Whitlow, or Felon. The severity of the inflammation in whitlow varies considerably; there is the mild form, which generally yields to fomentation with hot water there is a much more formidable affection, in which the deep textures of the finger are involved, accompanied by severe pain, throb-bing, and much redness, heat, and swelling. hear, with the frequent use of sea-bathing, if possible.

This form is only to be relieved by free and

5554. Carbuncle. A carbuncle is a early incisions with the lancet; for if this be neglected, the bones will become affected, and will be destroyed. It would therefore be advisable to submit the finger to the inspection of a surgeon when it does not easily yield to fomentations or a poultice.

Treatment of Whitlow. Steam the whole hand with bitter herbs for 30 or 40 minutes; bathe it frequently in strong hot lye table astringents are catechu, kino, galls, and water. The steaming must not be dispensed oak bark; the principal mineral astringents with. Or: Immerse the diseased finger in are sulphate of iron, nitrate of silver, chloride strong lye as long and as hot as can be borne several times a day. Apply a poultice of lin-seed and slippery elm, with a little salt and brandy. The formation of matter is indicated by a small white spot in the center of regularly, a voin has been wounded, and a the swelling. When this appears, open it string should be bound tightly around below with the point of a large needle or probe, that the wounded part, that is, beyond it from the the matter may escape. Repeat if necessary, heart. If the blood comes out by leaps or If proud flesh appears, apply the vegetable jets, an artery has been severed, and the person

stir without having the most piercing pain. relieve pain. Apply the black salve (see No. It may be confined to one side, or affect the 4971), to heal it. Attend to the general health,

5550. Simple Cure for a Felon. soon as the parts begin to swell get the tinc-ture of lobelia, and wrap the part affected with cloth saturated thoroughly with the tincture, and the felon is dead. An old physician says that he has known it to cure in scores of cases, and it never fails if applied in sea-

Bone Felon. The following re 5551. ceipt for the cure of bone felon is given by that high authority, the London Lancet: As soon as the disease is felt, put directly over the spot a blister of Spanish fly, about the size of the thumb nail, and let it remain for 6 hours, at the expiration of which time, directly under the surface of the blister may be seen the felon, which can be instantly taken out with the point of a needle or a lancet.

5552. To Cure Felons. Stir ½ teaspoonful water into 1 ounce Venice turpentine with a rough stick until the mixture appears

5553. Treatment of Boils. these appear, suppuration should be promoted by poultices of bread and liuseed meal, to which a little glycerine or fat or oil may be added, to prevent their getting hard. poultices are inconvenient, exposure to the vapor of hot water, or the application of stimulating plasters, may be adopted instead. When sufficiently ripe, the boil should be opened with a lancet, the matter evacuated, and 21 ounces water. Dose, a table-spoonful and the wound dressed with a little simple cintment spread on a piece of clean lint or linen. The diet may be full and liberal until the maturation of the tumor and the discharge of the matter, when it should be lessened, and the bowels opened by some saline purgacloths or poultices; and if matter forms, if tives, as salts or cream of tartar. When relieved by the lancet, it speedily heals; but there is a disposition in the constitution to the formation of boils, the bowels should be kept regular, and tonics, as bark or steel, ta-

> species of boil, but larger, and much more painful. It shows debility in the constitution. Carbuncles are very dangerous, and medical

advice should at once be obtained.

5555. Astringents. Substances that constrict the animal fibre, and coagulate albumen. When employed to check bleeding, they are called *styptics*. The principal vegeof zinc, sulphate of copper, acetate of lead, &c.

5556. To Stop Bleeding. If a man is wounded so that blood flows, that flow is either regular or by jets or spirts. If it flows caustic or chloride of potassium, diluted. A may bleed to death in a few minutes; to prethat is, between the wound and the heart. In case a string or cord is not at hand, tie the two opposite corners of a handkerchief around the limb, put a stick between, and turn it round until the handkerchief is twisted sufficiently tight to stop the bleeding, and keep it so until a physician can be had. This appliance is called a tourniquet.

5557. To Stop the Bleeding from Leeches. Make a ball of cotton about the size of a pea; put this pellet of cotton or lint upon the wound; press it down firmly; keep up the pressure for a quarter of an hour. Remove the finger cautiously, taking care to let

5559. Styptic Collodion. This is made by uniting equal parts of collodion and chloride of iron. It is recommended for erysipelas.

5560. Cotton for Stanching Hemorrhage. American cotton of the best quality should solution of soda (about 4 per cent.), then repeatedly washed in cold water, pressed out, and dried. By this process it will be perfectly required, in liquid perchloride of iron, diluted with 1 water, pressed, and thoroughly dried in the air—neither in the sun nor by the fire then lightly pull dout. The cotton so pre-pared will be of a yellowish-brown color. It must be kept very dry, ag it is affected by the damp

Styptic Paper. A mode for carrying about chloride of iron as a ready styptic has been invented in Paris, which consists in dipping paper in a decoction of 1 pound benzoin and 1 pound alum in 4 gallons water, which has been kept boiling for 4 hours, with renewal and skimming. The pauntil saturated; it is then dried, and painted

in an impervious cover.

5562. New Styptic Collodion. Collodion, 100 parts; earbolie acid, 10 parts; pure tannin, 5 parts; benzoic acid, 5 parts. Agitate until the mixture is complete. This preparation, which has a brown color, leaves on evaporation a pellicle exactly similar to that of ordinary collodion. It adheres strongly to the tissues, and effects the instantaneous coagulation of blood and albumen. Tannin effects a consistent coagulation of the blood, whilst benzoic acid has a cicatrizing action on the tissues.

5563. Spitting of Blood. In cases of the stomach, or from the lungs. When the mirable styptic.

vent which, apply the cord above the wound, | blood is of a florid or frothy appearance, and brought up with more or less coughing, preceded by a short tickling cough, a saltish taste, anxiety, and tightness across the chest, its source is the lungs. The blood proceeding from the lungs is usually of a florid color, and mixed with a little frothy mucous only. It may be distinguished from bleeding from the stomach, by its being raised by hacking or coughing, and by its florid and frothy appearance; that from the stomach is vomited in considerable quantities, and is of a dark color.

5564. Treatment for Spitting of Blood. Moderate the discharge of blood by the pellet remain.

5558. Pancoast's Styptic. Take carbonate of potash, 1 drachm; castile soap, 2 drachms; alcohol, 4 ounces. Mix. This styptic has been found preferable to the persulphate of iron in many of the minor cases of hemory. rhage, inasmuch as it leaves the surface of acidulated with lemon-juice), taken cold, and the stump in a healthy condition, and does the patient not suffered to exert his voice. not produce the thick incrustation so often After the operation of a little gentle aperient objectionable after the application of the iron, medicine, as lenitive electuary, or an infusion of senna, with a little cream of tartar dissolved in it, take 10 drops of laudanum and 10 drops of elixir of vitriol in half a cupful of Ehrle's New Preparation of cold water. If there is no cough, the lauda-for Stanching Hemorrhage. num may be omitted. A little salt and water given will often check spitting of blood, when be cleansed by boiling it for an hour in a weak it comes on. Put the feet in warm water, and give as above, the elixir of vitriol, &c. Give also ipecacuanha powder in small doses of from 1 to 2 grains every 4 hours.

cleansed and adapted to more ready absorption. After this it should be steeped once or twice, according to the degree of strength from an impoverished state of the blood. When it occurs in persons of middle age it is more serious, as it is then often a symptom of some other disease. The bleeding can generally be stopped by making the patient raise both his arms above his head, and hold them there for some time. Sponging with cold or iced water to the forehead and face, or applying a towel wet with cold water be-tween the shoulders, will, in most cases, succeed. The application of a strong solution of alum or iron-alum to the inside of the nostrils, pound benzoin and 1 pound alum in 4 gallons or plugging the nostrils with lint or cotton water, which has been kept boiling for 4 wool soaked in the solution, may be necessary hours, with renewal and skimming. The paper is left in the filtered solution for some time sons subject to these attacks should be improved by nutritious diet, animal food, with over with a neutral solution of perchloride of potatoes, water-cresses, and fruit. The foliron; this is then dried, folded, and wrapped lowing prescription may be relied on: Tincture of steel, 2 drachms; dilute muriatic acid, 1 drachm; syrup of orange peel, 1 ounce; infusion of calumba, 7 ounces. Mix. For a child, 1 table-spoonful in a wine-glass of water before meals; for an adult the dose may be

increased. 5566. To Stop Bleeding at the Nose. Placing a small roll of paper or muslin above the front teeth, under the upper lip, and pressing hard on the same, will arrest bleeding from the nose, checking the passage of blood through the arteries leading to the nose.

5567. Astringent for Leech-Bites. spitting of blood, it is often difficult to deter- Dissolve 1 part of crystallized perchloride of mine whether it proceeds from the internal iron in 6 parts of collodion very gradually. surface of the mouth, from the throat, from A drop or two of the product forms an ad-

5568. Antispasmodics. that alley spasms and other pains. Bark, opium, camphor, ether, musk, castor, assafætida, valerian, and chalybeates, are antispasmodics.

5569. Nervines — sometimes neurotics-are substances or agents which relieve disorders of the nerves. Antispasmodics, chalybeates, and vegetable tonics belong

to this class.

Treatment of Nervousness. The cure of nervousness is best effected by restoring the healthy action of the stomach should not be overloaded with indigestible food, and the bowels should be occasionally relieved by the use of some mild aperient. Abernethy's injunction to a nervous and dyspeptic lady, "Dismiss your servants, madam, and make your own beds," should be recollected by all as a proof of the importance that eminent surgeon attached to exercise. lerian is a medicine of great use in nervous disorders, hysteria, lowness of spirits, restlessness, and diseases of the bladder, &c. The common dose is from a scruple to a drachm, in powder; and in infusion from 1 to 2 drachms. Its unpleasant flavor may be neuthere is no remedy for nervous disorders of every kind, comparable to the proper and used to make a perfect solution.

constant use of magnetic electricity.

5571. Nerve Powder. Take 1 ounce each of scullcap, valerian and catnip; and cayenne, 1 drachm; coriander seeds, ½ ounce. Pulverize, and mix. Take 1 tea-spoonful in a cupful of boiling water, leaving room for milk toms. This powder tranquillizes the most irritable nerves without debilitating and deadening their sensibility. It greatly strengthens

the nerves.

tincture of cardamom, ½ ounce; oil of lavender, 8 drops; mint water, 3 ounces; mix, and take in two or three doses. It is inval-

nable.

5573. Nervous Pill. Assafætida, extract of hops, carbonate of ammonia, of each 1 ounce; extract of valerian, 20 grains. Dissolve the first two ingredients over the fire, then take off, and add the others; mix well, and with a few drops of the oil of lavender, and a little powdered liquorice, form into pills. Dose, 1 or 2 once or twice a day. Valuable in all nervous and hysterical dis-

Nervous Tincture. Compound tineture of bark, 2 ounces; ammoniated tineture of valerian, 12 ounces; compound tineture of aloes, & ounce. Mix. Good for general is an excellent remedy weakness, low spirits, and nervous irritability. Two tea-spoonfuls twice a day. (See No. 5570.)

5575. bonate of Ammonia. An excellent remedy arabic, and divide into 20 pills. Dose, 2 each for nervous headache and depression of spirits. hour, commencing 5 hours before the chill Mix 3 drops oil of valerian and 10 grains car-should set in. Then take one night and mornbonate of ammonia with 1½ fluid ounces ing until all are taken. (See No. 5584.)

Medicines | cinnamon water and & fluid ounce syrup. One-half to be taken every 4 hours!

5576. Remedy for Spasms. acetate of morphia, 1 grain; spirit of sal-volatile and sulphuric ether, of each 1 fluid ounce; camphor julep, 4 fluid ounces. Mix. It should be kept closely corked, in a cool place, and should be well shaken before use. Dose, 1 tea-spoonful in a glassful of cold water or

wine, as required.

Hypochondriasis, or Low Hypochondriasis, low spirits, or 5577. Spirits. "blues," is a peculiar state of the mind, acand bowels, and by the use of proper exercise, companied with indigestion. The principal especially in the open air. The stomach objects of treatment are, to remove the indigestion, to strengthen the body, and to enliven the spirits; and one of the best plans with which we are acquainted for this is constant exercise and change of place, with a warm bath about thrice a week; early hours, regular meals, and pleasant conversation; the bowels being at the same time carefully regulated by the occasional use of a mild pill. and the stomach strengthened by some appropriate tonic medicine.

5578. To Dissolve Quinine. Sulphate of quinine (sometimes called simply quinine) when forming a part of a fluid mixture, must be dissolved in sulphuric acid before comtrailized by the addition of mace. Assafestida pounding with the other ingredients. In is also recommended. Take assafestida, 1½ most of the fluid receipts which contain quidrachms; water, 6 fluid ounces. Dose, 1 to nine, a small quantity of the acid is prescribed and the small quantity of the acid is prescribed to t 3 table-spoonfuls thrice or oftener, daily. But solely for this purpose; it should be added to the quinine drop by drop, and only sufficient

5579. Remedy for Fever and Ague. Peruvian bark, 2 ounces; wild-cherry tree bark, 1 ounce; cinnamon, 1 drachm, all pulverized; capsicum, 1 tea-spoonful; sulphur, 1 ounce; port wine, 2 quarts. Let stand a day or two. Always buy the Peruvian bark and and sugar. Repeat according to the symp- pulverize it, as most ready pulverized articles are adulterated. This is the reason why more cures are not performed by it. Dose, a wineglassful every 2 or 3 hours in the day until broken; then 2 or 3 a day until all is used. 5572. Nervous Mixture. Liquid car- This mixture will be found an infallible cure bonate of ammonia, a drachm; compound for intermittent fever and fever and ague. It removes the disease when all other means fail, and may be used by those who object to qui-

> 5580. Cure for Ague. To 5 tea-spoonfuls water, add 50 drops tincture of gelsemi-num and 10 grains quinine. Shake well before using. Administer I tea-spoonful in a wineglass of sugar water every 2 hours. medicine has a tendency to affect the head and vision, and produce physical prostration. When these symptoms become developed, cease the doses, and the effects will pass off, leaving the patient completely restored. These directions must be adhered to, as gelseminum, administered after its effects have become apparent, may be attended with serious consequences. (See No. 5578.) This

5581. Dr. Krieder's Ague Pills. Take 20 grains quinine, 10 grains Dover's powder, Mixture of Valerian and Cariron; mix with molasses or mucilage of gum-

Quinine Mixture for Children. 5582. as above.

5583. Caution in the Use of Quinine. In all cases where quinine is to be administered, first give a cathartic to cleanse the

stomach and bowels.

5584. Ague Mixture. Dissolve 20 grains quinine, mix it with 1 pint diluted gin or ate of iron. Dose, a wine-glass each hour receipt No. 5581, in a liquid form. It may be used when the pills are objectionable.

5585. Remedy for Cold in the Head. Pollion, of France, recommends the inhaling of hartshorn for curing colds in the head. The inhalation by the nose he recommends 7 or 8 times in 5 minutes. Spirits of camphor may be used in the same manner with beneficial

results.

5586. Catarrh. There is perhaps no complaint so common as catarrh, or cold in the head; it occurs both in winter and summer; and it is generally said that a summer cold is more a flicult to get rid of than a winter one. The attack sets in with pains in the limbs and back, lassitude, and a sense of tightness across the forehead, repeated sneezdischarge from the nose; sometimes there is inflammation of the throat and tonsils, and an eraption of vesicles about the lips.

To Cure Catarrh. Remedies without number have been recommended for catarrh, but few are better than the old-fashioned plan-putting the feet into hot water, giving 10 grains of Dover's powder (see No. 5176) a hot drink, and plenty of blankets,

5588. Brown Mixture. Take powdered extract of liquorice and powdered gumarabic, of each 2 drachms; hot water, 4 fluid ounces; mix, and add spirit of nitrous ether, 1 fluid drachm; antimonial wine, 2 fluid drachms; and tincture of opium, 40 minims. A table-spoonful for a dose. This is an excellent remedy in the early stages of catarrh: it is the well-known compound liquorice mixture of the Pharmacopæia.

Flaxseed Tea. 5589. Macerate 1 ounce flaxseed and 1 ounce bruised liquorice root in 1 pint boiling water for 2 hours, in a the evil. It is molightly closed vessel; filter, and add 1 fluid bowels be freely ounce lemon juice. This is a good drink in ment of an attack.

cases of catarrh.

To Relieve a Cough. *5590.* troublesome cough caused by an accumulaof being harmless to the stomach, rather imounce pulverized gum-liquorice; fill the phial pal: nearly full with hot water, and shake thoring solid; shake also before using.

5591. Hay Fever. This very peculiar For small children nothing is better than 5 or disease appears generally as a severe attack of 6 grains dissolved (see No. 5578) quinine in catarrh, with asthmatic symptoms supera 2-ounce vial, 1 table-spoonful of white sugar, added. The lining membrane of the eyes, then fill with water. Dose, 1 table-spoonful nose, throat, and lungs is all more or less affected. The patient suffers from headache, sometimes severe, sneezing, irritation of the nose and throat, with a dry harassing cough. The asthmatic attacks come on generally towards evening, and last from 1 to 3 hours, causing great distress. Hay fever is not a very common complaint, and only atport-wine, and add 10 grains Dover's pow- tacks those persons who, from some peculiardor (see No. 5176), and 10 grains sub-carbon- ity of constitution, are susceptible to the causes producing it. It is supposed to be until the ague is broken, and then 2 or 3 times caused by the inhalation of the pungent a day till the whole has been used. This is aroma of spring grass and hay, but the inhalation of the powder of ipecacuanha will also produce it in certain individuals. In places where the rose is largely cultivated, similar attacks sometimes occur; it is then called rose fever or rose catarrh.

Treatment of Hay 5592. The best treatment for hay fever is change of air, to the sea-side if possible. During the attacks, antispasmodies, such as sal-volatile, ether, or an emetic, if the patient is able to bear it, inhalations of hot steam medicated with creosote, carbolic acid, or turpentine, When the attack will be found useful. passes off the general health should be im-

proved by tonics, diet, &c.

5593. Asthma. This disease is well known. It manifests itself in temporary fits ing, watery and inflamed eyes, and increased of difficult breathing, is accompanied with wheezing, cough, a sense of suffocation, and constriction of the chest. The causes are, hereditary predisposition; cold and moist atmosphere; sudden changes of temperature; intense study; suppression of long accustomed evacuations; certain fevers; irritation of the air cells of the lungs; irritation of the stomach, &c. When this disease is attended with expectoration, it is called humoral asthma; and when there is no discharge it is named dry asthma. It is remarkable that what will excite the disease in one patient will often prove a means of relieving it in another.

> 5594. To Alleviate Asthma. moderating the asthmatic paroxysm, agent is more valuable in many cases than tobacco. A pipe often acts as a charm, and enables the patient to sleep and forget his troubles. In others, the wearing of a gauze veil over the face quite prevents the effects of the evil. It is most important to see that the bowels be freely opened at the commence-

5595. Expectorants. Medicines that promote the secretion of the tracheal and bronchial mueus. According to Dr. Good, tion of phlegm in the throat, especially in the true expectorants are those medicines which morning, experienced mostly by persons rather promote the separation of the viscid affected with chronic catarrh, can be relieved phlegm with which the brouchiæ are loaded, instantly by taking a tea-spoonful of the fol-than simply soften and dilute it; though lowing mixture, which has also the advantage these are also treated as expectorants by many writers. Numerous articles of the maproving the appetite. Put into an 8-ounce teria medica have been denominated expectophial, I cance muriate of ammonia and I rants, of which the following are the princi-Tartarized antimony, ipecacuanha, squills, garlie, assafætida, ammoniaeum, the oughly, to prevent the liquorice from becom-oily resins, the balsams of tolu and Peru, benzoin, styrax, benzoic acid, the fumes of

vinegar, tar, and of many of the volatile oils, exceedingly valuable in deep-seated coughs and the smoke of tobacco and stramonium. and all diseases of the chest. Chlorine and ammoniacal gases have also been called expectorants. Medicines of this class are commonly employed in pulmonary complaints and affections of the air-tubes, at strain. Add ½ pound sugar candy, ½ pound tended by a vitiated state of the mucus, or honey, ½ pound loaf sugar. First boil the an imperfect performance of the natural function horehound in 1 quart water, then add the tions of the secretory vessels. (Cooley.) Of strained linseed and the other articles. Simall classes of the materia medica, none are mer for 2 hours. When cold, add of chloromore uncertain in their action than expectorants. (Pereira.) The act of ejecting matter from the chest is called expectoration.

5596. Bronchitis. An inflammation of the mucous lining of the bronchia, or smaller ramifications of the windpipe. In its milder form it is commonly called a cold on the chest. The usual symptoms are hoarseness, dry cough, a slight degree of fever, followed by expectoration of mucus, at first thin, and afterwards thick and copious. In the severer forms there is more fever, cough, and oppression at the chest, &c. The generality of cases of bronchitis yield to small and repeated doses of ipecacuanha and antimonial diaphoreties, at the same time adopting a light diet, and keeping the bowels open with mild pur-

gatives.

5597. How to Cure a Cold. Dr. G. Johnson, Professor of Medicine in King's College, London, in a recent lecture gives the following cure for a cold: On the whole, the plan which combines the greatest degree of efficiency with universal applicability, consists in the use of a simple hot-air bath, which the patient can have in his own bed-room. All that is required is a tin spirit lamp, with a sufficiently large wick, and holding sufficient spirit to burn for half an hour. patient sits undressed in a chair with a lamp between his feet, rather than under the chair, care being taken to avoid setting fire to the blankets, of which an attendant takes two or three, and folds them around the patient from his neck to the floor, so as to inclose him and the lamp, the hot air from which passes freely around the body. In from a quarter to half an hour there is usually a free perspiration, which may be kept up for a tions, coughs, and difficult breathing. time by getting into bed between hot blankets. Headache, pain in the limbs, and other premonitory indications of a severe cold, may be entirely removed in the course of half an hour by the action of the hot-air bath.

Another simple and efficient mode of exciting the action of the skin consists in wrapping the undressed patient in a sheet wrung out of warm water, then over this folding two or

amus, balm of gilead buds, with pulverized ipecacuanha or lobelia, and balsam of fir, of each
tounce; oil of anise a few drops, to form into
the poppy capsules, of each tounce. Infuse in 3
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tounce; oil of anise a few drops, to form into the poppy capsules, of each tounce. Infuse in 3
tounce; oil of anise a few drops, to form into the poppy capsules, of each tounce. Infuse in 3
tounce, common sized pills. Dose, 1 or 2 pills, 3 or Add a wine-glassful of best rum. A table-4 times daily. Dr. Beach says he endeavored spoonful is a dose. This is a valuable receipt 4 times daily. Dr. Beach says he endeavored spoonful is a dose. This is for more than 25 years to obtain a medicine for cough, hoarseness, &c. to fulfill the indications which are effected in this cough pill, particularly for ordinary colds Make a decoction of the leaves of the pine and coughs; and this admirably answers the intention, excelling all others. It allays the freely, warm, before going to bed, and cold, irritation of the mucus membrane, the bron-through the day. It is a certain cure in a chial tubes, and the lungs, and will be found short time.

5599. To Cure a Troublesome Cough. 2 or 3 table-spoonfuls of linseed, a small bunch of horehound; boil to a jelly, and dyne, 3 table-spoonfuls. Bottle it and cork tight. A small quantity of spirits of wire or brandy to keep it. When the cough is troublesome, take a table-spoonful. This is an excellent remedy.

5600. Pulmonary Syrup. Blood-root, boneset, slippery elm bark, coltsfoot, elecampane, of each 2 ounces; white root, spikenard root, of each 4 ounces; comfrey root, poplar bark, of each 1 ounce; lobelia, horehound. snake-root, of each 1 ounce. Pour upon them 2 quarts of boiling water; stir well, add 1 pound molasses, and, when cool, 1 quart Holland gin. It is one of the best remedies for asthma, coughs, hoarseness, &c. A table-spoonful every hour, or a wine-glassful 3

times a day.

Pulmonary Balsam. 5601. hound plant, comfrey root, blood root, elecampane root, wild cherry bark, spikenard root, penny-royal plant, of each 4 ounces. Pour 3 quarts boiling water upon them; infuse for 3 hours; then heat the water again, and pour it upon the plants to infuse 5 or 6 hours. Sweeten with sugar candy. It is very serviceable in diseases of the lungs, chronic coughs; it removes constriction of the chest by promoting expectoration. Take half a small tea-cupful 3 or 4 times a day, or oftener if necessary

Blood-Root Syrup. 5602. blood-root, 21 ounces; lobelia, 1 ounce; white sugar, 1½ ounces; water, 1½ pints; gently simmer half an hour, till it thickens; when cool, add a tea-spoonful of paregoric elixir. Take a table-spoonful occasionally; for a child, a tea-spoonful or less. This syrup is very valuable in chest complaints, bronchial affec-

5603. Cough Syrup. Tincture of lobelia, 1 ounce; Iceland moss, 2 ounces; white poppy capsules, bruised, 2 ounces; pearl barley, 2 table-spoonfuls; water, 2 quarts; molasses, 2 ounces. Boil down to 3 pints, and strain. Dissolve in it from 4 to 8 ounces of sugar candy. It effectually allays a tickling cough. A table-spoonful when the cough is troublesome. It does not constipate, like

three blankets. The patient may remain laudanum and paregoric.
thus packed for an hour or two, until free perspiration has been excited.

5604. Cough Remedy. Take lobelia herb, horehound, boneset, of each 1 ounce; comfrey root, spikenard, St. Johns' wort,

5605. To Cure a Cold with a Cough. tree, and sweeten with loaf sugar. Drink it

ture of cubebs and 20 drops liquid carbolic tendency to it. acid. Add the mixture to 1 pint hot water in an inhaler, and use every 3 or 4 hours, taking blood-root, 1 ounce an issued, and 1 ounce

of morphia, ½ grain; glycerine, 2 fluid ounces. Mix. Dose, a tea-spoonful when the cough is

troublesome.

5608. Treatment for Ulcerated Sore root, taken 2 or 3 times a day, afford great Chlorate of potassa, in cases of Throat. putrid ulcerated sore throat, has been used with the most decisive success. Its internal abates fever than any other medicine; and, when applied as a gargle to inflamed or ulcerated sore throats, it has been found to disperse tion inhale 4 or 5 whiffs as many times a day. the inflammation and cleanse the ulcers more effectually than the infusion of rose-leaves with sulphuric acid, the gargle generally resorted to in those cases. The chlorate of po-

Sore Throat. Mix together 2 grains corrosive sublimate; 1 ounce rectified spirits of wine; 3 ounces tincture of Peruvian bark, and 5 drops of the above on a lump of loaf sugar 1 ounce each honey of roses and tineture of every two hours will be found invaluable.

myrrh.

tincture of belladonna and tincture of nuxvomica; 3 drachms each antimonial wine and of balsam of tolu. A tea-spoonful 4 times a ness, loss of voice, and asthma. day relieves chronic or hacking cough.

5611. Hope's Cough Mixture. 2 ounces ammonia mixture; 5 ounces camphor mixture; 1 drachm tineture of digitalis (foxglove); 1 ounce each sweet spirits of nitre

It seems at first sight as superfluous to state acid loses its efficacy, the dose may be inthat in a disease of debility like consumption, patients should breathe pure air, as that they should have good nourishing food, but it is not so. Theoretically, the value of pure air is accepted; but practically it is universally neglected. Healthful respiration has yet to be applied not only to every-day life, but in the treatment of disease. In ill health, and particularly diseases of the respiratory organs, the dictates of science and common sense are grossly outraged. If those persons who have consumption, or who have an inclination to it, would spend an hour every day in breathing pure air to the fullest extent to which their lungs are capable of taking it in, they would do more to prevent and cure this disease than it is possible to do by medication.
5613. Inhalation of Tar for Cons

5613. Inhalation of Tar for Consumption. Mix together 16 ounces liquid tar and 1 fluid ounce liquor of potassa; boil them for paregoric elixir, 1 ounce syrup of squills, and a few minutes in the open air; then let it sim- 2 drachms antimonial wine, with 6 ounces mer gently in an iron vessel over a spirit or water. A tea-spoonful every 15 minutes until other lamp in the chamber of the patient. relieved.

5606. Inhalation of Cubebs and Car-| This may, at first, excite a disposition to cough. bolic Acid. Mix together \frac{1}{2} fluid ounce tine- but in a short time allays it, and removes any

full respirations. A very efficient remedy in liquorice boiled in 2 pints water down to a pint, and then mixed with 4 ounces honey. 5607. Cough Mixture. Take muriate This is highly recommended in consumptive cases attended with dyspeptic symptoms.

5615. Blood-root for Consumption. 25 to 40 drops saturated tincture of blood-

relief.

5616. Cigars for Pulmonary Consumption. Dissolve 1 part arseniate of soda application more effectually allays thirst and in 30 parts water. Dip white unsized paper into the solution and form into small rolls. 3 or 4 inches long. In pulmonary consump-

5617. Goddard's Cure for Loss of Voice. Wet bibuious paper with a solution of 1 part arsenite of potash in 25 parts water; dry and roll strips of 3 inches by 1 inch into tassa may be given in the dose of from 20 to cigarettes. The smoke to be inhaled, 8 or 10 30 grains in a half glass of water, 3 or 4 times inspirations, 3 times a day. In connection a day. For the purpose of gargling the with this use 14 grain ammoniated mercury throat, 4 drachms of the chlorate may be mixed with 10 drachms powdered sugar, apadded to ½ pint of water. (See No. 5637.) ply a little to the throat with the e finger. This is an excellent remedy. ply a little to the throat with the end of the

5619. Cigars for Hoarseness, Asthma, 5610. Atlee's Cough Mixture. 2 &c. Soak thick unsized paper in a solution grains acetate of morphia; 1 drachm each of saltpetre, and dry. Then brush over with tincture of cascarilla; and, when nearly dry, with compound tincture of benzoin. In about syrup of ipecacuanha root; 1 ounce fluid ex- half an hour, cut it into pieces 12 by 4 inches, tract of wild cherry bark, and 2 ounces syrup and roll into cigarettes. Excellent for hoarse-

> 5620. Remedy for a Sudden Hoarseness. Mix 1 tea-spoonful of sweet spirits of nitre in a wine-glassful of water. This may

be taken 2 or 3 times a day

5621. To Prevent Hoarseness. and syrup of poppies; 2 drachms solution of celebrated singer states that the greatest sulphate of morphia. A table-spoonful of benefit is derivable from taking, during 5 or 6 this mixture is to be taken 4 times a day.

5612. Treatment of Consumption. celebrated singer states that the greatest

creased to 10 or 12 drops.

5622. Snuffles. A troublesome complaint, to infants especially. The mucous membrane of the nose, through the taking of cold, being much swollen, the child is no longer able to breathe through its nose, as it was accustomed to do, but is compelled to breathe through the mouth. The difficult breathings are attended by a peculiar snuffling noise, which, in sleep, becomes a regular loud snore. It often interferes with its sucking at the breast; as soon as it seizes the nipple a threatening suffocation compels it to desist. While this complaint lasts the child may be partially fed with the spoon; give it a very mild purgative; bathe its legs frequently in warm water. Rub the nose with tallow, and apply

5624 lief is often obtained by smoking a pipe of severe cases 3 to 5 drops on a lump of sugar tobacco. To a person unaccustomed to smoking, a pipe of latakia, or other mild description of tobacco; this soon produces exhaustion, while, directly the feeling of nausea comes on, the attack ceases. This remedy is often very useful in preventing an attack when one is impending. Stronger tobacco should be used by inveterate smokers. fumes of burning filtering or blotting-paper, which has been soaked in a saturated solution of nitre, and dried, afford much relief in some cases (see No. 5619); and, lastly, there are instances where palliation is soonest obtained from a stimulant, as a glass of whiskey or brandy toddy, or a cup of very strong coffee. A mustard poultice over the front of the chest is often effective. Sometimes an attack may be arrested by taking off the patient's coat and vest, and exposing his back to the heat of a good fire. (See No. 5764.)

5625. Croup. This is a dangerous

5625. Croup. This is a dangerous disease. It is common to infancy, and rarely occurs to adults. It is an inflammation of the larynx, trachea, and contiguous tissues. It derives its name from the peculiar sound of the voice and breathing, being of a whistling or crowing character, owing to a contraction of the glottis. It generally commences with a common cold and catarrh, hoarseness, cough, and increased difficulty of breathing, and the crowing already spoken of. It de-

mands prompt treatment.

5626. Treatment of Croup. The great object is to diminish the inflammation and irritation, and to relax the spasmodic state of the muscles in the parts diseased. The vessels in those parts are overcharged with blood, by an imperfect action of the exhalants. Place the feet in warm water, and give an emetic. (See No. 5169.) After bathing, rub the legs and feet well with flanuel. Then give a vapor bath, if the patient can bear it. Repeat the process, if needful. The perspiraspoonful of cayenne pepper, nearly a cupful of vinegar; simmer 10 minutes, and strain. This tincture may be diluted with warm water, according to the strength of the patient. Rub it well on the throat for 5 or 10 minutes; and next saturate a flannel with it, and apply it to the throat. This application tends to relieve the internally congested Repeat the application as blood-vessels. necessary. Mustard plasters may be applied to the feet, the upper part of the chest, and between the shoulders alternately. Even a large sponge dipped in as hot water as the ber of attacks varies from 1 or 2 to 10, or even hand can bear, squeezed half dry, and re- 15 in the 24 hours, according to the severity, newed before it is cool, is of great advantage. of the disease. The child should be kept in a It has been recommended to steep hops in hot vinegar, and the patient to inhale the nel; his diet should be light and nourishing, vapor. Keep the atmosphere of the room such as fish, milk, light puddings, and new-laid

Treatment of Asthma. Re- | nel on the throat and chest, and in very may be taken inwardly. Every family should have a bottle of turpentine on hand.

5628. To Prevent a Return of Croup. To prevent a return of this disorder, keep the child warm, avoid wet feet, cold, damp, easterly winds, &c. Children whose constitutions dispose them to croup ought to have their diet properly regulated, and be kept from all crude, raw, and trashy fruits.

5629. Mumps. This is a specific contagious inflammatory affection of the salivary glands, especially the largest, situated below the ear. It begins with slight feverish symptoms, with pain and swelling, extending from beneath the ear along the neck to the chin. The attack generally reaches its height in 4 days and then declines. The treatment is very simple—a mild diet, gentle laxatives, occasional hot fomentations, and wearing a

piece of flannel around the throat.

5630. Quinsy. Inflammation of the tonsils, or common inflammatory sore throat, commences with a slight feverish attack, with considerable pain and swelling of the tonsils, causing some difficulty in swallowing; as the attack advances these symptoms become more intense, there is headache, thirst, a painful sense of tension, and acute darting pains in the ears. The attack is generally brought on by exposure to cold, and lasts from 5 to 7 days, when it subsides naturally, or an abscess may form in the tonsil and burst, or the tonsil may remain enlarged, the inflammation

subsiding.

5631. Treatment of Quinsy. patient should remain in a warm room, the diet chiefly milk and good broths, some cooling laxative and diaphoretic medicine may be given; but the greatest relief will be found in the frequent inhalation of the steam of hot water through an inhaler, or in the old-fashioned way, through the spout of a teapot. Relief will also be experienced from the foltion will be greater by applying to the feet lowing treatment: Roast 3 or 4 large onions. and each side hot bricks, and wrapped in Peel them quickly, and beat them flat with a flannel saturated with vinegar and a little rolling-pin. Immediately place them in a water. At the same time give an aperient, thin muslin bag that will reach from ear to to produce a free action on the bowels. Apply it ply this tincture to the throat, viz.: \(\frac{1}{2}\) testing the same approach to the throat. Keep it on day and night, changing it when the strength of the onion appears to be exhausted, and substituting fresh ones. Flannel must be worn around the neck after the poultice is removed.

5632. Whooping Treatment of Cough. The attack generally begins as a common cold, with slight feverish symptoms. In 8 or 10 days the fever partially subsides, and the child gets attacks of convulsive coughing, accompanied by the peculiar whoop which gives the disease its name. The numat a regular temperature. Aid the perspiration by warm drinks, as balm tea, &c.

5627. Remedy for Croup. Turpentine drocyanic acid, 6 drops; extract of belladonna, is a sovereign remedy for croup. Saturate 2 grains; paregoric elixir, 3 drachms; syrup a piece of flannel with it, and place the flances. Mix. 1 tea-spoonful 3 or 4 times daily. | mode of treatment. The false membranes When the severity of the disease has passed are first freely cauterized with lunar caustic, off, change of air will be found most useful; and injections then made every hour against and if the child has become debilitated, tonics, the fauces with a solution of common salt, with nutritious diet, should be given. This the strength of the solution being such as not disease being very infectious, great care to create nausea. Chlorate of potassa may be should be taken to prevent communication of also given internally; and tincture of iodine any kind with houses where there are children as a local application; but M. Roche considers who have not already had whooping-cough.

5633. Syrup for Whooping-Cough. mon salt are the chief agents in the case. Onions and garlies, sliced, of each 1 gill; stew them in 1 gill sweet oil, in a covered dish, to tack is severe, and confinement to the house

5634. Atlee's Cure for WhoopingCough. Take I drachm each powdered cochineal and strong aqua-ammonia; 1 ounce rectified spirits of wine. Mix. Dose for a child one year old, 10 drops in sweetened described worms. Among the principal and the latest a child one year old, 10 drops in sweetened described worms. Among the principal and the latest areas a child one year old.

water 3 times a day.

5635. Cure for Whooping Cough. Pure carbonate of potassa, 1 scruple; coch-

5636. Treatment of Diphtheria. Make two small bags to reach from ear to 5636. ear, and fill them with wood-ashes and salt; dip them in hot water, and wring them out the throat, to prevent blistering. hot water, and when cool, add ‡ as much slow fever. cider vinegar, and gargle every 15 minutes, 5643.

5637. Remedy for Diphtheria. Fermanganate of potassa has been administered with great success in cases of diphtheria. hour before each meal; if it purges too her; The proportions used for external use are 1 ter; the dose for internal use, 1 tea-spoonful of a solution of 1 drachm in 1½ pints water. (U. S. Dis.)

5638. Remedy for Diphtheria. A gentleman who has administered the following remedy for diphtheria, says that it has always proved effectual: Take a tobaccopipe, place a live coal in the bowl, drop a little tar upon the coal, and let the patient draw smoke into the mouth, and disc arge it through the nostrils. The remedy is safe and simple simple.

that the irrigations with the solution of com-

obtain the juices; then strain and add honey, or bed, with wrapping up of the neek with 1 gill; paregoric and spirits of camphor, of cotton-wadding or flaunel, together with ateach 1 ounce; bottle and cork tight for use. tention to the state of the digestive powers, Dose, for a child of 2 or 3 years, 1 tea, spoonful is necessary. The diet in these cases must be 3 or 4 times daily, or whenever the cough is regulated, and an aperient, such as the lenitroublesome, increasing or lessening, accorditive electuary (see No. 5154), or easter oil, taken if required by the state of the bowels.

thelminties are santonin (worm-seed), calomel, tin powder, castor oil, oil of turpentine, Pure carbonate of potassa, 1 scruple; cochineal, 1 grain; dissolve in 6 ounces of water A good plan for removing worms from chilsweetened with sugar. Dose for a child four years old, I tea-spoonful 3 times a day, to be taken before meals. This is an excellent next morning. The motions should be observed, and if worms be found, the same treatment may be followed once a week, un-

til they are wholly removed.

5642. Worms. The worms found in the human body are mostly the ascarides, the Worms. so that they will not drip, and apply them to thread worm, infesting the lower intestine, the throat; cover up the whole with a flaunel cloth, and change them as often as they become cool, until the throat becomes irritated, generally seated in the small intestines, and near blistering. For children it is necessary stomach. The symptoms denoting the exto put flannel cloths between the ashes and istence of worms are common to the different When the species, viz.: indigestion, with a variable ashes have been on a sufficient time, take a appetite; foul tongue; offensive breath; hard, wet flannel cloth and rub it with castile soap full, and tense belly, with occasional gripings until it is covered with a thick lather; dip it and pains about the navel; heat and itching in hot water, and apply it to the throat, and sensation in the rectum and about the anus; change as they cool; at the same time use a the eyes heavy and dull; itching of the nose; gargle made of 1 tea-spoonful each of cayenne short dry cough; grinding of the teeth; and pepper, salt, and molasses, in a tea-cupful of starting during sleep, attended often with a

Dr. Freeman's Vermifuge until the patient requires sleep. A gargle of the time.

Oil. Oil of worm-seed, 1 ounce; oil of turnent of the time.

Oil. Oil of worm-seed, 2 ounce; oil of turnent of the time. of peppermint, ½ ounce. Dose, for a chile M years old, a tea-spoonful 3 times 3 give it less often. This is an excellent verdrachin of the permanganate to a pint of wa- mifuge, and never fails to expel worms when administered for that purpose. Where no worms are present, it answers the purpose of a tonic, correcting the condition of the mucous

vessel; when cool, add ½ pint molasses and 5639. Roche's Remedy for Diphthe- a table-spoonful brandy. Dose for a child 1 ria. M. Roche recommends the following year old, 2 tea-spoonfuls 3 times a day. grains santonin; 2 grains powdered gamboge; is, to eat nothing but common rice, parched 3 grains calomel; and 12 grains powdered like coffee, and then boiled, and taken with a white sugar. Make into 6 powders. Give 1 little salt and butter. Drink little or no liquid powder 3 times a day for a child one year old, of any kind. Bits of ice may be eaten and

1 tea-spoonful night and morning.

5647. A Simple and Safe Vermifuge. Powdered rust of iron is a good vermifuge. than this simple preparation of iron. should always be followed by an aperient.

Ethereal extract loose evacuation. Worm Pills. of male-fern, 30 drops; extract of dandelion, 1 drachm; powdered gum enough to make 30

tape-worm. 2 or 3 drachm. of the powdered 1 tea-spoonful in a little warm water sweetenroot to be taken in the morning, no supper having been taken the night before. It generally sickens a little. A brisk purgative is to be given a few hours after, which some-together 2½ fluid drachms each chlorodyne and times brings off the worm entire; if not, the rectified spirit; add 1 fluid cunce syrup, and same course must be followed at due inter-For the success of this remedy, the root should be recently gathered; as, after being kept long in the stores, its activity is 1 to 2 table-spoonfuls in diarrhea, cholera, &c. diminished or destroyed.

5650. Dowler's Treatment of Tape-Worm. Dr. Dowler expelled a tape-worm 135 feet long by prescribing the continued use of eim-bark. He ordered the bark to be chewed and swallowed in moderate quan-

5651. Eeach's Treatment of Tape-Dr. Beach effectually cured a patient who had been tormented with a tapeworm for 25 years. His treatment was as fine common salt. This treatment is to be table-spoonful 3 times a day. continued until the tape-worm is killed or so cellent remedy. sickened that it will lose its hold on the bowels, when it will be expelled entire. once the tape-worm begins to pass the bowels, care must be taken not to break it off, for it will then grow again; it has this peculiar property.

5652. Diarrhea. The following excel-lent remarks on this disease are extracted It may be well for travelers to know that the first, the most important, and the most indis-

5645. Remedy for Worms. Take 6 disinclining us to locomotion. The next thing and a dose of castor oil the day after taking swallowed at will. Every step taken in diarthe powders.

Thea, every spoonful of liquid only aggratuates.

Thea, every spoonful of liquid only aggratuates the disease. If locomotion is compulsively aggratuates the disease. ounces caster oil, and 10 drops oil of anise; lessened by having a stout piece of woolen mix them together, and add 1 fluid ounce flamed bound tightly round the abdomen, so aromatic syrup of rhubarb. Shake well as to be doubled in front, and kent well in its Take 15 fluid drachms oil of worm-seed, 3 sory, the misfortune of the necessity may be before using. Dose for a child of 2 years, place. In the practice of many years, we have never failed to notice a gratifying result to follow these observances.

5653. Velpeau's Remedy for Diar-It expels the worms and strengthens the con- rhea and Cholera Morbus. Take 1 ounce stitution. To a child 6 years old from 10 to each tineture of opium, paregoric clixir, and 40 grains may be given. An adult may take tineture of rhubarb; 10 drachms essence of I ounce or more. It may be given in mo-peppermint; and 6 drachms tincture of caplasses or in beer. Dr. Rush says that he sicum. This is the original receipt for this knows of no safer and more certain remedy celebrated remedy. Dose for an adult, a traspoonful in & a wine-glass sweetened water; and, if required, half a dose after each

5654. Diarrhea Tincture. Compound tineture of myrrh, 6 ounces; tineture of rhupills. Dose, from 6 to 20; followed half an hour later by a strong dose of castor oil.

5649. Tape-Worm. The common anise and cinnamon, with gum camphor and male-fern root is a certain remedy for the tartaric acid, of each to ounce. Mix. Dose, ed with loaf sugar; repeat after each passage. This is a magic remedy.

shake again well; then add a little at a time, with brisk agitation, 4 fluid ounces distilled water and 3 fluid drachms mucilage. Dose,

Shake well before using.
5656. Goddard's Diarrhea Remedy. Dr. Paul Goddard gives the following remedy Take ½ ounce tincture of catechu, 2 drachms each tincture of opium and tincture of camphor, and 1 drachin aromatic spirits of ammonia. 40 drops every hour will afford speedy relief.

5657. Remedy for Diarrhea. Tincture of opium, spirits of camphor, essence of peppermint, ethereal tincture of capiscum, of follows: Cowhage stripped from the pod, a small tea-spoonful 3 times a day; to be taken, trailizing cordial, 2 ounces (see No. 5633); fasting, in a little arrow-root jelly; then occasionally a purgative of mandrake. In connection with this, eat freely of garlic and if the case is urgent. In dysentery give 1 fine common salt. This treatment is to be taken the trailed and the case is urgent. In dysentery give 1 This is an ex-

5658. Blackberry Cordial. To 1 quart When blackberry juice, add I pound white sugar, 1 table-spoonful each cloves, allspice, cinnamon, and nutmeg. Boil all together 15 minutes, add a wine-glass of whiskey, brandy, or rum. Bottle while hot, cork tight and seal. This is almost a specific in diarrhea. Dose is I wine-glassful for an adult, half that quantifrom Dr. Hall's Journal of Health: Cholera ty for a child; will often cure diarrhea. It is nothing more than exaggerated diarrhea. can be taken 3 or 4 times a day if the case is severe.

5659. Remedy for Summer Compensable item in the arrest and cure of loose ness of the bowels, is absolute quiet on a flower, roasted like coffee berries, is an adbed; nature herself always prompts is by

complaint. I pint of the seed is sufficient | merely to gargle the throat; a very small It should be remembered, however, that serious results often follow the too sudden stoppage of diarrhea by astringents, and with this, little water of gum-arabic may be allowed a

5660. Remedy for Bilious Diarrhea. Infuse & ounce Angostura bark for 2 hours in 1 pint boiling water, and strain; is a remedy for bilious diarrhea, especially in southern lati-

tudes

5861. Treatment of Diarrhea in Infants. Dr. Smith recommends the following prescriptions, if the bowels are rather loose, with dark, slimy, offensive stools. Tincture of opium, 8 minims; castor oil, 1 drachm; tion, this combination of castor-oil with laud-

anum is very valuable. (Med. News.) 5662. Treatment of Cholera. following excellent directions are given for preventive is also corroborated by other wellthe treatment of cholera by Dr. Pratt: For authenticated evidence, the stage of diarrhea. This may come on 5666. Neutralization the stage of diarrhea. This may come on insidiously, painless, and hence not alarming dered rhubarb, 3 scruples; saleratus, or but should be met promptly. The remedy is crude bicarbonate of potash, 3 scruples; powthe cholera mixture, so called, consisting of equal parts of laudanum, tincture of rhubarb, and spirits of camphor. Begin with 30 drops, aken clear and unmixed, with a little sugar placed in the mouth afterward. Repeat the dose after every evacuation, increasing it if the case becomes urgent to 60 drops (a teaspoonful), or 90 drops if necessary. If the diarrhea is not controlled by this means, an injection of from 30 to 90 drops laudanum, in a table-spoonful of starch, will prove a valuable help. This may be often repeated. If the diarrhea ceases, do not entirely intermit the medicine, but give in gradually diminished doses, every 1 or 2 hours, for a period of 12 or even 24 hours.

5663. Treatment for the Vomiting Dr. Pratt's remedy is laudanum, tincture of capsicum, tincture of ginger, and tineture of cardamom seeds, equal parts; to be given from 40 to 60 drops undiluted, and followed by sugar, after every fit of vomiting; taking care to give it as soon as the fit ceases, when it will be more likely to be retained. An excellent assistant to this is a large mustard poultice applied to the abdomen.

5664. Treatment for the Stage of Malignancy. According to Dr. Pratt, the only remedy is stimulants, especially brandy, which must be given with great freedom, from 2 to 4 tea-spoonfuls every half or even always to be given undiluted. Alcohol, or other spirits, will answer the purpose, if to combine with this, artificial heat, bottles followed by the free use of ice-cold water. of hot water to the body and extremities, second dose ½ an hour after is generally suf friction of the limbs (which no one need fear

quantity, swallowed, will bring on the diarrhea after it has been stopped for hours. as all remedies of a similar nature, caution tea-spoonful at a time; or, perhaps, lumps of should be used.

The page of that needs of a similar nature, caution tea-spoonful at a time; or, perhaps, lumps of ice might be taken with safety. For the typhoid fever, which often follows an attack. chamomile or sage tea, and diaphoretic (sce No. 5134) treatment, will be all that is needed, beside a moderate use of stimulants, for convalescence

5665. Cholera Preventive. gundy-pitch plaster worn over the region of the stomach during the prevalence of the disease. It should be warmed a little before it is put on, the person standing erect when syrup of ginger and mucilage of acacia, each it is applied, so that the plaster shall not in-1 ounce. A tea-spoonful 3 times daily. In terfere with the motions of the body. It is the screaming fits, accompanied by constipations asserted that a British regiment supplied with such plasters lost only five men during a severe visitation of cholera, and these had The refused to wear then. The efficacy of this

dered peppermint plant, 3 scruples; boiling water, 2 pint; decoction of aniseed, 2 pint. Mix. Strain, sweeten with sugar, and add 3 table-spoonfuls of brandy. Take 1 or 2 table-spoonfuls as often as the symptoms require it. For children, a less dose. Very valuable in cholera, bowel complaints of chil-

dren, laxity of the bowels, flux, &c. 5667. Spackman's Cholera Mixture. Take 1 ounce gum camphor; 2 ounces gum kino; ½ ounce gum catechu; 2 ounces ground cinnamon; 1 ounce ground cloves; 2 drachms African capsicums. Moisten these with brandy and digest for 48 hours. Displace (see No. 41) 18 ounces; then add 20 drachms tineture of opium and 1 ounce chloroform. Dose for an adult, 60 drops after

everv passage

5668. Brown's Cholera Mixture. Mix together 1 ounce essence of Jamaica ginger; 2 ounces each camphorated tincture of opium and aromatic spirits of ammonia; and 1 ounce spirits of camphor. Dose, a teaspoonful every hour.

5669. Troth's Cholera Mixture. Digest for 10 days 1 ounce each opium, camphor, oil of cloves, and African capsicums, in 1 pint Hoffman's anodyne (see No. 4749);

administer 20 to 40 drops every 2 hours. 5670. Austrian Cholera Specific. Take 20 grains sulphuric acid specific gravity quarter hour, till heat returns, and pulse and [1.500; 15 grains each sugar and gum; dissensibility of extremities are restored. It is tilled water sufficient to make the whole weigh exactly 1 ounce. 1 table-spoonful of the above mixture is to be taken in water on brandy is not to be had. It will be necessary the first appearance of premonitory symptoms, second dose ½ an hour after is generally sufficient to arrest the disease, but occasionally 4 to apply), and mustard, perhaps, to the feet or 5 doses are required. A table-spoonful in and hands, stomach and limbs. Remember a pint of cold water may afterwards be drunk that boldness, to the verge of rashness, is better than excess of caution, and that no dan-double doses are to be given, and repeated ger is to be apprehended from any of these after every attack of vomiting, until the sick-remedies so long as the symptoms for which ness and cramp abate. After which, the doses they are given are uncontrolled. The use of are to be repeated until 5 or 6 doses are recold water must be strictly forbidden, except tained by the stomach. Quiet sleep or drowsiness should not be interfered with. the warmth of the body returns. The use of meal, and before retiring to bed. It is an alwarm drinks, wine, spirits, &c., are to be most infallible cure. carefully avoided as so much poison. The above was adopted by the Austrian Govern- The following simple remedy has been known ment in 1849, after 18 years' successful trial. to cure the most obstinate and malignant

of sugar 2 or 3 times a day

receipt every 10 or 15 minutes, followed by draughts of ice-cold water until the symp-

toms abate.

5673. Use of Calomel in Cholera. should start for home in a vehicle instantly, calling on his physician on his way, and take immediately, get into bed as soon as possible, dress up warm, eat ice if thirsty, bind a thick warm flannel tightly around the abdomen, attack, but when it is impossible to procure a means of stopping the discharges, and of spoonful of the solution. All these are taken thus arresting the disease, until the physician in water. arrives. Calomel is generally easy to be procured, will remain on the stomach, from its heaviness, when even cold water is ejected as

phor, with essence of peppermint, equal parts of each, and each as strong as can be made. timely use of this valuable medicine.

5675. Treatment of Dysentery. A slight attack will often yield to the employment of a dose of castor oil; warm fomenta- ner with your brows knit, and your mind tions or mustard poultices being applied over absorbed in casting up interest accounts. the belly; the patient being confined to bed, Never abridge the usual hours of sleep. Take the belly; the patient being confined to bed, Never abridge the usual hours of sleep. Take and only allowed to partake of food the most more or less of exercise in the open air every if requisite), thin broths, &c. Perfect rest in the horizontal posture is almost essential. time if the patient feels faint, will often give live on ryo broad or oat meal porridge; a great relief. Stimulants should be forbidden reasonable quantity of nutritious food is esin mild cases; but where the patient is besential to the mind as well as the body. as the best stimulant in these cases, may be strictly observed.

Early treatment is most important in dysentery, and therefore the medical man should be sent for without loss of time, in case the best stimulant in these cases, may be If you have any treatises on dyspepsia, given in beef-tea, or alone. And the rule of domestic medicines, etc., put them directly out of your reach. If you are constantly talking and thinking about dyspepsia, you tery, and therefore the medical man should be will surely have it. Endeavor to forget that sent for without loss of time, in case the you have a stomach. Keep a clear conscience; simple means recommended are ineffectual.

In diseases of this kind, the Indians use the other things.

The root and leaves of the blackberry bush, a defree use of cold water or acidulated water is coction of which in hot water, well boiled to be allowed until perspiration sets in and down, is taken in doses of a gill before each

5677. Simple Remedy for Dysentery. 5671. Homeopathic Cholera Pre- forms of dysentery when all the ordinary ventive. Dissolve 1 drachm camphor in 6 methods were ineffectual: Take hot water, 1 drachms rectified spirit, and preserve it in a gill; vinegar, ½ pint; mix; then continue to well-corked bottle. Dose, 2 drops on a lump add common salt as long as it will be dissolved, stirring and irritating it freely and frequently. 5672. Homeopathic Cholera Remedy. Give for an adult 1 table-spoonful every hour Repeat the dose of the mixture in foregoing until the bloody discharges cease, or until it operates freely on the bowels. The patient

must remain in bed.

5678. Antacids. Medicines that neutralize the acid of the stomach, and thus tend When cholera is prevailing, a single large, to remove heartburn, dyspepsia, and diarrhea. thin, painless weakening action of the bowels. The principal antacids are the carbonates of may be cholera begun, and the business man potassa, soda, ammonia, lime, and magnesia. Ammonia is the most powerful, and when the acidity is conjoined with nausea and fainthim home with him; or, if he cannot be found ness, is the best; when great irritability of the coats of the stomach exist, potash is preferable; when accompanied with diarrhea, carbonate of lime (prepared chalk); and and wait for his doctor's arrival. A physician when with costiveness, magnesia. The dose should be called always on the instant of an of the carbonates of potassa and soda in powder is half a tea-spoonful; of chalk, a teahis services within an hour, 10 or 20 grains of spoonful; of magnesia, a dessert-spoonful; and calomel should be taken in pill or powder, as of carbonate of ammonia, 10 grains, or a tea-

5679. Dyspepsia. If a .. . wishes to get rid of dyspepsia, he must give his stomach and brain less to do. It will be of no service soon as swallowed, and is the most certain of to follow any particular regimen-to live on all medicines known to stimulate the liver to chaff bread or any such stuff—to weigh his action, this want of action being the funda-mental cause of the disease. (Hall.) food, etc., so long as the brain is in a constant state of excitement. Let that have proper 5674. Cholera Tincture. Tinctures of rest, and the stomach will perform its funcrhubarb, cayenne, opium, and spirits of cam-tions. But if he pass 10 or 12 hours a day in his office or counting-room, and take no exercise, his stomach will inevitably become Dose, from 5 to 30 drops, or even to 60, and paralyzed; and if he puts nothing into it but repeat until relief is obtained, every 5 to 30 a cracker a day, it will not digest it. In minutes. Many lives have been saved by the many cases it is the brain that is the primary cause. Give that delicate organ some rest. Leave your business behind you when you go to your home. Do not sit down to your dinsimple in its nature, that is, farinaceous food, day. Allow yourself some innocent recreacream, or milk (with one-third of lime-water, tion. Eat moderately, slowly, and of just what you please. If any particular dish disagrees with you, however, never touch it or A warm bath for 20 minutes, or a shorter look at it. Do not imagine that you must coming weakened by the disease, port wine, Above all, banish all thoughts of the subject. live temperately, regularly, cleanly; be indus-5676. Indian Cure for Dysentery. trious, too, but avoid excess in that, as in all physician, Dr. Marcet, has announced a pro-sional use of some mild aperient. cess by which natural digestion is imitated by or other animal. Diluted in a pint of water tinctures. and added to a pound of raw meat, the whole is allowed to simmer over a water-bath at often arises from a mother's impure milk; When the meat is by this means sufficiently ized by 81 grains of bicarbonate of soda. The stomach with warm brandy and water, to product is of a most agreeable character, which add a little salt. Give also the carmineasily digested and vastly more nutritious ative drops. (See No. 5689.) than beef tea. Where pepsin cannot be obtained, the doctor has found strips of calves' wind. Angelica, 2 ounces;

spoonful taken after each meal will cause a moting perspiration and refreshing sleep.

speedy cure.

Take 2 pills at bed-time. of cloves.

gamboge, scammony, and compound extract of colocynth; 96 grains soap; 15 drops each oil make each part into 24 pills; 384 pills altogether. A dose consists of 3 pills.

5684. Absorbents are medicines administered to counteract acidity in the stomach or intestinal canal. In most cases, emetics and aperients are given previous to their being taken; they are carbonate of ammonia, in doses of from 5 grains to 1 scruple; liquor of ammonia, 20 to 30 drops; lime water, 2 ounces to ½ pint; magnesia, calcined, 20 to 40 grains; carbonate of magnesia, ½ to 2 drachms; carbonate of potassa, 10 grains to 1 drachm; earbonate of soda, 10 grains to 1 drachm; soda water, ½ pint. (See No. 5678.)
5685. To Correct Acidity of the

Stomach. The neutralizing mixture (see No. 5666) is very effectual in curing this disorder. Or, 10 grains of calumba, powdered, and 10 grains of magnesia, well mixed. Magnesia and a little finely powdered chalk will be of

great service.

5686. Remedy for Acidity of Stomach. This is a common symptom of weak or disordered digestion, and should be treated with small doses 3 or 4 times daily of the carbonate or bicarbonate of potassa, soda, or hot fomentations, bags of hot salt or bran, or ammonia; or of sal-volatile or ammonia water, to which some tonic bitter may be added. Diet should be light and nutritious, with as While these means are being used, a dose of much out-door exercise as possible. The laxative medicine should be administered;

5680. Artificial Digestion. A London bowels should be kept regular by the occa-

5687. Carminatives. Medicines that artificial means, and solid food may thereby allay flatulency and spasmodic pains. Among be prepared for invalids. Dr. Marcet takes 58 the principal carminatives are aniseed, caragrains muriatic acid having a specific gravity way-seed, cardamoms, cassia. cinnamon, gin-of 1.1496; 15 grains of pepsin—the organic ger, peppermint and the peppers; including principle procured from the stomach of a pig ardent spirits and most aromatic essences and

5688. Flatulency in Children. about the temperature of the body, 98° Fahr. when it is so she must take the neutralizing mixture (see No. 5666); and if not effectual, broken up, it is strained, and the acid neutral- administer it to the infant. Also foment the

5689. Carminative Drops, for expelling wind. Angelica, 2 ounces; lady's slipper, 1 ounce; sweet flag, 1 ounce; anise, 1 ounce; stomach answer very well.

5681. Dick's Cure for Dyspepsia. ounce; sweet flag, ‡ ounce; anise, 1 ounce; fennel seed, ½ ounce; catnip flowers. 1 ounce; Mix together 1 ounce blearbonate of soda; 2 mother-wort, 1 ounce; pleurisy root, 2 oundrachms aromatic spirits of ammonia; 6 ces. Infuse in a pint of spirits of wine for 3 drachms compound tincture of gentian; 6 or 4 days, often shaking, keeping it in a warm drachms tincture of henbane; 2 drachms tinc- place; then add a pint of water and a tableture of ginger; 3 drops creosote; 1 ounce spoonful of tincture of cayenne. Excellent ginger syrup, and 3 ounces water. A table- in flatulency, colic, nervous affections, pro-

5690. Heartburn. Anxiety and pain 5682. Dick's Dyspepsia Pills. Make about the region of the stomach, generally the following ingredients into 40 pills: 2 attended by a sense of gnawing and heat; scruples each compound extract of colocynth, hence called heartburn. Faintness, nausea, and compound rhubarb pill (see No. 4923); 1 and eructation of a thin, acidulous, watery scruple blue mass (see No. 4919); 55 grains soap; 1 drachm extract henbane; 3 drops oil symptoms of this complaint. The usual causes of heartburn are excess in eating or 5683. Spackman's Anti-Dyspeptic drinking, the use of improper food, and seden-Pills. Make into a mass, 6 drachms 24 grains tary habits. A good remedy is a tea-spoonful powdered aloes; 3 drachms 20 grains each of carbonate of magnesia, or carbonate of soda, in a glass of peppermint or cinnamon water, to which a little powdered ginger may of caraway and oil of anise; with 1 drachm be added with advantage. This dose may be water. Divide the mass into 16 parts, and taken 2 or 3 times daily until the disease is removed. Articles of food that easily undergo fermentation should at the same time be avoided, and a dry diet had recourse to as much as possible. Soda-water, toast and wa-ter, and weak spirits and water, are the most suitable beverages in this complaint.

5691. To Cure Water-Brash. there is a tendency to confined bowels, some ammonia, 10 to 20 drops; aromatic spirit of aperient must be administered occasionally until proper dieting, &c., renders it unnecessary. Fluid magnesia, or the lenitive electuary (see No. 5154), will probably be all that is neces-The diet must be carefully attended to in all cases; and as the disorder often arises from the use of innutritious or unwholesome food, the adoption of a more varied and generous diet, including a sufficient proportion of meat, is essential to the permanent success of

any remedy.

5692. Treatment of Colic. Let it be remembered that colic may occur as the prelude to an inflammatory attack; and that if neglected or unskillfully treated, such tendency is very considerably increased. In the treatment of colic, very great advantage results from the external application of warmth; for, as in the great majority of cases of colic delion; 2 drachus carbonate of soda; 6 the pain depends on some obstruction in the drachms tartrate of potassa; 8 drachms tinebowels-very likely on the presence in them ture of rhubarb; 1½ ounces tineture of heubane. of some deleterious and indigestible food, &c. -it is of essential importance that free passage should be obtained as speedily as possible. A full dose (12 ounces) castor oil, is a safe and good medicine for the purpose; to be repeated in 2 or 3 hours if there has been no action of rhubarb, and 6 ounces spring water. the bowels. If the medical man has arrived a tea-spoonful 3 times a day meanwhile, he will very likely order some stronger medicine, as, if the oil has not acted, Mix & ounce each fluid extract of rhubarb steps must be taken to clear the bowels as and of senna with 4 ounces water. Then soon as possible. If the pain is very severe, add ½ ounce extract of taraxacum; 3 drachms soon as possible. If the pain is very severe, add ½ ounce extract of taraxacum; 3 drachms a tea-spoonful of powdered ginger, or a little acetate of potassa; ½ ounce compound tinccayenne pepper may be added to the oil or ture of gentian; and 1 drachm muriatic ether. taken after it. When free action of the bowels is obtained, the pain soon ceases. A fter such attacks great caution is requisite in the matter of diet for some time; only the plainest and most digestible food being taken.

5693. Treatment of Lead or Painters' Colic. In cases of colic arising from poisoning by lead, called lead colic, so often experienced by plumbers, painters, workers in shot towers, &c., the great object is to obtain free ing water. After 24 hours strain. 2 tableaction of the bowels, as in common colic; and medical assistance should be obtained at once. Of course every care should be taken to prevent any further entrance of lead into In order to obviate the occurthe system. rence of lead-poisoning in those who are of ling, all that is necessary is to soak the feet in necessity exposed in a greater or less degree to its influence, frequent ablutions of the hands and surface of the body should be practiced; while sulphuric acid lemonade

should be used as a beverage. 5694. Fainting Fits. If a person faints, let him be placed on his back until he comes to. Do nothing else. He has fainted because the heart has stopped beating. It will It will come to of itself as soon as nature desires it. perpendicularly to the head, chest, and arms, when sitting up. And yet the very first effort of bystanders when a person is observed to have fainted, is to place him on a chair, or lift up his head. (Hall). If the patient be a female, place her on her back, with the head low, loosen all clothes about the neck and chest, sprinkle cold water on the face, and apply smelling salts to the nostrils. When the patient can swallow, give some cold water, with 20 or 30 drops of sal-volatile, or a little brandy.

5695. Fits. If a person falls in a fit, let him remain on the ground, provided his face be pale; for should it be fainting or temporary suspension of the heart's action, you It is stated that 2 tea-spoonfuls of finely powmay cause death by raising him upright, or by bleeding; but if the face be red or dark colored, raise him on his seat, throw cold water on his head immediately, and send for a by too much acid on the stomach. This remsurgeon, and get a vein opened, or fatal pres-

sure on the brain may ensue.

5696. Cure for Cramps. Mix 2 5707. Bisulphide of Carbon a Remedrachms chloroform, 1 drachm oil of camdy for Headache. Dr. Kennion thus dephor, 6 drachms mucilage of gum-arabic, and scribes the mode of application of this rem-14 grains acetate of morphia. Dose, 40 drops every 2 hours.

5697. Remedy for Dropsy and Liver delion (taraxacum); ½ ounce extract of dan- the fluid; and, when the remedy has to be

Dose, a table-spoonful every 2 hours.

5698. Cure for Liver Complaint. Take i ounce each extract of taraxacum (dandelion) and tartrate of potassa; 45 grains carbonate of soda; & ounce sweet tincture of

5699. Remedy for Liver Complaint.

5700. Dandelion Pills. Take 30 grains extract of dandelion, and 6 grains calomel; make into 10 pills. 2 taken 3 times a day are a useful remedy for dropsy in the belly arising from disorder of the liver. (See No.

5697.

5701. Infusion of Dandelion. Steep 2 ounces bruised dandelion root in 1 pint boilspoonfuls 4 times a day is a remedy for dropsy.

(See No. 5697.)

5702. Sick Headache. This usually proceeds from acidity and overloading the stomach. When it is not from improper eathot water for 15 minutes, drink some warm herb tea, retire to bed, and take a good sweat for about an hour. This will give relief. If the trouble arises from over-eating, relief may be obtained by taking an emetic. (See No. 5169.1

5703. Periodical Sick Headache. Those who are afflicted periodically with sick headache, accompanied with nausea and sometimes with vomiting, may obtain relief and it will be easier to propel the blood in a by soaking the feet in hot water, and using horizontal direction, when lying down, than the emetic directed in No. 5169. This treatment should be followed by taking the lenitive electuary. (See No. 5154.)

Nervous Headache may be re-5704. lieved by using one of the evaporating lotions. (See No. 4843.) An application of the "Good Samaritan" is also very effectual. (See No. 4858.) Any of the remedies under the head of neuralgia are also recommended for severe

attacks.

(Sce Nos. 5544, &c.) To Relieve Nervous Headache. From 10 to 20 drops sal-volatile (aqua ammonia) in 1 wine-glass of water will frequently give relief; a dose of 10 drops, and repeated at intervals of 10 minutes, seldom fails.

5706. Remedy for Sick Headache. dered charcoal, drank in half a tumbler of water, will give immediate relief to the sick headache, when caused, as in most cases it is, edy has been highly recommended. (See also Antacids, No. 5678.

edy: A small quantity of the solution (about 2 drachms) is poured upon cotton-wool, with which a small wide-mouthed glass-stoppered Affections. Mix 8 ounces infusion of dan-bottle is half filled. This, of course, absorbs

used, the mouth of the bottle is to be applied 5713. Treatment for Interrupted or closely (so that none of the volatile vapor may Suppressed Menstruation. The stane part; and, after a lapse of a few minutes or hot ginger water. application is generally immediate. (British Mcd. Journ.)

5708. Simple Remedy for Piles.

cured by this treatment.

Internal Remedy for Piles. Pulverize in a mortar and mix thoroughly,

h pint of this extract, add h pint of oil rendered from old, strong bacon. Simmer tothe finger inside the rectum every night and

until cured.

5711. Persulphate of Iron for Piles. An ointment made of ½ drachm persulphate of iron, and 1 ounce simple salve, has been found especially beneficial in cases of ulcerated hemorrhoid. Dr. Geo. S. Cartwright describes a case of hemorrhoid in which there

health, particularly the enjoyment of pure air, and the use of the shower or hip-bath; moderate exercise, especially on horseback; with a quires considerable watching; it should eral treatment, the greatest attention must therefore be carried out under the eye of a be paid to dict and regimen. skillful physician. When the slightest apshould be had to the use of the warm hip-bath; indeed, very frequently it will be found that a hot hip-bath, containing a handful of the flowers of mustard, used every frequency at the structed Menstruation. Mix 1 to 2 fluid drachms liquor of ammonia with 1 pint of the flowers of mustard, used every frequency and the structed Menstruation. night for the week preceding the regular time for the flow to appear, and accompanied by a good rubbing with a rough towel of the body, some part of the front of the body, structed mentions and lower part of the front of the body, structly assist in bringing on the flow. will greatly assist in bringing on the flow.

escape) to the temple, or behind the ear, or as suggestions in the way of treatment apply as near as possible to the seat of pain, and so in No. 5719. When interruption has taken held for from 3 to 5 minutes. After it has place suddenly, recourse should be had to the been applied for a minute or two, a sensation warm hip-bath, bed, and some warm drink, is felt as if several leeches were biting the such as sherry and water, or a little brandy, When cessation for more, the smarting and pain become rather one or more periods has occurred, then it is severe, but subside almost immediately after specially important to favor, as much as posthe removal of the bottle. The effect of this sible, its restoration by attention to those particulars of general treatment already adverted to.

5714. Treatment of Excessive Men-Take fresh white pine pitch in pills, from struction. Those who are liable to this 12 to 20 a day, and sit in a tub of cold water form of irregular menstruation should be 4 or 5 times a day, 30 minutes each time, for careful in their diet, choosing a plain and nua month. A very obstinate case of piles was tritious one. They should attend to the function of the bowels, and maintain a horizontal posture from the time when the discharge commences till its cessation. 1 ounce each of cream of tartar, jalap, senna, dition, if the discharge, besides being copious, flowers of sulphur, and golden seal, and is continuous, recurring over and over again, dition, if the discharge, besides being copious. ounce saltpetre. Dose, a tea-spoonful 3 times it is necessary to have recourse to powerful day.

Fremedies. When the discharge is so profuse 5710. External Remedy for Piles. Boil as rapidly to reduce the patient's strength, some of the inner bark of white eak in water, still more, if by it, as has happened some-and strain; evaporate to a thick extract. To times, life be brought into peril, local means of arresting bleeding must also be adopted; foremost among these is the application of gether till mixed, and let it cool. Apply with cold—cold cloths placed over the lower part of the body, and to the groins. Injections of cold water may further be employed if the nurse or relatives are skilled in the use of the injecting instrument, but not otherwise.
5715. Difficult or Painful Menstrua-

tion. The most common form of this complaint is ranged under the head of neuralgia, scribes a case of hemorrhoid in which there for the violent pain with which it is accom-was an external tumor of the size of a large panied bears a close resemblance to neuralgic pea, protruding at certain times, to the size pains experienced in other parts of the body. of a walnut. He applied lead water freely to In such. if the affection is of long standing, the part, with an application of this salve the nervous system generally has probably before the patient retired at night, and the sympathized, and headache, with hysteria effect was almost immediate, relieving the pain and cauterizing the part. The effect of this salve is permanent. The same physician cases of this nature are connected with occasionally uses the ointment with double marked constitutional derangement, more the above proportion of the persulphate.

5712. Treatment for Irregular Menther the relief to the extreme pain which accompand the complete the comp struation, or Monthly Flow. Where the panies the complaint, soothing remedies flow is absent, or irregular. The treatment are rendered indispensable, and the most of cases of this kind should embrace every suitable medical ones will be prescribed by of cases of this kind should embrace every suitable medical ones will be prescribed by possible means of improving the general the medical attendant. In his absence, or conjoined to the medicines, the warm hip-bath may be tried, followed by the application of mustard poultices, or flannel wrung out wholesome nutritious diet. The medical of hot water and sprinkled with turpentine, treatment must not be trifled with, as it re- over the lower part of the back. In the gen-

5716. Remedy for Suppressed Menpearance of menstruation takes place, the struction. Make into 12 pills, 12 grains patient should be kept as quiet as possible; sulphate of iron, 6 grains powdered aloes, and and, in order to encourage the flow, recourse 12 grains white turpentine. Dose, 1 at bed-

ammonia, 1 ounce mucilage, and 9 fluid oun-

Pills for Suppressed Menstruation. Take dried sulphate of iron, 1 scru-ple; powdered aloes, 2 scruples; powdered pill 3 times a day.

5720. To Relieve Vomiting During Pregnancy. Mix 2 ounces sweet tincture of rhubarb, and 1 ounce compound tineture of gentian. Dose, a tea-spoonful 3 times a day.
5721. To Cure Vomiting in Preg-

nancy. Mix 1 drachm carbonate of magnesia, ½ ounce tincture of colombo, 5½ ounces peppermint water. Take a table-spoonful 3

5722. Citric Acid in After-pains. Dr. J. B. Chagnon recommends citric acid for the pains following labor, and declares that it has never failed in his hands. He gives 5 grains in 2 or 3 ounces of water every 5 hours. It acts as a nervine, and as a preventive of inflammation.

5723. Pills to Remove Obstructions in Females. Aloes and lobelia, 1 drachm each; black cohosh, gum myrrh, tansy, unicorn root, I ornce each; cayenne, a ounce. Mix, and for ratinto pills with solution of gum. remove female obstructions, and These are good for headaches, lowness of spirits, nervousness, and sallowness of the skin.

5724. Female Regulating Pills. Aloes, red oxide of iron, white turpentine, 1 ounce each. Melt the turpentine, and strain; mix well; form into pills with muci-lage. Take 2 or 3 per day.

5725. Alum Injection for Leucor-

5725. Alum Injection for Leucorhoea. Compound solution of alum, drachms; water, 1 quart. Mix, and use it lukewarm.

5726. Lead Injection for Leucorrhcea. Sugar of lead, 60 grains; water, 1 Mix

5727 dilate with water.

5728. Caustic Injection for Leucorrhæa. Nitrate of silver, 35 grains; water, 1 quart. Mix.

5729. Zinc Injection for Leucorrheea. Sulphate of zinc, 40 grains; water,

1 quart. Mix. To Cure Sore Nipples. **5730.** painful affection of the breast, especially so during the period of nursing, may be cured as follows: Arrest the bleeding by a slight application of compound tincture of benzoin, carefully dry the parts with a soft muslin handkerchief; apply a solution of gutta-percha, so as to completely surround the nipple and cover all abrasions, giving it three or four coatings, allowing each to dry thoroughly before repeating the application. During the act of suction, a boxwood shield, Make it into with calf's teat, should be used, and in the times a day

ces water; use in the same way as the last almost painless nature of the treatment, the effectual protection from the contact of the air and irritation of the infant's mouth re-

commend it strongly to general use. 5731. Harland's Gonorrheea Cure. cloves, 5 grains; Venice turpentine, sufficient to make a mass, and divide into 20 pills. One pill 3 times a day.

Mix together 1½ ounces powdered cubebs; ½ ounce balsam copaiba; ¼ ounce powdered gum-arabic; and 3 ounces cinnamon water. A table-spoonful of the mixture to be taken at intervals 8 times a day.

5732. Harland's Gonorrhea Injection. Mix 2 scruples Armenian bole, and 10 grains sulphate of zinc, with 4 ounces water. Inject 3 or 4 times a day.

5733. Goddard's Gonorrhœa Mixture. Take 2 drachms oil of cubebs; ½ ounce balsam of copaiba; 1 ounce each syrup of tolu and syrup of poppy; 2 drachms strong liquor of potassa; 1 drachm oil of juniper; and 21 ounces peppermint water. A table-spoonful 3 times a day.

5734. Goddard's Gonorrhœa Injection. Mix 3 drachms solution of iodide of icon with 4 ounces spring water. Apply with a syringe 3 times a day.

5735. Spackman's Copaiba Mixture. Mix together 2 drachms syrup of gum-arabic; 1 ounce balsam of copaiba; 24 drops oil of cubebs; 1 ounce syrup of balsam of tolu; § ounce each sweet spirits of nitre and com-pound tincture of opium; 20 drops tincture of opium; 3 drops oil of lavender, and 3 drachms compound spirits of lavender. Dose, a table-spoonful 3 times a day.

5736. Permanganate of Potassa in Gonorrheea. Dr. John G. Rich has employed this remedy with great success. He begins the treatment with a purgative, and then uses as an injection, 3 times a day, 6 grains of permanganate of potassa dissolved in 1 ounce water.

5737. To Apply Caustic to the Urethra. A weak solution of nitrate of silver (2 or 3 grains in 1 ounce rose-water), may be Catechu Injection for Leu- used as an injection twice a day. Some precorrhœa. Catechu, 1 drachm; myrrh, 1 fer a stronger solution of 10 grains to the drachm; lime-water, 12 ounces. Mix, and ounce, injected every 2 or 3 days. It may be also administered as an ointment of 10 to 20 grains to the ounce, smeared on a bougie and introduced into the urethra. This is perhaps better for severer cases of gonorrhea; the injections answering the purpose for milder cases, and gleet.

5738. Ricord's Gonorrhea Injection. Mix 15 grains each sulphate of zinc and acetate of lead, with 6½ ounces rose-water. Inject 3 times a day.

5739. Cure for Nocturnal Emissions. Mix 50 grains bromide of potassa with 25 grains each aromatic powder and white sugar. Make up into 12 powders, 1 to be taken 2 or 3 times a day.

5740. Remedy for Difficulty in Urinating. Mix together 1 scruple each oil of turpentine, extract of henbane, and soap. Make it into 12 pills, and administer 1 pill 3

course of a few days all will be well. The solution of gutta-percha is prepared by disder. To relieve the spasm, place the patient solving 1 drachm gutta percha in a bottle in a hot bath immediately, and keep him there, containing 3 drachms chloroform. The film supplying fresh hot water when required, rapidly formed by the evaporation of the until he is relieved, or he becomes at all faint chloroform is firm, elastic, and harmless, and, or fatigued. Then put him into a bed which should it rub off, is very easily replaced. The has previously been well warmed, and keep

plied, to prevent a return of the pain if possi-linen immediately remozed. medical man.

5742. Kidneys.

a wine-glassful 3 times a day.

every hour until relieved.

5744. Remedy for Nocturnal Inconof urine has been treated successfully by administering from 15 to 20 minims of tineture of belladonna 3 times daily

proved a successful remedy.

has met with great success in the use of belladonna in typhoid fever. Within 24 hours after the first dose, he found colirium, &c., vanish, succeeded by calm, natural sleep, clearness of intellect, and complete repose of Navy, reports equally successful results from the use of this drug. The amount and frequency of the dose will probably be understood by every physician, as the authorities above quoted do not specify these points.

5748. Remedy for Festering Wounds and Cancers. Professor Boettger recommends gun cotton, saturated with a solution of permanganate of potassa, put up in the form of a poultice, and held over an open wound by a bandage, as the best disinfectant for bad odors that can be conveniently applied. The strength of the solution of permanganate, best adapted for the purpose, is 1 part, by weight, of the dry permanganate, in 100 parts water. Ordinary cotton cannot be taken, as it readily decomposes, but gun cotton is permanent, and not liable to explosion

when in a moist state.

5749. Treatment for Measles. In the treatment of the ordinary cases of measles occurring in children otherwise than delicate, little is necessary beyond attention to the bed-clothes, preventing the access of too strong a light, which affects the eyes, &c. while the room is not overheated, it must not, for the same reason, be allowed to be cool. It must be remembered that in measles, as in

hot cloths, hot salt, hot bran, or hot tins ap- be well ventilated; all excrements and dirty Disinfectants ble; and as the medical treatment is of great should be used. The sense of heat and dry-consequence, lose no time in summoning the ness of the body, sometimes most distressing to the patient, can be much alleviated by Remedy for Disease of the washing the surface with soap and tepid Boil 1 ounce pareira brava in water; too great exposure being avoided by 3 pints of water until it is only 1 pint. Dose, one part of the body being cleansed, dried, and covered, before the rest is exposed. The 5743. Remedy for Incontinence of feeling of tension of the hands and feet can be Urine. Put 4 drops tineture of aconite root relieved by rubbing these parts with some in a tumbler of water. Dose, a tea-spoonful greasy matter, such as lard or simple salve. All sources of annoyance or irritation, all noises, should be avoided, and thus sleep is tinence of Urine. Nocturnal incontinence promoted, a condition which most materially affects the welfare of the patient, sleep lessening the fever and increasing the appetite. Food, light and nutritions, such as arrowroot, 5745. Remedy for Incontinence of gruel, good beef-tea, milk, chicken, or veal Urine of Old People. The continued use broth, plain wine, jellies, &c., should be of 1 to 6 drops tincture of iodine daily has given at the usual hours. The quantity should be moderate, great care being taken 5746. Remedy for Spermatorrhæa, that the digestion be not impaired by too Gelseminum, ½ grain; lupulin, 3 grains. To be large a quantity being taken. Should the taken each night on retiring. Gradually dipatient be very weak, the food must be adminish the dose as the patient shows signs of ministered in small quantities at frequently 5747. Belladonna as a Remedy for important as food. The prospect of recovery that met with great success in the control of the prospect of the pendent on the power of digesting and assimilating food possessed by the patient. The bowels should be moved by a mild laxative, such as the lenitive electuary (see No. 5154), effervescing magnesia, or castor oil; and, so the system, accompanied by regular evacua- as to produce a little perspiration, a small tions. Dr. Lewis S. Pilcher, of the U. S. dose (for a child, a tea-spoonful), of mindererus spirit (see No. 5143), in a little water, may be given at intervals of 2 or 3 hours. If the rash is long in appearing, or shows a disposition to disappear, the development of the eruption may be secured by placing the child in a warm bath; if the child appears sunk and the pulse be feeble, a little warm wine and water may be administered. In ordinary cases, the early appearance of the eruption will be favored by administering a dose of sulphur (a small tea-spoonful for a child, in milk); and if there be much hoarseness, and croupy character of the breathing and cough, it will be expedient to apply a hot sponge over the throat. (See No. 5626.) With the appearance of the eruption, these symptoms usually decline. Measles not unfrequently terminate in an attack of bowel complaint; this may be slight, and if so, will not require any medicinal treatment; indeed, it is salutary, but, on the other hand, when severe, and occurring in a delicate child, prompt means for arresting it must be adopted (such temperature of the room, the amount of the as are mentioned under the head of Diarrhea. (See No. 5652, &c.) If there be often-repeated sickness, food of the very blandest nature, Great care should be taken that draughts of pounded raw meat (the fat and gristle being cold air are avoided, lest they might prove removed before pounding), beef-tea, uncooked the cause of increase in the chest complaint, white of egg diluted with water, barley which generally attends the attack; and, water, &c., should be given in small quantities, and be very frequently repeated. Thirst, and the consequent restlessness, must be allayed by drinks. Large draughts should be all fevers accompanied by an eruption, the prohibited, as they tend to impair the digespatient will require a more abundant supply tion, and sometimes cause diarrhea; small of blarkets, &c., before the eruption appears, quantities, swallowed slowly, or ice to suck, than after it. Indeed, afterwards, he generate sufficient to allay thirst, and also prove ally desires light clothing. The room should grateful to the patient. The patient, however,

must be allowed to take larger quantities of ble, is all that is required. fluids than in health, as an increased quantity with other medicines, as salines, bark. &c., is required by the system during the existence and all acidulous drinks, are to be avoided. of fever. Acid, or acid and bitter drinks are degree than mere water, and are, moreover, unsusceptible to the fever, in places where it grateful to the potent. Lemonade with very is raging. It is to be given in extract, to little sugar, or appearsy vinegar and water, grain morning and evening. little sugar, or aspherry vinegar and water, will be found useful. Stimulants are admintion and quantity of stimulants given cannot spoonful every 3 hours. be regulated by the condition of the patient 5755. Atlee's Sca Medical advice is particularly necessary here. Various complications are apt to take place, so that, if possible, advice should be had Dose, 10 drops in a wine-glassful of cold wa-early in the day. If no advice is at hand, ter every 2 hours. the symptoms must be treated according to the directions given under the particular heads.

5750. Scarlet Fever. The preliminary that for measles. Give the patient a gentle cathartic, and keep very warm in bed until the eruption appears. (See No. 5749.) The aftertreatment consists of administering a gargle quinine, 1 ounce syrup of ginger, and 1 ounce every 15 minutes, when the patient is awake. cinnamon water. Take 1 tea-spoonful every Make a gargle of 2 table-spoonfuls each hour, in the absence of the fever. brewer's yeast and strained honey, mixed with 1 pint strong sage tea, and alternate it ing all over, at least 3 times a day, with a so-

treatment is simple: from ½ grain calomel, use of stimulants, wine or brandy; these for children, to 5 grains for adults, should be must, of course, be administered with great placed on the tongue and swallowed. About caution. In all stages, if the patient present an hour after, the first dose of the ammonia a sunken look, and the pulse be feeble, the (see next receipt) is to be given, and repeated necessity for stimulants is indicated. By every 3 or 4 hours, as long as the disorder giving them with caution is meant that only takes a favorable course. If the disorder injust sufficient to keep up the vital powers creases in violence, the medicine must be should be given. given every 2 hours, or every hour, or sometimes even more frequently, till the graver Pox. symptoms are subdued. This medicine has effectual: The application consists of a solubeen found to possess similar powers over tion of india-rubber in chloroform, which is diphtheria.

5752. Measles. Dr. Witt states that sesquicarbonate of ammonia is an antidote to scarlatina the chloroform has evaporated, which it very and measles. The dose in these complaints readily does, there is left a thin elastic film varies from 3 to 10 grains, according to the of india-rubber over the face. This the paage of the patient, given at longer or shorter tient feels to be rather comfortable, as it reintervals, according to the mildness or severmoves itching and all irritation; and, what ity of the attack. The suitable dose dissolved is more important, pitting, once so common, in as small a quantity of cold water as will is thoroughly prevented by the application. admit of its being swallowed with as many In making the solution, the india-rubber grains of loaf sugar, merely to make it palatamust be cut into small pieces, and chloroform

Any admixture

5753. Preventive of Scarlet Fever. generally found to lessen thirst to a greater Belladonna has been found to render persons

5754. Remedy for Dropsy in Scarlaistered to support the strength of the patient. tina. Mix together 12 drachms acetate of This they do in a great measure by promoting potassa; 6 grains extract of foxglove; 2 digestion, and by also directly increasing the drachms vinegar of squill; 6 drachms syrup force of the heart's action. The administra-

> 5755. Atlee's Scarlet Fever Remedy. I ounce each chlorate of potassa and hydrochloric acid, and a ounce spring water.

Intermittent Fever Pills. 5756. Take 10 to 12 grains white oxide of arsenic; 1 drachm muriate of ammonia, and 12 grains gum opium. Make into 64 pills. Dose, 1 to treatment for this disease is very similar to be taken morning, noon and night, with or without fever.

5757. Intermittent Fever Mixture. Take 5 grains tannin, 16 grains sulphate of

5758. Treatment of Small-Pox. Advice should always be obtained as soon as with the potassa gargle. (See No. 5064.) the earliest symptoms appear; often the Keep the skin of the patient moist by wash only symptom understood by the parents or friends is the eruption. In the absence of Intion of saleratus and water as hot as it can advice, the simpler cases of small-pox, unbe borne; after each washing grease the pa- attended by much cruption, scarcely require tient all over thoroughly, with a piece of fat any further treatment than confinement of bacon. Great care must be taken to prevent the patient to bed, adminstering at the the patient from catching cold in every stage commencement a dese of aperient medicine, of the disease, and the same cautions about such as efferveseing magnesia (see No. 4805, ventilation, warmth, diet, &c., given under $\delta c.$) or easter oil, &c., and, until the erupthe head of measles, must also be observed tion appears, of a few doses of mindererus in the treatment of scarlet fever. The patient spirit (see No. 5143), to promote perspiration. must not be exposed to any great or sudden In the more severe cases there are individual changes of temperature, even 3 weeks after symptoms of an unfavorable nature not unconvalescence, as a relapse might be the con-likely to be developed, and these must be met sequence.

5751. Preliminary Treatment of filling of the pustules is generally accompanied by a low form of fever, requiring the

To Prevent Pitting in Small-The following has been found very 5759. painted with a camel-hair pencil over the sur-Treatment of Scarlatina and face of the skin, where exposed, when the eruption has become fully developed. When added till it is dissolved. Gutta-percha has! 5764.

solution as before.

5760. **Prevent Pitting in Small-Pox.** Dr. George recommends the following treatment: ease cover the whole body, face and all, with calamine, shaken through a common pepperbox, taking care that the rowder does not remain in masses. The inflammation on remain in masses. The inflammation on each pustule is by these applications much lessened, a point of great consequence. Secondly, sprinkle about 1 onnce powdered camphor every 2 or 3 nights between the under large pills when going to rest. This is an insheet and blanket, the whole length of the comparable medicine for asthma. body, putting more about the shoulders and neck. The relief obtained by this, few would Soda water, either the usual carbonated wa-credit until they had had experience. Third-ter, or prepared from effervescing soda powly, in the advanced stage of the disease, ders, frequently gives instant relief in an atshould hardened incrustations have formed, tack of palpitation of the heart.

they may be removed, and without much pain too: for in one case every portion of Heart.

To Relieve Palpitation of the Heart.

To Relieve Palpitation of the Heart. the cuticle was removed from the whole face, (fox-glove); 20 drops tincture of aconite; 2 forehead, and even eyelids, the calamine apdrachms tincture of henbane; 6 drachms plied, and in a few days the cuticle was camphor-water. Dose, a tea-spoonful 3 times formed again without a blemish.

5761. Calamine. Native carbonate of 5768. Biliousness. Persons subject to zinc. It is prepared and purified for medibilious attacks should be particularly careful

1292.)

succeed to admiration, when every other may generally be removed by a blue pill, folmethod has failed. It should be applied at lowed with a mild purgative. intervals extending over several weeks, as and caution being observed the whole time.

5763. will be afterwards required to prevent a some cases a healthy granulating surface second attack. Strong medicines, great excitement, or much mental occupation are to had been destroyed in this manner.

Remedy for Shortness of been tried, but has not answered, on account Breath. Take spirits of ether, I ounce, and of its not-elasticity. Should any of the solu- camphor, 12 grains. Make a solution, of tion, from some cause, be torn off, apply the which take a tea-spoonful during the paroxysm. This is usually found to afford in-Dr. George's Treatment to stantaneous relief in difficult breathing, depending on internal disease and other causes, where the patient, from a quick and very Firstly, from the commencement of the dis-laborious breathing, is obliged to be in an erect posture.

5765. To Relieve Shortness of Breath. Take 1 ounce powder of elecampane root, 1 ounce powder of liquorice, as much flower of brimstone and powder of aniseed, and 2 ounces sugar-candy powdered. Make all into pills, with a sufficient quantity of tar; take 4

5766. Palpitation of the Heart.

a day.

cinal purposes by heating to redness, and to guard against excess in eating and drinkpulverizing it, afterwards reducing it to an ing, and should especially avoid those articles impalpable powder in the same manner as of food which, from experience, they find to directed for prepared chalk. (See No. disagree with them. A mutton chop undercooked is an excellent article for the break-5762. To Remove Pitting and Old fast or lunch of a bilious patient; and mutton Pock-Marks. To remove pitting and old or beef, either broiled or roasted, so that the pock-marks, simple oil, comade, or ointment, gravy be retained, is better for dinner than medicated with croton-oil, and of a strength many articles apparently more delicate. just sufficient to raise a very slight pustular Beer and porter should be particularly avoid-eruption, is probably the safest and most ed, as well as puddings and most articles of effective and convenient of all the preparations that are employed for the purpose. It cheese, butter, unripe fruit, and especially has for some years been successfully employbeans, peas, and nuts, are also objectionable, ed in France and has there received medical. An attack of bile may frequently be preventapproval. Dr. Cooley says he has seen it ed by the use of a saline purgative, and it

5769. To Remove Tumors. the feelings, experience, and convenience of move tumors, Dr. Simpson, of Edinburgh, in-the party concerned may indicate, due care troduces a hollow acupuncture needle, or very fine trocar (a surgical instrument in the Treatment of an Attack of form of a fine hollow needle) into their tis-Loosen the clothes, especially sue, and injects a few drops of some irritant **Apoplexy.** Loosen the clothes, especially sue, and injects a few drops of some irritant those about the neck and throat, and send at liquid, such as a solution of chloride of zinc, once for a physician. Meanwhile, remove perchloride of iron, or creosote. The effect the patient into a cool, well-ventilated room, has been to destrey the vitality of the turaise the head above the level of the body, mors so treated, and they have been separaand apply cold to the head, either by means ted. A similar plan has been adopted in of rags dipped in water, never allowing them Paris by M. Maisonneuve. He had slender to become warm, or by ice in a bladder, &c. stylets made of a paste composed of flour, The diet will require great care when the water, and chloride of zinc. These are patient is reviving. Only very small quantily baked. A puncture is made in the tumor, ties of milk, beef-tea, &c., must be given the caustic stylet is inserted, broken off, and until he is able to digest more. Supposing left. Several malignant tumors have been the patient to recover from the fit, great care successfully treated in this manner, and in

be avoided. The diet ought to be light, but 5770. Treatment of Rupture. Rupnutritious; milk is useful, taken to the extent ture is generally caused by a strain or an of 1½ or 2 pints in the day; and, as a rule, no accident, and should be attended to by a surspirits or wine should be allowed.

geon as soon as possible. Meanwhile the geon as soon as possible. Meanwhile the patient must be said upon a sofa or bed with 5777. Beach's Cure for White Swell-his hips and legs slightly raised, so as to give ing. Oil of hemlock, oil of sassafras, gum him ease and to place the rupture in the campbor, tincture of opium, ½ ounce each, and most favorable position for being restored to a pint of spirits of wine. When dissolved its proper place. If the patient is faint, sup- and properly mixed, bathe the part with it port him by giving wine and water, or sal- frequently. Then apply an oatmeal and bran volatile, or a little broth, but do not over-stim- poultice, mixed with a little finely powdered

one who has an attack of lockjaw take a then steam. small quantity of spirits of turpentine, warm it, and pour it on the wound, no matter camphorated spirit, sal-volatile, and Hoffman's and relief will follow in less than 1 minute. Nothing better can be applied to a severe cut of sugar. This often relieves when other or bruise than cold turpentine; it will give prescriptions fail.

certain relief almost instantly.

5772. Cure for Cancer. clover tea is said to effect speedy and effectual preventive. So is a tea-spoonful of bicarbonis used; the tops are boiled in water, and the means of counteracting the tendency to sea-

every day.

5773. Remedy for Scrofula. Put 1

drops tineture of iodine; 1 fluid drachm tineture of gentian; 7 fluid drachms simple syrup, and 5 fluid ounces rose-water. Dose, a dessert-spoonful 3 or 4 times daily, in a wine-glassful of water, observing to shale well

before pouring out the liquid.

5775. White Swelling. This is a very painful disease; it more frequently affects the ounces water. Administer a ten-spoonful knee than any other joint, sometimes the every 2 hours, until vomiting ceases. hip, ankle, and elbow. At first a severe pain is felt penetrating the joint, or only one particular part of the joint. The least motion eonsiderably, and suppuration takes place. Matter is discharged from several openings or ulcers, the bones are affected; and if the disease is not arrested the life of the patient is endangered.

Attend to the stomach and bowels, giving an alterative syrup (see No. 5163), diluted when extremities cold. first taken; or a decoction of sarsaparilla, sassafras, guaiaeum, queen's delight, unicorn the patient at once to a cool and shady place, root, cleavers, and prickly ash berries, of each

ulate him. In other respects he must be kept charcoal, salt, and cayenne pepper. If the perfectly quiet.

5771. To Relieve Lockjaw. Let any laudanum. Keep it on as long as possible, and

where the wound is, or what its nature is, anodyne, a few drops of each, mixed in a small quantity of water, or upon a small lump

5779. To Prevent Sea-Sickness. The The use of neutralizing mixture (see No. 5660) is a good cures of cancer, even in its most malignant ate of soda in 1 pint of water. Take an form, and of long standing. The red clover aperient before a voyage. One of the best tea is used externally and internally. About sickness, is to keep a horizontal position. A a quart a day should be administered internal-little chloroform has lately been suggested as ly, and the tea should be used as a wash twice a good remedy. 5 to 10 drops on a piece of

lump sugar.

5780. Treatment of Debility. ounce aqua-fortis in a bowl or saucer; drop arises from a discased action of the stomach; in it 2 copper cents; when the effervescence the occasional use of mild aperients, felceases, add 2 ounces strong vinegar. The lowed by bitters and tonics, is the best treatfluid will be of a dark green color. It should ment. When, from a general laxity of the and will smart. If too severe, dilute it with solids, and there are no symptoms of fever, a little rain-water. Apply it to the sore, nor a tendency of the blood to the head, a morning and evening, by a soft brush or a course of iron tonics will prove advantageous. rag. Before applying it, wash the sore with Either of the following may be adopted for water. This receipt comes well recommended this purpose: Pure sulphate of iron, 1 drachm; for curing old sores and other scrofulous erupextract of gentian and powdered ginger, of each 1½ drachms; beat together into a mass, 5774. Anti-Scrofulous Mixture. Mix and divide into 120 pills, 1 to be taken morn-30 drops tineture of bichloride of gold; 40 ing, noon, and night. Or: Sulphate of ironand powdered myrrh, of each 1 drachm; sulphate of quinine, ½ drachm; conserve of roses, sufficient to form a pill mass. Divide into 120 pills, administered as the last.

5781. Remedy for Lick Stomach and Vomiting. Mix 24 drops creosote, 1 drachm each white sugar and gum-arabic, with 3

5782. Sunstroke. This is a sudden prostration due to long exposure to great heat, especially when much fatigued or exhausted. aggravates the pain. It soon begins to swell It commonly happens from undue exposure to the sun's rays in summer, but the same effects have been produced in a baker from great heat of the bake-room. It begins with pain in the head, or dizmness, quickly followed by loss of consciousnes, and complete prostra-5776. Treatment of White Swelling. tion. Sometimes, however, the attack is as sudden as a stroke of apopiexy. The head is emetic and an aperient, if needed; to be fol-lowed by bitter tonics occasionally, giving the the breathing labored and snoring, and the

5783. Treatment of Sunstroke. Take but don't carry him far to a house or hospital. 1 ounce. Simmer in a covered pan with 2 Loosen the clothes thoroughly about his neck quarts water down to 3 pints. Sweeten. A and waist. La7 him down with the head a dessert-spoonful 3 or 4 times a day. Steam little raised. Apply wet cloths to the head, the part with bitter herbs, and now and then and mustard or iurpentine to the calves of the give a vapor bath to the whole body. After legs and the soles of the feet. Give a little steaming the affected part, rub the limb weak whiskey and water if he can swallow. with the rheumatic liquid. (See No. 4884.)

Meanwhile let some one go for the doctor.

Precautions Against Night-Avoid all exciting causes, as too mare. much abstruse thinking, late and heavy suppers, food difficult of digestion, cold feet, cos-

tiveness, and flatulence.

5785. To Prevent the Nightmare. pound tineture of cardamoms; 1 drachm simmixture. (See No. 5124.) Also a little cayenne in scullcap tea will prevent an attack. ment. Those who are habitually subject to nightmare should not sleep in a room alone, but have some person near them, to arouse them when attacked with it. A person is most liasleeping in a bed which is hollow in the centre, the pillow moderate in thickness, so that the head is not raised too high.

5786. To Restrain Perspiration. Spring water, 2 ounces; diluted sulphuric acid, 40 drops; compound spirits of lavender, 2 drachms; take a table-spoonful twice a

Consumption. trouble.

ing symptom, and give much relief to the patient.

essence of tansy, 1 ounce alcohol, 1 ounce water, and 30 drops muriatic acid. A teaspoonful taken 2 or 3 times during the day

used freely as a drink.

5790. Squinting. It is well known that in infancy there is not unfrequently a

You cannot safely do more without his ad- through the orifice in the centre. He will thus acquire the habit of looking forward towards an object, instead of looking to the right or left hand of it. It is not at all improbable that the slight squint, which in infancy is apparently only a habit, may be remedied by this means.

5791. Treatment of Styes. A stye is a small boil which projects from the eyelid, To prevent the nightmare, mix together 10 a small boil which projects from the eyelid, grains carbonate of soda; 3 drachms commuch inflamed, and very painful. The application of ice to the part will sometimes check ple syrup, and 1 ounce peppermint water, it in the beginning. Apply a poultice of lin-Repeat for several nights in succession; after-seed meal, or bread and milk, and take at the wards use for a few weeks the tonic aromatic same time an aperient. If the stye is ripe, puncture it, and then apply spermaceti oint-

5792. To Treat a Black Eye. This is usually caused by a blow. If attended with inflammation and pain, wash the eye often with very warm water, in which is dissolved ble to nightmare when sleeping on his back; a little carbonate of soda; or with equal parts in fact, it rarely occurs in any other posture. of tincture of opium and water. If the pain Those subject to it should therefore avoid be acute, foment with a decotion of stramonium leaves, simmered in spirits. Wash the as this induces the sleeper to lay on his back. eye. and bind on the leaves; often repeat. The bed should be level and not too soft, and Perhaps the best application is a poultice of slippery elm bark. Mix with milk and put it on warm.

To Cure a Black Eye. 5793. move the discoloration of the eye, bind on a poultice made of the root of Solomon's seal. Culpepper says it is available for bruises, falls, or blows, to dispel the congealed blood, 5787. Remedy for Night Sweats of and to take away the pains, and the black and onsumption. M. Guyot recommends as blue marks that remain after the hurt. The particularly useful, in the sweats of consump-root may be washed, the dark-colored skin tion, the phosphate of lime in quantities of carefully cut off, then scraped like horsefrom ½ to 1½ drachms in the day. In a small radish, and applied direct to the eye in the proportion of cases it may be inert; but in the way of a poultice, cold. A tingling senmajority it will diminish or quite remove the sation is the consequence; when this sensation ceases, another fresh application should 5788. Treatment for Night-Sweats be made, and repeated until the whole disin Consumption. Powdered borax, 5½ coloration is absorbed. It is often found suffidrachms; washed sulphur, 1 ounce; sub-cient to apply the scraped root at bed-time to nitrate of bismuth, 13 drachms; divide into the closed eye, when the blackness has dis40 powders, 1 to be given every 2 hours (12 a appeared by the morning. Or: Moisten with day). 4 to 5 days of treatment will suspend tepid water, and then with a piece of lint apor diminish this troublesome and exhaust- ply pure extract of lead; continue to keep the lint wet with the extract for a couple of hours. Leeches ought not to be used. A 5789. To Relieve Night-Sweats. Dis-|lotion often used by surgeons with advantage selve 15 grains sulphate of quinine in 1 ounce is prepared thus: Take nitrate of potassa and sal-ammonia, each 1 part; water, 48 parts; vinegar, 4 parts. The part bruised to be kept wet with this by means of a bandage

and at bed-time. In connection with this remedy, cold sage tea is recommended to be Particles from the Eye. Take a hog's bristle, double so as to form a loop. Lift the eyelid and gently insert the loop up over the ball, which will occasion no disagreeable feeltendency to squint; this often passes away as ing. Now close the lid down upon the bristhe child increases in age; but it sometimes the which may now be withdrawn. The dirt becomes quite a fixed habit, requiring a surgi- will surely be upon the bristle. M. Renard, cal operation for its permanent cure. A means in the case of small movable bodies which of rendering this operation unnecessary by become entangled beneath the upper eyelid, curing the tendency in early life has been recommends the following simple process: suggested, which is worthy of trial. A pair Take hold of the upper eyelid near its angles, suggested, which is worthy of trial. A pair Take hold of the upper eyelid near its angles, of spectacles is procured without any glasses with the foreinger and thumb of each hand, in them. One of the orifices opposite the eye draw it gently forwards and as low down as that squints is to be filled with thin horn or possible over the lower eyelid, and retain it in with ground glass, and in the centre of the this position for about a minute, taking care horn or glass is to be made a small hole. It to prevent the tears from flowing out. When, is obvious that to see with the squinting eye at the end of this time, you allow the eyelid it is necessary for the child to look directly to resume its place, a flood of tears washes

out the foreign body, which will be found ad- 5801. Anodyne Eye-water. Solution hering to, or near to, the lower eyelid. If of acetate of ammonia, 2 ounces; distaled lime gets into the eyes, a few drops of vinegar water, hot, 6 ounces; soft extract of opium, and water will dissolve and remove it. Al. 10 grains. Dissolve the opium in the hot wamond or clive oil will do away with any hot ter, strain through fine muslin, and add the fluid that may reach the eye.

when a mote or spark gets into your eye, is to inflammation. pull down the lower part of the eyelid, and eye wide open in a cup or glass filled to the after it. brim with clear cold water.

holding near it a powerful magnet.

5797. Eye-Waters. Eye-waters should thalmia. be perfectly clear, and free from any floating matter, however trifling. To secure this, it is diacetate of lead, 10 drops; rose or elder-in general necessary either to filter them dower water, 6 fluid ounces. Mix. Good in through bibulous paper, or a piece of clean, inflammatory stage of ophthalmia. fine muslin, or to carefully decant them ε^{μ} 5805. Wash for Removing Particles sufficient repose to allow the impurities to of Iron or Zinc from the Eye. Muriatic subside. When pure distilled water is used acid, 20 drops; mucilage, 1 drachm; mix with in their preparation, only some of them will 2 fluid ounces rose-water.

require filtering. In using eye-widers, a little 5806. To Allay Temporary Irritation ter of crystallization. (See No. 2065.)

5798. Astringent Eye-water. Take ophthalmia, as soon as the inflammatory symptoms subside; also in weak, lax, watery, irritable eyes, &c. If there be much piece of the size named will dilate the pupil if pain and irritability, 5 or 6 grains of acetate placed on the sclerotic, and the lids closed ever of morphia, or 2 fluid drachms of wine of it and tied with a handkerchief.

opium, may be added.

5799. Eye-water for Weak Eyes. ract. Triturate together 1 drachm each ex-Take ½ ounce rock salt and 1 ounce of dry tract of belladonna and glycerine. Used for sulphate of zine; simmer in a perfectly clean dilating the pupil of the eye in cataract, by covered porcelain vessel with 3 pints of water anointing the evebrow and temple.

until all are dissolved; strain through thick 5809. Taylor's Remedy for Deafness. until all are dissolved; strain through thick by the bound of the boun of rain-water, with 1 of eye-water, and bathe poured into the ear is effective in temporary the eyes, if weak, frequently. If it smarts deafness, too much, add more water; if not enough, 5810. eyes. It cannot be excelled.

for inflamed eyes.

solution of the acetate of ammonia. This 5795. To Expel Insects, Dirt, &c., application frequently affords great relief from the Eye. The first thing to be done from the pain and irritation accompanying

5802. Eye-water for Specks on the with a handkerchief in your hand blow your Eye. Oxymuriate of mercury, ½ grain; best nose violently at the same moment. This rose water, 4 ounces. This solution is of will frequently expel the mote without further much use in removing the indolent inflamtrouble. A mote will, in many cases, come mation and the white specks which an acute out of itself, by immediately holding your inflammation of the eyes frequently leaves

5803. Bates' Eye-water. Dissolve in 4 5796. To Extract Particles of Iron fluid onness boiling water, 15 grains dry sulor Steel from the Eye. A particle of iron phate of copper (see No. 5797), and 4 grains or steel may be extracted from the eye by camphor. When cold, add water to make it holding near it a powerful magnet. 4 pints, and filter. Good in purulent oph-

5804. Goulard's Eye-water, Solution

of the liquid should be perred into a clean or Weakness in the Eye. Temporary ineup, gallipot, or glass, or into the clean palm dammation, produced by cold or external of the left hand, where the eye should be causes, is rapidly allayed by frequently bath-thoroughly wetted with it, either by means of ing the eye with lukewarm milk and water, a small piece of clean sponge or soft white or the eye water; applied either with a linen rag rag, or the clean tips of the flagers of the or by means of an eye-glass. A poult'ce of right hand. In all cases it is advisable to tea-leaves (the wet leaves left in the ra-pot) bathe or wash the eyes in tepid water, and to is also an excellent remedy. Probably the wipe them dry, before the application of the best remedy of all is to put a table-spoonfal eye-water; and, in most cases, this is abso- of salt in a basin of water (say + gallon), lutely necessary to insure benefit from their immerse the face in this twice a day, opening use. In the preparation of eye-waters, substances of crystalline formation are better salt and water every day. The eyes should when used dry, that is, deprived of their was under no circumstance be rubbed, as that will increase the irritation.

5807. Atropine Paper. Green tissue of sulphate of zinc, 20 grains; distilled water, paper imbued with a solution of sulphate of pint; dissolve. An excellent astringent atropia, so that a piece one-fifth of an inch eye-water, in chronic as well as ordinary square contains as much as a drop of a solvtion 2 grains to 1 ounce of water. The paper is hung up and turned about while drying.

5808. Belladonna Mixture for Cata-

cork it tight. To use it, mix 1 tea-spoonful of almonds for a week, and strain. A drop

5810. Treatment of Earache. make it a little stronger by adding more eye- Enrile Duval says that he has, in person, found water. This is an admirable wash for weak relief in severe earache, after other means had beca tried in vain, from the use of a mixture 5800. Wash for Inflamed Eyes. Take of equal parts of chloroform and hudanum; 10 drops extract of lead (the liquor of acetate a little being introduced on a piece of cotton. of lead); distilled vinegar, 2 drachms; distill- The first effect produced is a sensation of ed water, 4 ounces. This is an excellent wash cold; then there is numbness, followed by scarcely perceptible pain and refreshing sleep

oil and insert it in the ear, covering the latter excess. with cotton wool, and use a bandage or cap to retain it in its place. Almost instant relief some chafing. Stout perturb be experienced, and the application is so er, from chafing. We know of nothing better than the country of the c gentle that an infant will not be injured by it, than a wash of alum dissolved in water, and but experience relief, as well as adults. 1 part laudanum and 6 parts sweet oil dropped 5820. I-otion for Bed-Sores. To 1 in the ear is also very effectual.

a common tobacco-pipe, place a wad of cotton in the bowl, drop upon it 8 or 10 drops of then blow into the bowl, and in many cases wine. the pain will cease almost immediately.

is a good remedy for earache in children, and or it will irritate instead of healing.

often effective with adults. If very severe, a 5823. Treatment of the Nails. If no relief comes, call a physician.

ness. If deaf from hardened wax in the ear, a mixture of sassafras oil, 10 drops; glycerine, 1 fluid drachm; olive oil, 1 fluid ounce, mixed,

Inject warm water into the ear by means of a avoided. proper syringe, the head being placed with

mild soap and war water. confining the drunkard in a room, and in furnishing him at discretion with his favorite other diet; but his desire must not be yielded to, until he no longer desires to eat or drink; he is then certainly cured of his love of drink. He acquires such a disgust for brandy, or other spirits, that he is ready to vomit at the very

5811. Cure for the Earache. Take a drops gromatic sulphuic acid; ½ ounce comsmall piece of cotton batting or cotton wool, pour tincture of gentien; ? drachms commake a depression in the centre with the finger, and fill it up with as much ground pepper ger up; and 2 ounces water. A tableas will rest on a five-cent piece; gather it into spoorful administered 3 times a day will a ball and tie it up; dip the ball into sweet remove the prostrating effects of drinking to

5820. I otion for Bed-Sores. table-spoonful of powdered alum put 1 teacup-5812. Simple Cure for Earache. Take ful of whiskey and bathe the sore part several times a day.

5821. To Relieve Irritation in Bedchloroform, and cover with another wad of Sores. Apply to the sores the white of an cotton; place the stem to the affected ear, egg, well beaten, and mixed with spirits of

5822. To Prevent and Cure Chapped 5813. Remedy for Inflammation of Hards. Wash the hands with fine soap; the Ear. Swelling and redness, attended and before removing the soap, scrub the hands with throbbing, indicates it If caused by accumulation of wax, syringe the ear forcibly with tepid water. If by cold, a poultice of the meal each time except the last; wipe the warm hops, soaking the feet. If the pain is hands perfectly dry; then rinse them in a very great, 1 drop saudanum and 2 drops sweet oil little water. The bands perfectly dry; then rinse them in a very great, 1 drop saudanum and 2 drops sweet oil little water. of almonds dropped into the ear 3 times a day, glycerine, rubbing the hands together until or juice of onions and laudanum. A slice of the water has evaporated. This is an excelonion, toasted and tied on hot outside the ear, lent remedy, but the glycerine must be pure,

mustard poultice can be held behind the car. nails should be kept clean by the daily use of If the stomach is out of order use an emetic, the nail-brush and soap and water. After no relief comes, call a physician.

wiping the hands, but while they are still soft from the action of the water, gently push back the skin which is apt to grow over the nails, which will not only keep them neatly rounded, but will prevent the skin cracking around may be dropped into the ear every day. If their roots (hang-nails), and becoming sore. deaf from other causes, go to the physician. The points of the nails should be pared at 5815. Cure for Temporary Deafness. least once a week; biting them should be

5824. To Remove Warts. that side upwards during the operation.

5816. To Destroy Insects in the Ear.

application of either of the three following remedies is effective in dispersing warts: application of either of the three following Insects may be destroyed by porring a spoonful of warm olive oil, or camphorated oil, into the ear over night, retaining it there until the matic vinegar. The lunar caustic produces a next morning by means of a piece of cotton black, and the nitric acid a yellow stain, which wool, when it may be wasted out with a little passes off in a short time; the vinegar scarcely discolors the skin. Sparks of frictional electricity, repeated daily, by applying the 5817. To Gura Habitual Drunken-electricity, repeated daily, by applying the mass. The fail owing singular means of curning habitual drunkenness is complayed by Dr. Schreiber, a Russian physician: It consults in as a cure for these troublesome and unsightly excrescences.

5825. Wart or Corn Powder. Ivyspirit diluted with 3 of water; as much wine, haves dried and ground to fine powder. A beer, and coffee as he desires, but containing popular and useful remedy for warts and soft to spirit; all the food—the bread, meat, and corns. The part having been moistened with the vegetables steeped in spirit and water. strong vinegal, a pinch of the powder is The poor patient is continually drunk. On sprinkled on it, and then bound on with a the fifth day of this treatment he has an exstrip of rag. This is sometimes called costant. treme disgust for spirit; he earnestly requests metic regetable caustic. A mixture of equal parts of savine and verdigris also make an efficacious wart powder.

5826. To Remove Moles. Croton oil, under the form of pomade or ointment, and potassio-tartrate of antimony (tartar emetic), under the form of paste or plaster, have each 5818. Tonic After Drinking to Excess. recently been successfully employed for the Mix together 5 grains sulphate of quinine; 10 removal of ordinary moles and birth-marks.

paste. Apply this paste to nearly a line in very useful. thickness (not more), and cover the whole 5832. unless repeated, by producing a pustular erup-tion, which, however, does not permanently mark the skin. (See No. 5762.)

5827. Ingrowing Toe Nails. This most painful of the diseases of the nails is caused by the improper manner of cutting the beginning to grow too long, and rather wide at the corners, is trimmed around the corner, cut off; and, as the shoe presses the flesh against the corner, the nail cuts more and more into the raw flesh, which becomes excessively tender and irritable. If this state continue long the toe becomes more and more painful and ulcerated, and proud-flesh sprouts up from the sorest points. Walking greatly increases the suffering, till positive rest be-

comes indispensable.
5828. Treatment of Ingrowing Toe drug stores in a fluid form, though sometimes in powder. There is immediately a moderate sensation of pain, constriction or burning. In blains. Nothing appears of such uniform a few minutes the tender surface is felt to be utility for allaying the inflammatory irritato be painful. The patient, who before could not put his foot to the floor, now finds that he for 2 or 3 weeks, it can be easily removed by healthy structure is found firm and solid, below. If thereafter the nails be no more cut trouble will be avoided.

hard, and apt to grow round, and into the cum has been presented as a specific in this corners of your toe, take a piece of broken disease. glass and scrape the top very thin; do this 5839. Chilblain Balm. Boil together whenever you cut your nails, and, by constant 10 fluid ounces olive oil, 2 fluid ounces Venice use, it makes the corners fly up and grow turpentine, and 1 ounce yellow wax; strain, flat, so that it is impossible they should give and while still warm add, constantly stirring, you any pain. Do not fail to try this.

5830. Remedy for Blistered Feet camphor. from Long Walking. Rub the feet, at going to bed, with spirits, mixed with tallow dropped from a lighted candle into the palm of less of the balsam of Peru. This is applied the hand.

5831. Method of Preventing Cold part affected. Feet at Bed-time. Draw off your stockings 5840. just before undressing, and rub your ankles gether I fluid ounce rectified oil of turpentine,

The following is the mode of using the latter feet in bed. It is hardly conceivable what a adopted by an eminent French surgeon: Take pleasurable glow this diffuses. Frequent tartar emetic in impalpable powder, 15 grains; washing of the feet, and rubbing them thorsoap plaster, 1 drachin; and beat them to a oughly dry with a linen cloth or flannel, is

thickness (not more), and cover the whole strips of gummed paper. In 4 or 5 days tory swelling, of a purple or lead color, proeruption or suppuration will set in, and, in a duced by the action of cold. Children, espefew days after, leave, in place of the birth cially those of a scrofulous habit, and elderly mark, only a very slight scar. Croton oil persons, are generally most liable to chilointment effects the same, but less completely blains. The common cause is holding the hands or feet to the fire, after exposure to cold. The sudden change of temperature partially destroys the vitality, and prevents the proper flow of blood through the part. As chilblain is only another name for a languid circulation in the part affected, indicated nail (generally of the great toe), and then by a congested skin, or a low form of inflam-wearing a short, badly-made shoe. The nail mation, the value of most of the following receipts will be apparent when it is noticed that they are all calculated to act as stimulants which gives temporary relief. But it then of the blood-vessels, and thus promote the begins to grow wider in the side where it was motion of the partially stagnant blood which gives rise to the heat and itching that are so

distressing. (See No. 5006.) 5833. Remedy for Broken Chilblains. Mix together 4 fluid ounces collodion, 11 fluid ounces Venice turpentine, and 1 fluid ounce

castor oil.

5834. Zinc Wash for Chilblains. Dissolve 1 ounce sulphate of zinc in 1 pint water.

Apply several times a day.

5835. Chilblain Lotion. Dissolve 1 Nails. Begin the effort at cure by simple ounce muriate of ammonia in ½ pint cider application to the tender part of a small quantity of perchloride of iron. It is found in hol may be added to this lotion with good effects.

dried up, tanned or mummified, and it ceases tion, as the ordinary petroleum or kerosene

5837. To Cure Chilblains. M. W. E. can walk upon it without pain. By permit- Schaller says that the fluid concentrated ting the hardened, wood-like flesh to remain chloride of iron is an unfailing remedy for chilblains, its application to them for a single soaking the foot in warm water. A new and day effecting a cure. It may also be used with advantage for frost-bites.

5838. Remedy for Severe Chilblains. around the corners or sides, but always curved From 10 to 60 grains nitrate of silver disin across the front end, they will in future solved in 1 fluid ounce water has been somegrow only forwards; and by wearing a shoe times found useful after other applications of reasonably good size and shape, all further had appeared of no benefit. Tincture of cantharides, to stimulate almost to blistering, 5829. To Prevent the Nail Growing has also been used in the more intractable into the Toe. If the nail of your toe be forms of the disease. The tincture of capsi-

21 drachms balsam of Peru, and 9 grains

by being spread on a soft cloth and laid on the

Chilblain Liniment. Mix toand feet well with your hand, as hard as you 15 drops sulphuric acid, and 2 ounces olive can bear the pressure, for 5 or 10 minutes, oil. This, rubbed gently on the chilblains and you will never have to complain of cold twice a day, is generally very effective. iron vessel and add hydrated oxide of iron, also said to be an excellent remedy.

2 ounces; stirring continually with an iron

5851. To Cure Soit Corns. Dip a spoon, until the mass is of a uniform black piece of linen rag in turpentine and wrap with a little olive oil before putting it in. disappear. Apply several times daily by putting it upon; few days.

5842.cumbers, dried with the soft parts attached, being bound up with a piece of linen rag. Previous to use they are softened by soaking 5853. Remedy for Corns. Soak the them in warm water, and are then bound on feet well in warm water, then with a sharp

chilblains.

Frost-bites. with the preparation until relieved.

The remedy for this is long-continued friction mation of a new corn than before. with the hands or cold flannel, avoiding the

fire or even a heated apartment.

in the Feet. Bathe them in a weak solu-

ive Perspiration of the Feet. Mix to- great relief will be the result. gether 7 ounces carbonate of magnesia, 2 ounces powdered calcined alum, 7 ounces orris root, and \(\frac{1}{2}\) drachm powdered cloves.

the subjacent muscles. (See Nos. 5079 and will be dissolved.

5848. To Prevent Corns. Prevention is better than cure. Wear woolen stockings,

pressure on any part of the foot.

5849. To Cure Corns. If a cure be forms an oil-like liquid. requisite, soak the corn for ½ hour in a soluents: Take of purified ammonia and yellow wax, of each 2 ounces; and acetate of copper, 6 drachms. Melt the first two ingredients together, and, after removing them from the fire, add the acetate of copper just before they grow cold. Spread this ointment on a piece with a lancet. of soft leather or on linen, and apply it to the corn, removing it in two weeks.

corn occurs between the toes, and is produced body causes a constant pressure on it. in the same manner as the common corn; but in consequence of the moisture existing in hole in the centre, will relieve the pressure comes saturated, and remains permanently under the foot, which is not only uncomfortaseft. The soft corn is best relieved by cutting ble, but likely to produce other corns. The

5841. To Cure Chilblains. The follow- with a drop of Friar's balsam, and wearing ing remedy was published by order of the habitually a piece of cotton wool between the Wirtemberg government. Mutton tallow and toes, changing the cotton daily. Tincture of lard, of each \(\frac{1}{2} \) pound avoirdupois; melt in an arnica, applied on a piece of cotton wool, is

color; then let it cool, and add Venice turpen-round the toe on which the corn is situated, tine, 2 ounces; and Armenian bole, 1 ounce; night and morning. The relief will be almost oil of bergamot, 1 drachm; rub up the bole immediate, and in a few days the corn will

5852. To Relieve Hard Corns. Bind lint or linen. It heals the worst cases in a them up at night with arnica, to relieve the pain. During the day, occasionally moisten Russian Remedy for Chil-the stocking over the corn with arnica, if the blains. Slices of the rind of fully-ripe cu- shoe is not large enough to allow the corn

the sore parts with the inner side next them, instrument pare off as much of the corn and left on all night. This treatment is said as can be done without pain, and bind up the to be adopted for both broken and unbroken part affected, with a piece of linen or muslin thoroughly saturated with sperm oil, or, what 5843. Remedy for Itching Feet from is better, the oil which floats upon the surface Take hydrochloric acid, 1 of the pickle of herring or mackerel. After ounce; rain water, 7 ounces; wash the feet 3 or 4 days the dressing may be removed, and with it 2 or 3 times daily, or wet the socks the remaining dead cuticle removed by scraping, when the new skin will be found of a soft 5844. To Cure Slight Frost-bites. and healthy texture and less liable to the for-

5854. To Relieve Corns. lemon, cut off a small piece, then nick it so 5845. To Correct an Offensive Smell as to let in the toe with the corn, tie this on at night, so that it cannot move, and in the tion of permanganate of potassa; I scruple of morning you will find that, with a blunt knife, the salt to 8 ounces of water. (See No. 1701.) you may remove a considerable portion of the 5846. Powder for Absorbing Excess-corn. Make two or three applications, and

5855. Remedy for Corns. The pain occasioned by corns may be greatly alleviated by the following preparation: Into a 1-ounce 5847. Corns. Corns are entirely owing phial put 2 drachms of muriatic acid and 6 to continued pressure, such as wearing small drachms of rose-water. With this mixture boots or shoes. At first they are the productive the corns night and morning for 3 days. tion of the outer skin only, but by gradually Soak the feet every evening in warm water thickening they at length come to be connect. without soap. Put one-third of the acid into ed with the true skin beneath, and even with the water, and, with a little picking, the corn

5856. Liquid Solvent for Corns; Corn Solvent. A saturated solution of salt of tartar or pearlash. It is commonly obtained and see that there is no local and permanent by exposing the article, contained in a jar or wide-mouthed bottle, in a damp place, until it

5857. To Cure Bunions. A bunion is tion of soda, and pare as close as possible; a swelling on the ball of the great toe, and is then apply a plaster of the following ingredithe result of pressure and irritation by frica swelling on the ball of the great toe, and is tion. The treatment for corns applies also to bunions; but, in consequence of the greater extension of the disease, the cure is more tedious. When a bunion is forming it may be stopped by poultieing and carefully opening it

5858. To Cure a Corn on the Sole of the Foot. A corn on the sole of the foot is 5850. To Cure Soft Corns. The soft usually difficult to cure, as the weight of the application of an ordinary corn-plaster, with a this situation, the thickened scarf-skin be- from the corn, but it causes an inequality away the thick skin with a pair of seissors, following method never fails: Cut a piece of avoiding to wound the flesh; then touching it stout cardboard (or thin binders' board) to fit

inside the sole of the boot. This should be! large enough in every way to prevent it shift- 5 to 10 drops hydrochloric acid in half a tuming under the foot in walking. Next cut a bler of spring water, a little lemon juice, and round hole in this inner sole, exactly where loaf sugar rubbed on lemon peel to flavor it to the corn rests, the hole being rather larger suit the palate. Let this mixture be taken 3 than the corn. This arrangement relieves the times a day for a month or six weeks, and, if corn from pressure and allows of its rapid cure, at the same time affording instant relief pleasant refrigerant and tonic draught. and freedom in walking.

5859. To Cure a Disagreeable Breath. This most disagreeable infliction may be alleviated or cured by one or other of the following remedies, provided that the teeth do not require a dentist's assistance. Chlorine water, as supplied by a good chemist, a tablespoonful to half a tumbler of water, to be spoonful to haif a tumbler of water, to be used as a wash and gargle for the mouth; no harm will be done if a few drops are accidentally swallowed in so doing. Charcoal in teaspoonful doses of the powder, or as charcoal biscuits, or the use of prepared chalk as a tooth-powder. A frequent cause of foul breath is a torpidity of some of the excretions are the skin kidners bow. tooth-powder. A frequent cause of foul breath is a torpidity of some of the excretory organs, such as the skin, kidneys, bow-els, liver, lungs. When these cease performing their functions one of the others will be called upon to perform an extra office. In this way, when the bowels or skin become affected, the lungs, being an excretory organ, depending upon the stomach, it must be cor-

rected by some skillful physician. 5860. Remedy for Bad Breath. Take of dry hypochlorite of lime, 3 drachms; disoughly pulverized add a portion of the distillliquid has become transparent then decant; are added. The solution thus prepared may the teeth be employed to remove the fetid odor which 1288, &c. is given off by the gums—an odor often due to the diseased condition of the tissues. To employ it, \(\frac{1}{2}\) tea-spoonful is poured into a tum-blerful of water, and the gums are washed acute pain and toothache. to which has been added a tea-spoonful of the liquid. Inasmuch as the odor of the essential gums, and upon the face against the tooth. oil is gradually diminished in time, said diminution taking place at the expense of the ache. hypochlorite of lime, and keeping it in one kinds of toothache unless the disease is conbottle, while the aromatic alcoholic solution nected with rheumatism. (prepared of 2 ounces of 85 per cent. alcohol 5869. Chloral for is desired to use the liquids, a half tea-spoondescribed above.

5861. Remedy for Bad Breath. Take useful, then continued occasionally.

5862. Remedy for Bad Breath. or foul breath will be removed by taking a teaspoonful of the following mixture after each meal: 1 ounce liquor of potassa, 1 ounce chloride of soda, 12 ounces phosphate of

soda, and 3 ounces water.

5863. Bad Breath from Constipation. When the breath is affected by constipation of

5864. To Remove the Smell of Onions from the Breath. Parsley eaten with vinegar will remove the unpleasant

effects of eating onions.

To Correct the Odor of Decay-5865. ed Teeth. To correct the odor of decayed will be called upon to throw off an additional teeth, 2 drops of a concentrated solution of waste from the system. If so, the breath becomes tainted. Should the foul breath be glass of water as a wash, or a few drops of a weak solution may be introduced in the cavity of the tooth on a small piece of cot-

ton.

(See No. 1701.)
66. To Preserve the Teeth and 5866. tilled water, 2 ounces troy. Triturate the hypochlorite of lime in a glass pestle and mortar; when the hypochlorite has been thoroughly purposed and a norther and the distribution of lime in a glass pestle and morning, a moderately small and soft brush being used; after the morning ablution pour on a second tooth-brush, slightly ed water; allow the mixture to rest until the damped, a little of the following lotion: carbolic acid, 20 drops; spirit of wine, 2 drachms; add a second portion of water, triturate and distilled water, 6 ounces. After using this allow to rest, again decant; this process is lotion for a short time the gums become distilled water, 6 ounces. After using this repeated a third time. The three liquids firmer and less tender, and impurity of the which have been decanted are then mixed, breatl (which is most commonly caused by and 2 troy ounces of 85 per cent. alcohol, and bad teeth) will be removed. It is a great 4 drops oil of roses or some other essential oil mistake to use hard tooth-brushes, or to brush the teeth until the gums bleed. (See Nos.

Magnetic Pain-Killer 5867. Acute Pain and Toothache. This is one of the very best receipts for relieving Laudanum, 1 with the mixture, employing for the purpose drachm; gum camphor, 4 drachms; oil of a sponge-brush. The same preparation may be employed to remove the odor of tobacco, add these to 1 ounce alcohol, 6 drachms sulrinsing the mouth several times with water phuric ether, and 5 fluid drachms chloroform.

5868. Blake's Cure for the Tooth-Take alum, reduced to an impalpable chlorine of the hypochlorite, it is suggested powder, 2 drachms; spirits of nitric ether, 7 that this inconvenience may be obviated by drachms. Mix, and apply them to the tooth. preparing the solution with water and the This is said to be an infallible cure for all

5869. Chloral for Toothache. and 4 drops of essential oil) is preserved in Page recommends chloral hydrate as a local another, both being well stoppered. When it application in cases of toothache. A few grains of the solid hydrate introduced into ful of each of the solutions is poured into a the cavity of the tooth upon the point of a glass of water, which is then employed as quill speedily dissolves there; and in the course of a few minutes, during which a not unpleasant warm sensation is experienced, The compound that results from the combi-(Bris Med. Journ.)

relief.

fine powder, then add, finest honey, 3 ness, which is, however, readily acquired, drachms; oil of cloves (or of cajeput), 20 5880. Gutta-Percha Stopping for drops; concentrated tincture of pellitory, Teeth. This is pure, uncolored, native smooth paste. Very effective.

5873. Cure for Toothache. Take well for filling hollow teeth with central equal parts of burnt alum and salt. Saturate eavities, and is efficient and durable. a piece of cotton, cover with the mixture, and put in the tooth. Or saturate a small bit of Journal of Applied Chemistry gives the folclean cotton wool with a strong solution of lowing method of preparing this, for dentists' perienced.

ache. A concentrated tineture of pellitory (See No. 4532.)

5875. Pieste's Toothache Essence. This is landanum mixed with about twice its .960. Applied on lint, like other toothache drops, it often rapidly relieves the pain.

5876. Cottereau's Odontalgic Es-alcohol by adding water, and the alcohol sence. A nearly saturated ethereal solution of camphor, mixed with $\frac{1}{10}$ to $\frac{1}{12}$ its volume of liquor of ammonia (specific gravity) One of the most important points to attend

with a little creesote, and apply to the cavity of the tooth, previously cleansed.

vent toothache. (See Nos. 3549, &c.)

them rapidly, by trituration, in a porcelain or and nearly circular hole in it may, in general, wedgwood-ware mortar, and apply the powder, in the dry state, as quickly as possible, as it soon becomes moist. The powder, after heigh well pressed in the craek or cavity of the tooth, is smoothed off with the finger moistened with a drop of water. It soon actives great hardness is white year durable.

the pain is either deadened, or, more often, nation of the ingredients almost exactly reeffectually allayed. A second or third ap-sembles the natural earthy matter of the plication may be resorted to if necessary, teeth, and is, therefore, unobjectionable. Its color closely resembles, and will soon become 5870. To Cure Toothache. To 1 drachm that of the teeth to which it is applied, proflexible collodion add 2 drachms carbolic acid, vided they possess ordinary whiteness. To A gelatinous mass is precipitated, a small cause it at once to furtate the color of the portion of which inserted into the cavity of teeth, the mixture may be rendered slightly an aching tooth invariably gives immediate grey by adding to it a mere trace of carbon. This may be done by holding the pestle, used 5871. Chlorate of Potassa as a Cure to mix the powders, over the flame of a canfor Toothache. According to the experi- dle or lamp, for an instant. A faint yellowence of eminent dentists, chlorate of potassa ish shade may be given to it by a trace of affords quick relief in toothache. If the hol-sulphuret of cadmium or a little yellow ochre; low tooth is in the lower jaw, a small crystal and a faint shade of red or flesh-color by a of this salt may be put in the cavity; but trace of jeweler's rouge or peroxide of iron, or perhaps it is more advisable to use a solution of 1 part of the potassa in 20 of water.

5872. Paste for Toothache. Take of qualities, is, perhaps, superior to all others; root-bark of pellitory, 1 drachm; muriate of but, except in the case of hollow teeth, its morphia, 5 grains: triturate until reduced to use requires some degree of skill and expert-

a sufficient quantity to form the whole into a gutta-percua. A small piece is softened in hot water, and at once applied. It answers

ammonia, and apply it immediately to the use and for other purposes. 4 ounces of pure affected tooth. Immediate relief will be exgutta-percha are digested with 5 pounds of methyl-chloroform until the solution is thin 5874. Perry's Essence for the Tooth- enough to pass through filtering paper. It is then filtered (an additional pound of chloromade with about equal parts of ether and form will facilitate this), and should then be rectified spirit largely charged with camphor, clear and nearly colorless. Alcohol is now Though a nostrum, it is an excellent prepara- added in sufficient quantity to precipitate the gutta-percha in a voluminous white mass, which is washed with alcehol, pressed in a cloth, and dried in the air. It must finally be volume of liquor of ammonia specific gravity boiled in water in a porcelain vessel for half an hour, and, while still hot, rolled into sticks. The chloroform can be separated from the

.880 to 882). A very useful preparation.

5877. To Kill the Nerve of a Hollow tooth must be thoroughly cleaned out, and Tooth. Take 1 drachm white oxide of arwiped perfectly dry, before inserting or apsenic; I drachm sulphate of morphia; mix plying the cement, of whatever kind it be. Without careful attention to this matter, the cement will not adhere, or will soon become 5878. Tooth Cements. These are pre- loose, and drop out or off, and the operation parations for filling up cavities, eracks, &c., prove a failure. When a defective tooth is in defective teeth, the object being either to conveniently situated it may often be stopped restore or preserve them, or to cure or pre- by the party himself, by the exercise of a little skill and care, particularly if it be a hol-Diamond Tooth Cement. low one with a clearly defined central cavity. Take of anhydrous phosphoric acid in fine When the reverse is the case, it is generally powder, 12 grains; pure caustic lime, fresh necessary that the operator should be a secburnt, and in fine powder, 13 grains; mix ond party. A hollow tooth with a central

quires great hardness, is white, very durable, methods for the successful removal of tattoo and does not become discolored by age. marks in the skin. While these are generally

insertion of some carbonaceous matter, a cor- strained orange-juice in a wine-glass, pour the marks disappeared by being first well then squeeze a few drops of lemon-juice upon lard, then with a solution of potash, and on the edge of the glass.

finally with hydrochloric acid.

5889. French Method of Administer-

exact cause of freekles were known, a remedy into a pan over a moderate fire; break an egg for them might be found. A chemist in Moravia, observing the bleaching effect of mercurial preparations, inferred that the growth The sick child will eat it agreeably, and never of a local parasitical fungus was the cause of discover the disguise. the discoloration of the skin, which extended and ripened its spores in the warmer season. tor Oil. A good way is to beat the castor Knowing that sulpho-carbolate of zinc is a oil with the white of an egg until both are deadly enemy to all parasitic vegetation (it-self not being otherwise injurious), he applied 5891. To Disguise the Taste of Epsom this salt for the purpose of removing the freekles. The compound consists of 2 parts the nauseous taste of Epsom salts; a strong of sulpho-carbolate of zinc, 25 parts of dissolution of extract of liquorice covers the tilled glycerine, 25 parts of rose-water, and 5 disagreeable taste of aloes; milk, that of parts of scented alcohol, and is to be applied Peruvian bark; and cloves, that of senna. twice daily for from half an hour to an hour, 5892. Agreeable Mode of Taki twice daily for from half an hour to an hour, then washed off with cold water. Protection Senna. Dr. Linthner says that senna leaves against the sun by voiling and other means is (1 or 2 drachms to 1 or 2 cups of water) recommended, and in addition, for persons of should be allowed to infuse all night in cold pale complexion, some mild preparation of water. With the strained infusion coffee is

5885. To Remove Liver-spots. These an aperient which does not taste of senna, are well-defined, brownish blotches on the and does not cause griping, is thus produced. skin, and generally appear on the forehead. ally from some derangement or unhealthy rently dead from drowning, are given by Prostate of the internal organs. In the first fessor Benjamin Howard, of this city, and place, the general health must be thoroughly sanctioned by the Metropolitan Board of cared for, in order to have a fair prospect of Health of the City of New York. success in any external local application. A ment in about 2 weeks, and their recurrence artificial breathing: may be prevented by a regular use of borax and glycerine lotion (See No. 4839.)

5866. To Remove Birth-marks. Mix beneath his stomach, and press heavily overit

medicine, or to remove the disagreeable taste kerchief, and hold both hands of the patient from the month after taking the medicine, it together, the arms being stretched forcibly is far more efficacious to prepare the mouth back above the head. beforehand with some strong aromatic flavor,

tor Oil. Castor or cod-liver oil may be taken everything in the chest upwards out of the with porter by pouring a little in the bottom mouth. Continue this while you can slowly of the glass, and then a little on top of the count—one—two—three; then suddenly let

asserted to be indelible, if produced by the seous flavor is to put a table-spoonful of respondent of the Chemical News says that the castor oil into the centre of the juice, and rubbed with a salve of pure acetic acid and the top of the oil, and rub some of the juice

finally with hydrochloric acid.

5889. French Method of Administer5884. To Remove Freckles. If the ing Castor Oil to Children. Pour the oil into it, and stir up; when it is done, add a little salt or sugar, or some current jelly.

5890. To Destroy the Taste of Cas-

Salts. Peppermint water almost prevents

prepared next morning, as if with water; and

5893. Restoration of Persons Appa-Notwithstanding their name, they do not rently Dead from Drowning. The follow-always proceed from the liver alone, but usu-ing rules for the restoration of persons appa-

I. Unless in danger of freezing, never move pomade composed of 20 grains of sulphate of the patient from the spot where first rescued, zinc and 1 ounce elder-flower ointment should nor allow bystanders to screen off the fresh be applied over-night to the spot, entirely air, but instantly wipe clean the mouth and within its limits, and not on the surrounding nostrils, rip and remove all clothing to a little skin. In the morning wash it off with white below the waist, rapidly rub and dry the castile soap and water, and bathe it repeated exposed part, and give two quick, smarting ly during the day with a lotion composed of slaps on the stomach with your open hand. 30 grains citric acid and 1 pint infusion of If this does not succeed immediately, proceed roses. The spots should yield to this treat-according to the following rules to perform

II. Turn the patient on his face, a large bundle of tightly rolled clothing being placed

parts Hoffmann's Life Balsam (see No. 5112), and 2 parts distilled water. Apply to the mark twice a day, shaking the bottle well before using. (Hager.) (See No. 5826.)

5887. To Disguise the Tasta 250. Instead of attempting to flavor the cf one corner of the mouth with a dry hand-

IV. Kneel astride the patient's hips, and such as orange or lemon peel, or cachou arowith your hands resting on his stomach, matise. (See No. 1336.) In preparing the spread out your fingers so that you can grasp mouth for bitters, liquorice is the only succet that should be used, all others creating a peall your weight steadily forward upon your culiarly disagreeable compound taste.

5868. To Disguise the Taste of Castor or old lives oil may be taken. oil, but the best method of covering the nau- go, with a final push, which springs you back

to your first kneeling position. Remain erect be done quickly. The instant a person is breathing which you are imitating.

if possible, have been kept up during the entire process, is now further increased.

perfectly natural, strip the patient rapidly and completely. Wrap him in blankets only. but with a free circulation of fresh air, and, except for the administration of internal treat-

Reference on Charlings ...

5894. Abstinence as a Cure for Discase. Disease may often be cured by abotinence from all final, especially if the disorders have been produced by luxurious living and repletion. The latter overtaxes nature, and giddiness, headache, mental depression, &c., are often the cheets of greediness in meat and and allows the chegged organs to dispose of and promote vomiting by the emetic recomtheir burdens. The practice of drug-taking mended in No. 5895. to cleanse the stemach, though it mar give while abstinence often secures the same result,

and vet dees no injurt.

aid as soon as possible, the subjoined direc-tions may be followed. When any poisonous or other hurtful thing has been swallowed. Forms. take instantly half a glass of water-cold, not salts), sulphate of soda (Glauber's salts), or hot—put into it a heaping tea-spoonful of salt. and another of ground mustard; stir it rapidly 3 or 4 times: if there is no salt at hand, use mustard alone; catch the patient by the nose and toss it down. The reason for using cold water is that, in the harry, the water may be hotter than thought for, and may scald the bark, which decomposes the tartar emetic. throat, causing eventual, if not instant death. 5901. Antidotes for Alkalies, Soda, The salt and mustard make the speediest Potash, Ammonia, &c. Vinegar and emetic known and are almost everywhere to lemon-juice are the best antidotes for potash, two domestic articles which are found in Olive oil may also be administered. every house, and pullify the effects of a haps any other articles known. (Hall.)

upon your knees while you can count-one- known to have swallowed poison by design or two: then throw your weight forward again accident, give water to drink, cold or warm, as before, repeating the entire motions—at as fast as possible, a gallon or more at a time, first about 4 or 5 times a minute, increasing and, as fast as vomited, drink more: tepid wathe rate gradually to about 15 times a minute, ter is best, as it opens the pores of the skin and continuing with the same regularity of and promotes vomiting, and thus gives the time and motion as is observed in the natural speediest cure to the poisonous article. If pains begin to be felt in the bowels, it shows V. Continue this treatment, though apparathat part at least of the poison has passed rently unsuccessful, for 2 hours, until the pa-downwards; then large and repeated injectient begins to breathe; and for a while after tions of topid water should be given, the this, help him by well-timed pressure to object in both cases being to dilute the poison deepen his first gasps into full, deep breaths; as quickly and as largely as possible. Do not while the friction of the limbs, which should, wait for warm water-take that which is nearest at hand, cold or warm, for every second of time saved is of immense import-VI. As soon as the breathing has become ance: at the same time send instantly for a physician, and as soon as he comes turn the case into his hands, telling him what you have Put him in bed in a room comfortably warm, done. This simple fact cannot be too widely published; it is not meant to say that drinking a gallon or two of simple water will cure ment, let him have perfect rest. Give him a every case of poisoning; but it will cure many, little hot leandy and water, or other stimu- and henefits all by its rapidly diluting quality, lant at hand, every 10 or 15 minutes for the (Journal of Health.) A short summary of first hour, and as often thereafter as may the antidotes resorted to in reference to particular poisons is given below. They should, of course, be administered as speedily as possible.

5897. Antidotes for Acid Poisons. Hydrochloric acid; nitric acid; oxalic acid (often mistaken for Epsom salts); acetic acid. repletion. The latter overtaxes nature, and For this form of poison, give quickly large it rebels against such treatment. Indigestion, draughts of chalk, whiting, magnesia, or soap and water, about as thick as cream; followed by albuminous diluents, such as milk, and drink. Omitting one, two, or three meals, white of egg mixed with water. Or, if these allows the system to rest, to regain strength, cannot be procured at once, warm water;

5898. Antidotes for Arsenic. the needed relief, always weakens the system, first endeavor, in cases of poisoning by arsenic, should be to remove, if possible, the poison from the stomach; for this purpose strong 5895. Antidotes for Poison. It need emetics or the stomach-pump should be had hardly be said that medical assistance must recourse to, after which the hydrated peroxide be sent for at once; but, meanwhile, as it is of iron in a dose thirty times greater than that of the greatest importance to administer some of the poison may be administered. (See No.

> 5599. Antidotes for Baryta in all its Sulphate of magnesia (Epsom

any alkaline or earthy sulphate.

Antidotes for Antimony, or **5900.** Tartar Emetic. Administer large doses of warm water to induce vomiting (see No. 5896); give the powder of Peruvian bark, and, as soon as it can be prepared, the infusion of

Vinegar and be had in a moment. It brings up the con- and all other alkaline poisons. A glassful of tents of the stomach more or less complete- water, mixed with a table-spoonful of vinegar ly. And for fear that some remnant may be or lemon-juice, should be given frequently; left, administer a cupful of strong coffee, and and in defect of these, simple water, in such then the white of 2 or 3 raw eggs, either first, quantities as to cause vomiting. Emetics, as may be the quickest had, because these are and other irritating means, are to be avoided.

5902. Antidotes for Corrosive Subgreater number of virulent poisons than per- limate, or Calomel. The white of eggs ips any other articles known. (Hall.) beaten up with cold water is the best antideto 5896. Treatment in Cases of Poison- for these. If eggs are not at once to be had, ing. Dr. Hall says: Whatever is done must milk may be used with great success.

water should be given afterwards, to induce

vomiting, also free purging in most instances. Gas. 5903. Antidote for Corrosive Sublicarbo. mate. In case of poisoning by corrosive be immediately removed into the open air, sublimate, if a dose of the hydrated protosul- and placed upon his back with the head phuret of iron (see No. 4149) be administered it instantly renders the poison innocuous, over the body, hot water applied to the feet, This antidote is almost useless unless taken and ammonia to the nostrils. Brandy and wawithin 15 or 20 minutes after swallowing the

5904.

5905. Antidotes for Nitrate of Silver. Same as for corrosive sublimate (see No. 5902), with copious draughts of warm water and salt. (See No. 5895.)

Antidote for Phosphorus. Same as for corrosive sublimate. (See No. 5902.) Phosphorus is the principal ingredient be given to remove them from the stomach. used in the manufacture of matches.

5907. Antidote for Sulphate of Zinc. Solution of carbonate of soda; also cream, butter, and chalk, are good antidotes for sulphate of zinc (white vitriol). Give water after the antidotes.

irritant form of injury, administer sulphate of effects on the stomach, a new preparation magnesia, potash, or soda. The phosphate of which he calls calcaria saccharata (sacchasoda is a good antidote. When palsy super-rate of lime), prepared by dissolving 16 venes, the regimen must be regulated care-

5909. Antidotes for Opium and its Preparations. Emetics of the sulphate of zinc, ½ drachm or 2 scruples; the stomach pump, or injections of tartar emetic, must be Chlorine. employed to bring away the poison. The patient should be constantly roused by dragging about the floor, throwing cold water in the face, and giving ammonia, assafætida, and

strong coffee

New Antidote for Opium. In a case of accidental poisoning by an overdose of morphia, the administration of 18 drops of Norwood's tincture of green hellebore was had obtained such mastery over the unfortunate patient that the pupils of the eyes had with 2 ounces of brandy. All appearance of poisonous effects had vanished in an hour.

5911. Antidotes for Prussic Acid. Small quantities of ammonia water diluted inhaled. The joint administration of carbonand is almost of itself a certain cure, if employed before the convulsive stage is over; and it is often successful even during the fortunately, the poisonous action of prussic sive than a stomach pump. acid is so rapid that life is usually extinct 5918. Cure for Ul

5912.

5896.) No antidote is known.

5913. Antidotes for Carbonic Acid When asphyxia from the inhalation of carbonic acid gas occurs, the patient should and placed upon his back with the head slightly raised. Cold water should be dashed ter, and other stimulants, may be administered. Friction on the surface of the body is Antidotes for Verdigris and also recommended. If the patient has ceased Sulphate of Copper. The treatment is to breathe, artificial respiration should be atthe same as for corrosive sublimate. (See down the ribs, forcing up the diaphragm, and then suddenly withdrawing the pressure. (See No. 5893, Rule V.)

5914. Antidotes for Poisonous Mush-The best antidote to poisonous rooms. mushrooms is tannin, or an infusion or decoction of galls. A strong emetic should also

5915. Antidote for Carbolic Acid. Dr. Crace Calvert states that the best antidote after the stomach pump is large doses of olive or almond oil, with a little caster oil. Oil is a solvent, and consequently a diluent of carbolic acid, and may be used to stop the 5908. Antidotes for Lead. Litharge, corrosive effect of the acid when the action red lead, white lead, sugar of lead, and on the skin is too violent. Dr. Husemann, of Goulard's extract. In the first stage, or the Gottingen, suggests, for counteracting its rate of lime), prepared by dissolving 16 parts refined sugar in 40 parts water, and adding 5 parts slacked lime. Digest the mixture for 3 days, stir occasionally, filter, and evaporate to dryness.

Antidote for Poisoning by 5916. Chlorine gas is an irritative poison, and the best antidotes are said to be ammoniacal gas, or the vapor of warm water, of wine, or of ether. The effects of chlorine have been known to pass off in the open air; leaving, in a certain instance, a violent cough,

which disappeared in a few hours.

5917. Hodgen's Simple Stomach Pump. Attach 4 feet of india-rubber tubing to a stomach tube, fill both with water by followed by a complete cure. The narcotic simply dipping it in the liquid, end first, then compressing the elastic tube between the thumb and finger to keep the fluid from runcontracted, and the jaws had to be forced ning out, introduce the stomach tube down open to give the medicine, which was mixed the throat of the patient, lower the outer end of the elastic tube, and the contents of the stomach pour out as readily as if from an open vessel, the rubber tube acting as a syphon. When the fluid ceases to flow, dip the outer with 10 or 12 parts of water; also the fumes end of the tube beneath the surface of the water, elevate the vessel containing it above ate of potash and sulphate of iron. This has the level of the patient's mouth, and the stombeen lately very strongly recommended. ach is soon filled; lower again the outer end Cold affusion should be adopted in all cases, of the tube and the stomach is emptied. This can, of course, be repeated as often as is necessary. The advantages claimed for this simple contrivance are, that it is of speedy stage of insensibility and paralysis. Artificial and easy application, has no valves to become respiration should also be attempted. Un-obstructed or deranged, and is far less expen-

Cure for Ulcers Caused by before antidotes can be applied. (See No. 5913.) Cyanide of Potassium. This substance is Antidotes for Strychnia and used in electroplating and other arts, and Nux-vomica. Evacuate the stomach with sometimes occasions ulcers on the hands. Prothe stomach pump or emetics. (See No. tosulphate of iron in fine powder, ground in raw linseed oil, is recommended by a pracfor relieving the pain and healing the sores.

First dose, 1 ounce elecampane root, boiled in these glasses. 1 pint milk until reduced to & pint. Second dose (to be taken 2 days after the first), 11 as 8000 persons die annually in British India ounces elecampane root in 1 pint of milk, and Burmah, from the effects of snake bites, boiled as the first. Third dose, the same as The Inspector of Police to the Bengal Governthe second (to be taken 2 days after); in all, ment reports that of 939 cases in which am-3 doses. Mr. J. W. Woolston, a respectable citizen of Philadelphia, vouches for the above receipt. He says: "I have known of its being receipt. He says: "I have known of its being the remedy was not administered till about 3½ tried in one case, and no inconvenience has hours after the attack, on the average. In the been felt. A friend of mine, of whom I fatal cases, the corresponding duration of time obtained the receipt, knew of 20 instances was 4½ hours.

We give 5927. To Cure the Stings of Hornets, the above for what it is worth, but we have no great faith in it.

Cure for Hydrophobia. 5920. Cut out completely the wounded part before the poison can be absorbed. It is recommended, in order to do this quickly and thoroughly, that a stick be whittled to a shape resembling supports the part, and renders the cutting more easy and certain. This should be followed by cauterization, either by the use of a hot iron, or some strong caustic substance.

5921. To Remove the Virus in Hydrophobia. Suck the bitten part well, spitting out the fluid obtained from the wound; then apply some strong nitric acid, or lunar caustic, and bind the part up as tightly as the patient can bear it. Only one cauterization is necded.

5922. Youatt's Cure for Hydrophobia. Youatt (the great horse doctor) says he has been bitten eight or ten times and always cured himself by rubbing nitrate of silver in the wound. It should be applied as soon after the accident as may be. In 6 weeks the virus is disseminated through the system and then hope is gone.

5923. Preventive of Hydrophobia. The production of profuse perspiration is sometimes of great use in preventing the bad effects of a bite, so it should be tried.

5924. Ribron's Antidote to the Poison of the Rattlesnake. Iodide of potassium, 4 grains; corrosive sublimate, 2 grains; bromine, 5 drachms. 10 drops of this mixture, diluted with 1 or 2 table-spoonfuls of brandy, wine, or whiskey, constitute a dose, to be repeated if necessary. It must be kept in glass-stop-pered phials, well secured, as the air will affect it. The salts may, in case of emergency, be first dissolved in a little water, before adding the bromine, as this dissolves them very This is a valuable remedy. Hammond, in speaking of the remedy, says that during a recent expedition to the Rocky Mountains, he had frequent opportunities to test its efficiency. The results were satisfac-

possible, and kept exhausted until all danger of cure suited to the party affected.

tical man, as the most effectual application has passed. It has been proved that the bites of vipers, both on man and animals, were ren-5919. Treatment for Hydrophobia. dered entirely harmles by the application of

5926. Cure for Snake Bites. As many ment reports that of 939 cases in which ammonia was freely administered, 702 victims have recovered, and in the cured instances,

5927. To Cure the Stings of Hornets, Wasps, Bees, and Spiders. Swelling may instantly be arrested by an application of equal parts common salt and bicarbonate of soda, dissolved in warm water, and well rubbed in on the place bitten or stung. (See also No. 5929.)

5928. Cure for Stings of Wasps, &c. a dog's tooth, and inserted in the wound. This Rub the part affected with a mixture of 1 part

spirits of hartshorn and 2 parts olive oil.
5929. To Cure the Bites of Insects. Dissolve 1 ounce borax in 1 pint water that has been boiled and allowed to cool. Instead of plain water, distilled rose-water, elder, or orange-flower water is more pleasant. The bites are to be dabbed with the solution as long as there is any irritation. For bees' or wasps' stings the borax solution may be made of twice the above strength.

5930. To Cure Poisoning by Poison Ivy, Oak, or Sumach. Bathe the poisoned part thoroughly with hot water, without soap. When dry, paint the place liberally, 2 to 4 times a day, with a feather dipped in strong tineture of lobelia. Avoid bringing the tincture in contact with any fresh wound or excoriation.

5931. Remedy for Poison Ivy, &c. In some cases, where lobelia (see last receipt) does not succeed quickly, an application, in a similar manner, of fauld extract of gelseminum sempervirens (yellow jessamine) will rarely fail to cure. Both of these are excellent remedies, generally acting like magic.

5932. Remarks on Poison Ivy, &c. Poison ivy, &c., act very differently upon different people. Some people are entirely proof against its effects, and can, with impunity, rub it on without any ill effect. Others are poisoned by simple contact with clothing that has touched it. This difference of susceptibility to the poison seems to apply equally to the remedies, as what will cure one person has little or no effect on another.

5933. Applications for Poison Ivy. Various applications have been used for the same purpose; bathing the parts with a decoction of hemlock boughs, or of oak leaves; or tory, and he thinks that, when taken in time, it with a table-spoonful of copperas (sulphate of may be entirely depended upon in the poison-ous wounds of the rattlesnake. iron) in a small tea-cupful of boiling water; or painting over with fresh lime-water; or 5925. To Extract the Poison from a rubbing wet salt on the poisoned part; or Rattlesnake Bite. The most direct and bathing the parts affected freely with spirit of efficient means of counteracting the absorp-tion of the poison is suction, and this is most allow the nitre to penetrate, more than a sineffectually done by exhausting a cupping-gle application is rarely necessary. It will glass over the wound. The cupping-glass scarcely be possible to fail in finding, in one must be applied as soon after the injury as or other of the remedies here given, a means Tables of Weights, Measures, &c. The following tables have been compiled for the purpose of aiding the reader to determine with facility, the relative values of different weights and measures; and to furnish in a convenient group a mass of valuable information that would otherwise have to be sought for in a number of volumes not easy of access. Most of the tables have been made expressly for this work, and all of them have been carefully recalculated, revised, and corrected by a competent mathematician.

5935. Avoirdupois Weight is employed for weighing all goods, except those for which Troy or Apothecaries weight are used. The ton is subdivided into hundredweights, quarters, pounds, ounces, and drachms. (See No. 6031.) Some goods are sold by the hundred-weight of 100 pounds, instead of the hundred-weight (cwt.) of 112 pounds; a ton composed of 20 hundreds would then contain only 2000 pounds. The pound avoirdupois consists of 7000 Troy grains. The drachm avoirdupois is therefore 27.34375 Troy grains. The standard avoirdupois pound of the United States is the weight of 27.7015 cubic inches of distilled water, at 39.83° Fahr., the barometer being at 30 inches.

		_		_		_	
. !	Ton. Cwt.		Lbs.	Oz.		Dr.	
Ì	1 = 20 = 0						
8	1 =	4 =	112 =	1,79	$^{2}=$		
3		1 =	28 =	44	18 =	7.168	ţ
3			1 =	1	6 =	256	
-					1 =	16	
ı	5936. E	quival	ents (of A	Voir		
ı l		in Tro	w We	oht.			
r	Avoirdupois.		y W e:	Oz.	Dwt.	Grains.	
3	1 Ton	=	2922	2	13	8	,
\$	1 Cwt.	=	146	ĩ	6	16	
,	1 Qr.		34	ō	6	16	
	1 Lb.	=== ===	i	$\tilde{2}$	11	16	
1	1 Oz.	=	-	•	$\tilde{18}$	5 <u>ł</u>	
	1 Dr.	=			ĩ	$3\frac{2}{3}\frac{1}{2}$	
- 1	5937. Va		Awai	well to the		Zaiaht	
9	3001, 4 <i>a</i>	Apothe	22.401	Moor	OTS A	ergur	•
•	111 2						
:			$f_3^2 = f_3^2$		呗		
ı		nd = 1	15 2		3.3622		
3		ce =	7		0.3351		
3	5938. Va	lue of	Avoir	rdupo	is in	Apo-	
?		thecar	iae W/	siæĥ+		•	
3	Av oirdupo	is.	Apot	hecario	es.		
3		₽₽	7	hecario 3	Э	Gr.	
٠!	1 pound	= 1	5	4	2	0	
١,	I pound		~	"M			

5939. Decimal Equivalents of lbs., grs., and cwt.

occo. Decimal Equivalents of 105., q15., and two.			
qrs. lbs. cwt.	qrs. lbs. cwt.	qrs. lbs. cwt.	qrs. lbs. cwt.
0 01=.0044	1 0=.25	2 0=.5	3 0=.75
0 1 .0089		2 1 .5089	3 1 .7589
0 2 .0178	1 1 .2589 1 2 .2678	2 2 .5178	3 2 .7678
0 3 .0268	1 3 .2768	2 3 .5268	3 3 .7768
0 4 .0357	1 4 .2857	2 1 .5089 2 2 .5178 2 3 .5268 2 4 .5357 2 5 .5446 2 6 .5535 2 7 .5625 2 8 .5714 2 9 .5803 2 10 .5892 2 11 .5982	3 2 .7678 3 3 .7768 3 4 .7857 3 5 .7946 3 6 .8035 3 7 .8125 3 8 .8214 3 9 .8303
0 5 .0446	1 5 .2946	2 5 .5446	3 5 .7946
0 6 .0535	1 6 .3035	2 6 .5535	3 6 .8035
0 7 .0625	1 7 .3125	2 7 .5625	3 7 .8125
0 8 .0714		2 8 .5714	3 8 8214
0 9 .0803	1 8 .3214 1 9 .3303	2 9 .5803	3 9 .8303
0 10 .0892	1 10 .3392	2 10 .5892	3 10 .8392
0 11 .0982	1 11 .3482	2 11 .5982	3 11 .8482
0 12 .1071	1 12 .3571	2 12 .6077	3 12 .8571
0 13 .1160	1 13 .3660	2 13 .6160	3 11 .8482 3 12 .8571 3 13 .8660
0 14 .125	1 14 .375	2 14 .625	3 14 .875
0 15 .1339	1 15 .3839	2 15 .6339	3 15 .8839
0 16 .1429	1 16 .3929	2 16 .6429	3 16 .8929
0 17 .1518	1 17 .4018	2 17 .6518	3 17 .9018
0 18 .1607	1 18 .4107	2 18 .6607	3 17 .9018 3 18 .9107
0 19 .1696	1 19 .4196	2 19 .6696	3 19 .9196
0 20 .1786	1 20 .4286	2 20 .6786	3 20 .9286
0 21 .1875	1 21 .4375	2 21 .6875	3 21 .9375
0 22 .1964	1 22 .4464	2 22 .6964	3 22 .9464
0 23 .2054	1 23 .4554	2 14 .625 2 15 .6339 2 16 .6429 2 17 .6518 2 18 .6607 2 19 .6696 2 20 .6786 2 21 .6876 2 22 .6964 2 23 .7054	3 23 .9554
0 24 .2143	1 24 .4643	2 24 .7143	3 24 .9643
0 25 .2232	1 25 .4732	2 25 .7232	3 25 .9732
0 26 .2321	1 26 .4821	2 26 .7321	3 26 .9821
0 27 .2411	1 27 .4911	2 26 .7321 2 27 .7411	3 26 .9821 3 27 .9911

5940. Decimal Equivalents of Pounds and Ounces.

oz.	1ъ.	oz.	lb.	oz.	1ъ.	oz.	1b.	oz.	lb.
1 1 2 1 2 1 2 1 2 1 1 2 1 1 2 1 1 1 1 1	.015625 .03125 .046875 .0625 .09375 .125 .15625	3 3½ 4 4½ 5 5½	.1875 .21875 .25 .28125 .3125 .34375 .375	6½ 7 7½ 8 8 8½ 9	.40625 .4375 .46875 .5 .53125 .5625 .59375	10 10½ 11 11½ 12½ 12½ 13	.625 .65625 .6875 .71875 .75 .78125 .8125	13½ 14 14½ 15 15½ 16	.84375 .875 .90625 .9375 .96875

5941. Avoirdupois Weight Expressed in Grams.

Avoirdupois.

1 Ton = 1,015.938.84 = 1.016 Milliers

1 Cwt. = 50,796.94 = 5.080 Myriagrams

1 Quarter = 12,699.23 = 1.270 Myriagrams

1 Pound = 453.54 = 4.535 Hectograms

1 Ounce = 28.34 = 2.834 Dekagrams

1 Drachm = 1.77

5942. Troy Weight is used by jewelers for weighing gold, silver, platina, and all precious stones except the diamond; and is the weight adopted by the mint. The pound Troy contains 5.760 grains.

5943. Diamond Weight. Diamonds are weighed by a separate method; the carat, equivalent to 3.2 grains Troy, is thus subdivided.

 Carat.
 Grains.
 Parts.
 Troy Grains.

 1
 =
 4
 =
 16
 =
 3.2

 1
 =
 4
 =
 .8

 1
 =
 9

5944. Troy Weight Compared with Avoirdupois.

Troy. Oz. Avoirdupois.

1 Pound = 13 2.65
1 Ounce = 1 1.55
1 Dwt. = 0.877

5945. Equivalents of Troy in Apothe-

caries Weight.
Apothecaries. Troy. Gr. Ħъ 1 Pound = 10 0 0 1 Ounce = 0 $\mathbf{0}$ 0 1 1 Dwt. 1 Grain = 5946. Weight Expressed Troy

Grams.

Troy. Grams.

1 Pound = 373,202, or 3,732 Hectograms
1 Opens = 21,100, or 2,110 Delegrams

1 Ounce = 31.100, or 3.110 Dekagrams 1 Dwt. = 1.555

1 Grain = .0648, or 6.48 Centigrams. 5947. Approximate Values of Troy in Metrical Weight.

Troy weight.		Weight.	N	leasure.
32 oz.	=	1 kilogramme,	=	
16 oz.	=	$\frac{1}{2}$ kilog. $= 500$ grams,		.500 ··
	-=	125 grams.	==	.125 "
1 oz.	=	32 grams,	=	.32 "
I dr'm.		4 grams,	=	.4 14
15 grains	==	1 gram,	==	.1 cubic
				centimetre.

1½gr'ns = 1 decigram.
5948. Assayer's Gold Weights. The richness or purity of gold is expressed in carats. Pure gold is spoken of as containing 24 carats, of 12 grains each; and any sample containing 12, 18, 22, or any other number of parts of pure gold, in 24 parts, is said to be of so many carats fine. In the process of assaying gold, the real quantity taken is very small, generally 6 or 12 grains; and this is termed the "assay pound." It is nominally subdivided into 24 carats, and each carat into 4 assay grains, and each grain into quarters. When the assay pound is only 6 grains, the quarter of the assay grain will only weigh the '54 of a grain; hence the most accurate system of weighing must be adopted.

5949. Assayer's Silver Weights. The richness or purity of silver is either expressed in pennyweights or Tion. In the first case, it is supposed that the mass of silver to be examined consists of 12 equal parts, called pennyweights; so that if an ingot weighs an ounce, each of the parts will be n's of an ounce. Hence, if the mass of silver be pure, it is called silver of 12 pennyweights; if it contain \(^1_2\) of its weight of alloy, it is called silver of 11 pennyweights; if $\frac{2}{12}$ of its weight be alloy, it is called silver of 10 pennyweights; and so on in proportion for other qualities. It must be observed here, that the assayers give the name pennyweight to a weight equal to 24 real grains, which must not be confounded with their ideal weights. The assayer's grains are called fine grains. An ingot of fine silver, or silver of 12 pennyweights, contains, then, 288 fine grains; if this ingot contain 288 of alloy, it is said to be silver of 11 pennyweights and 23 grains; if it contain $\frac{1}{288}$ of alloy, it is said to be 11 pennyweights, 20 grains, &c. The purity of silver is now more frequently expressed in 1700. which admits of greater accuracy.

5950. Table for Converting Troy into

Avoirdupe	ois Weight,
Troy Avelrdapeis	Troy Avoirdupois
Ounces, Ounces, Grains.	Ounces. Cunces Grains.
$1 = 1 42\frac{1}{2}$	$7 = 7 297\frac{1}{2}$
2 = 2 85	$ 8 = 8 \ 340^{\circ}$
$3 = 3 \cdot 127\frac{1}{2}$	$9 = 9 382\frac{1}{2}$
4 = 4 170	$10 = 10 ext{ 425}$
$5 = 5 212\frac{1}{2}$	11 = 12 = 30
6 = 6 255	12 = 13 721
175 Troy ounces are ed	jual to 192 avoirdupois.
Troy. Avoirdupois.	Troy. Avoirdupois.
Њ ЊОz. Gr.	th th Oz. Gr.
$1 = 0 13 72\frac{1}{5}$	18 = 14 12 430
$2 = 1 \ 10 \ 145$	$19 = 15 \ 10 \ 65$
$3 = 2 \ 7 \ 217\frac{1}{2}$	$20 = 16 7 137\frac{1}{2}$
$4 = 3 \ 4 \ 290$	$30 = 24 \ 10 \ 425$
$5 = 4 \cdot 1 \cdot 362\frac{1}{2}$	40 = 32 14 275
$6 = 4 \cdot 14 \cdot 435$	50 = 41 2 125
7 = 5 12 70	60 = 49 5 4121
$8 = 6 \ 9 \ 142\frac{1}{2}$	$70 = 57 9 262\frac{1}{2}$
9 = 7 6 215	$80 = 65 \ 13 \ 112\frac{1}{2}$
$10 = 8 \ 3 \ 287\frac{1}{2}$	$90 = 74 \ 0 \ 400$
$11 = 9 \ 0 \ 360$	$100 = 82 \ 4 \ 250$
12 = 9 13 432t	$175 = 144 \ 0 \ 0$
$13 = 10 \ 11 \ 67\frac{1}{2}$	$200 = 164 \ 9 \ 62\frac{1}{2}$
$14 = 11 8 140^{\circ}$	$300 = 246 \ 13 \ 312\frac{1}{4}$
$15 = 12 5 212\frac{1}{2}$	400 = 329 2 125
16 = 13 2 285	500 = 411 6 375
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$1000 = 822 \ 13 \ 312\frac{1}{2}$
20 20 20 20 20	1000 - 022 10 0129

5951. Apothecaries Weight is a subdivision of the Troy pound into ounces, drachms, scruples, and grains. It is used in compounding medicines, and is the officinal standard of the U.S. Pharmacopæia.

5952. Apothecaries Weight Compared with Avoirdupois Weight.

TENO MUCHETOR.		viorionbote.		
		Oz.	Dr.	
1 Pound	===	13	2.65	
1 Ounce		1	1.55	
1 Drachm	=		2.19	
1 Scruple	==		0.73	

Imperial Measure.

5953.	Apothecaries Weight Compared
	with Troy Weight.

Apothecaries.		Troy.				
-		Lb.	Oz.	Dwt.	Gr.	
1 Pound	=	1	0	0	0	
1 Ounce	=		1	0	Û	
1 Drachm	=			2	12	
1 Scruple	=				20	
OFA TT-1		A 41-		ica W	7-1-1	

5954. Value of Apothecaries Weight

in Apothecaries Measure.						
Weight		$f\frac{7}{3}$	<i>1</i> 3	πy		
1 Pound	=	$1\bar{2}$	5	7.2238		
1 Ounce	==	1	0	25.6020		
1 Drachm	=	0	1	3.2002		
1 Scruple	==	0	0	21.0667		
1 Grain	==	0	0	$_{-}1.0533$		

5955. Anothecaries Weight Expressed

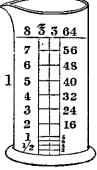
•	in (rams
1 Pound	=	3.732 Hectograms
1 Ounce	=	3.110 Dekagrams
1 Drachm	=	3.887 Grams
1 Scruple	==	1.296 "
1 Grain	_	6.4 Centigrams.

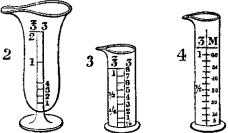
5956. Apothecaries, or Wine Measure, is the gallon of liquid measure divided into pints, fluid ounces, fluid drachms, and minims. The minim being equivalent to one drop of water. The symbols or abbreviations used in this table will be found explained in No. 5964. In all the tables of comparison between apothecaries measure and avoirdupois or other weights, the basis assumed is the weight of a cubic inch of water at a temperature of 39.83° Fahr., the barometer being at 30 inches, and is equivalent to 252.693 Troy A grain measure is the capacity or bulk of a grain of water weighed at its maximum density; a grain measure of any fluid, therefore, weighs more or less than a grain, according as its specific gravity is greater or 5962. less than water at standard temperature.

Cong. 0.

$$f\overline{3}$$
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5957. Graduated Fluid Measures. Fluids are measured by means of glass vessels having a gradnated scale engraved on their sides. These are of different capacities, to measure 8 ounces, 2 ounces, 1 ounce and 1 drachm respectively; the scale of each being graduated to represent the aliquot parts of their respective capacities.





figures on the left of the graduated scale denote ounces, and those on the right, drachms; the first ounce being divided into quarters of 2 drachms each. No. 2 is a 2-ounce measure, the first half-ounce being divided into drachms. Nos. 3 and 4 are 1 ounce and 1 drachm measures respectively; the former is graduated in drachms, the first of which is divided into halves; the latter is marked in divisions of 5 minims each.

5958. Relative Value of U.S. Apothecaries and British Imperial Measure. (See No. 6031.) U.S. Apothecaries Measure.

	Aportice					
١	Measure.		Pinte.	Fi.nz.	Fl.dr.	Minims.
	1 Gallon83311 Imp.	Gallon,	or, 6	13	2	22.85
i	1 Pint83311 "	Pint.	or,	16	5	17.86
ì	1 Fl.Oz. = 1.04139 "	F!.Oz.,	or.	1	0	19.87
Į	1 Fl.Dr. = 1.04139 "	Fl.Dr.,	or,		1.	2.48
	1 Minim - 1.04139 "	Minam,	or,			1.64
	5959. Apotheca	ries M	[east	ıre I	xpr	essed
1	in Litres.					
	1 Gallon		3.78	515 L	itres	
	1 Pint	=	4.731	143 I)ecili	tres
	1 Fluid ounce	_	2.957	715 C	entil	itres
	1 Fluid drachm	=	3.696	544 N	Tillili	tres

1 Minim .06160Value of Apothecaries Measure 5960. in Avoirdupois Weight.

1 Gallon =	8.332698 Pounds
1 Pint $=$	1.041587 Pounds
1 Fluid Onnce =	1.041587 Onnces

5961. Value of Apothecaries Measure in Troy Weight.

Apothecaries	•	7	ŕroy	Wei	ght.	
Measure.		Lbs.	Oz.	Dwt.	Grains.	
1 Gallon	=	10	1	10	8,88	
1 Pint	=	1	3	3	19.11	
1 Fluid Ounce	=			18	23.69	
1 Fluid Drachm	=			2	8.96	
1 Minim	=				.95	
OAS Walve of	F A v	atha	00 11	ina '	Meggii	

Value of Apothecaries Measure in Apothecaries Weight.

Measure.	th ₹ 3 → Grains Grains	
1 Gallon	$= 10 \ 1 \ 4 \ 0 \ 8.88 = 58328.886$	i
	= 131111.11 = 7291.110	
	= 7 1 15.69 $=$ 455.694	
1 Fluid drachm	a = 216.96 = 56.961	8
1 Minim	.949	
5963. M ise	cellaneous Measures an	d
! ተ ክ	seir Equivolente	

ì	rea-spoomuiao	ющ	, L II	. aracar	n.
1	Dessert "	"	2	44	
1	Table "	"	4	"	
	Wine-glassful.	46	2 f	. ounce	s.
	Tea-cupful	"	4	4.6	
	Breakfast-cupful	"	8	44	
	Tumblerful		8	46	
	Thimbleful	"	a fl	. drachr	n.
	Pinch (of leaves and flowers)	"	Ĩd	r. (Troy).
	Handful "	"	10		,

5964. Signs and Abbreviations Used in Medical Prescriptions.

R	Recipe	Take
āā	RecipeAna	Of each
	Libra	
7	Uncia.	Ounce
3	Uncia	Drachm
Э	Scrupulus	Scruple
Cong	-Congius	Gallon
0	Octarius	Pint
f 7	.Fluid Uncia	Fluid Ounce
f3	Fluid Uncia .Fluid Drachma	Fluid Drachm
np	.Minimum	Minim
Chart	.Chartula	Small paper

1 Gill

CollyrCollyrium	Eye-water
DecotDecoctum	Decoction
FtFiat	
GargGargarysma	
GrGranum	Grain
GttGutta	
Haust Haustus	Draught
InfusInfusum	
MMisce	
MassMassa	Mass
MistMistura.	
PulvPulvis	
Q. S Quantum Sufficit. Suffici	ent Opantity
SSigna.	
S. S. Semis	
N. N	· · · · · · · · · · · · · · · · · · ·

5965. Strength of Doses at Different Ages. The following gradations for doses of medicines apportioned to the age of the patient were originally drawn up by Gaubius.

Unde	r ş	year	16	οf	2	full	de
"	1	66	1			66	
"	2	years "	ئ ُ			"	
"	3	""	į			"	
64	4	"	¥			"	
66	7	"	ï			"	
46	.14	"	š			66	
22	20	44	~			"	
Abov	e 21	" th	e fu	dl d	los	e.	
44	63	**	11			"	
64	77	66	îã			"	
"	100	26	5623			"	

Dr. Young gives the following simple formula: For children under 12 years, the doses of most medicines must be diminished in the proportion of the age to the age increased by 12. Thus, at 2 years the Thus, at 2 years, the dose will be + of that for an adult, viz:

$$\frac{2}{2+12} = 1$$

Sex, temperament, constitutional strength, and the habits and idiosyncrasies of individuals, must be taken into account. Nor does the same rule apply to all medicines. Calomel, for instance, is generally borne better by children than by adults; while opium affects them more powerfully, and requires the dose to be diminished considerably below that indicated above.

5966. Liquid Measure. This is used for all liquids which are sold by measure. The $|\bar{1}|_{Peck}$ United States Government standard gallon, adopted by the Treasury Department in 1832, has a capacity of 231 cubic inches, and contains 58,372.2 troy grains of distilled water, at 39.83° Fahr., the temperature of its maximum density.

5967. Liquid Measure Compared with Apothecaries Measure. The gallon and pint are the same in both measures. liquid gill contains 4 fluid ounces, or 32 fluid drachms, or 1920 minims.

5968. Relative Value of U. S. Liquid Measure in English Imperial Measure. U. States. Imperial. Quar 1 Gallon = .83311 gal., or 3 Quart. Pint. 2.660 1 Quart $= .83311 \, \tilde{q}t.$, or 2.66 = .83311 pt., or 1 Pint 3.33 = .83311 gill, or 1 Gill 0.835969. Liquid Measure Expressed in Litres. 1 Gallon 3.785148 Litres 1 Quart 1 Pint 9.46287 Decilitres

4.73143

1.18286 5970. Dry Measure. The Winchester bushel, formerly used in England, contained 2150.42 cubic inches; this was superseded in 1826 by the Imperial bushel of 2218.192 inches, or 80 pounds of distilled water at 620 Fahr., and the barometer at 30 inches. In the United States, the Winchester bushel of 2150.42 inches has been generally adopted, which holds 77.627413 pounds of distilled water at 39.83° Fahr., the temperature of its maximum density, and 30 inches barometric pressure. In New York the bushel is de-clared to contain 80 pounds distilled water at its maximum density, under the mean pressure of the atmosphere at the level of the sea. This would make the New York bushel contain 2216.128 cubic inches, somewhat less than the Imperial bushel, eveing to the different standard of temperature of the water. The "small measure" used in the markets should contain 2 quarts, or ‡ peck.

Quarter. Bushels. Pecks. Quarts. Pints. Cupic Inches 1=8=32=256=512=17203.361 = 4 = 32 = 64 = 2150.428 = 16 =1 =537.605 67.20033,600

5971. Dry Measure expressed in Litres. 35.23661 Litres 1 Bushel 1 Peck 8.80915 1 Quart 1.10114 1 Pint .55057

5972. Relative Value of United States Dry Measure and Imperial Dry Measure.

Bush, Pecks, Gals, Pints, or 7 3 0 .36 United States. Imperial. 1 Quarter = .96945 quarter, or 7 1 Bushel = .96945 bushel, or 1 6.04 =.96945 peck, OT 1 7.51 = .24236 gallon, or 1 Quart 1.94 $= .96945 \, \text{pint},$ 1 Pint or

Weight of a Barrel of Various 5973. Some things which are sold by Articles. weight or measure are also sold by the Barrel, the quantity being different for different articles. The weights are here given. For rice 600 pounds. Flour, 196 pounds. Powder, 25 pounds. Corn, as bought and sold in Kentucky, Tennessee, &c., 5 bushels of shelled corn. As bought and sold at New Orleans, a flour-barrel full of ears. Potatoes, as sold in New York, a barrel contains 21 bushels. Pork, a barrel is 200 pounds, distinguished in quality by "clear," "mess," "prime." A barrel of beef is the same weight.

5974. Weight of a Bushel of Various Commodities. The term bushel is also applied to a certain arbitrary weight varying with different articles. Wheat, beans, potatoes, and clover seed, 60 pounds to the bushel. Corn, rye, flax-seed, and onions, 56 pounds.

Corn on the cob, 70 pounds. Buckwheat, 52 5979. Decimal Equivalents of Fractional Parts of an Inch. pounds. Timothy seed, 45 pounds. Castor beans, 46 pounds. Oats, 35 pounds. Bran, 20 pounds. Blue grass seed, 14 pounds. 5975. Lineal or Long Measure. The

standard of linear measurements, by which all measures of capacity are also regulated, is derived from the length of a pendulum vibrating seconds in a vacuum. This, in the latitude of London, is equal to 39.1393 inches, and in the City Hall of New York, 39.1012 inches.

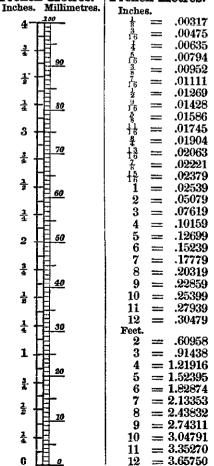
By scientific persons, parts of an inch are represented by a decimal fraction, but for mechanical purposes the inch is divided into a half, quarters and eighths.

Mile	Fu	rlor	ge.	Rods.		Yards.		Fcet.		Inches.
1	=	8	=	320	=	1760	=	5280	=	63360
		1	=	40	=	220	=	660	=	7920
				1	=	ō₫	=	$16\frac{1}{2}$	==	198
						1	=	3	=	36
								- 1		10

5976. Long Measure Expressed in Metres.

```
1 Mile
          = 1609.30634 = 1.609 Kilometres
1 \text{ Furlong} = 201.16329 = 2.012 \text{ Hectometres}
1 Rod
                5.02908 = 5.029 Metres
                 .91438 = 9.144 Decimetres
1 Yard
                 .30479 = 3.048 Decimetres
1 Foot
         _
                 .02539 = 2.539 Centimetres
1 Inch
```

5977. Compara-5978. Value of tive Scale of Inches in French Metres.



	Parts of		Parts of
Decimals.	an Inch.	Decimals.	an Inch.
.03125	= 1/2	.53125	$=\frac{1}{3}\frac{7}{2}$
.06250	= 16	.56250	= 4
.09375 -	= 3	.59375	= 1 2
.12500	$=\frac{1}{8}$.62500	= 3 ¹ / ₂ = ½
.15625	= 42	.65625	= 1
.18750	$=\frac{3}{16}$.68750	=
.21875	= 18 552 = 16 = 32 = 32 = 16	.71875	= 👯
.25000	$=\frac{1}{4}$.75000	= 3
.28125	= 32	.78125	= 35
.31250	≔ Å	.81250	==
.34375	$=\frac{11}{32}$.84375	$=\frac{\hat{2}\hat{7}}{3\hat{5}}$
.37500	= 32 = 3	.87500	= 1
.40625	$=\frac{13}{32}$.90625	= 39
.43750	= 4	.93750	= 15
.46875	<u> </u>	.96875	$=\frac{31}{32}$
.50000	= 1		0.2
KOOO	Dandrilann	Manager	C:

*5*980. Pendulum Measure. 6 points 12 lines = 1 inch. = 1 line.

5981. Shoemakers' Measures. No. 1 is 4½ inches in length, and every succeeding number is ½ inch. There are 28 divisions, in two series of numbers, viz.: from 1 to 13 and 1 to 15.

5982. Square or Syperficial Measure. Acre. Roods, Poles. Yards. Feet. Inches. 1=4=160=4,840=43,560=6,272,6401 = 40 = 1,210 = 10,890 = 1,568,160301 =2721 =39,204 9^{-} 1,296 1 =

Inches and Feet in French Metres.
Inches.

System 1 Agre = 4046.66700 sq. metres = 40.46667 Ares = 10.11667 " 1 Pole = 1 Yard = 25.29167 .83609 = 25.29167 Centares .83609 _ = 9.289 Milliares = .0645 " 1 Foot = .09289 " " 1 Inch = .000645

5984. Government Land Measure. A Township—36 sections, each a mile square.
A Section—640 acres. A Quarter Section, half a mile square—160 acres. An Eighth Section, half a mile long, north and south, and a quarter of a mile wide-80 acres. A Sixteenth Section, a quarter of a mile square -40 acres. The Sections are all numbered one to thirty-six, commencing at the northeast corner, thus:

6	5	4	3	2	NW NE
7	8	9	10	11	12
18	17	16*	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

The Sections are all divided in quarters, which are named by the cardinal points, as in section 1. The quarters are divided in the same way.

*School Section.

5985. Decimal Equivalents of the Divisions of a Foot.

	0	1	2	3	4	5	6	7	8	9	10	11
			.16666	.25	.33333	.41666	.5	.58333	.66666	.75	.83333	.91666
1,6	.00521	.08854	.17187	.25521	.33854	.42187	,50521	.58854	.67187	.75521	.83851	.92187
1	.01041	.09374	.17707	.26041	.34374	.42707	.51041	.59374	.67707		.84374	.92708
3	.01562	.09895	18228	26562	.34895	.43228	.51562	.59895	.68228	.76562	.84395 ,	.93229
1	.02083	.10416	.18750	.27083	.35416	.43759	.52083	.60416	68750		.85416	
5	.02604	.10937	.19270	.27604	.35937	.44270	.52604	.60937	.69270	.77604	.85937	.94270
3	.03125	.11458	.19791	.28125	.36458	.44791	.53125	.61458			.86458	
Ž	.03646	.11979	.20312	.28646		.45312					.86979	
			.20832			.45833			.70832	.79166	.87500	.95833
9	.04687	.13020	.21353	.29687	.38020	.46354	.54687	.63020	.71353	.79687	.88020	.96354
ã	.05208	.13541	.21874						.71874		.88541	.96875
11	.05729	.14062	.22395	.30729	.39062	.47395	.55729	.64062	.72395	.80729	.89062	.97395
8	.06250	.14583	22916	.31250	.39583	.47916	.56250	.64583	.72916	.81250	.89583	.97916
13	.06771	.15104	.23437	.31771	.40104	.48437	.56771	.65104	.73437	.81771	.90104	.98437
7	.07292	.15625	.23958	.32292	.40625	.48958	.57292	.65625	.73958	.82292	.90625	
16	.07813	.16146	.24479	.32813	.41146	.49479	.57813	.66146	.74479	.82813	.91146	.99479

To use the above table—suppose it is required to find what decimal of a foot is equivin the column under figure 5, run the finger feet, this squared is 16; then 16 times 3.14159 down that column until it is level with the is 50.265 square feet. If the diameter is 8 (marked on the left side of the table); the inches, the area would be 50.265 square inches.

figures .47916 give the decimal required.

5986. To Find the Square Feet in

Boards. Multiply the decimal in the table, corresponding to the width of the board, by the length of the board in feet.

Brealth in Inches.	Area of a Lineal Foot.	Breadth in Inches.	Area of a Lineal Foot.
1	.0208	6 1 61	.5208
$\frac{\tilde{1}}{2}$.0417	$6\frac{1}{2}$.5416
1 1 2 4	.0625	62	.5625
1	.0834	7	.5833
$\frac{1\frac{1}{4}}{1^{\frac{1}{2}}}$.1042	71	.6042
$1^{\frac{7}{2}}$.125	7± 7± 7± 74 8	.625
12	.1459	72	.6458
2^{-}	.1667	8	.6667
	.1875	81	.6875
$2\frac{1}{9}$.2084	81	.7084
$2\overline{4}$.2292	88	.7292
21 24 24 31	.25	81 81 82 82 9	.75
31	.2708	91	.7708
$3\frac{1}{2}$.2916	9 1 9 1 9 <u>2</u> 10	7917
$3\frac{3}{4}$.3125	98	.8125
4	.3334	10	.8334
41	.3542	101	.8542
$4\frac{1}{2}$.375	$10\frac{1}{2}$.875
43	.3958	10%	.8959
5	.4167	ii	.9167
5 1	.4375	114	.9375
$5\frac{4}{2}$.4583	$11\frac{1}{2}$.9583
5 <u>₹</u>	.4792	113	.9792
6	.5	***	10.00

Example. To find the square feet in a board 14½ feet long and 9½ inches wide. The decimal in the table opposite 91 inches

.7708 Multiply by 14 } 30832 7708 3854 11.1766 feet. Answer Or about 111 feet.

5987. To Find the Square Surface or quired to find what decimal of a foot is equivalent to 8 inches—look for the column headed the diameter), and multiply that by 3.14159; 8, and the figures at the top of that column, for small calculations 3\(\frac{1}{2}\) is nearly the same as .66666, is the decimal required. Again, to find the area of a circle the decimal of a foot equal to 5\(\frac{3}{4}\) inches, look whose diameter is 8 feet: The radius is 4

5988. Table Showing the Square Inches Contained in a Circle from Ten to Seventy-Three Inches in Diameter.

Diameter of Circle.	Square Inches.	Diameter of Circle.	Square Inches.
10	78.54	42	1900 50
11	$\frac{78.54}{95.03}$	43	$\begin{array}{c} 1388.59 \\ 1452.20 \end{array}$
12	93.03 113.10	44	1452.20 1520.53
13	132.73	44	
14	152.75 153.94	46	$\begin{array}{c} 1590.43 \\ 1661.91 \end{array}$
15	176.71	47	1735.00
16	201.06	48	
17	201.06 226.98	45	1809.56
18			1885.74
	254.47	50	1963.50
19	283.54	51	2042.82
20	314.16	52	2123.72
21	346.36	53	2206.19
22	380.13	54	2290.23
23	415.47	55	2375.83
24	452.39	56	2463.00
25	490.88	57	2551.76
26	530.93	58	2642.00
27	572.56	59	2734.00
28	615.75	60	2827.44
29	660.20	61	2922.47
30	706.86	62	3019.00
31	754.77	63	3117.25
32	804.25	64	3217.00
33	855.30	65	3318.31
34	907.92	66	3421.20
35	962.00	67	3526.66
36	1017.88	68	3651.69
37	1075.20	69	3739.29
38	1134.00	70	3848.46
39	1194.60	71	3959.20
40	1256.64	72	4071.51
41	1320.26	73	4185.40

The area may also be obtained by multiplying the square of the diameter by .7854. This method is deduced from the first one, and is founded on the fact that the square of any number is always 4 times as much as the square of half the number. In the first squared, and multiplied by 3.14159; in the in length = .7854. second, the whole diameter is squared, which will result in just 4 times as much as the square of the radius; the multiplier must 1 foot in height = .2619. be therefore the fourth part of 3.14159, or 5998. .7854.

5°89. To Find the Area of a Parallel. gram or Square. Multiply the length

of one side by the perpendicular height.
5990. To Find the Area of a Triangle. Multiply the base by 1 the perpendicular height. Or, to find the area from three sides given, from the half sum of the three sides subtract each side separately; multiply the half sum and the three remainders together, and the square root of the product will be the area.

5991. To Find the Area of a Trapezoid. Multiply the sum of the two parallel sides by 1 the perpendicular height.

5992. To Find the Area of a Sector of a Circle. Multiply the radius of the circle by 1 the are of the sector.

5993. To Find the Area of a Segment of a Circle. Find the area of a sector of a circle having the same arc, and deduct the triangle formed between the two radii and the chord of the arc.

5994. Cloth Measure, used for measur-

ing dry goods. Yard. Quarters. Inches. 16 36 9 4 = 1 21

The height of horses is measured by the "hand" of 4 inches.

Gunter's Chain. This is the measure generally adopted in land surveying, is 22 yards in length, and contains 100 links, each link, consequently being 7.92 inches long. The length of the chain was fixed at 22 yards, because a square whose side is 22 yards (1 chain) contains exactly 10 acre; in other words, a rectangular plot of ground 1 chain in width and 10 chains in length contains an acre. 80 chains make 1 mile in length; and, consequently, a square mile contains 640 acres. For surveying and laying out plots and building lots, a chain of 50 feet, or one of 25 feet (the usual frontage of a lot) is usually employed by surveyors.

5996. Cubic or Solid Measurement. Yard. Feet. Inches. 1 27 46,656

1.728 1 5997. American Cord-Wood Measure. Timber is measured by the ton of 50 cubic feet of round, or 40 cubic feet of hewn tim-Cord-wood is measured by the cord, which consists of a pile 8 lineal feet long and 4 feet high; and, as the wood is reckoned to be 4 feet in length, contains 128 cubic feet. A stick of cord-wood should measure 4 feet 4 inches from end to end, to compensate for the slope or bevil of the cut, and provide for an equivalent of 4 feet of solid wood. The contents of each lineal foot of the length of the pile is called a cord foot, and contains oneeighth part of a cord, or 16 cubic feet. A New York load of wood is one-third of a

A shipping ton contains 42 cubic feet. Also, the cubic foot being considered unity.

method the radius or half diameter is to be or 1, a cylinder 1 foot in diameter and 1 foot

A sphere 1 foot in diameter = .5236.

A cone 1 foot in diameter at the base and

Cubic Measure in Cubic Metres. .76450 Cubic Metres 1 Yard Foot 28.31486 Cubic Decimetres Inch 16.38591 Cubic Centimetres Table of Solid Feet reduced to 5999. Solid Inches

Solid Inches.										
Feet.	Inches.	Feet.	Inches.	Feet.	Inches.					
2=	= 3456	35=	= 60480	68=	=117504					
3	5184	36	62208	(29	119232					
4	6912	37	63936	70	120960					
5	8640	38	65664	71	122688					
6	10368	39	67392	72	124416					
7	12096	40	69120	73	126144					
8	13824	41	70848	74	127872					
9	15552	42	72576	75	129600					
10	17280	43	74304	76	131328					
11	19008	44	76032	77	133056					
12	20736	45	77760	78	134784					
13	22464	46	794 88	79	136512					
14	24192	47	81216	80	138240					
15	25920	48	82944	81	139968					
16	27648	49	84672	82	141696					
17	29376	50	86400	83	143424					
18	31104	51	88128	84	145152					
19	32832	52	89956	85	146880					
20	34560	53	91584	86	148608					
21	36288	54	93312	87	150336					
22	38016	55	95040	88	152064					
23	39744	56	96768	89	153792					
24	41472	57	98496	90	155520					
25	43200	58	100224	91	157248					
26	44928	59	101952	92	158976					
27	46656	60	103680	93	160704					
28	48384	61	105408	94	162432					
29	50112	62	107136	95	164160					
30	51840	63	108864	96	165888					
31	53568	64	110592	97	167616					
32	55296	65	112320	98	169344					
33	57024	66	114048	99	171072					
34	58752	67	115776	100	172800					
	· · · · · · · · · · · · · · · · · · ·				·					

6000. Measurement of Stone and Brick-Work.

Perch, Masons' or Quarrymen's Measure. = { 22 cubic feet. To be measured in ______ 161 feet long, 16 inches wide, high, 161 feet long, § 24.75 cubic feet. To 18 inches wide, > = be measured in pile. 12 high, 🕽

1 cubic yard = 3 feet $\times 3$ feet $\times 3$ feet = 27 cubic feet. The cubic yard has become the standard for all contract work of late years. Stone walls less than 16 inches thick count as if 16 inches thick to mason; over 16 inches thick, each inch additional is measured. Number of Bricks required in Walls for each

		Square F	oot o	f Fac	ce of	Wall.	
	cness o	f Wall,	- 1	Thic	kness c	of Wail.	
4 i	nche	S	71	24 5	inche	S	43
8	"		15 [*] 1	28			
12	"		221	32	44		60
16	44			36	44		. 671
20	46		37 1	42	"		75

Cubic yard = 600 bricks in wall. Perch (22 cubic feet) = 500 bricks in wall. To pave 1 sq. yard on flat requires 41 bricks. edge 68

end, as directed in No. 5987, and then multi- when the average is taken. ply the area by the length of the cylinder; the product will be the cubical content. same denomination of measurement must be adhered to throughout the calculation, as, if the diameter or area is in inches, the length must be in inches. Thus: to find the cubical content of a cylinder 8 inches in diameter and 3 feet long; we find in No. 5987 that the area of a circle 8 inches in diameter is 50.265 square inches; multiply this by 36 inches (3 feet reduced to inches, the same denomination as the given diameter), and the product is 1809.54 cubic inches, or 1 foot, 81.54 cubic inches.

6002. Table of Spherical Contents, This table shows the relative proportions between the diameter, surface, and capacity (or cubical contents) of spheres.

Diameters.	Surfaces.	Capacities.		
1	3.141	.523		
2	12.567	4.188		
3	28.274	14.137		
4	50.265	33.51		
5	78.540	65.45		
10	314.159	523.6		
15	706.9	1767.1		
20	1256.6	4189.		
25	1963.5	8181.		
30	2827.	14137.		
40	5026.	33510.		

6003. To Find the Cubical Contents of Spars or Other Round Timber. the spar or timber were the same thickness through its entire length, the diameter of all parts would be the same, and one measurement would suffice to obtain the correct diameter; its cubical contents could then be found in the same way as for a cylinder; but this is hardly ever the case, as the thickness or diameter is different in every part. If the spar tapers regularly from one end to the other, measure the diameter at each end, add the two measurements together, and divide their sum by 2; this will give the average diameter. A piece of timber of irregular thickness must be measured in portions, each portion extending as far as the tapering is regular, and the contents of the different portions added together to get the contents of the whole. Having obtained the correct diameter in inches, look for it in the next table, and opposite it, in the next column to the right, will be the contents in feet of 1 foot of timber in length; multiply this by the length of the timber in feet, and the result will be the contents of the whole.

Thus, to find the contents of a 16-foot log whose average diameter is found to be 13 (that is, 13.5) inches, we find the figures on the next right hand column in the table are .99; this means that a log 1 loot long and inches in diameter contains .99 or 100 of a cubic foot. Multiply this .99 by 16, the Dimensions. A box 4 feet 7 inches long, and 2 feet 4 inches in width, and 2 feet 4 .99; this means that a log 1 foot long and 131 length of the log in feet, and we get 15.84, or about 15% cubic feet, which is the contents of the whole log.

6001. To Find the Cubical Contents the reason that many sticks of timber taper of a Cylinder. Find the area of the circular suddenly, and others are unequal in diameter

THOU CHO	arcrago 16 t	dicti.	
Diameter Inches.	Contents. 1 foot long.	Diameter Inches.	Contents. 1 foot long.
4.	.0872	27.5	4.12
5.	.137	28.	4.28
6.	.196	28.5	4.43
7.	.267	29	4.59
7. 7.5	.31	29.5	4.75
8.	.35	30.	4.91
8.5	.39	30.5	5.07
9.	.44	31.	5.24
9.5	.49	31.5	5.41
10.	.55	32.	5.58
10.5	.60	32.5	5.76
11.	.66	33.	5.94
11.5	.72	33.5	6.12
12.	.79	34.	6.31
12.5	.85	34.5	6.49
13.	.92	35.	6.68
13.5	.99	35.5	6.87
14.	1.07	36.	7.07
14.5	1.15	36.5	7.27
15.	1.23	37.	7.47
15.5	1.31	37. 37.5	7.67
16.	1.40	38.	7.88
16.5	1.48	38.5	8.09
17.	1.58	39.	8.30
17.5	1.67	39.5	8.51
18.	1.77	40.	8.73
18.5	1.87	40.5	8.95
19.	1.97	41.	9.17
19.5	2.07	42.	9.61
20.	2.18	43.	10.08
20.5	2.29	44.	10.555
21.	2.40	45.	11.044
21.5	2.52	46.	11.541
22.	2.64	47.	12.049
22.5	2.76	48.	12.566
23.	2.89	49.	13.095
23.5	3.11	50.	13.635
24.	3.14	51.	14.186
24.5	3.27	52.	14.747
25.	3.41	53.	15.320
25.5	3.55	54.	15.904
26.	3.69	55.	16.499
26.5	3.83	56.	17.104
27.	3.98	5 7 .	17.720

6004. Capacity of Cubical Boxes. box 1 foot and 1 inch each way, i. e., length, breadth, and depth, will contain 1 standard

ei.			
Feet.	Inches.		Bushels.
1	1	===	1
1	4 }	=	2
1	6₽	==	3
1	$8\overline{i}$	==	4
1	$10 \tilde{\gamma}_{ m c}$	==	5
1	$11\frac{1}{2}^{\circ}$	==	6
2	4	=	ž
2	2^{T}	=	8
$\frac{2}{2}$	3	=	ğ
$\tilde{2}$	Ă	=	10

inches in depth, will contain 20 bushels. The dimensions of a cylinder containing 1 United About 10 per cent. should be deducted States standard bushel are 18½ inches inside from the results given in the table when diameter, and 8 inches deep. A box 24 inches toll is charged on rafts of spars or logs, for by 16 inches square, and 28 inches deep, will

contain a barrel, 5 bushels. will contain a half barrel. A box 24 inches by 11.2 inches square, and 3 inches deep, will

A box 24 deep, will contain 1 gallon. A box 4 inches inches by 16 inches square, and 14 inches deep, by 4 inches square, and 4.2 inches deep, will

contain 1 quart.
6006. To Find the Amount of Lumcontain 1 bushel. A box 12 inches by 11.2 ber any Log will Make. Find the length inches square, and 8 inches deep, will contain of the log in the left-hand column of the next bushel. A box 8 inches by 8.4 inches Table; then on the top of the page find the square, and 8 inches deep, will contain I peck. diameter, and under the same will be found A box 8 inches by 8 inches square, and 4.2 the quantity of lumber the log will make; calinches deep, will contain 1 gallon. A box 7 culated for any length from 10 to 25 feet, and inches by 8 inches square, and 4.8 inches for any diameter from 12 to 44 inches.

Table Showing the Number of Feet of Inch-Board in a Log of Timber.

Length	eet					<u> </u>	D	iamete	er in I	nches.							
Len	a l	12	13	14 1	5 16	17	18	19	20	21	22	23	24	25	26	27	28
1	0	49	61	72	89 9	9 116	133	150	175	190	209	235	252	287	313	342	363
	ĭ	54	67		93 10		147	165	192	209	230	259	278	315	344	377	400
	2	59	73	86 1	07 11:	9 139	160	180	210	228	251	283	303	344	375	411	436
	3	64	79	93 1	$16 \mid 12$	9 150	173	195	227		272	306	328			445	473
	4	69	85	100 1	25 13		187	210	245		292	330	353			479	509
1	5	74	91	107 1	34 14			225	262		313	353	379			514	545
	6	79			42 15			240	280		334	377	404			548	582
1	7	84			51 16			255	297		355	400	429			582	618
	8	89			60 17		240	270	315		376	424	454			616	654
	9	93			69 1 8		253	285	332		397	447	480				692
	90	98			78 19			300	350		418	470	505				728
	21	103			$87 \mid 20$			315	368		439	495	530				764
	22	108			96 21		293	330	385		460	518	555		688	753	800
	3				$05 \mid 22$		307	345	403		480	542	571			787	837
	24				14 23		320	360	420		501	566	606			1	873
2	5	123	152	179 2	23 24	8 289	333	375	438	475	522	589	631	717	781	856	910
Big Diameter in Inches.																	
Length in Feet	29	30	31	32	33	34	35	36	37	38	3	9	40	41	42	43	44
10	381	411	444	460	490	500	547	577	644	669	9 7	00	752	795	840	872	925
111	419	1				550	602	634	708				828	874	924	959	1017
12	457	493				600	657	692	772	801	t 8	40	903	954	1007	1046	1110
13	495	534			637	650	712	750	836	368	3 9	10 9	978	1033	1091	1135	1203
14	533			644	686	700	766	807	901					1113		1222	1295
15	571	616		690		750	821	865	965						1259		1388
16	609					800	876	923	1029						1343		1480
17	647	698				850	931	980	1094					1351		1484	1573
18	685	739				900	985	1038	1158						1511	1571	1665
19	723	780				950	1040	1096							1595		1758
20	761					1000		1152	1287						1679		1850
21	800					1050		1210							1763	1833	1943
22	838					1100	1204		1415					1749		1920	2035
23	876					1150	1259	1322							1931	2007	2128
24	914	986			1176		1314				1 10						2220
25	952	1027	11103	# 115t	1225	1250	1308	1438	TOUG	1 10 00	5 17	ov P	oot	1907	2099	2102	2313

6007. Measure of Time.

The year of 365 days is divided into 12 calendar months, 7 of which have 31 days; 4 have 30 days; and 1, February, 28 days. The subject to his authority, but the Protestant solar year consists of 365 days, 5 hours, 48 countries continued the use of the Julian minutes, and 49 seconds; this excess over reckoning. This gave rise to the two modes 365 days, nearly 6 hours, or ½ day, is allowed of computation still found in Europe, called to accumulate through each 4 years, and prothe old style and new style. The latter was to accumulate through each 4 years, and provided for every fourth, or leap year, by adding adopted in England in 1752, by making the 1 day to February; but as this is adding a 1st of September the 12th. trifle too much, every 400 years one leap year is omitted, and this occurs when the year is by 4 without remainder, February has 29 divisible by 400 without remainder.

In the year 1582, the fact was observed by Pope Gregory XIII that, in consequence of 1 = 4 = 28 = 672 = 40,320 = 2419,200 this discrepancy not having been taken into 1 = 7 = 168 = 10,080 = 604,800 account since the commencement of the Ju-86,400 lian system (see No. 6064), the true time 3,600 exceeded the time as then reckoned by 10 60 days; and therefore ordered the 11th of March to be accounted the 21st. The Pope's edict was generally observed by the nations

> Whenever the date of the year is divisible days, and that year is called Bissextile.

6008. Table Showing the Number of the Same Date in any Other Month.

From To	Jan.	Feb.	Mar.	April.	May.	June.	July.	Ang.	Sept.	Oct.	Nov.	Dec.
January												
Feby	334	365	28	59	89	120	150	181	212	242	273	303
March	306	337	305	31	61	92	122	153	184	214	245	275
April	275	306	334	365	30	61	91	122	153	183	214	244
May												
June												
July	184	215	243	274	304	335	365	31	62	92	123	153
August	153	184	212	243	273	304	334	365	31	61	92	122
Sept												
October.												
Nov												
Dec												

Example: How many days from the 2d of February to the 2d of August? Look for February at the left hand, and August at the top, in the angle is 181. In leap year, add one day if February be included.

6009. Table Showing Difference of Time at 12 o'Clock (Noon) at New York. New York 12.00 N. Buffalo.....11.40 A. M. Cincinnati.....11.18 London..... 4.55 Paris..... 5.95 Rome..... 5.45 Constantinople. 6.41 New Orleans...10.56 Washington....11.48 " Vienna...... 6.00 Charleston....11.36 "
Havana......11.25 " Charleston....11.36 "St. Petersburg.. 6.57 "Havana.....11.25 "Pekin, night... 12.40 A. M. 6010. Geographical or Nautical Mea-

sure. Great Circle. Degrees. Leagues. Geo. Miles. 1 = 360 =7200 = 2160020= 60 1

The geographical or nautical mile, accord-Days from any Date in One Month to ing to Brande, is equivalent to 1.153 statute miles; this would give 2029.3 yards to the nautical mile, 69.18 statute miles to the degree, and about 24.905 miles for the earth's equatorial circumference. According to one of the very best authorities, Chambers' Enevclopædia, the nautical mile contains 2029 yards; on this basis, a degree would measure about 69.17 statute miles, and the earth's circumference about 24.901 statute miles. A great circle of the earth is an imaginary line or belt so drawn round the earth as to divide it into two equal parts or hemispheres; the equator and the ecliptic are great circles. In navigation, sailors measure depth of soundings and short distances by the fathom of 6 feet, and the cable-length of 120 fathoms.

6011. Nautical Time. The hour of the day or night is noted on board a ship by 1, 2, 3, &c., up to 8 bells. The 12 hours between midnight and noon, or noon and midnight, are divided into 3 portions of 8 bells each, the duration of time between bells being half an hour. During the course of each 12 hours, the same number of strokes of the bell will necessarily be used to denote three different hours or periods of time.

Bell	. Clo	ck-Time.	Clock-Time.	Clock-Time.
1	denotes	12.30	4.30	8.30
2	6.5	1.	5.	9.
3	44	1.30	5.30	9.30
4	"	2.	6.	10.
5	"	2.30	6.30	10.30
6	"	3.	7.	11.
7		3.30	7.30	11.30
Ř	44	4	8	19

6012. Capacity of Cisterns, &c.

Diameter in Feet and Inches.	Depth in Feet and Inches.	Number of Wine Gallons.	Number of Barrels.	No. of Hhds.	No. of Gallons in 10 Inches Depth.
2 ft.	2 ft.	45	1227	4.5 6.3	19
2 ft, 6 in.	2 ft. 6 in.	90	2 5	$1\frac{6}{14}$	30
3 ft.	3 ft.	158	2 °F 5 8	$2^{\frac{1}{2}}$	44
3 ft. 6 in.	3 ft. 6 in.	252	1 8	4	60
4 st.	4 ft.	374	1155	549	78
4 ft. 6 in.	4 ft. 6 in.	524	1683	820	97
5 ft.	5 ft.	732	2315	1183	122
5 ft. 6 in.	5 ft. 6 in.	976	31	$15\frac{1}{2}$	148
6 ft.	6 ft.	1267	40 ક	20 1	176
6 ft. 6 in.	6 ft. 6 in.	1614	5115	$25\frac{3}{3}$	207
7 ft.	7 ft.	2016	64	32	240
8 ft.	8 ft.	3004	9523	47 4 3	313
8 ft. 6 in.	8 ft. 6 in.	3600	$114\frac{18}{63}$	57 93	353
9 ft.	9 ft.	4276	13543	6725	396
9 ft. 6 in.	9 ft. 6 in.	5027	15987	7983	441
10 ft.	10 ft.	5868	$186\frac{1}{6}\frac{3}{3}$	93^{63}_{63}	489
11 ft.	11 ft.	7814	248 3	$124_{63}^{\frac{5}{2}}$	592
12 ft.	12 ft.	10152	$322\frac{\circ}{\circ}\frac{\circ}{3}$	161_{63}^{53}	705
13 ft.	13 ft.	12901	409 5	$204\frac{13}{63}$	827
14 ft.	14 ft.	16111	51133	$255\frac{1}{6}\frac{1}{3}$	959
15 ft.	15 ft.	19818	629 87	$314\frac{3}{6}\frac{1}{3}$	1101
20 ft.	20 ft.	46992	149153	74583	1958
25 ft.	25 ft.	91770	2913 1	1456 3	3059

Example: Suppose you desire to ascertain | The right hand column shows the number of the capacity of a cistern 4 feet 6 inches in gallons contained in 10 inches of depth. By diameter and 4 feet 6 inches in depth. Find this standard you may easily increase or the diameter in the left hand column, and diminish the capacity at pleasure. Thus, if directly opposite you will see that the cistern will hold 524 gallons of 231 cubic inches each, equal to 16 3 barrels, or 8 3 hogsheads. lons more, 20 inches deeper.

feet, or 51 feet 13 + inches. 1 fathom = eradicate, but there is no doubt that the 5.11625 feet, or 5 feet 1½ + inches, estima- dozen, half, and quarter, those stumblingting a mile at 6139½ feet, and using a 30" blocks in the way of the decimal system, will glass. If a 28" glass is used, and eight divi-eventually disappear as entirely as the now sions, then 1 knot = 47 feet 9 + inches, totally obsolete eighth and sixteenth of a 1 fathom = 5 feet 11\har{s} inches. The line dollar, the Mexican shilling and sixpence, should be about 150 fathoms long, having 10 6015. Official Standard Metre. The fathoms between the chip and first knot for following information was lately given by stray line. Miles \times .87 = knots. Knots \times Mr. Hilgard, of the United States Coast Sur-1.15 = miles. Feet per minute \times .01 = knots, vey, to the Journal of the Franklin Institute: per hour. 1 knot = 6082.66 feet; 1 statute There are, in the custody of the Treasury Demile = 5280 feet.

 \mathbf{The} Weights and Measures. parts of the units.

The Greek prefix DEKA means 10 units Несто " 100 1000 " Kilo MTRIA " 10000 " The Latin prefix DECI 46 100 - "" CENTI "

weights and measures is the METRE; the Barnard, with the result that, at the temperastandard length of which is the 100000000 of a ture of melting ice, there is no appreciable quadrant of the earth's meridian, equivalent difference, by the most delicate means of to 39.371 inches. The unit of dry and liquid measures of capacity is the LITRE, which is of the Conservatory and this iron metre." the Toos of a cubic metre, and contains 61.028 cubic inches. These figures are as 61.028 cubic inches. These figures are as would make the equatorial circumference of exact as a calculation involving twelve places the earth measure 24.854 statute miles. Besof decimals will bring it. The government sel's calculations, given in Chambers' Encystandard, adopted as sufficiently correct for clopædia, give the equatorial circumference all practical purposes, is 61.022 cubic inches; at 24.901 in miles. If this measurement be all practical purposes, is 61.022 cubic inches; at 24.9014 miles. If this measurement be this is based on a metre of 39.3635 inches, correct, the standard metre should be 39.371 The GRAM or unit of weight is the weight of that it would a cubic centimetre ($\frac{1}{100}$ of a metre) of water at 39.83° Fahr., and is equivalent to 15.434 6016. Dec grains. For post-office purposes, the ½ ounce avoirdupois is declared equivalent to 15 grams. The ARE, or unit of surface measurement, is the $T_{0,0}^{1}$ of a square metre, or 119.6 square yards. This system of weights and measures has not as yet come into general use, either in America or England. Its advantages are indisputably great for facilitating calculation as well as establishing uniform international standards; but its adoption necessarily meets with much opposition, as it overthrows not only all the old, arbitrary units of measure-ment, but their multiples and subdivisions also. It seems so natural to halve and quarter, and count by the dozen, that even in our decimal currency we cannot dispense with the half and quarter dollar and eagle; in fact, the advantage of our decimal currency cannot be appreciated to its full extent until the

Log Lines. 1 knot = 51.1625 vision. Old rooted customs are difficult to

partment, at the Office of Weights and Mea-Decimal System of sures, the following authentic copies of the standard metre and kilogramme of France, law has already been passed by the American viz.: Metre of platinum, compared and certiand British governments, adopting the deci- fied by Arago; metre of steel, compared and mal system as applied to weights and mea- certified by Silbermann; kilogramme of plasures. It is substantially the same as the tinum, compared and certified by Arago; French decimal system, and founded on units kilogramme of brass (gilt), compared and cerof the same value. The multiples and subdivisions of the different units are the same; metre is 39.3685 inches of the United States Greek prefixes being used to denote the standard scale, and the kilogramme is 15432.2 multiples, and Latin prefixes the fractional grains, or 2 pounds, 3 ounces, 119.7 grains grains, or 2 pounds, 3 ounces, 119.7 grains avoirdupois. There is also another metre, the property of the American Philosophical Society, which is one of the twelve original metres made by the French Government, and was brought to this country by Mr. Hassler, 10 of a unit the originator of the United States Coast Survey. A comparison between this bar and " MILLI " $\frac{1}{1000}$ " the standard of France at the Conservatory The fundamental unit of all the decimal of Arts and Trades was made by Dr. F. A. P. the standard of France at the Conservatory

The above standard metre of 39.3685 inches which would make the gram 15.432 grains, inches. This difference, however, is so trifling that it would not be appreciable for all prac-

6016. Decimal Measures of Length. 10,000 Myriametre metres. 1,000 Kilometre metres. Hectometre 100 metres. 10 Dekametre metres. Metre metre. Decimetre metre. Too metre. Centimetre $\frac{1}{1000}$ metre. Millimetre

Value of Metric Measures of Length in Long Measure. 6017.

			_ ~~~~		v.
		Liles.	Yds.		Inches.
Myriametre	==	6	376	1	2
Kilometre	=		1093	1	11
Hectometre			109	1	1.1
Dekametre	==		10	2	9.71
Metre	=		1	Û	3.371
Decimetre	=				3.937
Centimetre	==				.394

For general purposes, or small calculations, custom of counting by the dozen is entirely the following equivalents will be found sufficiently accurate: 1 millimetre is equal to $\frac{1}{2}$ divisible by 2, 3, 4, and 6; the decade, 10, by 2 inch; 1 centimetre is equal to $\frac{2}{3}$ inche; 1 deciand 5 only; and, although this is a matter of little moment as far as regards calculation, it makes a great difference for practical subdiscrete first purposes, or small catchatatons, the following equivalents will be found sufficiently accurate: 1 millimetre is equal to $\frac{1}{3}$ inche; 1 deciands only; and, although this is a matter of little moment as far as regards calculation, it makes a great difference for practical subdiscrete first purposes, or small catchatatons, the following equivalents will be found sufficiently accurate: 1 millimetre is equal to $\frac{1}{3}$ inche; 1 deciands only; and, although this is a matter of little moment as far as regards calculation, it makes a great difference for practical subdiscrete first properties.

6018.			in Inches.
1	= .001	=	.03937
$\frac{2}{3}$	= .002 $= .003$.07874 $.11811$
4	= .004	=	.15748
5 6	= .005 $= .006$.19685 .23622
7	= .007		.27560
8 9	= .008 = .000		.31497 .35434
Centimetre	. .		-
$rac{1}{2}$	= .01 $= .02$.3937 .7874
$\tilde{3}$	= .03		1.1811
4	= .04	_	1.5748
5 6	= .06		$1.9685 \\ 2.3622$
7	= .07	′ ==	2.7559
$\frac{8}{9}$	= .08		3.1497 3.5434
Decimetre	.		
$rac{1}{2}$	= .5		3.93 71 7.8 742
3	= :	3 =	11.8113
4 5	= .4 = .5		15.7484 19.6855
6	= :		23.6226
7	= .		27.5597
8 9	= .6 = .5		31.4968 35.4339
6019.	Value o		s in Feet.
Decimetres.	Feet. .328	Met	res. Feet. . 100
2 =	.656	-	
3 = 4 =	.984 1.312		300
5 =	1.640		90
6 = 7 =	1.968 2.297		卙
8 =	2.625	l	間
9 = ·	2.953	_	250
1 =	3.281		<u> </u>
$\begin{array}{ccc} 2 & = \\ 3 & = \end{array}$	6.562 9.843	1 _	20
4 =	13.124	Ì	Ħ
$_{e}^{5}$ =	16.405 19.686		1 200
6 = 7 =	22.967	-	80 7 200
8 ==	26.248		H
9 = Dekametre, Ma			50
_	0 = 32.81 0 = 65.62	. -	150
	60 = 98.43		山"
4 = 4	10 = 131.24		40
	50 = 164.05 $50 = 196.86$		H
7 = 7	0 = 229.67	'	甘
	80 = 262.48 80 = 295.29		30 100
Hectometre.		Ī	
$ \begin{array}{rcl} 1 & = 100 \\ 2 & = 200 \end{array} $			20
3 = 300	0 = 984.3	3 -	一計
4 = 400 $5 = 500$			
6 = 600			20
7 = 700			
$ \begin{array}{rcl} 8 & = 800 \\ 9 & = 900 \end{array} $			H
			othlo se used for a
THE IOLE	ogume suu	с шау і	JE USEU IOT &

The foregoing scale may be used for any other portion of the metrical system; for instance, if millimetres be used instead of

decimetres, the relative scale of feet will consist of the same figures, with the decimal point removed one place to the left, to divide by 10, the millimetre being to decimetre.

6020. Decimal Measures of Capacity.

ıbic Measu	re.
cubic metro cubic metro cu. decime cub. " cub. "	tre etres
,	u. centin u. centin

The following are approximate values, correct enough for rough calculations. One millilitre is equal to 15½ grain measures of water; one centilitre is equal to 154 grain measures, or 3 fluid drachms; one decilitre is equal to 1,540 grain measures, or 3½ fluid ounces; one litre is equal to 15,406 grain measures, or 210 pints; one cubic centimetre of water at its maximum density weighs 15½ grains, and is ? fluid drachm.

6021. Value of Metric Measures of Capacity in U.S. Dry Measure.

			Duen.	Peck.	Quart.	PILU.
į	Kilolitre	==	28	1	4+	
i	Hectolitre	=	2	3	2	1.6
	Dekalitre	=		1	0	1.6
	Litre	=				1.816
	Decilitre	=				.181
	Centilitre	=				.018
		Value	of M	etric	Measu	res of

Capacity in U. S. Liquid Measure.

				Æ		
ļ	Kilolitre	=	264	0	1	1.6
	Hectolitre	===	26	1	1	1.36
	Dekalitre	=	2	2	1	0.136
	Litre	=		1	0	0.413
	Decilitre	=				.841
	Centilitre	=				.084

6023. Equivalent of Metric Measures of Capacity in U.S. Apothecaries Measure. Fluid Fluid

•	77 . 11.		Gal.	Pint.		Frachm. Mi	
	Hectolitre	==	26	3	- 5	5	20
	Dekalitre	=	2	5	2	1	20
	Litre	=		2	1	6	32
i	Decilitre	=			3	3	3
Į	Centilitre	=				2	42
	8004	17 ~ los.	~ ~f	Made	in War		-4

Value of Metric Measures of Capacity in Imperial Dry Measure.

0	- , ₁	Bush.	Pecks.	Gals.	Pints.
Kilolitre	==	27	2	0	0.800
Hectolitre	=	2	3	0	0.080
Dekalitre	=			2	1.608
Litre	=				1.760
Decilitre	===				.176
6025. T	7alue	of	Metric	Measu	res of
0			Tion		

Capacity in Imperial Liquid Measure.

Kilolitre		9	31		Ω	3.200
		J		v	U	
Hectolitr	e =		22	0	0	0.320
Dekalitre	=		2	0	1	2.432
Litre	==				1	3.040
Decilitre	=					.704
6026.	Decimal	Mea	sure	s of	: Su	rface.

Equivalents in Square Measure.

- 1		ΑÇ	rem, sq. yus.	ory to
7	Hectare 10,000 square	metres :	2 2279	5.76
	Are 100 square		119	5.4
f	Centare 1 square	metre	1	1.76

6027.	Decimal	Weights.
uuzi.	TACCITITE!	AL CISTING

CODI. Decimient Weighten.						
Names	Number of Grams.	Weight of what quantity of Water at maximum density.				
Millier, or Tonneau	1,000,000	1 cub. metre				
Quintal	100,000	1 hectolitre				
Myriagram	10,000	10 litres				
Kilogram or kilo	1,000	1 litre				
Hectogram	100	1 decilitre				
Dekagram	10	10 cu. cent're				
Gram	1	1 cu. cent're				
Decigram	4	Locu. cent're				
Centigram		10 cu. milm's				
Milligram		1 cu. milm'e				

6028. Equivalent of Metric Weights in Avoirdupois Weight.

		TOB.	UZ.	Dr.
Millier	==	2204	9	1.6
Quintal	=	220	7	4.96
Myriagram	=	22	0	11.69
Kilogram	=	2	3	4.37
Hectogram	=		3	8.44
Dekagram	=			5.64
Gram	=			.56
4000 E	14	AS MEA	twin TI	tai-h4a

Equivalent of Metric Weights in Troy Weight.

Millier = 2677 1 19 20. Quintal = 267 8 11 23.6 Myriagram = 26 9 5 4.77 Kilogram = 2 8 2 12.48 Hectogram = 3 4 6.05 Dekagram = 6 10.21 Gram = 15.43 Decigram = 1.54			Lbs.	Oz.	Dwts.	Grains.
Myriagram = 26 9 5 4.77 Kilogram = 2 8 2 12.48 Hectogram = 3 4 6.05 Dekagram = 6 10.21 Grain = 15.43 Decigram = 1.54	Millier	=		1		
Kilogram = 2 8 2 12.48 Heetogram = 3 4 6.05 Dekagram = 6 10.21 Gram = 15.43 Decigram = 1.54	Quintal	=	267	8	11	23.6
Kilogram = 2 8 2 12.48 Heetogram = 3 4 6.05 Dekagram = 6 10.21 Gram = 15.43 Decigram = 1.54	Myriagram	=	26	9	5	4.77
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Kilogram	==	2	8	2	12.48
$\begin{array}{llllllllllllllllllllllllllllllllllll$	Hectogram	==		3	4	6.05
$\begin{array}{lll} \text{Grain} & = & 15.43 \\ \text{Deeigram} & = & 1.54 \end{array}$					6	10.21
2001,31021		===				15.43
Contigues -	Decigram	=				1.54
Centigram —	Centigram	=				.15

6030. Equivalent of Metric Weights in U. S. Anothecaries Weight.

-		Lbs.	Oz.	Dr.	Scr.	Grs.
Millier	=	2677	1	7	2	16.
Quintal	==	267	8	4	2	7.6
Myriagram	=	26	9	2	0	4.77
Kilogram	=	2	8	1	0	0.48
Hectogram	=		3	1	2	2.05
Dekagram	=			2	1	14.21
Gram	==					15.43
Decigram	=					1.54
						-

For general purposes the following values 6036. are sufficiently correct: 1 milligram is equal to $\frac{1}{6}$ grain; 1 centigram is equal to $\frac{1}{6}$ grain; 1 decigram is equal to $\frac{1}{2}$ grains; 1 gram is equal to $\frac{1}{2}$ grains; 1 dekagram is equal to 154 grains; 1 hectogram is equal to 1,543 grains; 1 kilogram is equal

to 15,432 grains.

English Weights and Mea-Avoirdupois and Troy weight are 6031. exactly the same as used in the United States, and the tables will be found in Nos. 5935, &c. In the new British Pharmacopæia, the weights are expressed in pounds, ounces, and grains, avoirdupois; thus superseding the Apothecaries weight as now in use in the United States. The old British avoirdupois drachm (16 ounce or 27.344 grains) is now obsolete, except in weighing silk. The new drachm is dounce.

6032. Imperial Standard Measure. Minims Gal. Quarts. Pints. F. Oz. F. Dr.

```
= 160 ==
                     1280
= 4 =
        8
                          = 76.800
        2
               40 =
                      320 = 19.200
               20 =
                      160
                              9.600
                          =
                1
                        8
                          =
                                480
                                60
```

The standard unit of this measure is the gallon which is declared by statute to contain 10 pounds avoirdupois (70,000 Troy grains) of distilled water at a temperature of 62° Fahr., the barometer being at 30 inches. The weight of a cubic inch of water, under the foregoing conditions, is 252.458 grains; the capacities of the measures are therefore as follows:

Imperial Gallon 277.274 Cubic Inches. 69.3185 Quart ___ Pint 34.65925 Fluid Ounce 1.73296 66 ----Drachm ----.21662

Thus it will be seen that there is a slight difference in weight between the English and United States unit of capacity, viz.: The cubic inch of water; the English being weighed at 62° Fahr, and the United States at 39.83°. (See No. 5935.)

6033. Imperial Measure Expressed in

	تاليا	res.
1 Gallon	=	4.54339 Litres
1 Quart	=	1.13585 "
1 Pint	==	5.67925 Decilitres
1 Fluid Ounce	==	2.83962 Centilitres
1 " Drachm	==	3.54952 Millilitres
1 Minim	=	.05916 "
~~~		

## 6034. Measure of Capacity for all

```
31\frac{1}{2}
      1 =
            = 126 = 252 = 1008
               4 =
                      32
```

The gallon is the Imperial measure of 277.274 cubic inches; and the gill contains 5 ounces avoirdupois of water. In addition to the above measures, there is the Tierce of

# 42 gallons, and the Puncheon of 84 gallons. 6035. Comparative Value of Imperial Measure and U. S. Liquid Measure. Imperial. Culted States. Gall. Qt. Pints. Gills. College States.

```
Gail. Qt. Pints.
or 1 0 1
1 \text{ Gallon} = 1.20032 \text{ Gallons, or } 1
1 Quart = 1.20032 Quarts, or
1 Pint = 1.20032 Pints, or
                                                       -1.60
                                                       0.80
              = 1.20032 Gills,
1 Gill
                                                       1.20
            Imperial Liquid Measure Ex-
```

pressed in Litres. 1 Hogshead = 2.86234 Hectolitres

1 Barrel 1.43117 1 Gallon 4.54339 Litres 1 Quart 1.13585 1 Pint 5.67925 Decilitres 1 Gill 1.41981

6037. Dry or Corn Measure.

Quarter.	Duah	of a	Thomas	. ,	allon		Pinto.		Capacity in Cubic Inches.
									17.745.536
-	1	_			Ĭ8				2,218,192
	~			=			16		,
			-		ĩ	_	8		277.274
					-		ĭ	_	34.659

The above capacities are for struck measure; the heaped measures contain nearly 1 more, the heaped bushel containing 28151 cubic inches.

## 6038. Relative Value of Imperial Dry Measure and United States Dry Mea-

au.c.						
Imperial.	United States.	Qr.	Bush.	Pecks.	Qts.	Pinte.
1 Quarter	== 1.03151 Quarters,	or I	. 0	1	0	0.133
1 Bushel	= 1.03151 Bushels,	OF.	1	0	1	0.016
1 Peck	== 1.03151 Pecks,	or		1	0	0.404
1 Gallon	= 4.12604 Quarts.	or			4	0.252
1 Pint	1 09151 Pint	OF			-	1.091

#### 6039. Relative Value of Imperial Measure and United States Standard Apôthecaries Measure.

							•	Jal.	Pint.	Fl. Oz.	Fl. Dr.	Minims.
1	Imp.	Gallon	=			Gallons,	or	1	1	9	5	7.66
1	44	Pint	=	1.20032	+4	Pints,	or		1	3	1	38.45
1	16	Fluid Ounce	=	.960256	"	Fluid Ounces,	or				7	40.92
1	• 4	Fluid Drachm	=	.960256	46	Fluid Drachms,	or					57.62
1	14	Minim	=	.960256	"	Minims,	or					.96

## 6040. Imperial Dry Measure Expressed. France; the système usuel, or old Binary-

in Lines.										
1 Quarter	==	2.90777 Hectolitres								
1 Bushel	=	3.63471 Dekalitres								
1 Peck	=	9.08677 Litres								
1 Gallon	=	4.54338 "								
1 Pint	==	5.67922 Decilitres								

decimal system.

decimal system.

decimal system.

decimal system.

decimal system.

decimal system.

A last of corn is 10 quarters. A last of gun-powder, 24 barrels. A last of flax or feathers, 1,700 pounds. A last of wool, 12 sacks.

6042. The Secretary being superseded by the barrels superseded by the supersed by the superseded by the superseded by

6042. The Scotch Pint. A Scotch pint contains 105 cubic inches, and is equal to 4 English pints. 214 Scotch pints make a far-pared with Avoirdupois Weight. French lot of wheat.

English Wood Measures. 6043. Wood is sold in England by the stack, skid, solid feet, and usually piled 12 feet long, grain (of 1812) is equal to .8365228 grains 3 feet high, and 3 feet wide. A quintal of Troy. This would make the French Binary wood is 100 lbs. A skid is a round bundle of weight, as compared with Avoirdupois weight. sticks, 4 feet long. A one-notch skid girts 16 inches. A two-notch skid, 23 inches. three-notch skid, 28 inches. A four-notch skid, 33 inches. A five-notch skid, 38 inches. A billet of wood is a bundle of sticks 3 feet long, and girts 7, 10, or 14 inches, and these bundles sell by the score or hundred. A score is 20, and comes from the count by tally, or marks. Faggots of wood are bundles of brush, 3 feet long, 2 feet round. A load of 1 French Livre (16 oz) = 1 faggets is 50 bundles.

6044. English Coinage. English 1 money is reckoned in pounds, shillings, pence and farthings thus symboled and relatively, 1 valued.

The farthing, or fourth, part of a penny, is always written in the form of the fraction of a penny, one farthing being 1 penny, 2 farthings penny, &c. The standard sovereign is made of 22 carats pure gold and 2 carats copper alloy. The coin weighs 123.274 Troy grains; and the standard value of gold is £3, 17, 10½ ‡ Troy ounce, or £46, 14, 6 ‡ Troy pound. The half-sovereign, or 10 shillling gold coin is of the same standard, and half the weight and value of the sovereign. The standard shilling is composed of 222 parts pure silver alloyed with 18 parts copper. The coin weighs 87% Troy grains; and the standard value is £3, 6, 0 pound troy; consequently 66 shillings weigh exactly 1 pound Troy. The crown, or 5 shilling piece, the half-crown, value 2s, 6d, and the six pence, are of the same standard and relative weights.

Foot (pied) = .32484 " = 12.785 inches linch (pouce) = .02707 " = 1.0654 " = .002256 metre

6045. French Weights and Measures. There are two systems of weights in use in French measure.

and the more modern Decimal system. The former is still the most used in buying and selling, but the decimal system is already employed for all scientific purposes.

6046. French Binary Weights. These are more or less in common use in France, 6041. The English Last is an English but are gradually being superseded by the

Apothecaries weight is the same as the above, except that the livre contains 12 instead of 16 onces. The old French grain was equivalent quintal, billet, and bundle. A stack is 108 to .820 of a Troy grain, but the new French

	4.77	ith U.S.A	Lbs. (	Dz. Drms. Ser	uples. Grain
	pared w	ith U.S. A	Lpoth	ecaries i	Weight
	6048.	French Bi	nary	Weigh	ts Com
	1 "	Kilogramme	=	2,2046	"
i	1 "	Livre	=	1.1023	Pounds
	1 "	Once	==		Ounces
	1 "	Gros		60.2296	11
-	1 "	Denier	==	20.0765	
	1 French	Grain	=		Grains
į		-		Avoirdup	

" "  $(12 \text{ oz}) = 1 \quad 0 \quad 0$ 2.0456 1 0 0 1.8371 Once =0 0.2296 Gros 1 1 - 0.0765Denier = " 8365 Grain

6049. Value of French Binary Weights in Troy Weight

			•	Lb.	Oz.	Dwt.	Gr.
1	French	Livre	(16 oz.)	=1	4	1	5.184
1	"		(12 oz.)		0	0	21.888
1	"	Once	` '	=	1	0	1.824
1	• • •	Gros		=		2	12.228
1	i:	Denier		=			20.076
1	"	Grain		=			.8365

## 6050. Value of French Binary Weights

	in Grams,											
1	French	Livre (	(16	oz.)	=	4.9957	Hectograms					
1	4:			oz.)	=	3.7468	44"					
1	44	Once	•				Dekagrams					
1	"	Gros			=	3.9028	Grams.					
1	"	Denier	•			1.3009	44					
1	64	Grain			==	.0542	i i					

6051. Old French Linear Measure. The former measures of length in France were the

Toise ==1.949 metres, or 6.3945 feet Inch (pouce) = .02707Line (ligne) or  $\frac{1}{12}$  inch

The metre is equal to 3 ft. 11 lines old

6052. French Decimal Weights and pied by a kilogram (15434 Troy grains) of Measures. The French Gramme, litre, metre distilled water at its greatest density. It exand are, are precisely the same as in the ceeds the old Paris pinte by 14, and is equal American Decimal system. They are founded to 35 fluid ounces and 103 mi 113, or 1.7608 on the same standard unit, the metre; and Imperial pints, or 61.028 English cubic inches. therefore represent respectively the same the same and 103 mi 113, or 1.7608 Imperial pints, or 61.028 English cubic inches. The measures about 12 f3. The following table will show of capacity in France are multiples and divisions of the litre, which is the measure occurial gallon of 277.2738 cubic inches.

<b>-</b>		1	1	Imperial				
Litres.		Cubic Inches.	Gala.	Pts.	F1. 3	F1.3	Min.	
ากเกือ	Millilitre	.061028				}	16.9	
100	Centilitre	.61028				2	49	
10	Decilitre	6.1028			3	4	10.36	
'ľ	Litre	61.028		1	15	Î	43,69	
10	Dekalitre	610.28	2	ī	12	i	16.9	
100	Hectolitre	6102.8	22	õ	1	4	49	
1000	Kilolitre	61028,	220	Ŏ	$1\tilde{6}$	6	40	
10000	Myrialitre	610280.	2201	(1	or 2754	bushel		

French Money. money is reckoned in francs and centimes. The centime is the the part of a franc, 5 cenounces; the scruple into 24 grains. The times being represented by a sou; so that 20 pound by which drugs are weighed in Turkey sous are equivalent to a franc. The same is the Tchegy, equal to 4957 grains, and is Belgium, Switzerland, and Italy.

6054. Foreign Medicinal Weights. The following are divided as our Apotheca-

ries' weight: The pound of Austria weighs 6482.42 grains; Bavaria, 5556.24; Holland. pound), 5522.96; Poland, 5533.25; Prussia, 5113.99; Sweden, 5498.01; Venice (sottile),

socuple being divided into 24 grains: Bologna, 5026.32; Lucca, 5162.67; Modena, 5254.61; avoirdupois. Parma, 5062.35; Portugal, 5312.23; Rome, 5233.25; Spain, 5325.84; Tuscany, 5240.49; weights is the tola, equal to 180 Troy grains. Piedmont (Turin), 5123.49. The Naples 32 tolas are equal to 1 pound Troy. The pound contains 5490.63 Troy grains; the ounce maund is equal to 100 Troy ounces.

In France | contains 10 drachms; the scruple 20 grains. The old Paris pound was divided into 16 system of coinage is also at present in use in divided into 100 drachms, each drachm into 16 killos, and each killo into 4 grains.

The obolo is half a Spanish scruple; ? silicua make 1 obolo, and 4 grains a silicua.

The commercial pound in several countries differs from the pharmaceutical. The civil 5787.75; Lubec, 5697.09; Nuremberg (German pound of Bayaria and mark of Vienna are each about 194 avoirdupois ounces. That of Holland is the French kilogram, or 12 grains more than 2 pounds 31 ounces avoir The division of the following differs in the dupois. The mark is half a kilogram. The Coburg commercial pound is nearly 18 ounces

6055. Foreign Money, Weights, and Measures, Compared with American.

	MONE	Y.	LEN	TH.	LiQU	то. ∥	WEIGH	г.
	Name of Coin.	Value in American Dollars, Gold.	Name of Mea- sure.	Length in Inches, English.	Name of Measure.	Contents in Cubic Inches.	Name of Weight.	Ounces Avoird
England	Sovereign	4.20	Foot	12	Gallon	277+	tь Avoird.	16.
America	Dollar	1.00	Foot	12	Gallon	231	Pound	16.
Austria	Floria	.48₺	Foot	12.45	Eimer	3452	Pound	19.76
Denmark	Dollar	.53	Foot	12.35	Anker	2355	Pound	17.65
France	Franc	.19	Metre	39.37	Litre	61.028	Kilogran	35.28
Holland	Flerie	.40	Foot	11.14	Anker	2331	Pound	35.28
Portugal	Milreis	1.12	Foot	12.96	Almude	1040	Pound	16.19
Prussia	Dollar	.70	Foot	12.36	Eimer	4200	Pound	16.51
Russia	Rouble	.79 ½	Foot	12	Veddras	752	Pound	14.44
Spain	Dollar	1.00	Foot	11.03	Arroba	978	Pound	16.23
Sweden		!	Foot	12	Eimer	4794	Pounā	15.

6056. Foreign Measures. The kanna of Sweden = nearly 2.62 litres, or about 4 pints 12 ounces imperial.

The arroba of Spain = 16.073 litres.

The almude of  $\hat{P}$ ortugal = 16.451 litres.

pounds) = 12.29 litres, or 21 pints 12 ounces  $12\frac{1}{2}$  drachms imperial.

The mass of Wurtemburg = 1.537 litres,

The pott (half kanne) of Denmark = .9653 or about 3 pints 14\(\frac{1}{2}\) ounces imperial.

re.

6057. Roman Money. The Romans, like other ancient nations, at first had no coined money, but either exchanged commo-The barile of Naples = 43.6216 litres; of dities with one another, or used a certain Rome, 58.5416 litres; of Tuscany, 45.584 litres. weight of uncoined brass, or other metal. The wedro of Russia (10 stof or 30 Russian | Hence the names which indicated certain were the same as those which were used to and these Unciw into several weights of lower

indicate weights.

3058. Roman Brass Coins. The first brass coin that was used at Rome was called As, made in the reign of Servius Tullius; and being stamped with the heads of oxen, sheep, swine, &c., was called pecunia, from pecus. had also a measure called Congius, equal to \( \frac{1}{3} \)
Hence \( \frac{1}{3} \), brass, is often put for money; of an Amphora, or 1\( \frac{1}{3} \) gallon English; and \( \frac{1}{3} \) arother called Sextarius, equal to \( \frac{1}{3} \) of the wards the stamp was changed, and on one side it bore the figure of Janus; on the other the beak of a ship. The As originally ulus is said to have divide weighed a pound, but was gradually reduced, and in the first Punic war, Asses were coined of only 2 ounces in weight; in the second of the city 563, of only half an ounce. Sextans. The As, in value of our money, about 1½ cents; the Semissis, half an As; Triens, one-third; Quadrans, or Teruncius, one-fourth: Sextans, one-sixth.

6059. Roman Silver Coins. Silver was first coined in the year of the city 484, five years before the first Punic war; the impressions upon which were usually, on one side, carriages drawn by two or four beasts, and on the reverse, the head of Roma, with a helmet. On some were stamped the figure of Victory. The coins of silver were the Sestertius, Quinarius, Denarius, and Centussis. 10 Asses, 15½ cents; Centussis, worth 10

Denarii, nearly \$1.60.

6060. Roman Gold Coins. Gold coin was first struck in the year of the city 546, in the second Punic war, and called Aureus. The worth only \$3.70. Accounts were kept in The Sestertium was Sestertii and Sestertia. not a coin, but a shorter expression of 1000 Sestertii, or, in our money, about \$40. We find also mentioned the Libra, containing 12 ounces of silver, worth \$15, and the Talentum, city. worth about \$965. Besides the ordinary coins, there were various medals struck to commemorate important events, properly called Medallions; for what we commonly term Roman medals were their current money.

6061. Roman Measures of Length. The Roman measures of length or distance were feet, cubits, paces, stadia, and miles.

	Μ.	Yds.	Ft.	In.
Foot	0	0	0	12
Cubit	0	<b>0</b>	1	6
Passus, or Pace	0	0	5	0
Stadium, or Furlong		208	3	0
8 Stadia, or 1000 Paces		0	0	0
The Roman Acre cont		ed 940	foot	in

The Roman length, and 120 in breadth, that is, 28,800

square feet.

6062. Roman Weights. The chief T weight among the Romans was the As, or T Libra, a pound, equal in English Troy weight to 10 ounces 18 dwt. 13 grains; this Libra T

pieces of money, when coin came to be used, was divided into 12 parts, Unciæ (ounces), denominations.

> 6063. Roman Measures of Capacity. The most common measure of capacity was the Amphora, called also Quadrantal or Cadus, containing nearly 9 English gallons. They

6064. Roman Division of Time. Romulus is said to have divided the year into 10 months, beginning with March; Numa added the other 2 months. When Julius Cæsar became master of the State, he adjusted the Punic war, of only 1 ounce; and in the year year according to the course of the sun, and The assigned to each month the number of days the which it still contains. This is the famous other brass coins were the Semissis, the which it still contains. This is the famous Triens, the Quadrans or Teruncius, and the Julian Year, which continues in use to this day in all Christian countries, without any variation except that of the old and new style, occasioned by Pope Gregory, A. D. 1582. The Romans divided their months into three parts, by Calends, Nones, and Ides. The 1st day was called the Calends, the 5th day the Nones, and the 13th the Ides; except in March, May, July, and October, when the Nones fell on the 7th, and the Ides on the 15th. The custom of dividing time into weeks was introduced under the Emperors, being derived from the Egyptians; and the days of the week were Sestertius, named from the planets, viz.: Dies Solis, Sunmarked L.L.S. for libra libra semis, or by day; Lunæ, Monday; Martis, Tuesday; Merabbreviation' H. S., worth 2½ Asses, or, in our curii, Wednesday; Jovis, Thursday; Veneris, money, 3½ cents; Quinarius, marked V, worth Friday; Saturday. In marking the 5 Asses, 7½ cents; Denarius, marked X, worth days, they counted backwards; thus they called the last day of December, Pridie Calendas Januarii, or 'i'e day before the Calends of January; the 1 th day they called the third day before the Calends of January; and so on through the year. In leap-year the 24th and stamps upon it were chiefly the images of the 25th days of February were both called the 6th Emperors. The Aureus, at first, was equal in day before the Calends of March, and hence value to 25 Denarii, or 100 Sestertii; or, in our this year is called Bissextilis. The day, as money, to \$3.98. Soon afterwards it was with us, was divided into 12 hours, and lasted debased, and under the later Emperors was from six o'clock in the morning till six in the evening. The night was divided into four watches, each consisting of three hours. Romans had no clocks or watches, and the first dial is said to have been erected in Rome so late as 447 years after the building of the

orej.					
6065. Scriptural	Me	asure	of	Leng	th.
•	$\mathbf{M}$ .	Yds.	Ft.	In.	B.C.
A Finger	. 0	0	0	ŋ	$2\frac{1}{2}$
A Hand breadth		0	0	3	$1\frac{7}{4}$
A Span	. 0	0	0	10	$2\frac{1}{2}$
A Cubit	. 0	0	1	9	$2\frac{1}{2}$
A Fathom	. 0	<b>2</b>	1	3	11
Ezekiel's reed		3	0	0	0
Do. according to other	$\mathbf{s} 0$	3	1	11	(14
The Measuring Line	0	48	1	11	0
A Stadium or Furlons		243	0	6	0
A Sabbath-day's Jour	ney	1216	0	0	0
The Eastern Mile	. 1	672	0	0	0
A Day's Journey		288	0	0	0

AAAA BATTA MISS TING U.S.	u arc	The Car	<b>"</b> •
•	Gals.	Qts.	Pts.
The Log	0	0	04
The Firkin or Metretes	0	3	11
The Hin	1	1	0
The Bath		2	$0\frac{1}{2}$
The Homer or Cor	75	2	11

Scriptural Liquid Messura

anaa

6067. Scriptural Dry Measure.	6078. Austrian Measures of Capaci-
Bush. Pks. Pts. O 0 22 1	ty. The Muth is $50\frac{5}{8}$ imperial bushels.
The Omer0 0 5	1 Muth = 30 Metz 1 Metz = 64 Moasel
The Seah0 1 1	The liquid Mass or Kanne is about 2½ im-
The Ephah $3  3\frac{1}{4}$	perial pints, or 1.415 litres.
The Lethech $0 0\frac{1}{2}$	6079. Roman Money. This was reckoned
The Homer	in Paoli and Bajochi, the latter being about
6068, Scriptural Weights.  Lbs. Oz. Dwts. Gr.	equal to 1 cent American.
Lbs. Oz. Dwts. Gr. 0 0 9 21	1 Scudo = 10 Paoli 1 Paolo = 10 Bajochi
A Shekel 0 0 9 2½ A Manch 2 3 6 10 A Talent 113 10 1 10	6080. Prussian Money. The Prus-
A Talent	sians count their money in Thalers, Silber-
6069. Scriptural Money.	groschen and Pfennings.
\$ Cts.	1 Thaler = 30 Silbergroschen
A Gerah	1 Silbergroschen = 12 Pfennings.
A Zuzah	The Friedrich d'or is equal to 5 Thalers 20
A Bekah	Silbergroschen.
Golden Daric, or Dram	6081. Prussian Weights. The Prussian neural is 161 aurosa againdurais
A Shekel of Gold 9 00	sian pound is 16½ ounces avoirdupois.  1 Cwt. = 110 Pounds
A Manch or Mina 29 50	1 Cwt. = 110 Pounds 1 Shipping last = 400 Pounds
A Talent of Silver 1,707 00	6082. Prussian Lineal Measure. The
A Talent of Gold	Prussian foot is 12\frac{1}{8} inches English.
6070. Jewish Method of Reckoning	1 Putho — 19 Foot
Time. The day, reckoning from sunrise,	1 Foot = 12 Inches 1 Inch = 12 Linien 1 Faden = 6 Feet 1 Mile = 43 Miles English
and the night, reckoning from sunset, were	1  Inch = 12  Linien
each divided into 12 equal parts, called the	1  Faden = 6  Feet
1st, 2nd, 3rd, 4th, &c., hours. The first watch was from sunset to the third hour of	I Mile = 45 Miles English
the night. The second, or middle watch, was	6083. Prussian Measures of Capacity. The Scheffel is equal to 1½ bushels.
from the third hour to the sixth. The third	1 Wisnel = 24 Scheffel
watch, or cock-crowing, was from the sixth	1  Wispel = 24  Scheffel $1  Scheffel = 16  Metz$
hour to the ninth. The fourth, or morning	The Prussian liquid quart is equivalent to
watch, was from the ninth hour of the night	1.145 litres, or nearly $2\frac{1}{2}$ pints American.
to sanrise.	6084. Money of the Netherlands is
6071. Russian Money. In Russia,	reckoned in Guilders and Cents, the guilder
money is calculated in Roubles and Kopeks,	(or silver florin) being about 41 cents of our
the silver Rouble consisting of 100 Kopeks,	money. The Ducat is equivalent to 5.55
and equivalent to about 79½ cents of our money.	guilders, and the Stuiver to 5 cents.  6085. Weights Used in the Nether-
6072. Russian Weights. The Russian	lands. The pound is 1 pound 15 ounces
pound is 6317½ grains, or the weight of 25.019	avoirdupois.
cubic inches of water. The Pood, about 36	
pounds, 1½ ounces avoirdupois.	1  Lood = 10  Wigtj
6073. Russian Lineal Measure. The	
Danasian C. A. in Alan and the Alan A. Canada	1 Pound = 10 Lood 1 Lood = 10 Wigtj 1 Wigtj = 10 Korrels
Russian foot is the same as the American.	6086. Lineal Measure of the Nether-
1 Werst 500 Sashens	6086. Lineal Measure of the Netherlands. The <i>ell</i> is the same as the metre of
1 Werst 500 Sashens 1 Sashen = 3 Arsheens	6086. Lineal Measure of the Netherlands. The <i>ell</i> is the same as the metre of America.
$\begin{array}{cccc} 1 \text{ Werst} & 500 & \text{Sashens} \\ 1 \text{ Sashen} & = & 3 & \text{Arsheens} \\ 1 \text{ Arsheen} & = & 2\frac{1}{3} \text{ Feet} \end{array}$	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells
1 Werst 500 Sashens 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet 6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½	6086. Lineal Measure of the Netherlands. The <i>ell</i> is the same as the metre of America.
1 Werst 500 Sashens 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet 6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ im-	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = $\frac{1}{10}$ Palm 1 Palm = 10 Duim 1 Duim = 10 Streep
1 Werst 500 Sashens 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet 6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = $\frac{1}{10}$ Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or $\frac{\pi}{2}$ mile English
1 Werst 500 Sashens 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet  6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = \frac{1}{10} \text{Palm} 1 Palm = 10 \text{Duim} 1 \text{Duim} = 10 \text{Streep} 1 \text{Myl} = 1000 \text{Ells or }\frac{2}{2} \text{ mile English} 6087. Dry Measure of the Nether-
1 Werst 1 Sashen 2 3 Arsheens 1 Arsheen 2 Feet  6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bashels 64 gallons imperial. The Tschetwerick, 54 imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 34 wine gallons, and	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or § mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more
1 Werst 500 Sashens 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet 6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bashels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3½ wine gallons, and 40 Wedroja make 1 Fass.	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or § mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2½ bushels imperial.
1 Werst 500 Sashens 1 Sashen = 3 Arsheens 1 Arsheen = 2\frac{1}{2} Feet 6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6\frac{1}{4} gallons imperial. The Tschetwerick, 5\frac{1}{4} imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark. The Wedro consists of 3\frac{1}{4} wine gallons, and 40 Wedroja make 1 Fass. 6075. Austrian Money is reckoned in	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or \( \frac{1}{2} \) mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than \( 2\frac{1}{2} \) bushels imperial.  1 Last = 30 Mudden
1 Werst 500 Sashens 1 Sashen = 3 Arsheens 1 Arsheen = 2\frac{1}{2} Feet  6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6\frac{1}{4} gallons imperial. The Tschetwerick, 5\frac{1}{4} imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3\frac{1}{4} wine gallons, and 40 Wedroja make 1 Fass.  6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = \frac{1}{10} Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or \frac{2}{2} mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than \frac{2}{2} bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel
1 Werst 500 Sashens 1 Sashen = 3 Arsheens 1 Arsheen = 2\frac{1}{3} Feet  6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6\frac{1}{4} gallons imperial. The Tschetwerick, 5\frac{1}{4} imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark. The Wedro consists of 3\frac{1}{4} wine gallons, and 40 Wedroja make 1 Fass. 6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48\frac{1}{4} cents American.	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Duim 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or a mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2a bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet  8074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3½ wine gallons, and 40 Wedroja make 1 Fass.  8075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48½ cents American.  20 Kreutzers = 1 Zwanziger 60 " = 1 Florin	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Duim 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or fimile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2½ bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Nether-
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet  8074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3¼ wine gallons, and 40 Wedroja make 1 Fass.  8075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48½ cents American.  20 Kreutzers = 1 Zwanziger 60 " = 1 Florin 2 Florins = 1 Thaler	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = \frac{1}{10} Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or \( \frac{2}{7}\) mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than \( 2\frac{2}{7}\) bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains \( 22\frac{1}{70}\) imperial
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet  8074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3¼ wine gallons, and 40 Wedroja make 1 Fass.  6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48½ cents American. 20 Kreutzers = 1 Zwanziger 60 " = 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4½ Florins	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = \frac{1}{10} Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or \( \frac{2}{2} \) mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than \( 2\frac{2}{2} \) bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains \( 22\frac{1}{10} \) imperial gallons.
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2\frac{1}{2} Feet  6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6\frac{1}{2} gallons imperial. The Tschetwerick, 5\frac{1}{2} imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3\frac{1}{2} wine gallons, and 40 Wedroja make 1 Fass.  6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48\frac{1}{2} cents American.  20 Kreutzers = 1 Zwanziger 60 "= 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4\frac{2}{3} Florins 6076. Austrian Weights. The Aus-	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = \frac{1}{10} Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or \frac{2}{2} mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2\frac{2}{2} bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains 22\frac{1}{10} imperial gallons.  1 Vat = 100 Kann
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet  6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3½ wine gallons, and 40 Wedroja make 1 Fass.  6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48½ cents American.  20 Kreutzers = 1 Zwanziger 60 "= 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4¾ Florins 6076. Austrian Weights. The Austrian pound is rather less than 1½ pounds avoir-	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roede = 10 Ells 1 Ell = 10 Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or a mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2a bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Manjtes 6088. Liquid Measure of the Netherlands. The Vat contains 22 in imperial gallons.  1 Vat = 100 Kann 1 Kann = 10 Manjtes
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2\frac{1}{2} Feet  6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6\frac{1}{4} gallons imperial. The Tschetwerick, 5\frac{1}{4} imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3\frac{1}{4} wine gallons, and 40 Wedroja make 1 Fass.  6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48\frac{1}{4} cents American.  20 Kreutzers = 1 Zwanziger 60 "= 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4\frac{2}{3} Florins 6076. Austrian Weights. The Austrian pound is rather less than 1\frac{1}{4} pounds avoirdupois.	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Duim 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or a mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2½ bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains 22 10 imperial gallons.  1 Vat = 100 Kann 1 Kann = 10 Maajtes 1 Maajte = 10 Vingerh
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet 6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3½ wine gallons, and 40 Wedroja make 1 Fass. 6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48½ cents American.  20 Kreutzers = 1 Zwanziger 60 " = 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4½ Florins 6076. Austrian Weights. The Austrian pound is rather less than 1½ pounds avoirdupois.  1 Sanne = 275 Pounds	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Duim 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or fimile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2fi bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains 22 in imperial gallons.  1 Vat = 100 Kann 1 Kann = 10 Maajtes 1 Maajte = 10 Vingerh 6089. Portuguese Money. In Portu-
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet  8074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3½ wine gallons, and 40 Wedroja make 1 Fass.  8075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48½ cents American.  20 Kreutzers = 1 Zwanziger 60 " = 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4½ Florins  8076. Austrian Weights. The Austrian pound is rather less than 1½ pounds avoirdupois.  1 Sanne = 275 Pounds 1 Pound = 4 Vindlinge	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Duim 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or & mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2½ bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains 2210 imperial gallons.  1 Vat = 100 Kann 1 Kann = 10 Maajtes 1 Maajte = 10 Vingerh 6089. Portuguese Money. In Portugal, money is reckoned in Reis. For the
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2\frac{1}{2} Feet  8074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6\frac{1}{2} gallons imperial. The Tschetwerick, 5\frac{1}{2} imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3\frac{1}{2} wine gallons, and 40 Wedroja make 1 Fass.  6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48\frac{1}{2} cents American.  20 Kreutzers = 1 Zwanziger 60 " = 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4\frac{2}{3} Florins 6076. Austrian Weights. The Austrian pound is rather less than 1\frac{1}{4} pounds avoirdupois.  1 Sanne = 275 Pounds 1 Pound = 4 Vindlinge 1 Vindlinge = 4 Unzen 1 Unze = 2 Loth	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Duim 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or fimile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2fi bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains 22 in imperial gallons.  1 Vat = 100 Kann 1 Kann = 10 Maajtes 1 Maajte = 10 Vingerh 6089. Portuguese Money. In Portu-
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2\frac{1}{2} Feet  8074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6\frac{1}{2} gallons imperial. The Tschetwerick, 5\frac{1}{2} imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3\frac{1}{2} wine gallons, and 40 Wedroja make 1 Fass. 6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48\frac{1}{2} cents American. 20 Kreutzers = 1 Zwanziger 60 " = 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4\frac{2}{3} Florins 6076. Austrian Weights. The Austrian pound is rather less than 1\frac{1}{4} pounds avoirdupois.  1 Sanne = 275 Pounds 1 Pound = 4 Vindlinge 1 Vindlinge = 4 Unzen 1 Unze = 2 Loth 6077. Austrian Lineal Measure. The	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Duim 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or & mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2½ bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains 22 10 imperial gallons.  1 Vat = 100 Kann 1 Kann = 10 Maajtes 1 Maajte = 10 Vingerh 6089. Portuguese Money. In Portugal, money is reckoned in Reis. For the value of the coins see No. 6055 1 Vintem = 20 Reis 1 Crusado = 400 "
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2½ Feet  6074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6½ gallons imperial. The Tschetwerick, 5½ imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3½ wine gallons, and 40 Wedroja make 1 Fass. 6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48½ cents American. 20 Kreutzers = 1 Zwanziger 60 " = 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4½ Florins 6076. Austrian Weights. The Austrian pound is rather less than 1½ pounds avoirdupois.  1 Sanne = 275 Pounds 1 Pound = 4 Vindlinge 1 Vindlinge = 4 Unzen 1 Unze = 2 Loth 6077. Austrian Lineal Measure. The Austrian foot measures 12½ inches; the Nult	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = \frac{1}{10} Palm 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or \frac{2}{2} mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than \frac{2}{2}{2} bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains \frac{22}{10} imperial gallons.  1 Vat = 100 Kann 1 Kann = 10 Maajtes 6089. Portuguese Money. In Portugal, money is reckoned in Reis. For the value of the coins see No. 6055 1 Vintem = 20 Reis 1 Crusado = 400 " 1 Milrei = 1000 "
1 Werst 1 Sashen = 3 Arsheens 1 Arsheen = 2\frac{1}{2} Feet  8074. Russian Measures of Capacity. The Chetwert is equivalent to 5 bushels 6\frac{1}{2} gallons imperial. The Tschetwerick, 5\frac{1}{2} imperial gallons. 10 Tschetwericki make 1 Kuhl or Sark.  The Wedro consists of 3\frac{1}{2} wine gallons, and 40 Wedroja make 1 Fass. 6075. Austrian Money is reckoned in Florins and Kreutzers; the Florin being equivalent to about 48\frac{1}{2} cents American. 20 Kreutzers = 1 Zwanziger 60 " = 1 Florin 2 Florins = 1 Thaler 1 Ducat = 4\frac{2}{3} Florins 6076. Austrian Weights. The Austrian pound is rather less than 1\frac{1}{4} pounds avoirdupois.  1 Sanne = 275 Pounds 1 Pound = 4 Vindlinge 1 Vindlinge = 4 Unzen 1 Unze = 2 Loth 6077. Austrian Lineal Measure. The	6086. Lineal Measure of the Netherlands. The ell is the same as the metre of America.  1 Roedo = 10 Ells 1 Ell = 10 Duim 1 Palm = 10 Duim 1 Duim = 10 Streep 1 Myl = 1000 Ells or & mile English 6087. Dry Measure of the Netherlands. The Mudde contains a little more than 2½ bushels imperial.  1 Last = 30 Mudden 1 Mudde = 10 Schepel 1 Schepel = 10 Kop 1 Kop = 10 Maajtes 6088. Liquid Measure of the Netherlands. The Vat contains 22 10 imperial gallons.  1 Vat = 100 Kann 1 Kann = 10 Maajtes 1 Maajte = 10 Vingerh 6089. Portuguese Money. In Portugal, money is reckoned in Reis. For the value of the coins see No. 6055 1 Vintem = 20 Reis 1 Crusado = 400 "

4 Oxhoofte

1 Dollar

8 Reals.

3 Eimer

60 Stop

1 Fuder

1 Eimer

1 Oxhoofte

=

cents. This is the old system. (See No. 6053.) 6102. Swiss Weights.

1 Hundred-weight = 50 Kilogrammes 1 Kilogramme 2 Pounds. The hundred-weight is equivalent to 1104 pounds avoirdupois; the pound is therefore about 17% ounces avoirdupois. 6103. Swiss Lineal Measure. Helvetian foot is equal to  $11\frac{1}{2}\frac{7}{6}$  inches En-1 Stab or Staff 2 Ells 2 Feet == 16,000 Feet 1 Hour or Mile The Swiss mile is consequently a trifle over 3 English miles. 6104. Swiss Dry Measure. The Malter is about 4 bushels 1 gallon Imperial mea-10 Viertel 10 Immir 6105. Swiss Liquid Measure. Swiss Ohm contains 33 Imperial gallons. 100 Maas. Turkish Money. In Turkey, money is reckond by the Piaster, 22 of which are equivalent to \$1.00. 1 Sequin = 100 Piasters 40 Paras = 3 Aspers 1 Piaster (grush) = 166107. Turkish Weights. 100 Aspers. The Turkish Chequi is 111 ounces avoirdupois. 1 Cantaro 44 Okas = 1 Batman 6 Okas = 4 Chequi 100 Drachmas. 6108. Turkish Lineal Measure. The Turks use, for measuring length, the large pik halebi, or 27 ½ inches; and the small pik andassa of 27½ inches.
6109. Turkish Measures of Capacity.
The dry Killow contains 7½ imperial gallons; the Form 4 killows. A killow of rice the Fortin, 4 killows. A killow of rice should weigh 10 okas. The liquid almud contains 13 imperial gallons. 6110. Chinese Money. The Chinese 10 Mace 10 Candarin = 1 Candarin 10 Cash 6111. Chinese Weights. The Catty is 11 pounds avoirdupois. 100 Cattys 16 Taels === 10 Mazas 10 Candarins = 10 Cash. 1 Candarin 6112. East Indian Money. In Hindostan, money is reckoned in Rupees, Annas, and Pice, the Rupee being about 45 cents of our 1 Rupee 8 Annas 12 Pice 1 Anna = 10,000 Rupees = 6113. Mexican Money. 1 Lakh The Mexican gold dollar is worth about 96 cents United States coin; the Mexican silver dollar is reckened equal to the United States gold 1 Doubloon 16 Dollars

6114. Monte-Video Money. The Dol- | being equal to 91½ pounds avoirdupois. lar or Peso Corriente is equal to 80 cents United States coin.

1 Dollar = 8 Reales = 100 Centesimos 6115. Brazilian Money. In Brazil, money is reckoned in *Reis*, 4000 of which are equal to £1 sterling, or \$4.84 United States coin.

6116. Brazilian Lineal Measure. The equal to  $4\frac{1}{20}$  dwts. Troy. Brazilian Pe or Foot is the same as the English foct; the Palma is equivalent to 9½ English inches. 10 Palmas equal 1 Braça or 2% English yards. The Braça is also sub-Legoa or mile is about 42 English miles.

6117. Brazilian Weights. The weights in ordinary use are as follows, the Quintal

1 Quintal 1 Arroba 32 Arratels

Gold and silver are weighed by the Marco of 7 ounces 7# dwts Troy.

1 Marco 8 Onças 1 Onça 8 Oitavas 1 Oitava 72 Granos

Precious stones are sold by the Quilate,

1 Oitava 3 Escrupulos 1 Escrupulo 3 Quilates 4 Granos 1 Quilate

6118. Brazilian Dry Measure. divided into 2 Varas and 3½ Covados. The Brazilian Mayo is equivalent to 22½ imperial bushels.

1 Mayo 15 Fanegas 4 Alqueires 1 Fanega

6119. Decimal Approximations for Facilitating Calculations.

		AIIIII TOTOLO TO		
Lineal feet multipl	ied by	.00019	=	miles.
" yards	"	.000 <b>56</b> 8		44
Square inches	4.6	.007	=	square feet.
~" feet	41	.111	=	square yards.
" yards	44	.0002067	=	acres.
Circular inches	66	.00546	==	square feet.
Cylindrical inches	44	.0004546	=	cubic feet.
" feet	43	.02909	=	cubic yards.
Cubic inches	16	.00058	=	cubic feet.
" feet	44	.03704	=	cubic yards.
<i>u u</i>	46	6.2321		imperial gallons.
" inches	22	.003607	==	"
Bushels	"	.0476	=	cubic yards.
"	16	1.284		cubic feet.
"	11 2	2218.2	===	cubic inches.
Cubic feet	41	.779		bushels.
Cubic inches	44	.00045	=	bushels.
Pounds	"	.009	=	hundredweights.
Pounds	"	.00045	=	tons
Cylindrical feet	66	4.895	==	imperial gallons.
" inches	11	.002832	=	in e u
Cubic inches	"	.263	=	pounds of cast iron.
<i>u u</i>	44	.281	=	" wrought do.
	64	.283		" steel.
u u	"	.3225	=	" copper.
<i>11</i>	46	.3037	=	" brass.
u u	44	.26	=	" zine.
· · · · · · · · · · · · · · · · · · ·	66	.4103	=	" lead.
ii t	"	.2636	=	" tin.
ii 4.	44	.4908	=	" mercury.
Cylindrical inches	16	.2065		" cast iron.
" "	CC .	.2168	=	" wrought iron.
" "	44	.2223		" steel.
" "	"	.2533	=	" copper.
<i>u u</i>	16	.2385	=	brass.
u u	et.	.2042	=	" zine.
44 44	4	.3223	==	'' lead.
" "	44	.207		" tin.
44 44	"	.3854	=	" mercury.
		*0004		moreury.

1 cubic inch = .036 pounds. 1 gallon imperial = 10 pounds; or = 0.16 cubic feet. densed so as to exert a pressure of 30 pounds 1 cubic foot of water = 6.2321 imperial galto to the square inch, is said, in round numbers, lons; or, approximately = 61 gallons. 1 to be of 2 atmospheres; at 45 pounds to the cwt. of water = 1.8 cubic feet = 11.2 gallons.

1 ton of water = 35.9 cubic feet = 224 gallons.

Cubic feet of water × .557 = cwt.

approximately. Cubic feet of water × .028 second, nearly. Decomposition of light: The

In engineering, the common pressure of the ting color, and red the heat color.

Memoranda Connected with atmosphere, 14.6 pounds to the square inch, Water. 1 cubic foot of water = 62.4 pounds. is taken as a standard of that exerted by

= tons approximately. I cubic foot of sea seven prismatic colors of a ray of light are water = 64.14 pounds. Weight of sea water wiolet, indigo, blue, green, yellow, orange, red. Violet is the maximum chemical or 6121. Pressure of the Atmosphere. actinic color; yellow the maximum illumina-

6123. Force of the Wind.

Miles per Hour.	Feet per Minute.	Feet per Second.	Force in lbs. per Sq. Foot	Description.
1	88	1.47	.005	Hardly perceptible.
2 3	176 264	2.93 4.4	.020 }	Just perceptible.
4	352	5.87	.079 (	Gentle breeze.
5 10	440 880	$\begin{array}{c} \textbf{7.33} \\ \textbf{14.67} \end{array}$	.123 { .492 }	Pleasant breeze.
15	1320	22.	1.107 } 1.970 }	Pleasant oreeze.
20 25	1760 2200	29.3 36.6	3.067	Brisk gale.
30 35	2640 3080	44. 51.3	4.429 } 6.027	High wind.
40	3520	58.6	7.870	Very high wind.
45 50	3960 4400	66. 73.3	9.900 f 12.304	Storm.
60	5280	88.	17.733 }	Great storm.
70 80	6160 7040	$102.7 \\ 117.3$	24.153 ( 31.490)	
100	8800	146.6	49.200 }	Hurricane.

6124. Velocity of Sound. In air, 1.142 feet per second. In water, 4,900 feet. Through iron, 17,500 feet. Through copper, 10,378 feet. Through wood, 12,000 to 16,000 feet.

Distant sounds may be heard on a still day: Human voice, 150 yards. Rifle 5,300 yards. Military band, 5,200 yards. Cannon 35,000 yards.

Heat-conducting Power of 6125. Building Materials. Conducting power of substances, slate being 1000.

Slate1000	Chalk564
	Asphaltum451
	Oak336
Portland stone 750	Lath and plaster. 255
	Cement200
Fire-brick 620	

6126. Properties of the Circle. Diameter  $\times$  3.14159 = circumference. Diameter  $\times$  .8862 = side of an equal square. Diameter  $\times$  .7071 = side of an inscribed square. Radius squared,  $\times$  3.14159 = area of circle. Diameter squared,  $\times$  .7854 = area of circle. Radius  $\times$  6.28318 = circumference. cumference - 3.14159 = diameter. Circumference = 3.54 Varea of circle. Diameter = 1.128 Varea of circle.

6127. To Determine the Weight of Live Cattle. Measure in inches the girth round the breast, just behind the shoulderblade, and the length of the back from the tail to the forepart of the shoulder-blade. Multiply the girth by the length, and divide by 144. If the girth is less than 3 feet, multiply the quotient by 11; if between 3 feet 6132. Barometrical Rules for Progby 144. If the girth by the length, and divide by 144. If the girth is less than 3 feet, multiply the quotient by 11; if between 3 feet and 5 feet, multiply by 16; if between 5 feet and 7 feet, multiply by 23; if between 7 feet and 9 feet, multiply by 31. If the animal is lean, deduct  $\frac{1}{20}$  from the result. Or: Take the girth and length in feet, multiply the graphs of the girth by the length and multiply square of the girth by the length, and multiply the product by 3.36. The result will be the answer in pounds. The live weight, multiplied by .605, gives a near approximation to the net is likely to last.

rails, but the rule will apply to a crib of any size or kind. Two cubic feet of good, sound, dry corn in the ear, will make a bushel of shelled corn. To get, then, the quantity of shelled corn in a crib of corn in the ear, mea- before the perceptible change takes place.

sure the length, breadth, and height of the crib, inside of the rail; multiply the length by the breadth, and the product by the height; then divide the result by 2, and you have the number of bushels of shelled corn in the crib. In measuring the height, of course the height of the corn is intended. And there will be found to be a difference in measuring corn in this mode between fall and spring, because it shrinks very much in the winter and spring, and settles down.

6129. Percentage of Pork to Live The following table shows the Weight. proportion of pork to live weight of fat swine: Live Weight in Stones of 14 pounds. 

 Above 40 stones
 67 to 86

 From 35 to 40 stones
 84 to 86

 " 30 to 35 "
 83 to 84

 " 25 to 30 "
 81 to 82

 " 20 to 25 "
 80

 " 15 to 20 "
 77 to 78

 Under 15 "
 75 to 77

6130. Measures for Housekeepers. Wheat flour...... 1 pound is 1 quart. Loaf sugar, broken.. 1 " " 1 White sugar, powd.. 1 " 1 oz. "1 Best brown sugar... 1 " 2 oz. "1 Eggs.....10 eggs are 1 pound. Flour 8 quarts 1 peck.
Flour 4 pecks 1 bushel.
16 large table-spoonfuls are. ½ pint. A common sized tumbler holds..... pint. A common sized wine-glass 25 drops are equal to 1 tea-spoonful.

6131. Sizes of Drawing Paper. Wove Antique......52 ×31 

nosticating the Weather. 1. After a continuance of dry weather, if the barometer begins to fall slowly and steadily, rain will certainly ensue; but if the fine weather has been of long duration, the mercury may fall for 2 or 3 days before any perceptible change takes place, and the longer time that elapses before rain comes, the longer the wet weather

II. Conversely, if, after a great deal of 6128. To Measure Corn in the Crib. wet weather, with the harometer below its Corn is generally put up in cribs made of mean height, the mercury begins to rise stead-

III. On either of the two foregoing suppositions, if the change immediately ensues on the motion of the mercury, the change will

not be permanent.

If the barometer rises slowly and steadily for two days together, or more, fine weather will come, though for those two days it may rain incessantly, and the reverse; but if the barometer rises for two days or more during rain, and then, on the appearance of fine weather, begins to fall again, the fine weather will be very transient, and vice

versu.

V. A sudden fall of the barometer in indicates wind: in summer, during very hot weather, a thunder-storm may be expected; in winter, a sudden fall after frost of some continuance indicates a change of wind with thaw and rain; but in a continued frost a rise of the mercury indicates approaching snow.

VI. No rapid fluctuations of the barometer are to be interpreted as indicating either dry or wet weather of any continuance; it is only the slow, steady, and continued rise or fall, that is to be attended to in this respect.

VII. A rise of the mercury late in the autumn, after a long continuance of wet and windy weather, generally indicates a change of wind to the northern quarters, and the approach of frost.

6133. Melting or Boiling Point of Met-

als, Liquids, &c. Degrees Fahr. 3080° Platinum melts. 2786 Cast iron melts; 2696° (Morveau). 2500 Steel melts. Gold melts (Daniell); 2200° (Kane). Copper melts (Kane); 2548° (Daniell). Silver melts (Makins); 2233° (Daniell). 2016 1996 1873 1869 Brass melts (Daniell). 1000 Iron, bright cherry red (Poillet). 980 Iron, red heat (Daniell). 914 Zine burns (Daniell). Antimony melts. Zinc melts (Daniell); 793° (Gmelin). 810 Mercury boils (Daniell); 662° (Graham). 644Whale oil boils (Graham). 630Lead melts (Crighton); 609° (Daniell). Linseed oil boils. 612600

560 Sulphur ignites. Sulphuric acid boils (Phillips); 6200 545(Graham) Bismuth melts(Phillips);518°(Gmelin). 476

442Tin melts.

380Arsenious acid volatilizes.

372Saturated solution of nitrate of ammonia boils.

356 Metallic arsenic sublimes.

336Saturated solution of acetate of potassa boils.

320Cane sugar melts, 320° to 400°, baking heat of an oven.

315 Oil of turpentine boils (Kane).

Saturated solution of nitrate of lime boils.

302 Etherification ends.

275 Saturated solution of carbonate of potash boils.

256 Saturated solution of acetate of soda beils.

Nitrie acid, specific gravity 1.42, boils. Saturated solution of nitre boils.

236° Saturated solution of sal-ammoniae boils.

226Sulphur melts (Fownes); 232° (Turner). 220Saturated solution of alum, carbonate of soda, and sulphate of zinc boils.

218Saturated solution of chloride of potassa boils.

216 Saturated solution of sulphate of iron, sulphate of copper, and nitrate of lead boils.

Water begins to boil in glass (or  $213\frac{1}{2}^{\circ}$ ). 212 Water boils in metal, barometer at 30

inches. 199 Milk boils.

194 Sodium melts.

135 Nitric acid, specific gravity 1.52, boils.

180 Starch dissolves in water.

Rectified spirit boils. Benzole distills. 176 Alcohol, specific gravity 796 to 800,

Bees'-wax melts (Kane); 142° (Lepage).

Scalding heat. Pyroxylic spirit boils (Scanlan). 150

Albumen coagulates.

140 Chloroform and ammonia, specific gravity .945, boils.

Potassium melts (Daniell).

132 Acetone (pyroacetic spirit) boils (Kane).

130 Butter melts (130° to 140°).

Mutton suet and styracine melts.

120 Phosphorus inflames. Friction matches ignite.

Bisulphuret of carbon boils (Graham).

112Spermaceti and stearine melt.

Reef tallow melts. 111

110 Highest temperature of the human body (in Lekjaw).

106 Mutton tallow melts.

Phosphorus melts (99° to 100°)

98 Ether, specific gravity .720, boils. Blood heat.

Acetous fermentation ceases. Water boils in a vacuum.

Mean temperature at the equator.

Vinous fermentation ends; begins.

Lowest temperature of the human body (in cholera).

Best temperature of a room (65° to 68). Oil of anise liquefies; congeals at 60°.

Mean temperature at Rome. 50 % Mean temperature at London.

Sulphuric acid, specific gravity 1.741, congeals (41° to 42°).

41 Mean temperature of Edinburgh.

Olive oil freezes.

Water freezes. 30 Milk freezes.

Vinegar freezes.

20 Strong wine freezes.

Mixture of snow and salt. 7 Brandy freezes.

-39 Mercury freezes (30° to 40°). (See also Nos. 7, 3353, 3459 and 1687, &c).

6134. Weight of Earth, Rocks, &c. A cubic yard of sand or ground weighs about 30 cwt. Mud, 25 cwt. Marl, 26 cwt. Clay, 31 cwt. Chalk, 36 cwt. Sandstone, 39 cwt. Shale, 40 cwt. Quartz, 41 cwt. Granite, 42 cwt. Trap, 42 cwt. Slate, 43 cwt.

To find the weight of a cubic foot of any of the above, divide the weight of a cubic yard

by 27. Thus, a cubic foot of	sand wei	gns	•
6135. Weight of Various	124 pour	nds.	an
6135. Weight of Various	Minera	als.	St
One cubic foot of water weighs at	t a temp	era-	
ture of 60° Fahrenheit, 621 pour	ids avoii	rdu-	Dia
pois. By ascertaining the specifi	ic gravit	y or	
a substance and multiplying with	623 pour	nas,	
the exact weight of one cubic foot	; 18 odtan	ied.	
	Avoirds	ipols.	
	Sp. Gr. We	c foot	Ru
Anthracite coal	1.5	94	4
Antimonial copper, tetrahedrite,			Sa
or grey copper	5.0	300	То
Antimonial silver	9.5	600	•
Antimony ore, grey sulphuret	4.5	279	_ '
Antimony metal	6.5	400	Ru
Apatite, or phosphate of lime	3.0	186	En
Arsenical iron pyrites, mis-	0.0	270	Ga
pickel	6.0	370	Ag
Asbestos	3,0	186 62	On Sa
Asphaltum, mineral pitch	1.0 4.5	310	Ar
Baryta sulphate.	4.0	248	Cr
Baryta carbonate, witherhite	9.7	600	Co
BismuthBituminous coal	1.5	90	Ja
	$\frac{1.0}{2.0}$	125	1
Black lead, graphiteBlack jack blende, sulphuret of	A.0	1.00	Sc
zinc	4.0	250	To
Bog iron ore	4.0	250	Qυ
Brown hæmatite	4.0	250	ďι
Building stones, comprising			CÈ
granite, gneiss, syenite, &c	3.0	186	Ze
Calamine	3.3	190	F
Chromic iron	4.5	260	Ca
Copper pyrites	4.0	260	$G_{ m J}$
Derbyshire spar, fluor spar	3.0	186	Ct
Feldspar	3.0	190	Gl
Flint	2.5	110	]
Loose sand	<del></del>	95	
Franklinite	5.0	310	6
Galena	7.5	465	<u>ار</u>
Gold (20 carats)	15.7	1000	11_
" (pure)	19.2 \ to		
Gypsum	2.3	130	1
Iron—east iron	<u>-                                    </u>	450 310	11
magnetto (decision)	$\begin{array}{c} 5.0 \\ 3.0 \end{array}$	200	1 1
pharmo organia	5.0	310	! !
pyrromanna	0.0	OIO	$\Pi$
" pyrrhotine, or magnetic pyrites	4.5	280	Ш
" specular ore	4.5	290	11
" wrought		487	
Limestone, hydraulic	2.7	150	1 1
" magnesian	2.5	130	
Manganese, binoxide of	4.8	294	
Malachite	4.0	248	3
Mica	2.8	<b>16</b> 0	)
Novaculite, or whetstone	3.0	186	3
Ochre	3.5	217	7
Platinum, metal and ores	16 to 19	1116	3
Porcelain clay	2.0	140	- 1
Pyrites, iron	4.5	280	. 1
Quartz, pure, compact	2.6	155	1
" loose, angular, and round		4.00	
sand	0.0	100	_ 1
Trap	3.0	186	
Vitreous copper, copper glance.	5.5	341	. 1
Wood tin, stream tin	7.0	$\frac{434}{250}$	- 1 1
Zinc, sulphide or blende	4.0 5.5	231 331	
Zincite, red zinc ore	5.5 4.4	268	_
		200	
Zine silicate	chtwange		1
(Feu	onewange	ur j.	L

# by 27. Thus, a cubic foot of sand weighs and Weight of the Relative Hardness and Weight of the Principal Precious Stones. &c.

İ	Stones, &c.		
l	Substances.	Hard- ness.	Specific Gravity.
ļ	Diamond from Ormus		3.7
ì	" (pink)		3.4
ł	" (bluish)	19	3.3
ł	" (yellowish)		3.3
l	" (cubic)		3.2
1	Ruby	17	4.2
	" (pale, from Brazil)	16	3.5
l	Sapphire	16	3.8
1	Topaz	15	4.2
1	" (whitish)	14	3.5
	" (Bohemian)	11	2.8
l	Ruby (spinelle)	10	3.4
1	Emerald	10	$\frac{3.4}{2.8}$
١	Garnet	10	2.0 4.4
ļ			2.6
1	Agate	10	$\overset{2.0}{2.6}$
	Onyx	10	2.6 2.6
	Sardonyx.	12	$\frac{2.0}{2.7}$
	Amethyst (occidental)	11	2.6
	Crystal	11	2.0 2.7
	Cornelian	11	2.7
	Jasper (green)	- 11	2.6
1	(reddish yellow)	10	2.0 3.6
	Schoerl		3.0 3.0
	Tourmaline		3.0 2.7
1	Quartz	10	2.7 2.6
'	Opal	10	2.6 3.7
	Chrysolite		
•	Zeolite		2.1
•	Fluor		3.5
,	Calcareous spar	b	2.7
)	Gypsum	ģ	2.3
j	Chalk		2.7
)	Glass		2.3:3.62
)	" (plate)		2.5:2.6
,	" (crystal or flint)		3.0:3.616

## " (crystal or flint)...... 3.0:3.616 6137. Weight of Hemp and Wire Rope.

Немр.		IBON WIRE.		STEEL WIBE.		
Cir- cumfer- ence.	Lbs. Weight per Fathom	Cir- cumfer- ence.	Lbs. Weight per Fathom.	Cir- cumfer- ence.	Lbs. Weight per Fathom	
28 38 - 41 51	$\begin{bmatrix} \frac{2}{4} \\ \frac{4}{5} \end{bmatrix}$	1 1½ 1½ 1½ 1¼ 1¼	$\begin{array}{c c} 1 \\ 1\frac{1}{2} \\ 2 \\ 2\frac{1}{2} \\ 3 \\ 3\frac{1}{2} \end{array}$	1 11 11 11 11 11 11 11 11 11 11 11 11 1	1 11 -	
51/6	5 7 9	2 2 <del>1</del>	4 4½ 5	1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 <del>§</del> 1 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6 6½ 7 7½ 8 8½	$\begin{array}{c c} 10 \\ \hline 12 \\ \hline 14 \end{array}$	24 22 25 25 25 27 25 27 27 3 34	5½ 6 6½ 7 7½ 8 8₺	2 2 <del>1</del> 2 <del>1</del>  2 <del>8</del>	3½ 4 4½ 5	
	$ \begin{array}{c c} \hline 16\\ \hline 18\\ \hline 22 \end{array} $	3 3 5 3 4 7 5 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	9 10 11 12 13	2½ 2½ 2½ 2½ 	5½ 6 6½ -	
$ \begin{array}{c c}     \hline                                $	26 30 34	4 4 <del>1</del> 4 <del>8</del> 4 <del>1</del> 4 <del>8</del>	14 15 16 18 20	38  32 32 38	9 10 12	

6138. Miscellaneons Statistics.

TIMBER.	SpecificGravity	Weight in lbs. per Cubic Foot.	Tenacity in lbs. per Square Inch.	Crushing Force in lbs. per Square Inch.
Ash	.8	50	17.200	9.000
Beech	.69	43	11.000	9.000
Birch	.71	44	15,000	5.500
Cedar	.48	30	11.000	5.600
Deal, Christiana.	.7	44	12.000	6.000
Elm.	6	37	13,000	10.000
Hornbeam.	.75	47	20.000	7.000
Larch	.55	34	9.000	5.500
Memel	.6	37	3.000	0,000
Mahogany, Spanish	.8	50	16.000	8.000
Oak, English	.93	58	17.000	10.000
Oak, Canadian	.87	54	10.000	
Pine, red.	.65	41	12,000	6.000
Pine, yellow.	.45	28	11.000	5.800
Teak, Moulmein	.65	41	15.000	5.100
Yew	.8	50	8.000	12.000
MISCELLANEOUS.	•0	30	6.000	
Asphaltum	.9	56		
Gutta-percha	.98	61		
India-rubber	.94	59		
Ivory	1.8	112		
FLUIDS.	1.0	112	Boiling Point.	Expansion.*
Alcohol	.8	50	173°	_
Ether	.74	46	100	.11
Oil.	.90	40 56	100	.07
Water, fresh.	1.000	62.4	010	.08
Water, sea	1.028	64.1	212	.047
	1.020	04.1	213	ļ
GASES.	Water 1.		ive Weight eing 1.)	Weight of Cubic Foot in Grains.
Air	.0012	1 (	000	527
Carbonic acid	.0018		524	800
Carburetted hydrogen	.0005		120	220
Hydrogen	.00008		120 169	
0xygen	.00125		103	43 627
* Expansion of fluids is				027

6139. Weight of Copper and Lead.

Weight of a Square Foot of Copper and Lead in pounds, from 3 to ½ inch in thickness.

Thickness.	Copper.	Lead.
32	1.45	1.85
16	2.90	3.70
372 16 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 372 18 18 18 18 18 18 18 18 18 18 18 18 18	4.35	5.54
1	5.80	7.39
32	7.26	9.24
16	8.71	11.08
32	10.16	12.93
ŧ	11.61	14.77
32	13.07	16.62
16	14.52	18.47
11	15.97	20.31
3	17.41	22.16
33	18.87	24.00
76	20.32	25.85
35	21.77	27.70
<del>1</del>	23.22	29.55

6141. Weight of Sheet Iron.
Weight of a Square Foot of Sheet Iron in pounds avoirdupois, the thickness being the number on the wire gauge. No 1 is 16 of an inch; No. 4, 1; No. 11, 1, 3c.

1111 111011 7 2101	-,4,	······································	
No. on Wire Gauge.	Pounds	No. on	Pounds
Wire Gauge.	Avoir.	Wire Gauge.	Avoir.
1	.12.5	12	4 69
2	19	13	
			4.OL
3	.11.	14	4.
4	.10.	15	
5	9.	16	
6	. 8.	17	
7	7.5	18	
8		19	
9	;		
	- v.	20	1.62
10	. 5.68	21	. 1.5
11	5.	22	
	· • • [	~~	· · · T·O1

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6143. Properties of Metals.

METALS.	Weight of a Cubic Inch in Lbs.	Specific Gravity.	Weight of a Cubic Foot in Lbs.		Crushing Force in Lbs per sq. Iuch.	Melting Point. Fahr.	Expansion between 32" & 212"	Con- ducting Power.	Specific Heat.
Aluminum	.092	2.56	160			*18000			
Antimony, cast	.242	6.7	418	1,066		810°	.0011	ł	.0507
Bismuth	.35	9.82	605	3,250	ļ	4970	.0014	İ	.0288
Brass, cast	.3	8.4	525	17,978	10,300	1869°	.002		*
" wire		8.5	531	49,000	′			j	ļ
Copper, cast	.32	8.89	555	19,072	11,700	19960	.0017		.0949
sheet		8.95	559	33,000	ĺ			898	
" wire	Í	9.	562	61,000					ļ
Gold	.7	19.25	1203	20,400	1	2016°	.0016	1000	.0298
Gun-metal	.3	8.4	525	36,000					,
Iron, wrought bar	.28	7.7	48.1	60,000	38,000		.0012	347	.1100
" Swedish	ļ	7.6	475	70,000	1 ,		1		
" wire	<b>!</b>	i	-	85,000					
" cast	.26	7.18	443	19,000	92,000	27860	.0011		
Lead, cast		11.35	709	1,824	7,000	6120		180	.0293
" sheet				3,328	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1			
Mercury	.49	13.56	847	1 1		—39°	.016		.0330
Silver		10.47	654	41,000		1873°		973	.0557
Steel		7.8	487	120,000		2500°			
" puddled	-	7.78	485	80,000					
Tin	.263	7.29	455	5,000	15,000	4420	.0021	304	.0514
Zinc	.253	7.	437	8,000	/	7730		363	.0927

3144. Weight of Round and Square and by 3.36; the product will be the weight Shafts of Wrought Iron, 1 Foot Long. in pounds avoirdupois, nearly. 6144.

Weight in Lbs. Weight in Lbs. Size in Size in Inches. Inches. Round. Square. Round. Square. 59.7 66.2 .04243 76.0 . 166 5 84.3.2115<del>1</del> 5<del>1</del> .372.474 72.992.9.662.843 80.1 102 1.031.3254 87.5 111 6 1.49 1.90 95.3121 6<u>1</u> 6<u>1</u> 6<u>1</u> 7 2.032.58103 132 2.65 3.37 112 142 3.354.27121154 4.14 5.27130 165 5.006.377<del>1</del> 7<del>1</del> 7<del>1</del> 8 139 177 5 97 7.58149 190 8.90 7.00 159 203 216 8.1110.3 169 8<u>1</u> 8<u>1</u> 8<u>1</u> 9.3111.8 180 229 10.613.5 191 244 11.9 15.2 203258 9 13.4 17.1 214 273 9<u>1</u> 9<u>1</u> 14.9 19.0 227 288 16.521.1 239 304 18.2  $9^{\bar{2}}$ 23.2252 32024 |20.0|25.5 10 265 337  $\frac{2\frac{4}{5}}{3}$  $\frac{27.9}{30.3}$ 21.9  $10_{\frac{1}{2}}$ 292 372 23.8320 11 408 31 31 31 32 32 28.0 |35.6|350 111 448 32.4 41.3 12 381 486 37.2 47.4  $12_{\frac{1}{2}}$ 414 527 4 42.4 54.013 447 570  $13\frac{1}{2}$ 41 47.8 60.9483 614 53.6 68.2 14 519661

6145. Weights of Wrought-Iron and Steel.

Round Iron.-Multiply the square of the diameter in inches, by the length in feet, and by 2.63, and the product will be the weight in pounds avoirdupois, nearly.

in pounds avoirdupois, nearly.

Square, Angled, T, Convex, or any figure of Beam Iron.—Ascertain the area of the end of each figure of bar, in inches, then multiply the area by the length in feet, and that product by 10, and divide by three; the remainder will be the weight in pounds, nearly.

Square Cast Steel.—Multiply the area of

the end of the bar in inches, by the length in feet, and that product by 3.4; the product will be the weight in pounds, nearly.

Round Cast Steel.—Multiply the square of the diameter in inches, by the length in feet, and that product by 2.67; the product will give the weight in pounds avoirdupois, nearly.

6146. Number of Nails per Pound. The following table shows the length of the various sizes of nails and the number of each in a pound:

Size.	Length	Number.
3-penny,	1 inch long,	557 per pound.
4 "	11 "	353 " "
5 "	14 "	232 ''
6 "		167 "
7 "	21 "	141 "
8 "	21 "	101 "
10 "	2 " 21 " 2½ " 2½ "	98 "
12 "	3 "	54 "
20 "	31 "	34 "
Spikes	4 "	16 "
		12 "
"	4½ " 5 "	10 "
4.6	6 "	7 "
14	7 "	5 "

The term "penny," designating the size of nails, appears to mean "pound." Ten-penny nails weighing 10 pounds per thousand, four-penny nails 4 pounds per thousand, &c. (Webster.) This is probably the weight the nails were originally made; according to the Square Iron.—Multiply the area of the foregoing table they have since learned econend of the bar in inches, by the length in feet, omy in the material.

6147. Calendar for Ascertaining on what Day of the Week any Given Day will Fall within the Present Century.

			YEA	ARS :	1801	то	1900.				31 Jan.	28 reb	31 Mar.	30 April	31 May.	30 June	31 July.	31 Aug.	30 Sept.	31 Oct.	30 Nov.	
1801	1807	1818	1829	183.	1846	1857	1863	1874	1885	1891	4	7	7	_ 3	·—	1		6			7	
1802	1813	1819	1830	1841	1847	1858	1869	1875	1886	1897	5	1	1	4	6	2	4	7	3	5	1	1
1803	1814	1825	1831	1842	1853	1859	1870	1881	1887	1898	6	$\frac{1}{2}$	2	 5	7	3	5	1	4	6	2	;
1805	1811	1822	1833	1839	1850	1861	1867	1878	1889	1895	2	5	5	1	3	G	1	4	7	-	5	
1806	1817	1823	1834	1845	1851	1862	1873	1879	1890	! ;	3	6	6	2	4	7	2	 5	_ 1	3	6	
1809	1815	1826	1837	1843	1854	1865	1871	1882	1893	1899	7	3	3	6	_ 1	4	6	2	5	7	3	1
1010	1821	1827	1938	1849	1855	1866	1877		1894	!	1		4	7	-		- 7	3		1		1
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			espond ns of da			t the		·	1864	1892	-!	1	2	5	7	٠.	5	1	4	6	2	:
For	Exam	inle · ˈ	To find	a what	day o	f the	1812	1840	1868	1896	3	_	7	_	5	_		6	2	-	7	1
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	n tha		iary 1				1824	1852	1880		4	7	1	4	6	2	4	7	3	5	1	
							1828	1856	1884	i :	. 2	5	6	2	4	7	2	5	1	3	6	÷
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6148. Proportions of a Beautiful Body. The height should be exactly equal to the distance between the tips of the middle fingers of either hand when the arms are fully extended. Ten times the length of the hand, from the elbow to the tip of the middle finger of seven and a half times the length of the foot, or five times the diameter of the chest from one armpit to the other, should also each give the height of the whole body. The distance from the junction of the thighs to the

6149. Loss Sustained by Different Substances in Drying.

Grains.		Dried at	Lose Grains.
100	Gallic Acid	2120	9.5
100	Sulphate of Quinine	212	14.4
100	Arseniate of Soda	300~	40.38
100	Alum	400≎	47.
100	Carbonate of Soda	Dull Redness	63.
100	Phosphate of Soda	14	63.
100	Sulphate of Soda	1.5	56.
100	Carbonate of Potassa	••	16.
Grains.		Dried at	Leave Grains.
29	Oxide of Silver	Redness	27 Metallic Silver
10	Oxalate of Cærium	44	4.8 Oxide with Peroxide
100	Oxalate of Iron	42	27 Peroxide of Iron
50	Tartrate of Iron		15 Sesquioxide of Iron
50	Carbonate of Magnesia	**	22 Magnesia

6150. Table of Symbols and Equivalents of Metallic Elements. The specific lents of Non-Metallic Elements. The

gravity of the following are given at water specific gravity of these are given in their standard. The equivalents are multiples of gaseous form, air being the standard or 1.000. hydrogen, which is adopted as the basis, or 1. The equivalents are multiples of hydrogen which is adopted as the basis or 1.

		! 1	·				
. Dis.	1	Sp. Gr.	il	Symbol.	Equiva	lent.	Specific
Dis.	Ure.			j byzarios.	U.S. Dis.	Ure.	Gravity.
3.70	13.67		Bromine	Br	78.4	80.0	5.4110
9.00 5.00	129.00 75.00		Carbon	Ĉ	6.0	6.0	.8290
3.70	68.50	4.70	Chlorine	Cl	35.5	35.5	2.4530
	213.00		Fluorine	Fl	18.7	19.0	1.3270
).90 5.80	11.00 56.00		Hydrogen	H	1.0	1.0	.0692
.00	20.00		Iodine	I	126.3	127.0	8.7827
6.00	46.00		Nitrogen	N	14.0	14.0	.9713
i. 30 ). <b>50</b>	26.27 29.50		Oxygen	0	8.0	8.0	1.1056
5.00	23.50	0.00	Phosphorus	P	32.0	32.0	4.2840
	123.00		Selenium	Se	40.0	40.0	7.6960
l.70 1.50	32.00		Sulphur.	S	16.0	16.0	2.2140
3.30	48.00	1	6152. T	o Redu	ice Part	s hv	Volume

or Measure to Parts by Weight. Multiply the parts by volume or measure by the specific gravity of the different substances; the result will be parts by weight.

6153. To Find the Length of the Day or Night. To find the length of any day, double the time of sunset. Double the hour of sunrise will be the length of the night.

6154. To Reduce a Liquid to a Given Density. It has been already stated in No. 52 that the actual weight of any substance may be found by weighing an exactly equal bulk of water, and multiplying the weight found by the specific gravity of the substance; the product is the actual weight. To simplify this, suppose that a liquid has a specific gravity of 1.325; also that a certain bulk of water (say any 1 measure) weighs 100 grains; then a similar bulk (1 measure) of the substance would weigh  $100 \times 1.325 = 132.5$  grains. Now, supposing we wish to reduce the weight of this liquid, so that 1 measure of it shall weigh only 115.5 grains (that is, shall have a specific gravity of 1.155), how much water, whose specific gravity is 1.000, must be added to it to produce this result?

From the nature of the proposition, it follows that the bulk of the substance (1) multiplied by its specific gravity (1.325), added to the bulk of added (unknown) water multiplied by its specific gravity (1.000), must be equal to the aggregate bulk of the substance

-		<del></del>		,
		Equiva	ent.	
	Sym. ol.	TT N TV	Ure.	Sp. Gr.
		U. S. Dis.	Ure.	_
Aluminum	Al	13.70	13.67	2.56
Antimony (Stibium)	Sb	122.00	129.00	
Arsenic	As	75.00	75.00	
Barium	Ba	68.70	68.50	
Bismuth	Bi	210.00	213.00	9.80
Boron	В	10.90	11.00	
Cadmium	Cd	55.80	56.00	
Calcium	Ca	20.00	20.00	1.58
Cerium	Ce Cr	46.00	46.00	- 00
Cobalt	5	26.30 29.50	26.27	5.90 8.53
Columbium (Tantalium)	12	185.00	29.50	0.55
Cæsium	Čæ	100.00	123.00	
Copper (Cuprum)	Cu	31.70	32.00	8.72
Didymium	Ď	47.50	48.00	
Erbium	E	56.30		i
Glucinium	G	7.00	6.97	
Gold (Aurum)	Au	199.00	98.33	19.4
Ilmenium	Ţ1	60.20	f	1
Indium	In Ir	74.00		10.00
Iron (Ferrum)	Fe	98.80	98.56	
Lantanium	La	28.00 44.30	28.00	7.84
Lead (Plumbum)	Pb	103.60	104.00	11 30
Lithium	L	7.00	7.00	
Magnesium	Mg	12.00	12.00	
Manganese	Mn	27.70	26.00	8.00
Mercury (Hydrargyrum)		200.00	200.00	13.50
Molybdenum	M	48.00	48.00	
Nickel	Ni	29.50	29.50	8.63
Niobium	Nb	94.00		
Norium Osmium	No Os	00.50	00.41	70.00
Palladium	Pd	99.70 53.30	53.24	10.00
Pelopium	Pe	40.00	00.22	11.50
Platinum	Pt	98.90	99.00	21.50
Potassium (Kalium)	K	39.20	39.00	
Rhodium	Ro	52.20		11.20
Rubidium	Rb	85.40	85.00	
Ruthenium	Ru	52.20	52.11	
Silicon.	Si	21.30	21.00	
Silver (Argentum)	Ag	108.00	108.00	
Sodium (Natrium) Strontium	Na C-	23.30	23.00	
	Sr	43.80	44.00	
Tellurium Terbium	Te Tb	64.00	64.08	6.30
Thallium	Ti	204.00	i	ĺĺ
Thorium	Th	59.60	59.50	
Tin (Stannum)	Sn	59.00	59.00	7.29
Titanium	Ti	25.00	24.12	5.28
Tungsten (Wolfram)	W	92.00	92.00	17.20
Uranium	U	60.00		10.15
Vanadium	v	51.20	68.46	
Yttrium	Y	30.85		
Zinc	Zn	32.30	32.52	6.91
Zirconium	Zr	33.60	33.58	! <i>]</i>

and of the water combined, multiplied by its required specific gravity (1.155).

Putting the above words into shape, and assuming x to be the required bulk or quantity of water

 $(1 \times 1.325) + (x \times 1.000) = (1+x) \times 1.155$ or 1.325 + 1.000x = 1.155 + 1.155xby subtracting 1.155 and 1.000 x from each

.170 = .155x

in other words the required

side we have

bulk of water,......  $x = \frac{110}{55} = 1.097$ 

If, as supposed above, the measure assumed was such that it weighed 100 grains of water, we should have to add  $109_{10}^{-7}$  grains of water to 1 measure of the substance to produce a mixture of specific gravity 1.155.

6155. Gay Lussac's Light Areometer Reduced to Specific Gravity. This instrument ranges from 0° to 50°, 0° corresponding with water at 59° Fahr.

Degree.	Sp. Gr.	Diff.	Degree.	Sp. Gr.	Diff.
000	1.0000	.0095	<b>30</b> 0	.7692	.0057
5	.9524	.0087	35	.7407	.0053
10	.9090	.0079	40	.7143	.0049
15	.8696	.0073	45	.6897	.0044
20	.8333	.0067	50	.6667	ļ
25	.8000	.0062			İ

This table gives the specific gravity corresponding to every 5 degrees of the scale. To find the specific gravity of intermediate degrees, the average difference between each degree is given in the third column, each given difference referring to the four degrees following the degree opposite which the difference is placed. Thus: To find the specific gravity corresponding with 33 degrees of the scale, look in the table for the specific gravity of the nearest lower degree given, in this instance 30°; and we find .7692; 33° is 3° more than 30°, hence we must deduct 3 times the given difference (.0057), or .0171; this last deducted from .7692 = .7521, which is the approximate specific gravity corresponding to 33° of the scale.

The intermediate degrees of other areometers may be determined in a similar manner.

The corresponding degrees of different arcometers may also be found by a comparison with their respective specific gravities; allowance being made for difference of temperature.

Information showing the practical use of some of the areometers will be found in Nos. 58 to 68

6156. Gay Lussac's Heavy Areometer Reduced to Specific Gravity. This areometer ranges from 0° to 50°, 0° representing water at 59° Fahr.

Degree.	Sp. Gr.	Diff.	Degree.	Sp. Gr.	Diff.
00	1.0000	.0105	360	1.4286	.0220
5	1.0526	.0117	35	1.5385	.0256
10	1.1111	.0131	40	1.6667	.0303
15	1.1765	.0147	45	1.8182	.0363
20	1.2500	.0167	50	2.0000	
25	1.3333	.0191			

The specific gravity of the intermediate degrees is found in the same manner as in No. 6155, only that the differences must be added instead of subtracted.

6157. Gay Lussac's Alcoholmeter Reduced to Specific Gravity. This instrument exhibits the percentage of alcohol by volume in different alcoholic mixtures at 59° Fabr

Per cent. of Alcohol by Volume.	Sp. Grav.	Diff.	Per cent. ef Alcohol by Volume.	Sp. Grav.	Diff.
100	.7947	.0044	60	.9141	.0021
95	.8168	.0036	55	.9248	.0020
90	8346	.0031	50	.9348	.0018
85	.8502	.0028	45	.9440	.0016
80	.8645	.0031	40	.9523	.0014
75	.8799	.0022	35	.9595	.0002
70	.8907	.0024	10	.9656	.0034
65	9027	.0023	0	1.0000	

The specific gravity of the intermediate degrees is found as explained in No. 6155, only that the difference must be added instead of subtracted.

6158. Beck's Heavy Areometer Reduced to Specific Gravity. This ranges from 0° to 76°, 0° corresponding with water at 54½° Fahr.

Degree.	Sp. Gr.	Diff.	Degree.	Sp. Gr.	Diff.
00	1.0000	.0061	45°	1.3600	.0113
5	1.0303	.0064	50	1.4167	.0123
10	1.0625	.0068	55	1.4782	.0134
15	1.0968	.0073	60	1.5454	.0147
20	1.1333	.0078	65	1.6190	.0162
25	1.1724	.0084	70	1.7000	.0179
30	1.21 i3	.0090	75	1.7895	
35	1.2592	.0097	76	1.8085	
40	1.3077	.0105			

The specific gravity of the intermediate degrees is obtained as shown in No. 6155, the differences being added instead of subtracted.

6159. Beck's Light Areometer Reduced to Specific Gravity. The scale on this areometer marks from 0° to 70°, 0° representing water at 54½° Fahr.

Deg.	Sp. Gr.	Diff.	Deg.	Sp. Gr.	Diff.
<u>0</u> 0	1.0000	.0057	400	.8095	.0038
5	.9714	.0054	45	.7907	.0036
·10	.9444	.0051	50	.7727	.0034
15	.9189	.0048	55	.7555	.0033
20	.8947	.0046	60	.7391	.0031
25	.8718	.0043	65	.7234	.0030
30	.8500	.0041	70	.7083	
35	.8293	.0040			

The equivalents of the intermediate degrees may be found by the method given in No. 6155.

6160. Dutch Light Areometer Reduced to Specific Gravity. This areometer ranges from 0° to 60°, 0° denoting water.

Deg.	Sp. Gr.	Diff.	Deg.	Sp. Gr.	Diff.
0್	1.0000	.0067	350	.8045	.0044
5	.9664	.0063	40	.7826	.0041
10	.9351	.0059	45	.7619	.0039
15	.9057	.0055	50	.7423	.0037
20	.8780	$\parallel .0052 \parallel$	55	.7236	.0035
25	.8521	.0049	60	.7059	
30	.8276	.0046		]	

The specific gravity of the intermediate degrees may be found in the same manner as directed in No. 6155.

6161. The Heavy Areometer of Brix. 00 denoting water at 600 Fahr.

Deg.	Sp. Gr.	Diff.	Deg.	Sp. Gr.	Diff.
0-,	1.0000	.0025	1050	1.3559	0047
5	1,0127	0026	110	1.3793	.0048
10	1.0256	[.0027]	115	[1.4035]	.0050
15	1.0390	$^{+}.0027$	120	[1.4286]	.0052
20	1.0526	(0)28	125	1.4545	.0054
25	1.0667	.0029	130	1.4815	.0056
30	1.0811	-0029	135	1.5094	.0058
35	1.0058	.0030	140	1.5385	.0060
40	1.1111	.0031	145	1.5686	.0063
45	1.1268	0032	150	1.6000	.0065
50	1.1429	.0033	155	1.6326	.0068
55	1.1594	.0034	160	1.6667	.0071
60	1.1765	.0035	165	1.7021	.0074
65	1.1940	.0036	170	1.7391	.0077
70	1.2121	.0037	175	1.7777	.0081
75	1.2308	.0038	180	1.8183	.0085
80	1.2500	.0039	185	1.8605	0089
85	1.2698	.0040	190	1.9047	.0093
90	1.2900	.0042	195	1.9512	9600
95	1.3115	.0044	200	2.0000	
100	1.3333	.0045	i		

The specific gravity of the intermediate degrees is obtained as in No. 6155, by adding the differences instead of subtracting them.

6162. The Light Areometer of Brix. This areometer is graded from 0° to 200°, 0° corresponding with water at 60° Fahr.

Degrec.	Sp. Gr.	Diff.	Degree.	Sp. Gr.	Diff.
0°	1.0000	.0025	105°	.7921	.0016
5	.9876	.0024	110	.7843	.0015
10	.9756	.0024	115	.7767	0015
15	.9638	.0023	120	.7692	.0015
20	.9524	.0022	125	.7619	.0014
25	.9412	.0022	130	.7547	.0014
30	.9302	.0021	135	.7477	.0014
35	.9195	.0021	140	7407	.0014
40	.9091	.0020	145	.7339	1.001;
45	.8989	.0020	150	.7273	.001:
50	.8889	.0020	155	.7207	.001:
55	.8791	.0019	160	.7143	.001:
60	.8696	.0019	165	.7080	.001:
65	.8602	.0018	170	.7018	.0012
70	.8511	.0018	175	.6957	.0012
75	.8421	.0018	180	.6897	.0012
80	.8333	.0017	185	.6838	.0012
85	.8247	.0017	190	.6780	.0011
90	.8163	.0016	195	.6723	.0011
95	.8081	.0016	200	.6667	
100	.8000	.0016	ļ'		

To obtain the specific gravity of the intermediate degrees see No. 6155.

6163. Dutch Heavy Areometer Reduced to Specific Gravity. The range of and based on 1000 as the unit representing this instrument is from 0° to 75°, 0° correwater, instead of 1. sponding with water.

Deg.	Sp. Gr.	Diff.	Deg.	Sp. Gr.	Diff.
0° 5 10 15 20 25 30 35	1.0000 1.0359 1.0746 1.1163 1.1613 1.2101 1.2631 1.3211	.0072 .0077 .0083 .0090 .0098 .0106 .0116	40° 45 50 55 60 65 70	1.3846 1.4545 1.5319 1.6180 1.7143 1.8228 1.9459 2.0869	.0140 .0155 .0172 .0193 .0217 .0246 .0282

The specific gravity of the intermediate This instrument is graduated from 0° to 200°, degrees is easily obtained by following the directions laid down in No. 6155, adding the difference instead of subtracting it.

6164. Twaddel's Areometer Reduced to Specific Gravity. The range of this areometer or saccharometer is from 9° to 2000, 00 corresponding with water.

Degrees.	Sp. Grav.	Degrees.	Sp. Grav.
0°	1.000	105°	1.525
5	1.025	110	1.550
10	1.050	115	1.575
15	1.075	120	1.600
20	1,100	125	1.625
25	1.125	130	1,650
30	1.150	135	1.675
35	1.175	140	1.700
40	1.200	145	1.725
45	1.225	150	1.750
50	1.250	155	1.775
55	1.275	160	1.800
60	1.300	165	1.825
65	1.325	170	1,850
70	1.350	175	1.875
<b>7</b> 5	1.375	180	1.900
80	1.400	185	1.925
85	1.425	190	1.950
90	1.450	195	1.975
95	1.475	200	2.000
100	1.500		

In the above table the difference between the degrees is .005, throughout; the specific gravity of the intermediate degrees can be found by following the method given in No. 6155, adding instead of deducting the difference. (See No. 68.)

6165. Baumé's Heavy Areometer. This instrument marks from 0° to 75°, 0° being water at 63% Fahr.

Deg.	Sp. Gr.	Diff.	Deg.	Sp. Gr.	Di <b>ff.</b>
ტა	1.0000	.0071	<u>40°</u>	1.3746	.0135
5	1.0353	.0076	45	1.4421	.0149
10	1.0731	.00∈1	50	1.5166	.0165
15	1.1138	.0088	55	1.5992	.0184
20	1.1578	.0095	60	1.6914	.0207
25	1.2053	.0103	65	1.7948	.0234
30	1.2569	.0112	70	1.9117	.0266
35	1.3131	.0123	<b>7</b> 5	2.0448	

The specific gravity of the intermediate degrees can be obtained as directed in No. 6155, adding the difference instead of subtracting. A ready method of calculating the specific gravity corresponding to the degrees of this areometer, sufficiently correct for common purposes, will be found in No. 66; the table given in No. 65 is made on that principle,

6166. Baumé's Light Areometer. This areometer ranges from 10° to 60°, 10° denoting water at 54% Fahr.

Deg.	Sp. Gr.	Diff.	Deg.	Sp. Gr.	Diff.
10° 15 20	1.0000 .9669 .9358	.0066 .0062 .0058	40° 45 50	.8294 .8065 .7848	.0046 .0043 .0041
25 30 35	.9067 .8794 .8537	.0055 .0051 .0049	55 60	.7642 .7447	.0039

The specific gravity of the intermediate de- to prepare a solution of chloride of lime, grees is found by following the directions which must be allowed to settle, and the given in No. 6155. A simple method for clear liquid poured into a basin, in which the converting the degrees of this areometer into skeletons may be put by floating them off the specific gravity, applicable in cases where card. It is as well to have half a dozen great accuracy is not required, is given in ready to bleach at once, as they require watch-No. 66. A table, similar to the above, will ing, and if allowed to remain in the liquid too be found in No. 62, sufficiently accurate for long will fall to pieces. From 2 to 4 hours general practical purposes.

iscellaneous Receipts. These consist mainly of such receipts as could not be properly included in any division of the work; embracing also a few classification under their proper headings.

6168. To Prepare Skeleton Leaves. The object in view is to destroy what may be called the fleshy part of the leaf, as well as the skin, leaving only the ribs or yeins. The most successful, and probably the simplest washing soda in 2 pints boiling water, and way to do this, is to soak the leaves in rain-water till they are decomposed. For this ed; boil for 10 minutes, decant the clear solupurpose, when the leaves are collected, they tion, and bring it to the boil. During ebullishould be placed in an earthenware pan or a wooden tub, kept covered with rain-water, and allowed to stand in the sun. In about 2 the place of that lost by evaporation. Take weeks time they should be examined, and if out a leaf, put it into a vessel of water, and found pulpy and decaying, will be ready for rub it between the fingers under the water, skeletonizing, for which process some cards, a If the skin and pulpy matter separate easily, camel's-hair brush, as well as one rather the rest of the leaves may be removed from stiff (a tooth-brush, for instance), will be the solution, and treated in the same way; required. When all is prepared, gently float but if not, then the boiling must be continued a leaf onto a eard, and with the soft brush for some time longer. (See No. 6168.) carefully remove the skin. Have ready a 6171. To Bleach Skeleton Leaves. basin of clean water, and when the skin of To bleach the skeleton leaves, mix about 1 one side is completely removed, reverse the drachm chloride of lime with 1 pint water, card in the water, and slip it under the leaf, adding sufficient acetic acid to liberate the so that the other side is uppermost. Brush chlorine. Steep the leaves in this until they this to remove the skin, when the fleshy part are whitened (about 10 minutes), taking care will most likely come with it; but if not, it not to let them stay in too long, as they are will readily wash out in the water. If parti- apt to become brittle. Put them into clean cles of the green-colored matter still adhere water, and float them out on pieces of paper. to the skeleton, endeavor to remove them Lastly, remove them from the paper before with the soft brush; but if that is of no avail, the hard one must be used. Great care or botanical press. They look best when will be necessary to avoid breaking the skelecon, and the hard brush should only be used 6169.) in a perpendicular direction (a sort of gentle tapping), as any horizontal motion or brush- are few prettier ornaments, and none more ing action will infallibly break the skeleton, economical and lasting, than bouquets of Never attempt to touch the leaves or the dried grasses, mingled with the various unskeleton in this state with the fingers, as when changeable flowers. They have but one they are soft their own weight will often break fault; and that is, the want of other colors them. Well-grown leaves should always be besides yellow and drab or brown. To vary chosen, and be thoroughly examined for flaws their shade, artificially, these flowers are before soaking. Leaves containing much tannin cannot be skeletonized by this process, bad taste, and unnatural. The best effect is but are generally placed in a box with a number of caddis worms, which cat away the gether with a very little pale blue, with the fleshy parts, when the skeletons can be grasses and flowers, as they dry naturally. fleshy parts, when the skeletons can be grasses and flowers, as they dry naturally. bleached by the method given in the next The best means of dyeing dried leaves, flowreceipt. Holly leaves must be placed in a ers, and grasses, is to dip them into the spirit-separate vessel, on account of their spines, uous liquid solution of the various compounds which would be apt to damage other leaves; of analine. (See Nos. 2552, &c.) Some of they make beautiful skeletons, and are suffi- these have a beautiful rose shade; others red, ciently strong to be moved with the fingers. blue, orange, and purple. The depth of color (See No. 6170.)

will generally suffice to bleach the skeleton of all ordinary leaves, after which they should be washed in several changes of water, and finally left in clean water for hour. After the leaf has been sufficiently washed it should be floated onto a card and dried as quickly as possible, care being taken to arrange the skeleton perfectly flat, and as near as possible to the natural shape. This can be done with additional general receipts, whose merits dethe assistance of the soft brush. When dry manded their insertion, obtained too late for the skeleton should be perfectly white, and may be mounted on dark backgrounds, as black velvet or paper. (Sec No. 6171.)

6170. Quick Method of Preparing Skeleton Leaves. A solution of caustic soda is to be made by dissolving 3 ounces but if not, then the boiling must be continued

they are quite dry, and place them in a book mounted on black velvet or paper. (See No.

6172. To Stain Dried Grass. There produced by blending rose and red tints, to-70.)

To Bleach Skeleton Leaves. can be regulated by diluting, if necessary, the original dyes, with spirit, down to the shade A good way of bleaching skeleton leaves is desired. When taken out of the dye they should be exposed to the air to dry off the first to be well dried at the fire. With regard colors

6173.

6174. To Copy Ferns. Dip them well

pressure, and let them dry out.

Dip the flowers in melted paraffine, withdraw- upon them as before.

specimens in this way.

To Collect and Preserve Specimens of Plants. To form what is called the hortus siccus, or herbarium, various methods the Microscope. are employed, but the following is recommended as the most simple. The articles requisite for the purpose consist of a dozen quires of smooth soft paper of a large size, 6 boards of about an inch in thickness, and 4 iron or lead weights, two of them about 30 pounds, and the two others about half that the legs and antenne may be nicely extended. weight, and a botanical box of tin, and of such all the expressed moisture absorbed by the dimensions as shall be most convenient for the collector. The plants to be preserved ought, if possible, to be gathered in dry weather; but if the weather be wet they should be laid out for some time on a table till partially dried, and when the roots are taken up along the usual way. (See No. 6180.) with the stems, they must be washed and then exposed to the air for the same purpose.

6177. To Preserve Plants. one of the boards two or three sheets of the boiling heat of water. paper described in the last receipt. On the most sheet spread out another specimen, and procured. As some plants are delicate and to be placed over them, and the latter considerably more.

Shape of Plants when Drying. To pre-

They then require arranging, or set- to keeping the shape of flowers, the utmost ting into form, as, when wet, the petals and care and attention is necessary when arrang-fine filaments have a tendency to cling to- ing them on the paper; this can be done by gether. A pink saucer, as sold by most having another piece of paper and gently lay-druggists, will supply enough rose dye for ing it on part of the flower; the part of the two ordinary bouquets. The pink saucer flower so covered with the paper ought to yields the best rose dye by washing it off have a small book placed on it. Then begin with water and lemon juice. The analine and lay out the other leaves of the flower, dyes yield the best violet, mauve, and purple and also press it, and so on, until each part has had the gentle pressure necessary to keep Artificial Coral. Melt together it in position. Let them remain so for a short yellow resin, 4 parts; vermilion, 1 part. This time, and then put some heavy weight on gives a very pretty effect to glass, twigs, them; look at them next day, and change the raisin stalks, cinders, stones, &c., dipped into damp paper. Ferns may be kept for years the mixture and dried. quite fresh in color by this simple mode of drying. In 3 or 4 days the plants thus treated in common porter, and then lay them flat should be taken out, together with the paper between white sheets of paper, with slight in which they have been deposited, and laid essure, and let them dry out. in fresh paper with 3 or 4 sheets between 6175. To Preserve Natural Flowers. every 2 plants, and the board and weights laid This process must be ing them quickly. The liquid should be only continued till the plants are perfectly dried. just not enough to maintain its fluidity, and Each specimen is then to be placed on a sheet the flowers should be dipped one at a time, of dry paper, along with a memorandum of held by the stalks and moved about for an the name of the plant, the place and time at instant to get rid of air bubbles. Fresh-cut which it was gathered, the character of the flowers, free from moisture, make excellent soil from which it was taken, and any other particulars tending to illustrate its character

and history.
6179. To Mount Small Insects for Mounting small insects for the microscope, such as parasites and acari from birds, beetles, &c., may be performed by placing the live insect on the inside of a sheet of tolerable good note paper, folded, and when in the act of running, closing the paper and pressing it tightly in a book. By this means paper, and the skin left apparently unbroken. It should be allowed to remain in the book about 2 days, when it may be carefully removed from the paper, put in a turpentine bath, and afterwards mounted in balsam in

To Mount Microscopic Ob-6180. jects in Canada Balsam. Warm the glass Lay over slips, &c., to a temperature just below the If there is any doubt of the balsam penetrating all the interstices uppermost sheet spread out the specimen to and readily adhering to the specimens, it will be preserved, unfolding its parts so as to give be well to pour a few drops of clear turpenit as natural an appearance as possible, laying tine upon the specimens, which will greatly out the leaves and flowers with particular facilitate the taking of the balsam; the latcare. Over the specimen thus disposed of ter, however, must not be used until the turplace several sheets of paper; on the upper- pentine has nearly evaporated. The moment when the balsam is to be added with the best so proceed till all the plants intended to be effect can only be known by experience. preserved are laid down; and having put over Clear old Canada balsam is the best suited for the whole some more sheets of paper, place a these purposes. When used it must also be board over them with the weights upon it, heated to a temperature just below boiling which may be a number of clean bricks, if water, and then poured upon the object, pre-iron or lead weights cannot conveniently be viously arranged upon a slip of glass. The top slip of glass, which is usually smaller and flexible, and others comparatively thick and thinner than the under one, is now to be placed hard, the former class will require less weight upon it; one end of each slip being brought into contact first, and then the other allowed to fall upon it. By this means no air-6178. To Preserve the Color and bubbles will be enclosed. The exact quantity of balsam must be learned by practice. serve the color of flowers when drying, the two faults, namely, too much or too little, the greatest care is required in changing the former is to be preferred. Be careful not to papers every second day, which papers ought press the glasses together too hard, otherwise,

on the removal of the pressure, the air will has been covered over (which must always be enter between the glasses, and the preparation done with a woolen rug in winter) repeat over will be spoilt. Having thus mounted the ob- several times in the same tone the sentence ject, it must be slowly dried in a warm situal you wish him to learn. He may not appear tion. This will take 1 or 2 days; after which to notice at first, but some day, quite unexthe slide is to be cleaned by scraping off the pectedly, he will repeat the sentence exactly surplus balsam with a strip of plate glass. In the same tone that he has heard it. He Finally, wipe it clean, using first a linen rag should at once be rewarded with a bit of moistened with turpentine, and then a piece sugar, or fruit, or any little dainty that he is of dry clean leather.

crystal formation may be seen under the or permit it to be fed indiscriminately by microscope as follows: Upon a slip of glass, visitors. Keep the cage extremely clean; let place a drop of liquid chloride of gold or ni- it be wiped out and fresh sand given every trate of silver, with a particle of zine in the day. Some birds drink very little, but they gold and copper in the silver. A growth of should always be able to get a drink of fresh exquisite gold or silver ferns will vegetate water if they wish. It is also a good plan to exquisite gold or silver ferns will vegetate under the observer's delighted eye.

6182. To Prepare a Skeleton. After seed-can; it is possible that the morning cutting off as much flesh and cartilage from bread and milk may be forgotten, and the the bones as possible, boil them in water till seed will thus prevent the bird being starved. ing for a short time in a weak solution of chloride of lime.

6183. Phial Barometer. Take a comclean water, place your finger on the mouth, and invert it; withdraw your finger, and suspend it in this position with a piece of wire or twine. In dry weather the under surface of the water will be level with the neck of the bottle, or even concave; in damp weather, on the contrary, a drop will appear at the mouth and continue until it falls, and is then followed by another in the same way.

The Chemical Barometer, or ass. Take a long narrow bottle, 6184. Storm Glass. such as an old-fashioned eau-de-Cologne bottle, and put into it 2½ drachms of camphor and 11 drachms of spirit of wine; when the from its action. camphor is dissolved, which it will readily do by slight agitation, add the following mixture: Take water, 9 drachms; nitrate of potassa (saltpetre), 38 grains; and muriate of ammonia (sal ammoniae), 38 grains. Dissolve these salts in the water before mixing with the camphorated spirit; then shake the whole well together. Cork the bottle well, and wax the top, but afterwards make a very small aperture in the cork with a red-hot needle. The bottle may then be hung up, or placed in any stationary position. By observing the different appearances which the materials assume as the weather changes, it becomes an excellent prognosticator of a coming storm or

of a sunny sky.
6185. To Teach a Parrot to Speak. The quickest way is to send the bird, if possible, where there is another parrot who can

fond of. They are very quick at understand-6181. Marvels of the Microscope. A ing that rewards are given for obedience. beautiful and easily produced exhibition of Never allow a parrot to be startled or teased, let a small quantity of canary seed be in the

the remainder easily separates. The French still further prepare their skeletons by bleaching for a short time in a weak solution of upon must be protected by a so-called etching-ground, which consists of a thin layer of varnish blackened in a flame so as to see mon phial and cut off the rim and part of the plainly the figures afterward drawn on it. Be neck with a file. This may also be effected careful, when doing this, to make a clear drawby means of a piece of cord passed round it, and moved rapidly to and fro, in a sawing direction; the one end being held in the left hand and the other fastened to any convenient writing would not be brought out. The object, while the right hand holds and moves the acid, either strong acetic, diluted nitric, or phial; when heated, dip it suddenly into cold muriatic, is then applied, and when its action water, and the part will crack off. (See Nos. is sufficient it is washed off with water, the 2368, (c.) Then nearly fill the phial with varnish is rubbed off with turpentine or alcohol, when the drawing or lettering will appear, and look as if cut in with an engraver's tool. The design may also be drawn with varnish on the shell by means of a fine brush, then the acid will dissolve the surface around the lines drawn, and the writing will appear in relief, the letters being elevated in place of being sunk in as by the former process. latter is the more common way in which these shells are treated. This method is applied to many other objects; all that is wanted being a liquid dissolving the material to be acted upon, and a varnish to protect some parts

6187. To Clean Shells. Make lye by boiling strong ashes, allow it to settle; pour the lye over the shells, and boil them 6 or 7 hours, or longer if they are large; then soak, and wash often in fresh water.

6188. To Color Shells. Dissolve a little lac dye in a solution of chloride of tin; and having made the shells thoroughly clean, dip them in this preparation until they are of the desired color. The dye should be first boiled, and then allowed to stand to settle.

6189. To Keep Gold-Fish. Gold-fish must be kept in a vessel of sufficient capacity, and be given fresh water every day, or at least every other day. It is best to clean the vessel then, by washing it inside with a cloth. The fresh water ought to be clean, and not too hard. It is not good to feed them, as the food will only serve to render the water unfit speak. They should be placed near enough to for their existence, and if renewed every day, hear, but not see each other, and the one will the water itself furnishes them with enough soon imitate the other. A good way is to material for their sustenance. Fish kept in speak to the bird at night; just when his cage this way generally perish from want of oxyinto carbonic acid.

6190. Food for Mocking-Birds. Mix together 2 parts corn-meal, 2 parts pea-meal, and 1 part moss-meal; add a little melted lard, but not sufficient to make the mixture the sake of economy of time and labor. Detoo greasy, and sweeten with molasses. Fry and taking care not to let it burn; this makes the imported German moss-seed.

6191. Singing-Birds. Blanched sweet almonds, 1 pound; pea-meal, 2 pounds; butter, 3 ounces; pound; pea-meal, 2 pounds; butter, 3 ounces; 6196. To Apply Decalcomine Picsaffron, a few grains; honey, a sufficient quantures. The proper way to put on decalcotity. Form the whole into a paste, and granulate it by pressing it through a cullender.

Some add the yolks of 2 eggs.
6192. How to See Under Water.
The Indians of North America do this by cutting a hole through the ice, and then covering or hanging a blanket, in such a manner as to darken or exclude the direct rays of the sun, when they are enabled to see into the water, and discover fish at any reasonable depth, ular to purchase only those transfer pictures Let any one who is anxious to prove this, place himself under the blanket, and he will be astonished when he beholds with what a brilliancy everything in the fluid world is lighted up. A correspondent of the Scientific procured a American says: "I once had occasion to is trifling. examine the bottom of a mill pond, for which I constructed a float out of inch boards, sufficient to buoy me up: through the centre of satisfied that, where water is sufficiently clear, this latter plan could be successfully used for searching for lost bodies and articles."

6193. To Prepare Soap for Bubbles.

trouble.

6194. To Produce Large and Longlasting Soap-Bubbles. For the production of unusually large soap-bubbles that will last for hours, and exhibit splendidly the beautiful colors of the rainbow, a fluid may be employed that can easily be prepared in nicely fitted together. the following way: Fine shavings of palmoil soap are shaken in a large bottle with distilled water, until a concentrated solution of the soap is obtained; this is filtered through with 3 ounces common salt, 1 ounce Epsom gray filtering paper, and then mixed with salts, 200 grains chloride of magnesium, and about one-third its bulk of pure glycerine. 40 grains chloride of potassium. Or, more The fluid is to be shaken up before use. By precisely, the real constitution of sea-water means of a small glass funnel, of two inches may be imitated in the following manner: diameter, connected with a tube of india-rub- Mix with 970,000 grains rain water 27,000 of

gen. Anything, therefore, which consumes it ber, soap-bubbles may be prepared with this ought to be avoided, and this is a reason for fluid, that will vie in beauty of color with the not giving them any food. Green leaves of rainbow itself, and which may be kept for a living plants have an opposite effect, and they; long while by putting them carefully upon an may be kept for this purpose in fish-bowls; iron ring which is slightly rusty and thoroughthey absorb the carbonic acid in the water ex- ly wet with the soap solution. Bubbles of haled by the fish, giving off oxygen, which is 1 foot and more in diameter will keep from 5 in turn taken up by the fish and reconverted to 10 minutes; those of 2 or 3 inches in diameter will retain their form for 10 or 12 hours.

calcomine pictures expressly designed for earin a frying-pan for & hour, stirring constantly, riages are now sold at the leading stationers' stores, and the amateur painter is enabled it keep well. Put it in a covered jar. The thereby to finish a job of carriage painting in moss-meal is prepared by drying and grinding fine style. These pictures may be stuck on, d German moss-seed.

German Paste for Feeding leaving the picture intact upon the panel, requiring no touching with the pencil.

mine pictures is to varnish the picture carefully with the prepared varnish (which can be obtained with the pictures), with an ornamenting pencil, being sure not to get the varnish on the white paper. In a few minutes the picture will be ready to lay on the panel, and the paper can be removed by wetting it; and when thoroughly dry, it should be varnished like an oil painting. Be particwhich are covered with gold leaf on the back, for they will show plainly on any colored surface, while the plain pictures are used only on white or light grounds. They may be procured at any stationery store, and the cost

6197. Lead for Pencils. The easiest way of producing not only black lead, but all sorts of peneils, is by the following process, this float I cut a hole, and placed a blanket over it, when I was enabled to clearly discover objects on the bottom, and several lost a tub of clear water, to soak for 12 hours, tools were discovered and picked up. I am then agitate the whole until it resembles milk; let it rest 2 or 3 minutes, and pour off the supernatant milky liquor into a second vessel; then allow it to settle, pour off the clear water, and dry the residue on a filter. Then add black lead in any quantity. Pow-Dissolve castile soap in strong alcohol; let it der it, and calcine it at a white heat in a settle, or filter, and take the clear solution, loosely covered crucible; cool, and most carefrom which evaporate the alcohol. The solid fully repulverize; then add prepared clay and residue is cleate of soda. To this add half prepared plumbago, equal parts. Make into its weight of glycerine and sufficient water to a paste with water, and put into oiled moulds give the proper consistency. The beauty of of the size required; dry very gradually, and the experiments will compensate for all the apply sufficient heat to give the required degree of hardness—the pieces to be taken carefully from the moulds and placed in the grooves of the cedar. The more clay and

heat employed, the harder the crayon; less clay and heat produce a contrary effect. The moulds must be made of 4 pieces of wood, chloride of sodium, 3600 of chloride of mag-jof the vessel well with the solution. bromide of magnesium, 2300 of sulphate of using magnesia, 1400 of sulphate of lime, 35 of caraccount is the water to be boiled, or even Into this water, when clear, the the edges. heated. rocks and sea-weed may be introduced. As soon as the latter are in a flourishing state, the animals may follow. Care must be taken for 5 or 10 minutes, then rinse them in tepid not to have too many of these, and to remove water, dry them and tie them up in bunches immediately any that die. The loss by evaporation is to be made up by adding clean over tarts or yastry.

The aquarium, whether of fresh 6204. Remedy for Frozen Potatoes. or of salt water, will require occasionally arti- In time of frost, potatoes that have been ficial aeration. This may be done by simply affected thereby should be laid in a perfectly blowing through a glass tube which reaches dark place for some days after the thaw has to near the bottom, or, better still, in the fol-commenced. If thawed in open day they lowing way: Take a glass syringe which can be easily worked. Having filled it with water, hold it with the nozzle about 2 inches ties from the surface of the water in the aguariam. into which the contents are to be discharged means a multitude of small bubbles are forced down into the fluid. This operation should be repeated for a considerable number of times.

6199. To Prevent Stair Carpets from Wearing. Stair carpets should always have the edge of every stair, which is the part where they wear first, in order to lessen the start any wood that is fit to burn. friction of the carpet against the boards beneath. The strips should be within an inch or two as long as the carpet is wide and about 4 or 5 inches in breadth. A piece of old earpet answers better than paper if you have it. This plan will keep a stair carpet in good condition for a much longer time than without it.

window in which it is to be placed. those of a violin, to wind the strings around, stopper two pins in each end. Make a sound-hole in the middle of the top, and string the box with opposite end of the box. The ends of the box b so as to form a loop (a) of about 4 inches should be increased in thickness where the wooden pins enter, by a piece of wood glued upon the inside. Tune the strings in unison and place the box in the window. It is better to have 4 strings, as described, but a harp with a single string produces an exceedingly sweet melody of notes, which vary with the in length; at the doubled end, bring the knot force of the wind.

nesium, 750 of chloride of potassium, 29 of wards scald it well with plain hot water before

6202. To Preserve Ribbons and Silks. bonate of lime, 5 of foodide of sodium. These Ribbons and other silks should be put away all being finely powdered and mixed first, are for preservation in brown paper; the chloride to be stirred into the water, through which a of lime used in manufacturing white paper stream of air may be caused to pass from the frequently produces discoloration. A white bottom until the whole is dissolved. On no satin dress should be pinned in blue paper. with brown paper outside, sewn together at

6203. To Make Feather Brushes. Boil the wing feathers of a turkey or chicken

rot; but if in darkness, they do not rot; and they lose very little of their natural proper-

6205. To Make Fire Kindlers. Take a quart of tar and 3 pounds of resin, melt quickly, and with a sort of jerk. By this them, bring to a cooling temperature, mix with as much coarse sawdust, with a little charcoal added, as can be worked in; spread out while hot upon a board; when cold, break up into lumps of the size of a large hickory nut, and you have, at a small expense, kindling material enough for a household for one a slip of paper put under them, at and over year. They will easily ignite from a match and burn with a strong blaze, long enough to

6206. To Loosen Ground Glass Stoppers. Sometimes the ground glass stoppers of bottles become, from one cause or another, fixed in the neck, and cannot be removed by pulling or twisting. An effectual method is to wrap a rag wet with hot water around the neck and let it remain a few seconds. The heat will expand the neck of the bottle, when 6200. To Make an Æolian Harp. Of the stopper can be removed before the heat very thin cedar, pine, or other soft wood, make penetrates the stopper itself. Or, wind a a box 5 or 6 inches deep, 7 or 8 inches wide, string once or twice around the neck, and, and of a length just equal to the width of the holding the bottle between the knees, pull Across alternately on one and the other end, thus the top, near each end, glue a strip of wood 1 creating friction, and consequently heat. Or inch high and 1 inch thick, for bridges. Into a little camphene dropped between the neck the ends of the box insert wooden pins, like and stopper of the bottle will often relieve the

6207. To Remove a Glass Stopper. The most effectual mode of removing stopsmall cat-gut, or blue violin strings. Fasten- pers, especially those of small bottles, such as ing one end of each string to the wooden pin smelling-bottles, is as follows: Take a piece of in one end of the box, and carrying it over the strong cord, about a yard or 4 feet in length, bridges, wind it around the turning-pin in the double it at the middle, and tie a knot (Fig. 1.



Fig. 1.

close to one side of the stopper, and tie the 6201. To Remove the Disagreeable ends tightly together on the opposite side, as Taste from New Wooden Vessels. First at Fig. 2 (e) so as to fasten the string securely scald them with boiling water, then dissolve round the neck of the stopper; now pass one some pearlash or soda in lukewarm water, of the ends through the loop (a), and then tie adding a little lime to it, and wash the inside it firmly to the other end; the doubled cord

found that in a short time the stopper is liber- ammonia is also effective.

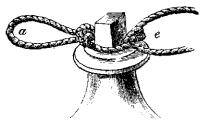


Fig. 2.

that the strain on both sides of the stopper or an entanglement will occur in the unwindisequal; the other, that care be taken that ing. A curved needle will pass under the when the stopper is liberated, it is not dashed ring more easily than a straight one. by the rebound against any hard substance, which would cause its fracture.

required. 6209. fire in a chimney which has been lighted by a the meter, and soon wears it out.

fire in the fireplace, shut all the doors of the 6215. To Prevent the Creaking of common fine salt upon the fire in the grate or parts, and appl stove, which will immediately extinguish the 6216. To extinguisher of fire.

6210. To Prevent Glass from Cracking by Sudden Heating. Probably more used, or a little cold water be boured into the kept in a warm place. glass on which the hot water may be drawn. upon the lighted lamp, especially if taken week, they will become very tough, will not from a cold room. The proper remedy is to cut a carpet, last much longer, and always turn up the flame slowly or by degrees; this sweep like a new broom. will gradually heat the glass, and prevent its

6211. Window glass constantly exdow Glass. posed to the action of the sun and rain soon taking care not to let the soap lather get into deteriorates, as the potash or soda it contains its eyes. Have a tub with clean tepid water combines with the carbonic ac d of the air.  $\Lambda$  in which a little blue has been dissolved whitish opaqueness is the result of this action; ready; when the coat is clean dip the dog and in order to restore the pane to its original into the blue-water and rinse out the soap. clearness, rub it with dilute muriatic acid, and tion may be restored by this means ..

is then to be placed over a bar or other sup- | 6212. To Clean Discolored Glass. port, then if the bottle is surrounded by a Glass that appears smoky may be cleaned cloth, to prevent accident in case of fracture, by applying diffute nitric acid, when soap, turand pulled downwards with a jerk, the force pentine, alcohol, or scouring with whiting of which is gradually increased, it will be would make no impression on it. Water of

6213. To Remove a Ring from a Swollen Finger. A thread should be wound evenly around, beginning at the extremity of the finger, and bringing each coil close to the preceding, until the ring be reached. A needle is then threaded on and passed under the ring, and the thread is carefully unwound from the finger. The ring follows each coil as it is successively unrolled, and by almost imperceptible degrees is brought over the knuckle and removed. Care must be taken that the thread is wound on ated. Two precautions are requisite—one is, evenly, particularly over the swollen knuckle,

6214. To Prevent Gas Meters from Half a pint (or less) of good Freezing. 6208. To Keep Up Sash Windows, glycerine is said to prevent the freezing of a This is performed by means of cork, in the gallon of water, though at least double the simplest manner, and with scarcely any expense. Bore 3 or 4 holes in the sides of the sash, into which insert common bottle-cork, projecting about the sent part of an inch. These will press against the window frames freeze. Glycerine is but little inclined to freeze. Glycerine in a pure state is perfectly along the usual greeve, and by their elasticity inert, and exercises no influence upon the support the sash at any height which may be metals of which the meter is composed. Whiskey, on the contrary, undergoes the acet-6209. How to Treat a Burning ous fermentation, by which the alcohol is Chimney. If it is desired to extinguish the converted into acetic acid, which corrodes

apartment so as to prevent any current of air Doors. Apply a little soap to the hinges. up the chimney, then throw a few handfuls of Or: Take lard, soap, and black lead, equal

6216. To Keep Kerosene Oil. This fire in the chimney. The philosophy of this oil should be kept for use in air-tight closed is, that in the process of burning the salt, vessels. A large quantity is best kept in a muriatic acid gas is evolved, which is a prompt well-corked can provided with a faucet an inch or two from the bottom, so that the oil can be drawn off as required, without disturbing the sediment which usually collects on the articles of glass in daily use are broken by bottom of the vessel; by this means the oil being suddenly heated than by blows or other will be always clear and bright. The small acts of carelessness. Glass is a very poor concans used for filling lamps should be kept ductor of heat, and when hot water is poured closely corked both at the neck and spout. suddenly into a tumbler or goblet, it is almost If either cork be left out for a day or two, the certain to break unless the glass itself is oil will burn dull, and cake on the wick; this quite warm. Tepid water should be first is more especially the case when the can is

6217. Management of Brooms. Lamp chimneys frequently crack when placed brooms are wetted in boiling suds once a

6218. To Wash White Dogs. Make a good lather of white soap with a little spirit To Restore the Color of Win- of turpentine; wash the dog as quickly as window glass constantly expossible in this while it is warm, but not hot, Then rub it well in a clean sheet before a fire; then clean with moistened whiting. It is said if the hair is long comb it out and brush it as that glass in an extreme state of decomposi- it dries. The turpentine will kill fleas unless the dog is much infested with them.

Mix the paint to a proper consistency with poured out. best coachmakers' Japan varnish. For white lead paint, use half turpentine and half coachmakers Japan. It will not darken much. Venetian red is best for a first coat, for any color but white.

6220. To Raise Old Veneers. In repairing old cabinets, &c., workmen are often at a loss to know how to get rid of those blisters which appear on the surface. We will describe how the operation may be performed without difficulty. First wash the surface heat. with boiling water, and with a coarse cloth remove dirt or grease; then place it before the fire; oil its surface with linseed oil, place it again to the fire, and the heat will make the oil penetrate quite through the veneer the latter is not at hand, may be found in the will spoil the work. If the work should get knife through the two, and give a twist. cold during the operation, apply more oil, and heat it again. When you have entirely sep
Inside of a Bottle. With a stout string ceed to lay it again as a new veneer.

6221. To Take Bruises out of Furniture. Wet the part with warm water; To Take Bruises out of Furnidouble a piece of brown paper 5 or 6 times, place; apply on that a warm, but not hot, the bruise be not gone, repeat the process. After two or three applications the dent or bruise will be raised to the surface. If the bruise be small, merely soak it with warm water, and hold a red-hot iron near the surface, keeping the surface continually wet; the bruise will soon disappear.

6222. To Dissolve Gum-Shellac in Ammonia. The vessel containing the shell upon the pods a quantity of scalding water continuously, stirring all the while with a labor saved. glass rod, until solution is effected. An excess of ammonia will color the solution Candles. brown. After cooling, the fluid is filtered, and may be kept in this state a long while.

6223. When the frost begins to set in, cover the water-pipes with hay or straw bands, twisted tight round them. Let the cisterns and water-butts be washed out occasionally; this will keep the water pure and fresh. pumping up water into the cistern for the water-closet, be very particular in winter water-closet, be very particular in winter 6233. Ajutage of Fountains. M. time. Let all the water be let out of the Francois, in his work, "Art des Fontaines," pipe when done; but if this is forgotten, and it should be frozen, take a small gimlet and bore a hole in the pipe, a little distance from the place where it is let off, which will prevent its bursting. Put a peg into the hole 1 of the size of the pipe itself. when the water is let off.

6224. To Protect Lead Water-Pipes. Dr. Schwarz, of Breslau, notes a simple method of protecting lead pipes from the ac-The operation, which is a very simple one, fullest jet the head is capable of. consists in filling the pipes with a warm and concentrated solution of sulphide of potassium ments for Picture Frames or Other

6219. To Paint an Iron Bath Tub. the lead for about 15 minutes, and then

6225. Blowing Out Steam Boilers. Steam boilers should never be blown out un-The safety valve should der steam pressure. first be raised until the pressure is all removed by letting the steam escape as rapidly as possible; then the hand hole plate or other device should be opened, and the dirt and sediment will run out with the water. If the boiler is allowed to cool off, the dirt will settle to the bottom and be fastened on by the The dirt is always on the top of the water when there is any pressure of steam on it.

6226. Substitute for a Corkscrew. A convenient substitute for a corkscrew, when and soften the glue underneath; then, whilst use of a common screw, with an attached hot, raise the edge gently with a chisel, and it will separate completely from the ground. forks vertically into the cork on opposite sides, Be careful not to use too much force, or you not too near the edge. Run the blade of a

arated the veneer, wash off the glue, and pro- projected into the bottle, turn the bottle around until the cork is caught in a loop of

the string, and with force pull out the cork.
6228. To Remove Starch or Rust from Flat-Irons. To remove starch or soak it in warm water, and lay it on the rust from flat-irons, have a piece of yellow beeswax tied in a coarse cloth. When the flat iron, till the moisture is evaporated. If iron is almost hot enough to use, but not quite, rub it quickly with the beeswax, and then with a clean, coarse cloth.

6229. To Prepare New Linen for Being Embroidered. New linen may be embroidered more easily by rubbing it over with fine white soap; it prevents the threads from cracking.

lac is put into a large vessel with hot water, and the beans will slip very easily from the Boiling water is then poured on the gum, pod. By pouring scalding water on apples, after which ammonia is added slowly, but the skin may be easily slipped off, and much

6231. To Improve the Wicks of First steep the wicks in a solution of lime-water in which saltpetre has been dissolved. To 1 gallon water add 2 ounces To Manage Water-Pipes in saltpetre and 1/2 pound lime. Dry well the wicks before using. It improves the light, and prevents the tallow from running.

6232. Adhesive for Leather Belts. Printers' ink is a good adhesive for leather In belts. One application will keep a leather belt in running order for 12 months.

estimates the decrease in the height of the jet to be 1 foot below the level of the source for every 100 yards distance. He considers the ajutage or opening of the pipe should be Where pipes are already laid down, and the power of the head not very accurately known, it is well, by means of a leaden nozzle, the orifice of which may be readily increased or diminished, to tion of water, by forming on the inside sur- test the amount of force, so that the ajutage face of the pipes an insoluble sulphide of lead. may be adapted to throw the highest and

or sodium; the solution is left in contact with Purposes. Mix as much whiting as you

wanted, you may, before it gets hard, apply it bottles. to your work with thick glue, and bend it into the form required.

6235. staved.

6236. Muslin. According to Professor Calvert, of to fire brick will also loosen it. Manchester, England, this very much increases its thickness and strength. The cot-" blanket."

6237. on Worn Coins. By heating these gradually, the inscription will, in almost all cases, make its appearance

6238. paraffine with a clean dry cloth.

6239. To Prepare Bladders. These articles are prepared by cutting off the fat and loose membranes attached to them, and washthey will neither keep nor prove sound.

6240. the right time, and dried in the best manner. throw out the heard. The seasons when the various herbs have in during July; sage, August and September; turn, strop it on a coarse strop, drawing the tarragon and burnet, June, July, and Augedge occasionally over the thumb nail, until ust; chervil, parsley, fennel, elder flowers, the edge is smooth, then finish on a fine and orange flowers, May, June, and July.

think will be required for present use with and dried gradually upon a warm stove, or in thinnish glue, to the consistence of putty; a Dutch oven, after which they may be tied and having a mould ready, rub it well all over up in bags made of old newspaper. Or, the with sweet oil, and press your composition in chaves may be picked off, pounded in a morit; take it out, and you will have a good im-tar, passed through a hair sieve, and the powpression, which you may set by to dry; or, if ders be preserved separately in well-stoppered

6241 To Remove Clinker from Fire Brick. When the fire bricks have become To Stop Leaky Skylights, covered with clinkers which have fused and Leaky skylights may be stopped and cured adhered, they may be cleaned by throwing with Dutch rushes, bedded in, caulked, and oyster or claim shells into the fire box when covered with good white lead. On wet mak- the fire is very hot, and allowing the fire to ing its appearance it quickly attacks the rush. go out. The clinkers will generally cleave which swells up so tight and firm that all off without the use of much force the next progress of wet and droppings is effectually morning. From 2 quarts to ½ peck will be sufficient for most stoves, and the operation To Thicken and Strengthen can be repeated if some of the clinkers still Dip the muslin in dilute sulphuric adhere. Salt sprinkled on clinker adhering

6242. To Preserve Carpets. It is very advisable in laying down carpets at ton thus prepared is technically known as first, to cover the floor beneath them with To Develop the Inscription dust from rising between the boards. A carpet lasts longer by adopting this precaution.

scription will, in almost all cases. 6243. To Prevent Injury to Kid pearance. Gloves from Excessive Perspiration. To Preserve Copper Coins Persons who wear kid gloves in hot weather. and Medals from the Action of the and who perspire freely, will find that injury Air. Immerse them for a moment in melted to the gloves will be prevented by applying paraffine, and then wipe off the excess of ordinary corn starch to their hands (dry) before drawing on their gloves. Pulverized

soap-stone will answer the same purpose.
6244. The Art of Easy Shaving.
The following is the substance of the instrucing them first in a weak solution of chloride tions of the celebrated Mr. Mechi on this subof lime, and afterwards in clear water; they ject: Never fail to well wash your beard with are then blown out and submitted to pressure soap and cold water, and to rub it dry, imby rolling them under the arm, by which they mediately before you apply the lather, of become considerably larger; they are next which the more you use, and the thicker it is, blown quite tight, dried, and tied up in dozens the easier you will shave. Never use warm for sale. Or, dip them in warm water, dry water, which makes a tender face. In cold and rub them well in with a little glycerine; weather, place your razor (closed of course) they will keep soit and pliable. They are in your pocket, or under your arm, to warm employed by druggists and oil and colormen it. The moment you leave your bed (or to tie over pots, bottles, and jars, and to con-bath) is the best time to shave. Always tain pill masses, and other similar substances, wipe your razor clean, and strop it before Never buy bladders unless they are perfectly putting it away; and put your shaving-brush dry and tight, as, if the reverse be the case, away with the lather on it. The razor (being only a very fine saw) should be moved in a To Obtain Herbs of the Finest sloping or sawing direction, and held nearly When herbs are to be kept for flat to your face, care being taken to draw flavoring dishes, it is obviously of the first the skin as tight as possible with the left importance that they should be gathered at hand, so as to present an even surface, and to

6245. To Hone a Razor. The surface their fullest flavor, are as follows: Basil, of the hone must be perfectly level. The from the middle of August to the middle of razor should be held flat on the hone, and the September; marjoram, during the month of back never raised, or it will induce a round July; winter savory, the latter end of July or thick edge. Draw the razor from heel to and throughout August; summer savory, the point, alternating the sides at each stroke, same; thyme, of various kinds, during June and the action always against the edge. and July; mint, the latter end of June, and When the edge is wiry and thin enough to

As the seasons vary in different localities, a 6246. Strop for Razors. There are good general rule is to gather the herbs when many kinds of razor strops formed of leather they first blossom. Herbs should be gathered glued on a wooden holder. These are apt, in on a dry day, before the sun has been long time, to round the edge of the razor, by allow-upon them. When intended for preservation, ing the blade to bed itself or sink in the they should be cleaned from dirt and dust, leather. The best is a strip of Russia leather,

6247. Paste for Razors. Emery very the operation on the remaining teeth. The finely levigated (washed) in the same manner as prepared chalk (see No. 2292), mixed gular, and in fine order. A dull file will with lard or tallow, or a mixture of these with neat's-foot oil. Or: equal parts of jew-

Best putty powder, 1 ounce; jewelers', rouge, 1 ounce; scales of iron, ½ ounce; levi-

wipe them with.

plest method of sharpening a rizor is to put it or east iron, and afterwards on wrought iron. for half an hour in water to which has been 6256. Recutting Files with Acids. ther than a smooth polish is necessary.

coed as directed in the last receipt.

Tools. For grinding, the stone should be small diameter.

grinder. He does much work, and cheap may come in contact with the mixture. he gives it back well sharpened, but a spoiled

First, run a file along the edge of the teeth paper, and laid aside for use. till you see them range in a direct line; then 6257. Re-Sharpening Files. lay the blade on a smooth piece of lead, or on interesting and economical process has been the end of a trying-plane, and with a square exhibited before the Société d'Encouragement steel punch and a hammer, give a gentle tap of Paris, by M. Werdermann. Well-worn on every alternate tooth. Reverse the saw files are first carefully cleaned by means of and punch the alternate teeth on the other hot water and soda; they are then placed in side, and look down the saw to see that the connection with the positive pole of a battery, teeth are all equally set. Then begin with in a bath composed of 40 parts sulphuric acid, your file at that part of the saw nearest the 80 parts nitric acid, and 1000 parts water. handle. To sharpen or file the teeth to a The negative pole is formed of a copper spiral good point, hold the file so that it makes an surrounding the files, but not touching them; angle with the saw-blade of about 30 degrees, the coil terminates in a wire which rises or  $\frac{2}{3}$  that of a mitre angle. Then file every towards the surface. This arrangement is the other tooth to a very sharp point, sharpening result of practical experience. When the files

strained as tight as a drum on a curved or only those teeth which are set away from the bowed piece of wood.

Turn the saw round, and repeat

6255. To File a Flat Surface. clers' rouge, black lead, and prepared suct. filing a flat surface on a piece of iron, unless 6248. Pradier's Paste for Razors. there is some skill or care used in the operation, the exterior edges are apt to be greatly pared away, so that that part of the surface gated Turkey stone, 3 ounces; beef suct, 12 about midway between them will be the least ounces. Or: Mix equal parts of dried sul-, filed down. The work should be held in a phate of iron and salt, and apply a gradually bench vise, in such a position that the file will increased heat, in a closed vessel. Pulverize, run in a horizontal direction nearly level with elutriate (see No. 14), and mix with lard or the workman's elbow; but should the work be tallow.

6249. To Strop a Razor. The practice more elevated position; or, if it be very of pressing on the edge of a razor in stropping heavy, it may be held a little lower. In filing soon rounds it; the pressure should be direct- flat surfaces, a 'surface-plate' is used, to ened to the back, which should never be raised able the operator to finish the work with acfrom the strop. If you shave from heel to curacy. The surface-plate is a cast-iron plate point of the razor, strop it from point to heel; planed and carefully reduced to a true surface, but if you begin with the point in shaving. Some red lead is rubbed on this plate before then strop it from heel to point. If you only being used; then this piece of work is rubbed once put away your razor without stropping on the plate, and wherever the work is redit, or otherwise perfectly cleaning the edge, dened it shows that that part of the work is you must no longer expect to shave well and above the level, and has to be filed down; easy, the soap and damp so soon just the fine and this process of testing and filing is carried edge. A piece of soft plate-leather (chamois on until the work is reduced to a perfectly leather) should always be kept with razors, to true surface. It saves the file to draw it back at each stroke as lightly as possible. 6250. To Sharpen a Razor. The sim- is also economy in using the files first on brass

added to of its weight of muriatic or sulphuric. There are many receipts for converting old acid, and after a few hours set it on a hone. files into new by means of acids, and among The acid acts as a whetstone, by corroding the the latest is that recently patented by Albert whole surface uniformly, so that nothing fur. I. Ferguson, of Sharon, Pa. The files must be thoroughly cleansed in warm water con-6251. To Sharpen Edge Tools. Protaining a small quantity of potash, which readily removes any grease or dirt from them. 6252. To Grind Cutlery and Edge After the files are thus cleansed, they must be washed with warm water and dried by artidipped in water to prevent the heating of the ficial heat. Next, place 1 pint warm water tools; and careful cutlers use oil for polishing, into a wooden vessel, and put into it as many instead of water, when using grindstones of files as the water will cover. Then add 2 ounces blue vitriol (sulphate of copper) finely 6253. Caution in Grinding Cutlery. pulverized, and 2 ounces borax, well mixed, Never follow the example of the street knife- taking care to turn the files over, so that each work. He uses as little water as possible, the above mixture now add 7 ounces sul-Give him a good razor or a good knife, and phuric acid and 1 ounce cider vinegar, which will cause the files to assume a red appeartool, which needs to be hardened anew, ance at first, but they will in a short time Therefore, when sharpening tools, take large resume their natural color. Then they must stones with much water, and make slow and be removed, washed in cold water, and dried good work.

by artificial heat. When dry, they must be 6254. To Sharpen and Set a Saw. sponged with olive oil, wrapped in porous

taken out, washed, and dried, when the whole formed in this mode, it is more rapidly made of the hollows will be found to have been than almost any attacked in a very sensible manner; but otherknot; and, should the effect not be sufficient, they are as before stated, replaced for the same period as before. Two it excells all in operations are sometimes necessary, but rare- security and ly more. The files thus acted upon are, to all compactness; so appearance, like new ones, and are said to be firmly do the good for sixty hours' work.

6258. To Clean Files. The occasional cleaning of files in the machine shop by means of oil, heat, and the card (wire brush) will save dollars to the owner and annovance

to the worker.

6259. To Cut Good Steel Scrapers, tie; this is the Part of the blade of a broken saw makes the best scrapers; but, as it is hard, it is very difficult to cut it into the required form. The and in this respect it is inferior to the reefvery close, placing the mark even with the face of the Vise, and the part to be cut to waste above the vise. Then with a coldchisel, holding it close to the vise and rather reef-knot is to observe that the inclined upwards, begin at one end of the two parts of each string are on steel plate, and with a sharp blow of the the same side of the loop; if hammer it will cut it. Keep going on by degrees, and it will with ease be cut to the shape bows, if any are formed) are at required; then grind the edges of the scraper level, and finish by rubbing it on a Turkey-

6260. Knots. It is not a very difficult thing to tie a neat and secure knot, yet comparatively few persons know how to accom- connect two cords, but it is unplish it. Below we give all the knots necess-necessary to describe them, as

6261. The Sheet Bend or Weaver's tioned.

Knot. This knot is usually employed by netters, and is called by sailors "the sheet bend." It is readily made by

bending one of the pieces of cord into a loop (a, b, Fig. 1), which is to be held between the finger and thumb of the left hand; the other cord, c, is passed through the loop from the further side, then round behind the two legs of the loop, and lastly under itself, the loose end coming out at d. In the smallness of its size, and the firmness with which the various parts grip together, this knot surpasses every other; it can, moreover, be tied readily when one of the pieces, viz., a, b, is exceedingly short; in common stout twine, less than an inch

being sufficient to form the loop. Fig. 1. The above method of forming it is the simplest to describe, although not the most rapid in practice; as it may be made in much less time by crossing the two ends of cord (a, b, Hitch or Clove Fig. 2) on the tip of the forefinger of the left **Hitch.** For fasthand, and holding them firmly by the left ening a cord to Fig. 5 thumb, which covers the crossing; then the any cylindrical object, one of the most useful part c is to be wound round the thumb in a knots is the clove hitch, which, although exloop, as shown in the figure, and passed be-ceedingly simple and most easily made, is one tween the two ends, behind a and before b; of the most puzzling knots to the uninitiated. the knot is completed by turning the end b. There are several modes of forming it, the downwards in front of d, passing it through most simple being perhaps as follows: make

have been 10 minutes in the bath they are; and lightening the whole by pulling d. As

various turns grip each other, that, after having been tightly pulled, it is very difficult to unonly drawback to its usefulness.

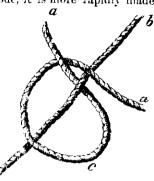


Fig. 2.

best and most expeditious way is to mark knot, Fig. 3, which is made in precisely the it out to the lize wanted, and then to place same manner that a shor-string is tied, only the blade or steel plate in a vise which shuts pulling out the ends instead of leaving them as bows.

6262. The Reef Knot. The only pre-

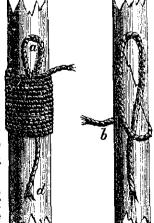
caution necessary in making a they are not, the ends (and the right angles to the cords. The knot is less secure than the weaver's knot, and is termed by sailors a granny-knot. Other knots are occasionally used to sary for ordinary purposes, with illustrations every useful purpose may be and directions for making them.

6263. The Binding Knot. The binding knot, (Figs. 4, 5,) is exceedingly useful in connect-

ing broken sticks, rods, &c.. but *Fig* 3. some difficulty is often experienced in fastening it at the finish; if, however the string is

placed over the part to be united, as shown in Fig. 4, and the long end b, used to bind around the rod, and finally passed through the loop a, as shown in Fig. 5, it is readily secured by pulling d, when the loop is drawn in, and fastens the end of the cord.

6264. The Double Half



the loop, securing it under the left thumb, two loops, precisely similar in every respect,

as a and b, Fig. 6, then bring b in front of a, so as to make both loops correspond, and pass up of parcels in paper is an operation which them over the object to be tied, tightening is seldom neatly performed by persons whose the ends; if this is properly done, the knot occupations have not given them great facilwill not slip, although surrounding a tolera- ities for constant practice. Let a single knot bly smooth cylindrical object, as a pillar, be made in the end of the cord, which is then pole, &c. This knot is employed by surgeons passed around the box or parcel. This knotin reducing dislocations of the last joint of the thumb, and by sailors in great part of the standing rigging. The loop which is formed when a cable is passed around a post or tree to secure a vessel near shore, is fastened by what



sailors term two half hitches, which is simply a clove hitch made by the end of the rope which is passed around the post or tree, and then made to describe the clove hitch around that part of itself which is tightly strained. (See Fig. 7.)

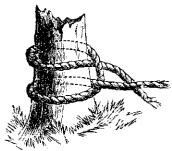


Fig. 7.

6265. The Bowline. This knot is used in slinging heavy bodies; it cannot slip, and will never jam under the heaviest strain. It is difficult to understand at first, but with a little practice can be made very rapidly. Take the fixed or standing part of the rope in the left hand (this should be done in making all knots), lay the free end over it, and then by a twist of the wrist make a loop in the

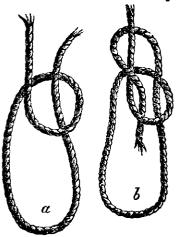
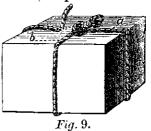


Fig. 8.

standing part which shall inclose the free end  $(a, \overline{Fig}, 8)$ ; then carry the free end behind the standing part and through the loop, parallel with itself (b, Fig. 8). This knot will well repay the trouble spent in learning it.

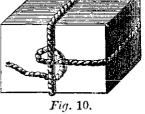
6266. How to Tie a Parcel. The tying and where it crosses the transverse cord on the bottom of the box (Fig. 10) it should, if the parcel is heavy and requires to be firmly secured, be passed over the cross cord, then



back underneath it, and pulled tightly, then over itself; lastly, under the cross cord, and on around the other end of the boz. When it reaches the top it must be secured by passing it un-

der that part of the cord which runs lengthways (a, Fig. 9), pulling it very tight, and fastening it by two half hitches round itself. The great cause of parcels becoming loose is the fact of the cord being often fastened to





figures, which exhibit the top and bottom of a box corded as described. The cords, however, are shown in a loose state, to allow their arrangement to be perceived more

6267. Artificial Grindstones. Washed silicious sand, 3 parts; shellae, 1 part; melt, and form it into the proper shape while warm. The fineness of the sand must depend on the work the stone is intended for. Powdered emery may be substituted for sand. The same composition is formed upon pieces of wood, for the purpose of sharpening knives,

and cutting stones, shells, &c.
6268. To Make an Emery Wheel
for Grinding Tools. Provide a solid wheel, made of pine, or any other soft wood, and of the size required for the purpose. Turn the wheel true, and then turn rounds or hollows in its face, to suit the tools you wish to grind, gouges, rounds, &c. Then prepare some best glue, and, using it hot and thin, put it on the face of the wheel with a brush. The first coat of glue should be a light one, and when it is dry a second one should be applied, and, as quickly as possible, as much emery should be sifted upon the wet surface as the glue will hold. When this is dry another coat of glue and emery should be applied in the same way. This will make a wheel that will last for months, and grind faster than anything else. No. 0 emery is best for this purpose. (See last receipt.)

6269. To Cement Emery to Wood. | chocolate are given below. Vanilla, &c., must The following cement is wonderfully tough. be ground before adding to the paste. (See Melt together equal parts of shellae, white No. 6279.) resin, and carbolic acid in crystals; add the the carbolic acid is surprising.

6270. Kerosene Oil for Whetstones. Kerosene oil on whetstones is superior to any

ation of sharpening.

6271. How to Use a Grindstone. Do not waste the stone by running it in water; by dropping water on it from a pot suspended the lest receipt.

above the stone, and stop off the water when 6279. To Grind Vanilla Beans. Value of order, but keep it perfectly round by use of sugar. gas pipe, or a hacker. Clean off all greasy

entirely, to the exclusion of every other subas follows:-Rub a piece of toilet soap and a stead of lemon. little water over the surface of the stone until a thick lather is formed, and then allow this en the soap and place the stone in proper con-dition for use at once. This plan is one that you find it sufficiently stiff. has been successfully employed for years.

wrought iron, use 1 pound soft soap, mixed lubricator; it insures working with great ease,

and clean cutting by the drill.

6274. To Face Oil Stones. Take a pour into buttered pans. piece of iron with even or straight face (it ought to be planed); scatter a little emery or favorite and wholesome candy, take 12 pounds fine sand about as coarse as No.  $1\frac{1}{2}$  sand moist sugar, 3 ounces butter,  $1\frac{1}{2}$  teacups paper on the iron plate, add a little water and water, and 1 lemon. Boil the sugar, butter, rub the face of the stone, renewing the emery or sand and water as requisite, finishing with and when done (which will be known by an adition of water without emery or sand. an adition of water without emery or sand, dropping into cold water, when it should be This is the quickest and truest way, making quite crisp) let it stand aside till the boiling

To Make Plain Chocolate. Roasted cocoa or chocolate beans or nuts are made into paste by trituration in a heated mortar; then poured into tin moulds and left being added during the trituration; the pro- a broad flat dich, not much exceeding one portions of these used for the various kinds of inch in depth.

6276. French Chocolate. Grind tolast after the others are melted. The effect of gether as in last receipt, 3 pounds best cacao nuts, 1 pound refined sugar, and 2 vanilla beans. (See No. 6279.)

6277. Spanish Aromatic Chocolate. other liquid for the purpose, as it keeps the Grind together 11 pounds Caracca nuts, 3 stone in better condition and assists the oper-pounds white sugar, 1 ounce vanilla, ‡ ounce cinnamon, and ½ drachm cloves. (Sec No. 6279.)

6278. Spanish Almond and Vanilla Chocolate. Take 10 pounds Caracca nuts lut if you do, do not allow it to stand in and 3 pounds sugar (or 8 pounds Caracca water when not in use, as this will cause a nuts and 2 pounds island cacao and 10 pounds soft place; it is much better to wet the stone sugar), and 3 ounces vanilla. Prepare as in

not in use. Do not allow the stone to get out inilla is pulverized by triturating with a little

6280. Molasses Candy. Take 1 quart tools before sharpening, as grease or oil molasses, 1½ pounds brown sugar, the juice of destroys the grit. Observe: when you get a a large lemon and 12 drops oil of lemon; mix stone that suits your purpose, send a sample the molasses and sugar together, butter the of the grit to the dealer to select by; a half inside of a kettle and put it in. Let it boil ounce sample is enough, and can be sent in a over a moderate fire for 2 hours, then add the letter by mail. 6272. Soap in Place of Oil on Arprevent it from burning; when thoroughly kansas Stones. The employment of oil for done it will cease boiling; then butter a pan the purpose of keeping Arkansas and other and put it in to cool; if sufficiently done it will stones in proper condition for sharpening in- be crisp and brittle, if not it will be tough and struments is so general as to be almost, if not ropy. Nuts of any kind may be added just to the exclusion of every other sub-The tendency, however, to become stirred in. The candy may be worked by gummy, and clog the surface of the stone keeping the hands well covered with flour, or after it has been on a short time, and the by greasing them well with butter. The liability of soiling the fingers and imparting working must be done as soon as it is cool an unpleasant odor to them, make the use of enough to handle. It may be made of mocil objectionable. All this can be readily oblasses only—in this case it requires longer viated, however, by using soap in place of oil, boiling—and other flavoring may be used in-

6281. To Make Taffee. Mix # cup butter with 2 of sugar, and, when well stirred When occasion arises for putting an together, put it in a china lined saucepan over edge on a tool, a few drops of water will moist- the fire. Let it boil steadily and gently until, by dropping a little on a plate and cooling it,

6282. To Make Molasses Taffee. To Drill Lubricator. In drilling 1 quart of molasses put 1 gill of cold water, wrought iron, use 1 pound soft soap, mixed and set it over a moderate fire; let it boil with 1 gallon boiling water. This is a cheap steadily until nearly stiff enough, then add 1 table-spoonful butter and 1 tea-spoonful brown sugar. Boil 10 minutes longer, then

6283. Everton Taffee. To make this water, and half the rind of the lemon together, the stone perfectly straight and occupying has ceased, and then stir in the juice of the from 5 to 10 minutes time.

| Butter a dish, and pour it in about 4 lemon. Butter a dish, and pour it in about ‡ inch in thickness. The fire must be quick, inch in thickness. and the taffee stirred all the time.

6284. To Make Cream Rise. Cream cannot rise through a great depth of milk. till cold. In this form it is cake chocolate. Therefore, if milk is desired to retain its cream By grinding this is reduced to chocolate pow- for a time, it should be put into a deep narrow Sweetened and flavored chocolate is vessel; but if it be desired to free it almost made in this way: the sugar and aromatics completely of cream, it should be poured into

Take a little gum arabic, and a little isin- there be more suet than will be used while glass dissolved in hot water; pour it, fresh, throw it into a pickle made in the pro-when dissolved, in your sugar, when it is boil-portion of 4 ounces salt to 1 quart cold water. ing, and it will clear all the sediment to It must be freshened by laying it in fresh water the top of the pan, which must be skimmed an hour or two before using it, and will then off as soon as it rises. Loaf sugar may be be as nice as fresh suct. Or the suct may cleared with the white of an egg, isinglass, or be rendered down, and poured into a pan congum arabic. A little of each will do. (See taining about an inch of cold water. When No. 1357.)

6286. To Keep a Churn from Frothing Over. Take the body of the churn and pack it away in jars for future use. Do not cut a groove around the inside of the mouth, put in salt, if it is intended to use for frying, about 3 inches from the top and \{\frac{1}{2}\) inch deep, and then remove half the thickness of the take the cover and cut it to fit nicely inside. fore required to save the cream flowing over.

6287. To Make French Coffee. A French coffee pot consists of two tin vessels, one on top of the other. In the upper one is syrup of tolu. a strainer, and a tin plate pierced with holes. The coffee, ground almost as fine as gunpowder, is poured into the strainer, and the plate with the holes put over it. Boiling water is then poured in and filters through into the bottom vessel or pot. The pot should be kept on the range or stove, a few moments, until scalding hot, and the fluid which has which will extract all the flavor of the berry, We have tried this experiment material. with great success, and find it a vast improvement over the method of simply pouring boiling water on the top; it is, moreover, economical, because the ground coffee is exhausted more completely than by simple immersion in hot water. After standing a few moments, it is as clear as spring water, and as deep colored as claret. A still better plan, in making coffee by the filtering method, is thus: place the ground coffee in the filter, cover it closely; then pour sufficient boiling filter in the coffee-pot, and set the whole on peach flavoring given in No. 6294. From 1 the stove or fire, so that the water will boil to 1½ gallons of the flavoring should be added and its steam rise and soften the coffee in the to 40 gallons of whiskey. This will give it a filter as usual. The ground coffee will be so thoroughly exhausted of its strength and aroma that it will not hear twice well as a solution of the strength and aroma that it will not hear twice well as a solution of the strength and aroma that it will not hear twice well as a solution of the solution of the strength and aroma that it will not hear twice well as a solution of the Coffee should never be brought in contact with comes through. When this occurs the coffee will be bitter and black, for it attacks iron, pot must be scrupulously clean.

To Clear all Kinds of Sugar. very nice to use for puddings or pastry. cold, take off the suet (the impurities will have fallen to the bottom of the water), and as salt prevents articles from browning easily.

6289. Imitation Asses' Milk. The folwood, making a shoulder all around; then lowing preparations are used freely as substitutes for asses' milk, and may be adminisand you have now done away with the tered in cases of consumption and general denecessity for cloths, tubs, pans, &c., hereto-bility, a tea-cupful 3 or 4 times a day, either

plain or with a spoonful of rum.

Mix the whites of 2 eggs with 4 pint new cow's milk, and 1 ounce sugar; add 4 ounce

6290. Factitious Asses' Milk. Boil 1 ounce hartshorn shavings to a jelly in 1 pint water, adding 2 ounces white sugar; when cool add 1 pint new cow's milk and ½ ounce syrup of tolu. Used as in the last receipt.

6291. Liqueur de la Grande Chartreuse. According to Dr. Chevalier, this celebrated liqueur, made at the Abbey of the filtered through poured in at the top again, name, near Grenoble, is composed of essence of melissa citrata, 31 grains; essence of hyssop, and make a cup of coffee far superior to that 31 grains; essence of angelica root, 154 grains; boiled. Liebig says, however, that a portion essence of best mint. 309 grains; essence of of the coffee should be kept out, thrown into nutmeg, 31 grains; essence of cloves, 31 grains; the bottom of the vessel, and there permitted and 4½ pints rectified spirits of wine, of best to steep, like tea. This, he says, gives the quality. The liquid is artificially colored, flavor, while the infiltrated portion gives the either with turmeric or any other suitable

> 6292. Doppel Kummel. To 5 gallons 94 per cent. alcohol, add 4 ounces oil of caraway, ½ urachm (30 drops) oil of anise, 5 drops oil of coriander, 5 drops oil of bitter almonds, and 10 drops oil of calamus. Add 20 gallons French proof spirit, and 15 gallons water in which 10 pounds white sugar have been dissolved. This will make 40 gallons kummel of a strength of 364 per cent. If for cordial, more sugar may be added.

6293. To Improve Cheap Bourbon. water in the coffee-pot (not into the filter) to Inferior Bourbon whiskey may be much incover the bottom about  $\frac{1}{8}$  inch. Place the proved in quality by the addition of the

aroma that it will not bear twice watering. bottom, perforated with 1-inch holes. Cover this false bottom with a thin layer of straw, iron. Tinned coffee-pots that have been used laid uniformly; this again covered by a thin for some time are apt to get worn on the sureven layer of straw laid at right angles across face, so that the iron the tin plate is made of the lower layer. Then pack 10 gallons dried peaches regularly, without pressing them; add 5 pounds black tea evenly sprinkled over forming an acid very quickly. This any one the peaches, and cover the whole with a can see by putting a few drops on a case-cloth. Next pack 10 gallons oak sawdust Above all, to have good coffee, the evenly, and cover it also with a cloth. Place some pieces of lath over the cloth, with some 6288. To Keep Suet. Suet chopped middle-sized stones to keep the sawdust fine and mixed with flour, if tied down tight down. Insert a faucet in the side of the in a jar will keep 10 days or 2 weeks, and is pipe, between the bottom and the false bottom. Now add 20 gallons proof spirit, and of the gun, beveling from the outer edge to will be ready for use and bright in 10 or 15 neatly If a greater quantity is required.

ity. The process consists in plunging into the vat containing the wine, two plates of connected with the poles of an electric battery. The Bunsen and Daniell's batteries are the development of any vegetation. much used in France for this purpose. The t) one of an agreeable and superior quality, is from two to three weeks, with the battery continually working. By this method, wines ities which were considered only fit for making

perior table wines. (See No. 726.)

6296. Pharaoh's Serpents Eggs are made in the following way: Take mercury and dissolve it in moderately dilute nitric mercury remaining; decant the solution, and mer. It is also an excellent material to apply pour it into a solution of sulpho-cyanide of to all iron utensils used about a farm. ammonium or potassium, which may be bought at a good drug store, or of a dealer in chemicals. Equal weights of both will answer, to it, fill it with pulverized charcoal, and imprecipitate will fall to the bottom of the bed the pieces of steel in it, put in the top, filter and washed two or three times with wa to a red heat, then take out and let it cool off. ter, when it is put in a warm place to dry. hot water. When the gum is completely softand the pulverized and the dried precipitate gradually mixed with it by means of a little are formed by hand, put on a piece of glass, by rubbing with a dry coarse piece of cloth, and dried again; they are then ready for use. 6306. French Composition for Wash-

substitute, nearly as good as the original merlons of water, then add \(\frac{1}{2}\) ounce spirits of turcury compound, and superior in not being penting and \(\frac{1}{2}\) ounce spirits of hartshorn. poisonous, is prepared in the following way:

Take bichromate of potassa, 2 parts; nitrate of potassa, 1 part; white sugar, 3 parts. him is best), and 6 pounds common washing Pulverize each of the ingredients separately, soda. Put all together and boil for half an

6298. Solidified Glycerine for Toilet Use. Transparent soap, 1 ounce; water, 4 ounces; inodorous glycerine, 24 ounces. Dissolve the soap in the water by heat, adding an equal weight of glycerine. When dis-solved, add the remaining portion of glycerine, and sufficient water to make up the weight. When nearly cold, add any suitable perfume and pour in glass jars. It has a very pale amber color, is transparent, melts easily on the skin, and leaves no residue.

draw off, three times every day, 15 gallons of nothing at the inward. It can be fastened in the tineture, and pour it back immediately, with rivets. It should be made of metal about As the sawdust acts as a filter, the tincture 1/2 of an inch in thickness, and be fitted very

6300. Preservation of Stone. Dector double the above proportions and use a gin Eugene Robert, of Paris, recommends copper salts as being the best preservatives of stone 6295. To Improve Wine by Electric- in a damp climate. These salts prevent the formation of lichens, to the action of which M. Robert attributes the destruction of stone. platinum or of silver, having attached to This is, without doubt, true for granite, but them two wires of the same metal, which are its efficiency for sandstone is questionable. The latter deteriorates by exfoliation, without

6301. Ground Tea. A French chemist time necessary to transform a low grade wine asserts that if tea be ground like coffee before hot water is poured upon it, it will yield nearly double the amount of its exhilarating qual-

6302. To Impart a Fine Flavor to vinegar, are changed to such an extent that Tea. To impart a fine flavor to ordinary they are used as good, and in some cases su- tea, place rose leaves in the tea-canister, or add one drop of the attar of roses on a piece of soft paper to every pound of tea, and keep the canister closely covered.

6303. To Prevent Stoves From Rustacid by means of heat, taking care, however, ing. Kerosene applied with a rag to stoves that there be always an excess of metallic will keep them from rusting during the sum-

beaker or jar, which is to be collected on a and lute with fire-clay. Heat it in a slow fire,

6305. Remedy Against the Cracking Take for every pound of this material 1 ounce of Wooden Taps and Faucets. This is gum tragacanth which has been soaked in best prevented by putting the taps and fauhot water. When the gum is completely soft-cets in melting paraffine, and heating them ened it is to be transferred to a mortar, there at a temperature of 212° Fahr., until bubbles of air cease to escape from the wood. The whole is then allowed to cool to about water, so as to present a somewhat dry pill 120° Fahr., when the taps are taken from the mass, from which pellets of the desired size bath and cleaned from the adhering paraffine

6297. Pharaoh's Serpents Eggs. A ing. Dissolve 1 pound hard soap in 6 gal-

and then mix them thoroughly. Make small hour, and let it stand all night to clear. Draw paper cones of the desired size, and press the off the lye, and add to it 1 pound common mixture into them. They are now ready resin and 7 pounds of fat (any fat will do), for use, but must be kept from moisture and Boil this for half an hour, then let it stand till cool, and cut into bars.

6308. To Make a Bad Yellow Soap Good and Hard. Heat a solution of 28 pounds hyposulphite of soda in 4 gallons water, with 250 pounds of bad yellow or brown soap, and the result will be a good hard soap. This is Desborough's patent.

To Preserve Soap Grease. 6309. Fill a cask half full of good strong lye and drop all refuse grease therein. Stir up the

mixture once a week.

6310. Waterproof Starch. This is a 6299. To Remedy a Scattering Gun. French patent, and consists in passing the To prevent a gun from scattering, insert a goods, after being properly starched, through ring about half an inch in width in the nozzle a bath of chloride of zinc at a temperature of about 60° Fah. remain in the clot'es after several successive be done by filling the pipe with melted resin.

washings.

Cement to Resist Sulphuric 6311. Acid. Melt caoutehoue by a gentle heat, add from 6 to 8 per cent. of the weight of tallow, taking care to keep the mass well stirred; add dry slacked lime, so as to make the fluid mass the consistency of soft paste; and I ounce; oatmeal, 3 ounces. Soften the gum lastly add 20 per cent. of red lead, whereby the mass, which otherwise remains soft, be-then roll in finely-powdered sugar or flour, to comes hard and dry. This cement resists, form sticks to suit. according to Dr. Wagner, boiling sulphuric acid. A solution of caoutchoue in twice its and the addition thereto of an equal weight and glycerine. It is stirred on cooling, and of pipe-clay, yields a plastic mass which also afterwards compressed. The amount of glyof pipe-clay, yields a plastic mass which also resists most acids.

trace of soap or grease will spoil the adhesion of any cement. Try soda or ammonia, followed by whiting and water, clean cloths, and plenty of rubbing, and let the cement dry on the letters till the surface just begins to be

"tacky" before you apply them.

6313. New Process for Rendering Cloth Waterproof. This is a method for rendering fabrics waterproof without destroying their ventilating qualities. Place in a metal vessel of about 6 gallons capacity, 20 pounds sulphate of alumina cut in thin slices; no sensible acidity remains, plunge it in a and in another similar receptacle 8 pounds weak alkaline solution, then in water, and dry. oleic acid and 6 quarts alcohol. Thoroughly dissolve the latter compound, and stir it with ous electricity. a wooden stick for 20 minutes, gradually adding the sulphate of alumina. Leave the whole for about 24 hours to settle. The oleic ceid and the spirit will then be at the surface, and moist and plastic for a length of time, thus can be decanted; the remaining deposit should removing one of the greatest inconveniences be filtered through flannel, and pressed into a experienced by the modeler. cake. This can be dried by heat, and ground to a powder. For use on silken or linen be ample; wood will not require more than 1 pound. It is as well to strain these solutions, and the fabrics require only to be thoroughly saturated and dried in the air.

6314. To Clarify Quills. Cut off the small top of the quills, tie them loosely in bundles, fix them nearly upright in a saucepan of water in which a small piece of alum has been dissolved, about the size of a walnut of alum to a quart of water; let them boil slowly until they become clear; add a little turmeric or a small pinch of saffron to the water, to give them the yellow color; dry them in the sun. Tie paper round the feather part of the quills, to keep them from dust. The quantity of alum may be increased according as you wish the quills more or less

brittle.

6315. New Glazing for Frescoes. Dr. Vohl announces that paraffine, mixed with little solution of chloride of line; after which benzole or Canada balsam, affords a glazing they are rinsed in clean water, and dried as for frescoes much superior to soluble glass. By covering the interior of wine casks with a film of pure white paraffine, poured in melted, he has effectually prevented the spoiling of the wine and its evaporation through alcohol, and add a few drops to the oil until the wood.

The starch will then! 6316. To Bend Gas Pipe. This may When the resin hardens, bend the pipe, and it will retain its round form. Remove the resin by heating.

6317. Chewing Gum is made as follows: Take of prepared balsam of tolu, 2 ounces (see second receipt in No. 5102); white sugar, in a water-bath and mix in the ingredients;

6318. Chewing Gum from Paraffine. This article may be made by dissolving parafweight of raw linseed oil, aided by heating, | fine at a gentle heat in a very little olive oil cerine depends on the consistency to be 6312. Cement for Fixing Glass Letdesired, and must be determined by the charters. A thick solution of marine glue in acter of the paraffine employed. This latter wood naphtha will answer perfectly if color is consists of mixtures of various carbo-hydrides, no object. But the glass must be chemically and is by no means always of the same comclean, and this is not always easy. The least position and properties. The glycerine will trace of soap or grease will spoil the adhesion keep it soft and make it sweet at the same time

6319. Boot Powder. Scraped or powdered French chalk is used by bootmakers to make new boots or shoes go on easily, by rubbing or dusting a little of it on the inside

of the heel and instep of the boot.

6320. Electric Tissue. Steep linen or cotton 1 hour in a mixture of 1 part strong sulphuric acid and 3 of pure nitric acid; squeeze out the acid, wash with water until By friction it yields a large quantity of resin-

To Make Modeling Clay. 6321. Knead dry clay with glycerine instead of water, and a mass is obtained which continues

6322. To Remove Stains from Knives. The very best way to clean a stained steel clothes, 14 pounds to 20 gallons of water will knife is to cut a solid potato in two, dip one of the pieces in brick-dust (such as is usually used for knife-cleaning), and rub the blade with it.

6323. To Prevent Ivory Knife Handles from Cracking. When the blades of knives require washing or standing in water, it should be done in a pitcher, with water enough to cover the blades, but not to touch the handles; and the water no hotter than is absolutely necessary. Soaking the handles in

water makes them crack.

6324. To Cleanse Goose Feathers. Feathers are prepared by exposing them to the sunshine or in a stove until perfectly dry, and then beating them to remove dust and loose dirt. When carelessly collected and dirty, they may be cleansed with lime-water; or, still better, with a weak solution of carbonate of soda, or with water containing a before. (See No. 659.) Old feathers are purified and cleansed in the same way.

6325. Coloring Castor Oil. Make a strong tincture of turmeric root with strong you have the desired color. Rather than being

ing to prevent griping.

6326. Labels for Damp Situations. Write on the back of adhesive plaster. Labels made of this substance are not affected by

damp, and adhere strongly.

To Reproduce a Beautiful White on Flannel Goods Turned Yellow are then thoroughly washed in water.

Take 1 part crystallized carbonate of soda; 4 ter, and afterwards with clean water. to 6 parts each white wax, stearine, and pure parts altogether. A little ultramarine is saturate the spot well with a solution of hyadded, if needed, to counteract the yellow posulphite of soda, and dry gradually; the tint of the linen, which is starched with this color will be perfectly restored.

preparation, passed between rollers, and dried.
It is then sprinkled with soap water, placed Glass. First coat the glass with copal var-

and calendered.

6329. Starch Lustre is a substance used for washing purposes, which, when added to starch, causes the linen to which it is applied to assume not only a high polish, but a dazling whiteness. A piece of lustre of the size Wood, Stone, &c. Take a saturated alcoto assume not only a high polish, but a daz-ling whiteness. A piece of lustre of the size Wood, Stone, &c. Take a saturated alco-of a copper cent added to \(\frac{1}{2}\) pound starch, and holic solution of potash, pour the solution of of stearine, colored by a slight addition of

it is applied. (See Nes. 497, &c.)
6330. To Clean Windows and Mirrors. Tie up some finely powdered whiting glass fully better. The corners of the windowpanes should receive particular attention; they are too often left dirty, and spoil the appearance of the window.

6331. To Wash Mirrors or Windows. For washing finger-marks from lookingglasses or windows, put a few drops of ammonia on a moist rag, and make quick work

of it.

cleaning hid gloves; sometimes improperly order to diffuse the fluid jelly equally over its

a disadvantage, it will prove a benefit, tend-termed Saponine. Dissolve 3 trov ounces soap by heat in 2 ounces water, and when nearly cold add 2 ounces javelle water and 1 drachm water of ammonia; form a paste, which is to be rubbed over the glove with

flannel till sufficiently clean.
6333. To Clean and Preserve Brewing Utensils. In cleaning them before by Age. For the restoration of old flannels being put away, avoid the use of soap, or any to their original color, Professor Artus recom- greasy material, and use only a brush and mends the following method: Dissolve 21 scalding water, being particularly careful not pounds white Marseilles soap in 75 pounds to leave any yeast or fur on the sides; then soft water, and to the solution add, under con-stant stirring, 1 ounce liquor ammonia. The dry situation. Should they become tainted goods are soaked in this fluid, and afterwards or mouldy, take a strong lye of pearlash, well washed with water. The object may be which spread over the bottoms of the vessels accomplished, however, more quickly, by put-ting the goods for 1 hour in a dilute solution the sides and other parts. Or: Take common of bisulphite of soda, and adding, under con-salt and spread it over the coolers, &c., and stant stirring, some dilute hydrochloric acid, strew some on their wet sides, pour in scald-when the vessel has to be covered and the ing water and scrub them with a broom. Or: goods left in it for 15 minutes longer. They Throw some quicklime into water in the vessel, and scrub over the bottom and sides with 6328. Sizing for Holland Linen. The it; in each case well washing afterwards with sizing or dressing employed for the Holland clean water. Or: Wash well first with oil of used for window shades is prepared as follows: vitriol diluted with 8 times its weight of wa-

6334. To Restore the Color of an white soap; 20 parts carbonate of magnesia Acid Stain on Violet Silk. Acid dropped or fine Paris white; 40 parts potato starch, on violet-colored silk destroys the color; to and 130 parts fine wheat starch. Boil these restore it, brush the discolored stain with together with sufficient water to make 1600 tineture of iodine; then, after a few seconds,

in a stamping mill, and afterwards steamed nish, then press on the picture, face downwards, smoothly and tightly; let it dry. Next damp the paper slightly, and rub it off with the finger, leaving the picture to be

boiled with it for 2 or 3 minutes, will produce the engraving, and immediately remove all the best results. The starch lustre consists the superfluous liquid by means of blotting of stearine, colored by a slight addition of paper. Lay the engraving, while damp, upon ultramarine blue, the essential ingredient the wood or other material to which it is to being the stearine; and, with or without the be transferred, and place it in a press. (A coloring matter, will be found to add very small printing press is the best.) The transsmall printing press is the best.) much to the beauty of linen articles to which fer will be obtained immediately. The engraving must be immersed in clear, cold water,

after removal from the potash bath. (Orr.) 6337. How to Wash Printing Rollers. in a small piece of muslin. Dab it over the glass thoroughly; the dirtier the glass the strong ley to loosen the ink, and quickly, more whiting will adhere to it. Next smear with a soft sponge, wash the ley off with it evenly with a damp rag, and let it remain water (in winter blood-warm) squeezing the until perfectly dry; then rub it off with a sponge dry, face up the roller, so that no leather. This is an easy, clean, and thorough moisture remain thereon. Let it then stand plan. If alcohol be used instead of water, it exposed to the air one hour, machine rollers will dry in much less time, and polishes the two hours, before distributing ink on its surface. The time for exposure must be guided by the state of the weather, as shorter time will do in dry or windy weather. Be careful to ink the roller as soon as possible after exposure, to keep it tacky. (See No. 2542.)

6338. Gelatine Capsules. A strong solution is made of 6 parts gelatine and 1 part sugar; the extremity of a rod of bulbous shape is oiled, and dipped into the solution; Ganteine. A composition for when the rod is withdrawn it is rotated, in

surface; as soon as the gelatinous film has 6344. To Remove the Stains of Benpartially hardened, it is removed from the zine. In removing grease spots from fabrics mould and placed on pins furnished with by means of benzine or petroleum it often little cells made in the table to receive them, prevented by the application of a layer of and the liquid with which they are to be gypsum extending a little beyond the moistfilled is introduced by means of a small glass ened region. When dry, the powder is to be tube. They are then closed by dropping shaken and brushed off, when no trace of the some melted gelatine on the orifice of each. spot will remain. Ricord recommends that capsules containing copaiba be coated with extract of rhatany, which is easily done by immersing the capsule for an instant in a mixture of 3 parts newly prepared extract of rhatany, 1 part syrup of moist sugar, and 1 part mucilage of gum arabic, melted together in a water-bath. Capsules thus prepared are said to act with greater certainty, as well as improving the tone of the stomach.

6339. To Remove Nitrate of Silver Stains. A solution of iodide of potassium will freely disselve iodine. Silver stains stain merely. moistened for a while with this solution will be converted into iodide of silver, which is soluble in iodide of potassium. The stains will grain of pure carmine, previously mixed with therefore have disappeared when the cloth, a little powdered gum and water; then distill after the foregoing treatment, is washed in off the chloroform and knead well the rewater. (See No. 385.) Perhaps the best maining gutta-percha. In the same way ulmethod of removing these stains is as follows: The stained cloth is washed with a concentrated solution of sulphate or chloride of zinc and then touched with a piece of metallic zinc. This same process may be used for the removal of ink stains in both cases without danger to the fabric. After the color has disappeared, they are washed first with pure water and then with water and soap. No visible traces of the stains are left behind, intended for 25 hats or bonnets. They are (See No. 3141.)

6340. To Remove Nitrate of Silver Stains from Woven Tissues. According to M. Grimm, chloride of copper completely removes, even from colored woven cotton tissues, stains occasioned by nitrate of silver; the tissue is to be afterwards washed with a solution of hyposulphite of soda, and next thoroughly washed with water. From white stains are more readily and effectually removed by applying dilute solution of permanganate of potassa and hydrochloric acid, followed by washing with hyposulphite of soda solution, and rinsing in plenty of fresh water. By these means the use of the highly poisonous cyanide of potassium is rendered unnecessary. (See Nos. 385 and 3141).
6341. To Dissolve Old Blood Stains.

Dr. Helwig recommends a solution of iodide of potassium in four times its weight of

6342. Silk Cleaner. Mix well together ‡ pound soft soap, a tea-spoonful of brandy, ½ pint proof-spirit, and 1 pint water. It is to be spread with a sponge on each side of the silk without creasing it; the silk is then rinssilk without creasing it; the silk is then rins- By the addition of picric acid, the blueish ad out 2 or 3 times, and ironed on the wrong shade of this dye-stuff is modified to leaf (See No. 460.)

ing greasy stains from silk, &c., may be pre- after the dyeing with aniline green. (Springpared by mixing 2 ounces rectified spirits of muhl.) turpentine, 1 ounce absolute alcohol, and 1 ounce sulphuric ether.

suitable heads, and fixed on a cork table, happens that a colored and stained outline of When dry, the capsules are placed upright in the portion moistened is left. This can be

6345. To Clean Silver. To clean silver utensils, blackened by sulphuretted hydrogen, Boettger recommends a boiling saturated solution of borax, or a solution of caustic potash, with some fragments of metallic zinc.

6346. To Clean a Wedgwood Mortar. A solution of caustic potash will usually be effectual; this may be triturated in the mortar with fine sand or powdered pumice-stone. Sometimes sulphuric acid will serve a better purpose. Chlorinated lime (chloride of lime) will sometimes remove the color where it is a

6347. To Dye Gutta-Percha. Dissolve 1 ounce gutta-percha in chloroform, and add } tramarine, ochre, oxide of chrome, &c., may be used.

6348. To Clean Gutta-Percha. This can be done by using a mixture of soap and powdered charcoal, polishing afterwards with a dry cloth with a little of the charcoal on it.

6349. To Dye Straw Hats Black. The following is given as a black color for straw hats. The quantities of material are kept for 2 hours in a boiling decoction of 4 pounds logwood, 1 pound sumach, and 5 ounces fustic; and afterwards dipped into a solution of nitrate of iron of 4° Baumé, then well rinsed with water, and, when dry, are painted over with a solution of lae or dextrine.

6350. To Dye Leather Yellow. Picthoroughly washed with water. From white ric acid gives a good yellow without any cotton and linen tissues, nitrate of silver mordant; it must be used in very dilute solution, and not warmer than 70° Fahr., so as not to penetrate the leather.

6351. To Dye Leather Green. Aniline blue modifies picric acid to a fine green. In dyeing the leather, the temperature of 85° Fahr. must never be exceeded.

6352. To Dye Leather Green. Aniline green is well adapted to dyeing leather, and its application is quite simple. Whether used in paste or as powder, we must make a concentrated aqueous solution. The leather is brushed over with a solution of sulphate of ammonia, mixed with water, the dye solution applied at 95° Fahr., and it must be endeavored, by rapid manipulation, to prevent the dye from penetrating through the leather. green, and it becomes faster; but the picric 6343. Fluid for Removing Grease acid must not be added to the color solution; Stains from Silk, &c. A fluid for removing it must be applied to the leather before or

> 6353. Slating for Black-Boards. The imitations of slate are of two kinds, real imi-

asphaltum or Grahamite dissolved in petro-sity of the current. leum naphtha. The first one will produce

never be screened before it is laid on. It is a tern in a cellar will rarely freeze, common mistake to lay these walks too round. cause holes made in a new walk are not easily will bind them more firmly than could be accomplished by any other method.

6356. Polishing Powder for Specula. Precipitate a dilute solution of sulphate of time-from 24 to 36 hours. iron by ammonia in excess; wash the precipitate, press it in a screw press till nearly dry, dull red color in the dark. (Lord Ross.)

6357. To Make a Voltaic Pile. size, soak the cloth in a solution of sal-ammoniae, then pile them up in the following order: Copper, zinc, cloth, and so on. The must be observed throughout the whole series, so that, if the pile commences with a copper plate, it shall terminate with a zinc one. These two extremes are called the poles. Zine is called the positive pole, and copper the negative pole. The outer disks are connected with copper wire, that the electric or galvanic stream which is excited in the pile mass to a fine powder. (Hager.) may be conveyed to any place desired. When

tations, consisting of pulverized slate or from one to the other; this is a token of the quartz rock moistened to the consistency of a galvanic current, manifesting itself in the thick fluid with silicate of soda (water-glass of same manner as the current of the electrical commerce), and applied to the boards by machine. The larger the disks and the means of a brush; or merely paints, such as greater their number, the greater is the inten-

6358. To Make a Cistern. A good slates that are very similar to the natural cistern can be made in a solid clay soil, if slates, less expensive than those, and last a not in an exposed situation, by comenting good while.

| against the sides of the ground. Where the 6354. Asphalt for Walks. Take 2 ground freezes we would not recommend parts very dry lime rubbish, and I part coal-such a practice, but lay a wall of cobbleashes, also very dry, and both sifted fine. In stones in a mortar of cement, and face the a dry place, on a dry day, mix them, and wall with a thick coating of clear mortar. leave a hole in the middle of the heap, as Great care must be exercised to get good cebricklayers do when making mortar. Into ment, and mix it with coarse sand. Fine this pour boiling hot coal-tar; mix, and when sand will not do at all. 1 part cement and 3 as stiff as mortar put it 3 inches thick where parts sand is the usual proportion, to be used the walk is to be; the ground should be dry, as soon as mixed. Every part of the wall and beaten smooth. Sprinkle over it coarse must be laid below the reach of the frost. sand. When cold, pass a light roller over it; This can be done, and an iron or wooden pipe in a few days the walk will be solid and or throat lead to the surface, through which aterproof. the pump can pass. A cheap and excellent 6355. To Make Gravel Walks. The cistern can be constructed of wood, in the bottom should be laid with lime-rubbish, form of a large cask, or a tank made of pine large flint stones, or any other hard matter, or cedar plank. When sunk into the ground, for 8 or 10 inches, to keep weeds from grow- and kept constantly wet, it will last for years. ing through, and over this the gravel is to be A better way is to place the tank or cask in laid 6 or 8 inches thick. This should be laid one corner of the cellar, with a faucet in the rounding up in the middle, by which means bottom, from which the water is easily drawn the larger stones will run off to the sides, and when it is desirable to clean it out and when may be raked away; for the gravel should water is required in the cellar. An open cis-

6359. To Purify Water. which not only makes them uneasy to walk iron and carbonate of soda, in the proportion upon, but takes off from their apparent of 10 parts by weight of the former salt and breadth. 1 inch in 5 feet is a sufficient pro- 26½ of the latter to a quantity of water equal portion for the rise in the middle: so that a to 20,000 parts, has been found a most valuawalk 20 feet wide should be 4 inches higher ble and quite innocuous means of purifying at the middle than at the edges, and so in water, even such as is otherwise quite unfit proportion. As soon as the gravel is laid, it for drinking purposes, and could not be renshould be raked, and the large stones thrown dered fit by alum. The salts alluded to are back again; then the whole should be rolled best previously dissolved in some pure water, both lengthwise and crosswise; and the per- and the solutions, that of iron first, poured son who draws the roller should wear shoes into the tank containing the water intended to without heels, that he may make no holes, be- be operated upon. The soda solution is not added until after a few moments, the water remedied. The walks should always be rolled being first vigorously stirred. The soda solu-3 or 4 times after very hard showers, which tion having been added, the fluid is stirred again, and then left quiet for the purpose of allowing the very bulky and floculent sedi-ment to deposit; this takes considerable

6360. Gutta-Percha Tissue. If a solution of gutta-percha in chloroform be mixed then expose it to heat until it appears of a with 3 parts of other and exposed for some time to a temperature below 15° Fahr., the gutta-percha will be precipitated as a white disks of copper, zinc, and woolen cloth of any powder, forming, when washed and dried, a soft white mass. If some of this solution be spread on a plate of glass, a skin is formed, re-sembling kid-glove leather, which becomes relative position of the metals in each pair transparent on the application of heat. These films are beautifully white if carefully prepared, and have been employed in the manufacture of the finest kinds of artificial flowers.

6361. Mosaic Silver. Take 2 parts each pure tin and purified bismuth, melt them together by a moderate heat, and add 1 part purified mercury. When cold reduce the

6362. Mosaic Gold. Melt 12 ounces the two ends of the wires are brought very pure tin, by a gentle heat, add 6 ounces mernear to each other, sparks are seen to dart cury, and reduce to powder; when cold, add

6 ources muriate of ammonia, and 7 ounces when dissolved, remove the vessel from the flowers of sulphur; mix thoroughly. Place fire and proceed as before. the compound in a glass flask, and gradually heat to redness in a sand-bath, continuing the together, until combination takes place, 2 heat till all white fumes cease; during this parts yellow wax, 3 parts red lead, and 6 parts operation bisulphuret of mercury, muriate of olive oil; strips of soft linen, rather wider at tin and sal-ammoniac are sublimed, leaving one end than the other, are then dipped into the mosaic gold at the bottom of the flask in the composition, rolled up firmly, and finishsoft, brilliant, gold-colored flakes. gold, also called Aurum Musicum, is therefore

the bisulphuret of tin. (Cooley.)
6363. To Preserve Pencil and Indian Ink Sketches. To a solution of collodion of the consistency used by photographers, add 2 per cent. of stearine. The drawing is add 2 per cent. of stearine. then spread on a board or plate of glass and the collodion poured over it as in photography. (See No. 3143.) It dries in 16 to 20 minutes, and so thoroughly protects the drawing that it may be washed without fear of injury.

6364. Golden Compound. Melt anhydrous tungstate of soda in a porcelain crucible, over a spirit lamp, at a temperature not more than sufficient to fuse it. Add small pieces of pure tin to the melted mass, and cabes of a golden color instantly form. The process should not be continued too long, or they acquire a purple hue.

6365. Ink for Writing on Tin Plates. Mix together without heat, 1 part pine soot, with 60 parts of an aqueous solution of nitrate

of copper. (Hager.)

6366. Black Stencil Ink. Triturate together 1 part pine soot and 2 parts Prussian blue with a little glycerine, then add 3 parts gum arabic, and sufficient glycerine to form a

6367. Factitious Beef Marrow. Mix together, by dissolving at a gentle heat, 2 parts fresh hogs' lard and 1 part cacao

butter.

6368. To Obtain Absolute Alcohol. A German savant has recently improved on the well-known method employed by Mendelejeff, for obtaining absolute alcohol. Strong alcohol is boiled with quicklime, the pieces of the latter projecting above the surface of the liquid for 1 hour or more, with a condenser inverted so that the liquid may return by its own gravity to the flask. condenser is then reversed, and the alcohol If the alcohol contains more than 5 per cent. of water, the process must be repeated 2 or 3 times. The vessel should only be half filled with the pieces of lime, as the rapid formation of hydrate of lime may break it to pieces. (See No. 1442.)

6369. Bougie. A long slender instrument, introduced into the urethra, cesophagus, or rectum, to overcome strictures of those canals. Add 3 parts boiled linseed oil to 1 part melted amber, and when mixed add exposure to damp that produces mouldiness 1 part oil of turpentine; spread the mixture and decay of the canvas. For this reason at 3 successive intervals upon loose spun silk cord or web, dry in a heat of 150° Fahr., and churches, nor suspended against heavy walls repeat the process until the instrument has of masonry, especially in badly ventilated acquired the proper size, then polish, first buildings. Excess of light, particularly the with pumice-stone, and afterwards with tripoli and oil. This is the original receipt of the French Professor Pickel, and is still generally used in Europe, slightly modified as fol- nal hue by touching them with deutoxide of lows: Add to the oil and amber, melted together as last, caoutchouc in the proportion of water. The part must be afterwards washed of  $\frac{1}{2^{10}}$  of the weight of the oil employed; with a clean sponge and water.

6370. Hunter's Bougie. Boil slowly Mosaic ed on a polished slab.

6371. Catheters, or Hollow Bougies. These are made of the same composition as the ordinary bougies, but a piece of polished metallic wire is introduced into the axis of the silk; or tinfoil is rolled round the wire and

the composition applied as before

6372. Caoutchouc, or Elastic Gum Bougies. These are made by applying an ethereal solution of india-rubber to the silk or foil prepared as in the foregoing methods. Where ether is expensive naphtha is employed, but it furnishes a very inferior product. Sometimes slips of india-rubber previously boiled in water, or that have had their edges softened with ether, are wound round the wire or foil, and kept in their place by a piece of tape applied over them, as in making clastic tubes. They are afterwards carefully smoothed off and polished.

6373. To Prevent Lamp Chimneys from Cracking. Put the chimneys into a kettle of cold water, and gradually heat it until it boils, and then let it as gradually cool; the chimneys will not be broken by the ordi nary fluctuation of the flame of the lamp.

6374. To Mend Rubber Overshoes, &c. Rub the patch and shoe thoroughly with sharp sand paper. Smear both with liquid rubber 5 times, every time letting them dry. Do this once more, and, before they dry, apply the patch, with pressure if possible, and the boot is mended. If liquid rubber is not obtainable, dissolve small pieces of pure rubber (not vulcanized), in warm spirits of turpentine, to the consistence of syrup.

6375. To Preserve and Restore Oil Paintings. Many valuable paintings suffer premature decay from the attacks of a microscopic insect of the mite class. The best method of preventing this species of decay is to add a few drops of creosote to the paste and glue used to line the picture, as well as to make a similar addition to the varnish. If it has already commenced, the painting should be at once carefully cleaned and relined, observing to employ a little creosote in the way just mentioned. Paintings should be kept in as pure an atmosphere as possible, and in a moderately dry situation; as it is the presence of sulphuretted hydrogen in the air that blackens the "lights," and causes most of the middle tints and shades to fade; and it is valuable paintings should not be kept in direct rays of the sun, also acts injuriously on paintings. The blackened lights of old pictures may be instantly restored to their origimoderate amount of pressure. It can be hours, until it becomes a viscid paste. rolled into thin sheets, and will be useful for 6384. Substitutes for Lenses. Promany purposes; it will not, however, resist cure a piece of thin platinum wire, and twince prevent its cracking.

(Sec. No. 2171.) wall.

6378. To Wash Silks. upon it, and brush it with a clean hard brush. The silk neast be rubbed until all the grease used for removing grease from silk.

6379. To Extinguish Fires. Dr. Clan- better, and will resist dampness twice as well ny's solution consists of 5 ounces sal-ammo- as glue made with water, niac to 1 gallon water. The compound used 6386. Brick-Dust of dried prussiate of potash, sugar, and chlor-

ate of potash.

the oil of lavender, cloves, peppermint, &c. Russia leather, which is scented with the tar tempered with water in the usual way. of the birch tree, is not subject to mouldiness, and books bound in it will even prevent iron Pot. mouldiness in other books bound in calf, near

which they happen to lie.

6381. Moulding. Solutions of gum-arabic soon ings saturated with urine, caulk the crack, mould and sour, and finally lose their adhe- This method has been tried on oil-pots on sive property. It is said that sulphate of board whale ships with success. quinine will prevent this, while it imparts no glue.

formation of a crust.

6376. Compressed Leather. A new 6383. Bird Lime. Boil the middle bark process for using the clippings and refuse from of the holly 7 or 8 hours in water; drain it, saddlers' and shoemakers' shops is as fol and lay it in heaps in the ground, covered lows: The leather shavings are washed with stones, for 2 or 3 weeks, till reduced to clean, cut up fine, and soaked in water and a mucilage. Beat this in a mortar, wash it in sulphuric acid, I per cent. of the acid being rain water, and knead it till free from extrasufficient. The immersion must continue till neous matters. Put it into earthen pots, and the shavings become plastic, and the leather in 4 or 5 days it will be fit for use. An infethen can be pressed into moulds with only a rior kind is made by boiling linseed oil for some

moisture. A little glycerine rubbed in will it once or twice round a pin's point, so as to form a minute ring with a handle to it. Break 6377. To Render Walls Water-tight. up a piece of flint glass into fragments a little It is proposed by Mr. F. Ransome, of Lon-larger than mustard seed; place one of these don, to render stone and brick walls water-pieces on the ring of wire, and hold it in the proof by costing them to saturation with a point of the flame of a candle or gas-light, solution of silicate of soda, which is superfi- The glass will melt and assume a complete cially decomposed by the further application lens-like or globular form. Let it cool gradof chloride of calcium. The surface thus ually, and keep it for mounting. Others are obtained consists of silicate of lime, which is to be made in the same manner; and if the perfectly insoluble, and therefore water-tight, operation be carefully conducted but very while it does not alter the appearance of the few will be imperfect. The smaller the drop No person nifying power. It may be mounted by placshould ever wring or crush a piece of silk ing it between two pieces of brass which when it is wet, because the creases thus made have corresponding circular holes cut in them, will remain forever if the silk is thick and of such size as to hold the edge of the lens. hard. The way to wash silk is to spread it. They are then to be cemented together. A smoothly upon a clean board, rub white soap perfectly round glass globe filled with pure water also makes a powerful lens.

6385. Ether Glue. An excellent liquid is extracted, then the soap should be brushed glue is made by dissolving glue in nitric ether. off with clean cold water, applied to both The ether will only dissolve a certain amount sides. The cleaning of silk is a very nice of glue, consequently the solution cannot be operation. Most of the colors are liable to made very thick. The glue thus made is be extracted with washing in hot suds, espe- about the consistency of molasses, and is cially blue and green colors. A little alum, doubly as tenacious as that made with hot dissolved in the last water that is brushed on water. If a few bits of india-rubber, cut into silk, tends to prevent the colors from running, scraps the size of buck-shot, be added, and Alcohol and camphene, mixed together, are the solution be allowed to stand a few days, being stirred frequently, it will be all the

6386. Brick-Dust Cement. Ordinary in Phillip's Fire Annihilator is said to consist brick dust, made from hard burned, finelypulverized bricks, and mixed with common lime and sand, is a good substitute for hy-6380. To Prevent Mouldiness. The draulic cement. The proportions used in best preventive is any of the essential oils, as general practice are 1 part brick-dust and 1 of lime to 2 of sand, mixed together dry, and

6387. Cement for a Crack in a Cast-If the crack be in the bottom of the pot, drill a hole at each extreme end of the crack, to stop further cracking, plug rivet To Keep Gum-Arabic from the holes with copper, and, with fine iron fil-

quinine will prevent this, while it imparts no bad odor of its own. The addition of a solution of a few crystals of this salt to gum-arastream of oxygen gas, passing through the bic will prevent the formation of mould quite flame of a spirit lamp, upon a small ball of as effectually as carbolic acid, and by analogy quicklime of about 1 inch in diameter. It it is safe to suppose that the same salt could gives an intense light; and, placed in the fobe used in writing ink, mucilage, and, possibly, cus of a parabolic mirror, has been distinctly seen at a distance of 60 miles.

6382. To Prevent the Formation of 6389. Doebereiner's Self-Igniting a Crust in Tea-kettles. Keep an oyster-Lamp. Take an ordinary fruit jar, with a shell in your tea-kettle. By attracting the cork stopper or leaden cover; procure any stony particles to itself, it will prevent the old bottle that will go into the jar, at least two thirds as tall as the jar. Cut off the botescaped, a piece of spongy platinum may be placed a little distance from the point of the tube. The gas, impinging on the platinum, heats it sufficiently to ignite itself. The escape of gas may be cut off by slipping a rubber tube closed at one end over the glass tube, or a tube with a stop-cock may be used. As soon as the escape of gas is cut off, its pressure drives the acid out of the bottle into the jar, and no more gas is generated. Pieces of for this use may be obtained of dealers in chemical apparatus. The lamp may also be purchased complete from the same parties.

6390. Pencils for Writing on Glass. add 6 parts red lead and 1 part purified carbonate of potassa, previously thoroughly triturated together. Set the mixture aside for an hour in a warm situation, stirring frequently, then pour it into glass tubes or hol-

low reeds.

Elastic Cement. Dissolve 1 drachm gutta-percha in 1 ounce or more bisulphide of carbon, so as to make a fluid that will easily pass through coarse filtering paper. After filtering, add about 15 grains pure indiarubber, and let it dissolve; or, when it has become soft and gelatinous, quickly rub the whole smooth with a palette knife on a slab.

6392. To Mend a Balloon or Gas-Bag. Paint 4 or more coats of the varnish described in the last receipt, around the hole in the bag, allowing each coat to dry before the application of the next. Treat a piece of fine strong muslin in the same way. The last coat on each should be pretty thick, and, when nearly dry, apply the patch to the bag, and press evenly and quite firmly together. When at last the whole is dry, press with a warm iron, and then paint the surface of the new piece with a coat or two of the varnish. If nicely done, the bag will be as strong as ever. Chloroform may be used in place of the bisulphide of carbon.

6393. Improvement in Ink-Erasers. The Great Lightning Ink-Eraser may be used blot without injury to the paper, leaving the without injury to the printer's ink upon any printed form, or the ruling upon any first-class lengthways, hence the top and bottom, or paper. Take of chloride of lime 1 pound, long edges, are both rough. The deckle is

tom of the bottle either with a file or by thoroughly pulverized, and 4 quarts soft wawrapping a piece of candle-wick soaked in ter. The above must be thoroughly shaken alcohol around it, burning the wick, and dip- when first put together. It is required to ping in water while hot. (See Nos. 2367, &c.) stand 24 hours to dissolve the chloride of A hole is cut in the cork or lead cover, to lime; then strain through a cotton cloth; admit the neck of the bottle and prevent it after which add a tea-spoonful of acetic acid resting on the bottom of the jar. The bottle (No. 8 commercial) to every ounce of the is closed with a cork fitted with a short glass chloride of lime water. The eraser is used tube bent at right angles and drawn to a fine by reversing the pen-holder in the hand, dipopening. Some pieces of zine are suspended ping the end of the pen-holder into the fluid, in the bottle by a wire or little basket of lead. and applying it, without rubbing, to the The jar is then filled to about one-half with word, figure, or blot required to be erased. dilute sulphuric acid. The acid, coming in When the ink has disappeared absorb the contact with the zinc, generates hydrogen fluid with a blotter, and the paper is immegas, which escapes from the glass tube. The diately ready to write upon again. Chloride mixture of air and gas being highly explo- of lime has before been used with acids for sive, the lamp should not be ignited until all the purpose as above proposed; but in all the air has been expelled. After the air has previous processes the chloride of lime has been mixed with acids that burn and destroy the paper.

6394. To Preserve Clothes Pins. Clothes pins beiled a few moments and quickly dried, once or twice a month, become more flexible and durable. Clothes lines will last longer and keep in better order if occa-

sionally treated in the same wav.

To Fasten Loose Window 6395. Sashes. The most convenient way to prespongy platinum incounted on wires suitable vent loose window sashes from rattling unpleasantly when the wind blows is to make four one-sided buttons of wood, and serew them to the beading which is nailed to the casings of the window, making each button Take 4 parts stearic acid, 3 parts mutton suct, of proper length to press the side of the sash and 2 parts wax; melt them together and outwards when the end of the button is turned down horizontally. The buttons operate like a cam. By having them of the correct length to crowd the stiles of the sash outwards against the outer stop of the window frame, the sash will not only be held so firmly that it cannot rattle, but the crack which admitted dust and a current of cold air will be closed so tightly that no window strips will be required. The buttons should be placed about half way between the upper and lower end of each sash.

6396. To Detect a Counterfeit Bank of England Note. The Bank of England possesses no security which may not be known by any person who will make himself acquainted with the following characteristics of the paper, the plate printing and the type printing of the note. The paper is distinguished: By its peculiar color, such as is neither sold in the stores nor used for any other purpose. By its thinness and transparency, qualities which prevent any portion of the printing on the note being washed or scratched out without a hole being made. By its characteristic feel, which consists of a singular crispness and toughness, owing to the fact that the bank paper is made from new linen and cotton, not from rags. By the peculiar wire-mark or water-mark, which can only be produced when the paper is in a state of pulp; consequently the forger must procure a mould, and instead of a knife or scraper for erasing ink, make his own paper, both requiring the skill in order to rectify a mistake or clean off a of such first-rate artisans as are not likely to be met with in the haunts of crime. By the paper as clean and good to write upon as it three deckle or rough edges. These edges was before the mistake or blot was made, and are produced when the paper is in pulp; two kinds, type and plate; the paper is moistened tion may be necessary by water driven through its pores by the ressure of the atmosphere; 30,000 double composed of two different liquids, No. 1, vines of Rhenish grapes; this gives a pecuby a machine which cannot err; and, lastly, are authorized by the signature of the clerk. only retains the slightest trace of that mark.

To Flatten Engravings or above dye may be found in No. 1202. thas been Rolled Up. To suc- 6402. Fire Kindlings. In F Paper that has been Rolled Up. To succeed in this, take a roll of paper, wall-paper for temperature of boiling water. (See No. 6205.)

6403. To Convert Sized Paper into Blotting Paper. Common paper may be carefully done, the card-board will be flattened without danger of breaking, and free from the creases inevitably made if rolled backwards in the hands. If wall-paper be used, it should be as thick as can be obtained and the larger the diameter. Collectors of engravings will find it worth their in diameter, and 5 or 6 yards of the stout water, paper sold in rolls or by the yard under the name of "pattern paper. The cost is trifling, of soa and it will last for years.

the sunshine.

completely restored by being immersed in perior to the officinal process. (See No. 4869.) this preparation for only one minute, without the least injury to the paper, if the precaution is taken to thoroughly wash the article in water containing a little hyposulphite of soda. Undyed linen and cotton goods of all kinds, tency with alcohol. This varnish, applied to however soiled or dirty, are rendered snowy the surface of wood with a camel's hair varnishing in a very chest time by morely placing this hypoth produces an excellent black for them in the liquid mentioned. For the pre- ing, and may also be used for preparing paration of Javelle water, take 4 pounds bi-carbonate of soda, and 1 pound chloride of 6406. Beautiful

6400. To Clean Soiled Engravings. water is cold: take it out earefully and re- general use. (See No. 2460.)

the raw edge of the paper, and cannot be imi-{ move as much of the moisture as possible tated by cutting. By the strength of the pa- with clean blotting paper, then place the enper—a bank note will lift a hundred weight if graving in a press between clean white paper, carefully adjusted. The printing is of two If very much soiled, a repetition of the opera-

notes are thus moistened in the space of un called the mordant, which is employed to give hour. The ink used is made at the bank, permanency to the dye, and No. 2, which is from linseed oil and the charred husks and the dye itself. Take ‡ ounce pyrogallic acid, 6 ounces alcohol, and 18 ounces water; shake liar velvety black to the mark in the left-hand corner of the note. The notes are numbered glass-stoppered bottle. This is the mordant, and must be labeled Solution No. 1. To prepare the dye, take 1 ounce nitrate of silver, 2 The bank notes are printed on the side of the ounces ammonia, and 8 ounces distilled wapaper which receives the water mark, so that, ter; dissolve in a stoppered bottle, and mark if the paper be split, the unprinted surface it Solution No. 2. This is a very fine article. (See No. 1201.) Directions for using the

6402. Fire Kindlings. In France, a very convenient and economical kindling is instance, unroll a portion of it, and insert the made by dipping corn-cobs for about one paper or card-board, which is to be flattened, minute in a bath composed of 60 parts melted in such a manner that when the whole is resin and 40 parts tar. They are next spread rolled up again, the card-board will be bent out to dry on metallic plates heated to the

the larger the diameter of the roll, the better, in a bath of the ordinary undiluted acid, removing it, after a few seconds, to a vessel while to obtain a straight roller, say 3 inches in which it was treated to several changes of

8404. Rother's Soap Liniment. Take of soap (genuine castile, mottled or white), dry and in No. 12 powder, 24 troy ounces; 6398. To Remove Water Stains from camphor, 12 troy ounces; oil of rosemary, 3 Engravings or Paper. Fill a sufficiently fluid ounces; water, 3 pints; strong alcohol, large clean vessel with pure water; dip the 102 pints. Mix the water with half a pint of engraving in, waving it backward and for the alcohol in a capacious vessel; add the ward until wet through. Then fasten it to a soap and apply heat until solution has oc-flat board with drawing pins, and let it dry in curred; to this add 4 pints of alcohol. In the remaining 6 pints of alcohol dissolve the cam-6399. To Bleach Engravings, &c. phor and oil; to this add the solution of soap; Old engravings, wood cuts, and all kinds of mix. Let the impurities (coloring matter of printed matter, that have turned yellow, are the soap) subside, and filter. This is vastly su-

white in a very short time by merely placing nish brush, produces an excellent black fac-

6406. Beautiful Black Ink. Take a lime; put the soda into a kettle over the fire, sufficient quantity of elder berries, bruise and add I gallon boiling water, let it boil from 10 keep them for 3 days in an earthen vessel; to 15 minutes, then stir in the chloride of then press out and filter the juice. To 12½ lime, avoiding lumps. When cold, the liquid pints of the filtered juice, add ½ ounce each of can be kept in a jug ready for use. (See No. sulphate of iron, and crude pyroligneous acid. The ink that results has, when first used, a violet color, but when dry is an indigo blue-Lay the engraving, face downwards, in a per-black. In writing, it flows easily from the feetly clean vessel, sufficiently large to allow pen without gumming, and does not thicken the engraving to lay flat; pour clean boiling as soon as common ink. These are no small water upon it, and allow it to stand until the advantages, and ought to recommend it for

size of fish glue or isinglass. sized flat varnish brush, wet the brush with examining, hold a mirror in such a position as the size just sufficiently to moisten the surface to reflect the sun's rays in the water, so that of the print to the extent of the width of the anything floating on the surface can then be brush and the whole length of the print, plainly seen. If the contents of the well are Commence at one side and continue in this! way until you have gone over the whole sur-face. Draw the brush with a light, quick dropped in wells of 60 feet in depth, and stroke, as closely each time to the part previously wet as possible, without lapping or going twice in one place. When dry, go objects are small, or a minute examination of over it again in the same way, only at right the bottom is required, an opera-glass may be angles to the first stroke. Let this dry, then used. If the top of the well is not exposed proceed to mount as follows: Stretch, as to sunlight, a mirror may be placed outside, tightly as it will bear, to a frame of the re-even at a great distance, to reflect the light quired size, a piece of new, smooth, fine mustover its top, where a second mirror may reflect lin or factory cloth. Rub over the whole surtit downward. Letting a lamp, candle, or lanface of this, with a good paste-brush, a suffi-tern down gives by no means as successful a cient quantity of well-cooked paste, made of result, as the light is very weak compared equal parts of wheat-flour and starch, to thore with sunlight, and its glare, even when the oughly wet the cloth. Lay the print onto it, eyes are shaded from its direct rays, prevents and, covering it with a piece of clean paper, distinct vision. The method of employing rub it down both back and front, until smooth two mirrors, one outside reflecting the solar and fast. When thoroughly dry, varnish with rays in a room, and a second small mirror in white copal varnish.

ity. It is important to use pure washed

ether, free from spirit.

6409. Xylol, the New Remedy for Small-Pox. Xylol, xylene, or ethyl-benzine, as it has been respectively called, is one best vinegar, and & pint spirits of wine. Dip of the hydrocarbons formed from coal-tar a soft cloth into the mixture and rub over the naohtha. Müller, but its nitro-compound had previously clean soft cloth. Always shake the mixture been discovered by Warren De la Rue, in before using. We do not know any article Coal-tar naphtha is submitted to frac-distillation until the part which boils 6412. To Wash Ladies' Summer tional distillation until the part which boils at 141° is separated; this is submitted to the Suits. Summer suits are nearly all made of solves the xylol and leaves the other hydro-carbons. The xylol is then separated by ance after washing is a matter of the greatest Physician at the Charité Hospital at Berlin, ed to touch the fabric; it should be washed with great success in cases of small-pox. The and rinsed quickly, turned upon the wrong xylol is taken up by the blood, and acts as a starched (in thin-boiled, but not boiling disinfectant. Its boiling point is variously starch) should be folded in sheets or towels, stated at 139° to 140°. The specimens examined by the writer generally commenced possible. Linen should be washed in water to boil at about 135°. The specific gravity in which hay or a quart-bag of bran has been is of importance, but there is no very ready starch as well, and is excellent for print method for testing its purity. It should be dresses of all kinds; a handful of salt is also soluble in fuming sulphuric acid, but it is not very useful to set the colors of light cambrics soluble in the ordinary sulphuric acid of the and dotted lawns; and a little beef's gall will like benzole, and an aromatic taste. doses are 3 to 5 drops for children; 10 to 15 soda, or other washing compound should on drops for adults, every hour to every 3 hours. any account be used. It is quite harmless in reasonable doses. In Berlin it is given in capsules. As it is very Mixed Fabrics. Boil the rags in a mixture insoluble, the best method of giving it would of 1 part nitric acid and 10 water, or a little be in an emulsion of almonds. (Tichborne.) stronger. The cotton fibre, after drying, can

6407. To Mount Prints. Make a thin 6410. To Examine Wells or Chim-Take a good neys. In case the bottom of a well needs not turbid, the smallest object on the bottom which contained more than 20 feet of water, have been traced and recovered. When the its path to reflect these rays into a dark cav-Varnish to Imitate Ground ity, is employed by physicians, for the exam-Glass. Dissolve 90 grains sandarac and 20 ination of cavities of the body; for instance, grains mastic in 2 ounces washed methylated to explore the tympanum in the human ear, ether, and add, in small quantities, sufficient the throat, etc. To examine a straight chimbenzine to make it dry with a suitable grain, ney a piece of looking-glass is to be held, intoo little making the varnish too transparent, clined at an angle of 45°, in the hole in the and excess making it crapy. The quantity of chimney wall, into which the stove-pipe is to beuzine required depends upon its quality, go, or in the open fireplace. If the observer from \frac{1}{2} ounce to 1\frac{1}{2} ounces or even more; but can see the light of the sky, he will also see the best results are got with a medium qual-the whole interior of the chimney, and any obstruction in the same. As most chimneys are straight, the top will be clearly visible.

6411. To Clean Furniture. Mix together 1 pint cold drawn linseed oil, 1 pint It was first procured by Hugo furniture, and then wipe thoroughly with a

action of fuming sulphuric acid, which dis- white or buff linen, piqué, cambric or musdistillation from this mixture. Xylol is said importance. In the first place, the water to have been used by Dr. Zuelzer, the Senior should be tepid, the soap should not be allowtheory of its action would appear to be that side, and hung in the shade to dry, and when was .866. It is said that the purity of xylol boiled. This last will be found to answer for Pharmacopæia. It has a faint odor something not only set, but brighten, yellow and purple The tints, and has a good effect upon green.

6413. To Dissolve Wool Out of

be shaken out as dust in a willowing machine, This is the plan adopted in England and half ripe; pound then in a tub, and to every Germany for making "extract," and is used quart of pounded fruit add 2 quarts water. for mixing with wool in many manufactures. Let it stand in the mash-tub for 14 days, then This prepared wool, however, will be found to draw it off, and to every gallon of liquor add have lost, to a great extent, its felting prop- 3 pounds loaf sugar. When the sugar is dis-

quantities of which are sufficient to render This produces a domestic real champagne, the most soiled linen perfectly white. It is in no way inferior to the genuine imported prepared by taking 4 pounds sal-soda to 1 article. pound chloride of lime in 1 gallon water. Put the sal-soda into a vessel over the fire, add 1 gallon boiling water; let it boil for 10 or 15 sugar, with 6 gallons water, and the whites of minutes, then add the chloride of lime by 2 eggs well beaten; then skim it, and put in throwing it, free from lumps, into the soda 4 peck elder flower from the tree that bears water. When cold, pour into a jug or large white berries; do not keep them on the fire. bottle and cork tightly. Where it is desirable When nearly cold, stir it, and put in 6 spoon-to have a larger quantity, the following mix-fuls lemon juice, 4 or 5 of yeast, and beat well ture can be taken: Stir 5 pounds chloride of into the liquor; stir it every day; put 6 lime into 2 pails warm water; dissolve 10 pounds best raisins, stoned, into the cask, and pounds glauber salt (sulphate of soda) in 1 tun the wine. Stop it close, and bottle in 6 water. The contents of the 4 pails can be excellent imitation of Frontignac poured together and kept in any suitable tight vessel. Such a quantity as the above ought to last a long time, as a dipperful of it and with the same ingredients as the white would bleach a large quantity of linen or other goods. The materials are cheap, and the mixture easily made. (See No. 4787.)

instantly, with blood or blood stains, a beautiful tint of blue. He had taken a single lint fibre, on which was a stain of blood scarcely perceptible, that had been made twenty years before, and he found that the test produced immediately the characteristic blue color, which was easily detected on a microscopic

examination. (See No. 4393.)

6416. Artificial Honey. Put 10 pounds white sugar in 2 quarts water, and gradually heat it, stirring it occasionally until brought and warm soft water. to the boiling point. Then remove from the fire and add I pound real honey. When half cooled, add ½ pound more honey, and, when only blood warm, add another  $\frac{1}{2}$  pound honey. from the graduated glasses used for measuring When nearly cold, add 10 drops good essence them. A mixture formed of the same ingrevaried to the liking by adding more or less the whole being rubbed off dry and clean with peppermint essence. (See Nos. 1572, &c.) a piece of cotton.

6417. Grape Champagne. Gather the solved, cask it; and, after it has done work-6414. Javelle Water. Many persons ing, bring it down. In 6 months it should be keep on hand a supply of Javelle water, small bottled, and the corks tied down or wired.

6418. Imitation White Frontignac Wine. Boil 18 pounds white powdered pail water; also 4 pounds sal-soda in 1 pail months. When well kept, this wine is an

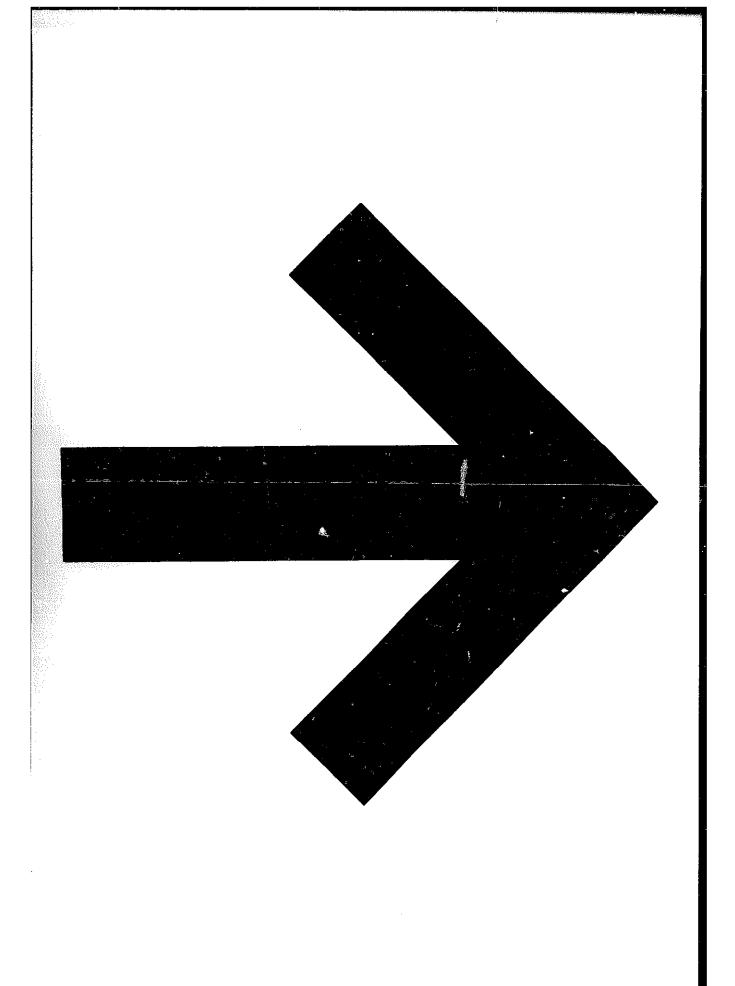
6419. Imitation Red Frontignac Wine. This is made in the same manner, wine (see No. 6418), except that dark elder-

berries are used instead of white

6420. Cure for Fever and Ague and 6415. To Detect Blood-stains. It is Intermittent Fever. Take 40 grains sulsaid by Professor Bloxam, of London, that a phate of quinine, 30 grains powdered liquor-mixture of tineture of guaiaeum and a solu-ice, and 10 grains gum myrrh. Make into 40 tion of peroxide of hydrogen in ether produces pills. Take 2 pills every 2 hours for the first 24 hours; 2 pills every 4 hours for the second 24 hours; and the remainder, 1 at night on going to bed, and 1 in the morning, first thing. This performs an effectual cure if the directions are implicitly followed. (Trent.)
6421. To Remove Tar or Pitch from

the Skin. Mix together pulverized extract of liquorice, and oil of aniseed to the consistency of thick cream; rub it on the part thoroughly with the hand, then wash off with soap

6422. To Remove Tar, &c., from Glass. It is not easy to remove tar, pitch, Venice turpentine, and other sticky substances of peppermint. This makes 16 pounds in all dients as in the last receipt, combines with of a very good sweetening. Its flavor can be the sticky matter so completely as to allow of a piece of cotton.



## INDEX.

In the compilation of this Index, especial pains have been taken to economize space as much as possible, without impairing its usefulness for ready reference. With this end in view, classification of items has been largely resorted to: so that, in many cases, a single entry will embrace several receipts, varying in number from two or three to twenty or more.

Some discretion is, therefore, advisable in searching the Index for any desired receipt. If, for instance, it is required to find out "How to put out a fire in a Chimney," it will naturally be found under "Chimney," the object to be operated upon. Again: in searching for some preparation of a compound body, "Solution of Citrate of Magnesia," for instance, it would be found under "Citrate of Magnesia," the principal ingredient, and not under "Magnesia," which, although its base, is an entirely different substance.

Proprietary preparations and processes will be found only under the name of the inventors; thus, "Brandreth's Pills" are indexed under "Brandreth," and not under the head of "Pills;" this latter heading including only such as have no such distinctive designation. This is done to avoid needless repetition, and thereby sare space.

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Potensium and Iron. 6633   Lead Ores, Flux for Reducing 9445   Lice, Dody, to destroy. 1929   Launy Firmants. 9528   Lead Pipes, Flux for Soldering 2535   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   Launy Self-igniting 6829   L	Lahache's Syrup of Iodide of		Libevius' Fuming Lionor 4194
Lairy Wrigind	Potassium and Iron		Lice. Body. to destroy 1990
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Lamp   Self-igniting			
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Lamps, Kerosene, to clean		Leaf Gilding	
Lamps, Kerosene, to keep, from getting (freasy)			Liebig's Silvering on Glass3619
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Gems	Lancon's Paste for Artificial		
Land Alexance. Government	Gems 2426		
Landles Process for Carmine. 2074 Lapis Lazelli, Imitation	Land, Level to drain 1891	Leather, Dubbing for 3078	
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Lapis lazuil, mintation 2449 Lapis lazuil, mintation 2449 Lapis Miraculosus 5.257 Lard, Denzoard 5.255, 1518 Lard, Benzoard 5.255, 1518 Lard, Benzoard 6.255, 1518 Lard, Denzoard 6.255		for	
Lapis Alizuculosus   5.227   Lard   Lapis Alizuculosus   5.227   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard   5.25   Lard	Lanis Divinus	Leather, Invisible Patches on 2256	Lilies, White, Oil of. 4752
Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525     Lard   Denzonted   .525   515     Lard   Denzonted   .525     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515     Lard   Denzonted   .525   515   515     Lard   Denzonted   .525   515   515     Lard   Denzonted   .525   515   515     Lard   Denzonted   .525   515   515     Lard   Denzonted   .525   515   515     Lard   Denzonted   .525   515   515     Lard   Denzonted   .525   515   515     Lard   Denzonted   .525   515   515     Lard   Denzonted   .525   515   515   515     Lard   Denzonted   .525   515   515   515   515     Lard   Denzonted   .525   515   515   515   515   515   515     Lard   Denzonted   .525   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   515   51	Lapis Lazuli, Imitation2440	Leather, Japan Black Varnish	
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Roaches, to exterminate1901	Rue, Oil of, Test for1486	Sampson's New York Pills5300
Roche Alam4256	Rugs, Hearth, to clean 445	Sand Bath 4
Rochelle Salt	Rugs, Sheepskin, to clean 420	Sand-Soap Balls 575
Roche's Diptheria Remedy5639		Sandal Wood, Essential Oil of 1465
Roche's Embrocation5257	ting Fluid3555	Sandarach French Polish 2999
	Dulan for the Prontmant of Al	
Rocket Cases, to make2050	Rules for the Treatment of Al-	Santa Cruz Rum, Imitation 699
Rockets, Chinese Fire for 2055	eohol1449, &c.	Santa Cruz Sonr 926
Rockets, Composition for charg-	Rum1435	Santonate of Soda
ing	Rum, Imitation	Santonate of Soda, Syrup of 4650
Rockets, Display2051	Rum, New England, Distillation	Santonin Lozenges 5463
Rockets, Garniture for 2055, &c.	of931,&e.	Santonin, Solution of 4794
Rockets, Plain		Santonin, Syrup of
		Samonni, Syrup ot
Rockets, to charge2052	Rum, New England, Yeast for 932	Sap Green
Rocks, &c., Weight of6134	Rum Punch         710           Rum, Test for         4407	Saponine
Roman Candles	Rum. Test for	Sapphire, Imitation 2358, 2433
Roman Candles, Composition	Runge's Black Ink2483	Sarcine
for charging	Rupture, Treatment of5770	Sarcosine4013
Roman Candles, Stars for 2058,2064	Russia Leather 644	Sarel's Cement
Rollian Candles, Stars for 2006,2004		
		Sarsaparilla, Fluid Extract of 4577
Roman Cement	Russia Salve5343	Caracipatina, 1 iana 13actaet et 1011
Roman Money, Ancient 6057	Russian Liquid Glue2286	Sarsaparilla Syrup
Roman Money, Ancient 6057	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient         6057           Roman Money, Modern         6079           Roman Vitrol         120           Roman Weights and Measures 6057         6079	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient       6057         Roman Money, Modern       6079         Roman Vitriol       120         Roman Weights and Measures 6057       6079         Rondeletia, Bouquet de       1066	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essenee or Extrait de 946, 1062	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essenee or Extrait de 946, 1062	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c.	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 129 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essenee or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2217 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve. 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve. 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889	Russian Liquid Glue	Sarsaparilla Syrup 1391 Sarsaparilla, Syrup of, Compound 4655 Sarsaparilla Syrup for Sodawater 1389, &c. Sash Windows, to keep Open 6208 Sassafras, Essential Oil of 1405 Sassafras Flavoring for Liquors 670 Sassafras Water, to distill 1071,1073 Satin Shoes, White, to clean 455 Satins, to clean 460 Saturated Solution 22 Saturated Solutions, Boiling Heat of 1405
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous to preserve 1888	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for 0224 Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Vitriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roets, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Ropiness in Beer, to remedy 841 Ropiness in Beer, to remedy 841 Ropiness in Wine, to remedy 749	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Wine, to renedy 749 Rosaniline 2553	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Moderm 6079 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2217 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roets, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 81 Ropiness in Beer, to remedy 749 Rosaniline 2553 Rosant, Pomade, for the Lips 1135	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Wine, to renedy 749 Rosaniline 2553	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Moderm 6079 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2217 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roets, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 81 Ropiness in Beer, to remedy 749 Rosaniline 2553 Rosant, Pomade, for the Lips 1135	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Beer, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose, 6079 Rose, Esprit de 1001 Rose	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2224 Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 81 Ropiness in Beer, to remedy 81 Ropaniline 2553 Rosat, Pomade, for the Lips 1135 Rose Bandoline 1195 Rose Esprit de 1001 Rose Glycerine Cream 1130	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Ropiness in Beer, to remedy 81 Ropiness in Beer, to remedy 81 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose Glycerine Cream 1130 Rose Lipsalve. 1171	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose Glycerine Cream 1130 Rose Glycerine Cream 1130 Rose Glycerine Cream 1130 Rose Lip-salve 1171 Rose, Oil of 1227, 1229, 4752	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose Bandoline 1195 Rose Glycerine Cream 1130 Rose Glycerine Cream 1130 Rose Glycerine Cream 1171 Rose, Oil of 1227, 1229, 4752 Rose, Oil of Test for 1484	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Moderm 6079 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 227 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose Bandoline 1195 Rose, Esprit de 1001 Rose Ciperine Cream 1130 Rose Lip-salve 1171 Rose, Oil of 1227, 1229, 4752 Rose, Oil of 1257, 1229, 4752 Rose, Oil of 1851 for 1484 Rose, Pastilles à la 1343	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 81 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose Glycerine Cream 1130 Rose, Oil of 1227, 1229, 4752 Rose, Oil of Test for 1484 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Moderm 6079 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 227 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose Bandoline 1195 Rose, Esprit de 1001 Rose Ciperine Cream 1130 Rose Lip-salve 1171 Rose, Oil of 1227, 1229, 4752 Rose, Oil of 1257, 1229, 4752 Rose, Oil of 1851 for 1484 Rose, Pastilles à la 1343	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 81 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose Glycerine Cream 1130 Rose, Oil of 1227, 1229, 4752 Rose, Oil of Test for 1484 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Moderm 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2224 Roots, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Beer, to remedy 881 Ropiness in Wine, to renedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose Bandoline 1195 Rose Esprit de 1001 Rose Glyceriae Cream 101 Rose, Oil of 1227, 1229, 4752 Rose, Oil of 1227, 1229, 4752 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267 Rose Soap 563 Rose Water 1008	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essenee or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Beer, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose Glycerine Cream 1135 Rose, Esprit de 1001 Rose Oil of 1227, 1229, 4752 Rose, Oil of Test for 1484 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267 Rose Soap 553 Rose Water 1008 Rose Water, to distill 1071, 1073, 1079	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Beer, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose Glycerine Cream 1130 Rose Glycerine Cream 1130 Rose Oil of 1227, 1229, 4752 Rose, Oil of 1227, 1229, 4752 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267 Rose Soap 563 Rose Water 1008 Rose Bushes, Composition for	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2217 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose Bandoline 1195 Rose Esprit de 1001 Rose Glycerine Cream 1130 Rose Lip-salve 1171 Rose, Oil of 1227, 1229, 4752 Rose, Oil of 1227, 1229, 4752 Rose, Oil of, Test for 1484 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267 Rose Soap 563 Rose Water, to distill 1071, 1073, 1079 Rose-Bushes, Composition for Wounds on 1877	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essenee or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 841 Ropiness in Beer, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose Glycerine Cream 1135 Rose, Oil of 1227, 1229, 4752 Rose, Oil of Test for 1484 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267 Rose Soap 563 Rose Water, to distill 1071, 1073, 1079 Rose-Bushes, Composition for Wounds on 1877 Rose-Bushes, Insects on, to re-	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2224 Roofs, Leaky, Cement for 2217 Root Beer 889, &c. Roots, Bulbous, to preserve 1888 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Wine, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose Bandoline 1195 Rose Esprit de 1001 Rose Glycerine Cream 1130 Rose Lip-salve 1171 Rose, Oil of 1227, 1229, 4752 Rose, Oil of 1227, 1229, 4752 Rose, Oil of, Test for 1484 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267 Rose Soap 563 Rose Water, to distill 1071, 1073, 1079 Rose-Bushes, Composition for Wounds on 1877	Russian Liquid Glue	Sarsaparilla Syrup
Roman Money, Ancient 6057 Roman Money, Modern 6079 Roman Witriol 120 Roman Weights and Measures 6057 6079. Rondeletia, Bouquet de 1066 Rondeletia, Essence or Extrait de 946, 1062 Roofs, Leaky, Cement for 2224 Rooms, Cement for Coating 2171 Root Beer 889, &c. Roots, Leaky, Cement for 2224 Roots, Cement for Coating 188 Roots, to extract Essential Oil from 46 Roots, to dry 1889 Roots, to dry 1889 Roots, Tuberous, to preserve 1888 Rope, Weight of 6137 Ropiness in Beer, to remedy 881 Ropiness in Beer, to remedy 749 Rosaniline 2553 Rosat, Pomade, for the Lips 1135 Rose, Esprit de 1001 Rose Glycerine Cream 1130 Rose Glycerine Cream 1130 Rose, Pastilles à la 1343 Rose, Pastilles à la 1343 Rose Pomade 1262, 1267 Rose Soap 563 Rose Water, to distill 1071, 1073, 1079 Rose-Bushes, Composition for Wounds on 1877 Rose-Bushes, Insects on, to remove 1846	Russian Liquid Glue	Sarsaparilla Syrup
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Tonics         5117           Tonic after Drinking to excess 5818         7000           Elixir         5118, 5407           Tonic, Hair         1180           Tonic Infusion         5120           Tonic Mixture         5123	Tuberose, Essence of 954 Tuberose Pomade 1263 Tuberose Roots, to dry 1889 Tuberose Roots, to preserve 1888 Tubes, Glass, to bend 3851 Tubing, Rubber, to make, Gastisht 4033	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics         5117           Tonic after Drinking to excess 5818         5018           Tonic Elixir         5118         5407           Tonic, Hair         1180         1180           Tonic Infusion         5120         5123           Tonic Mixture         5123         1524	Tuberose, Essence of 954 Tuberose Pomade 1263 Tuberose Roots, to dry 1889 Tuberose Roots, to preserve 1888 Tubes, Glass, to bend 3851 Tubing, Rubber, to make, Gastisht 4033	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics         5117           Tonic after Drinking to excess 5818         5118, 5407           Tonic Elixir         5118, 5407           Tonic, Hair         1180           Tonic Infusion         5120           Tonic Mixture         5123           Tonic Mixture, Aromatic         5124           Tonic Orange         5122	Tuberose, Essence of 954 Tuberose Pomade 1263 Tuberose Roots, to dry 1889 Tuberose Roots, to preserve 1888 Tubes, Glass, to bend 3851 Tubing, Rubber, to make, Gastight 4033 Tulip Roots, to preserve 1888	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics         5117           Tonic after Drinking to excess 5818         7000           Elixir         5118, 5407           Tonic, dair         1180           Tonic Infusion         5120           Tonic Mixture         5123           Tonic, Orange         5124           Tonic, Orange         5125           Tonic Pills         5125, 5166, 5216	Tuberose, Essence of 954 Tuberose Pomade 1263 Tuberose Roots, to dry 1889 Tuberose Roots, to preserve 1888 Tubes, Glass, to bend 3851 Tubing, Rubber, to make, Gastight 4033 Tulip Roots, to preserve 1888 Tuperos to remye 5769	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics         5117           Tonic after Drinking to excess 5818         5407           Tonic Elixir         5118, 5407           Tonic, Hair         1180           Tonic Infusion         5120           Tonic Mixture         5123           Tonic, Orange         5122           Tonic Pills         5125, 5166, 5216           Tonic Tineture         5126	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tunostates       4212	Uvanterin Brown Dye for Cottons 145  Valerian and Carbonate of Ammonia, Mixture of 5575  Valerian, Essential Oil of 1465  Valerian, Fluid Extract of 4526, 4542  Valerian Water, to distill 1071, 1073
Tonics         5117           Tonic after Drinking to excess 5818         5118, 5407           Tonic Elixir         5118, 5407           Tonic, Hair         1180           Tonic Infusion         5120           Tonic Mixture         5123           Tonic, Orange         5124           Tonic Pills         5125, 5166, 5216           Tonic Tineture         5126           Tonquin Oil         1246	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics         5117           Tonic after Drinking to excess 5818         5118, 5407           Tonic Elixir         5118, 5407           Tonic, Hair         1180           Tonic Infusion         5120           Tonic Mixture         5123           Tonic, Orange         5124           Tonic Pills         5125, 5166, 5216           Tonic Tineture         5126           Tonquin Oil         1246	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstic Acid       4212	Uvanterin Brown Dye for Cottons 145  Valerian and Carbonate of Ammonia, Mixture of 5575  Valerian, Essential Oil of 1465  Valerian, Fluid Extract of 4526, 4542  Valerian Water, to distill 1071, 1073
Tonics         5117           Tonic after Drinking to excess 5818         5118, 5407           Tonic Elixir         5118, 5407           Tonic, Hair         1180           Tonic Infusion         5120           Tonic Mixture         5123           Tonic, Orange         5124           Tonic Pills         5125, 5166, 5216           Tonic Tinceture         5126           Tonquin Oil         1246           Tonquin Pomade         1246	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       385         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tangstates       4212         Tungstic Acid       4212         Tungstic Glue       2281	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics         5117           Tonic after Drinking to excess \$818         5018           Tonic Elixir         5128         5407           Tonic, Hair         1180           Tonic Infusion         5120           Tonic Mixture         5123           Tonic, Orange         5124           Tonic, Orange         5125           Tonic Pills         5125           Tonic Tineture         5126           Tonquin Oil         1246           Tonquin Pomade         1246           Tools, Edge, Caution in grind-	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Tungstic Glue       2281         Turkey Corn, Tincture of       4492	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics         5117           Tonic after Drinking to excess 5818         5407           Tonic Elixir         5118, 5407           Tonic, Hair         1180           Tonic Infusion         5120           Tonic Mixture         5123           Tonic, Orange         5123           Tonic, Orange         5125           Tonic Pills         5125, 5166, 5216           Tonic Tineture         5126           Tonquin Oil         1246           Tonquin Pomade         1246           Tools, Edge, Caution in grinding         6953	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Tungstic Glue       2281         Turkey Corn, Tincture of       4492	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Glue       2281         Turkey Corn, Tineture of       4492         Turkey Red, French Process for	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Tungstic Glue       2281         Turkey Corn, Tineture of       4492         Turkey Rod, French Process for         Dyeing       189	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Tungstic Glue       2281         Turkey Corn, Tineture of       4492         Turkey Red, French Process for       Dyeing         Dyeing       189         Turkish Money       6106	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Tungstic Glue       2281         Turkey Corn, Tincture of       4492         Turkey Red, French Process for       Dyeing       189         Turkish Money       6106         Turkish Weights, &c.       6107, &c.	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tuberose Roots, to preserve       1888         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumost, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Turkey Corn, Tincture of       4492         Turkey Red, French Process for       189         Turkish Money       6106         Turkish Weights       6107         Kongard       5304	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Tungstic Glue       2281         Turkey Corn, Tineture of       4492         Turkey Red, French Process for       Dyeing       189         Turkish Money       6106         Turkish Weights, &c.       6107, &c.         Turlington's Balsam       5304         Turnbull's Prussien Blue       2674	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Tungstic Glue       2281         Turkey Corn, Tineture of       4492         Turkey Red, French Process for       Dyeing       189         Turkish Money       6106         Turkish Weights, &c.       6107, &c.         Turlington's Balsam       5304         Turnbull's Prussien Blue       2674	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics after Drinking to excess 5818 Tonic after Drinking to excess 5818 Tonic Elixir	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tungstates       4212         Tungstate of Soda       4212         Tungstic Acid       4212         Tungstic Glue       2281         Turkey Corn, Tineture of       4492         Turkey Red, French Process for       189         Turkish Money       6106         Turkish Weights, &c.       6107, &c.         Turlington's Balsam       5304         Turneul's Prussien Blue       2674         Turner's Cement       2228	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of         954           Tuberose Pomade         1263           Tuberose Roots, to dry         1889           Tuberose Roots, to preserve         1888           Tuberose Roots, to preserve         1888           Tubing, Rubber, to make, Gastight         4033           Tulip Roots, to preserve         1888           Tumost, to remove         5769           Tungstates         4212           Tungstate of Soda         4212           Tungstic Acid         4212           Tungstic Glue         2281           Turkey Corn, Tincture of         4492           Turkey Red, French Process for         189           Turkish Money         6106           Turkish Weights, &c.         6107, &c.           Turlington's Balsam         5344           Turnbull's Prussien Blue         2674           Turner's Cement         2928           Turner's Cerate         5289	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of         954           Tuberose Pomade         1263           Tuberose Roots, to dry         1889           Tuberose Roots, to preserve         1888           Tuberose Roots, to preserve         1888           Tubing, Rubber, to make, Gastight         4033           Tulip Roots, to preserve         1888           Tumost, to remove         5769           Tungstates         4212           Tungstate of Soda         4212           Tungstic Acid         4212           Tungstic Glue         2281           Turkey Corn, Tineture of         4492           Turkey Red, French Process for         189           Turkish Money         6106           Turkish Money         6106           Turkish Weights, &c.         6107, &c.           Turnbull's Prussien Blue         2674           Turner's Cement         2228           Turner's Cerate         5289           Turner's Work, to polish         3009	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tangstates       4212         Tungstate of Soda       4212         Tungstic Glue       2281         Turkey Corn, Tineture of       4492         Turkey Red, French Process for       189         Turkish Money       6106         Turkish Weights, &c.       6107, &c.         Turington's Balsam       5304         Turner's Cement       2228         Turner's Cerate       5289         Turner's Work, to polish       3009         Turning, Brass for       3372	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of         954           Tuberose Pomade         1263           Tuberose Roots, to dry         1889           Tuberose Roots, to preserve         1888           Tuberose Roots, to preserve         1881           Tubing, Rubber, to make, Gastight         4033           Tulip Roots, to preserve         1888           Tumors, to remove         5769           Tungstates         4212           Tungstate of Soda         4212           Tungstic Acid         4212           Tungstic Glue         2281           Turkey Corn, Tincture of         4492           Turkey Red, French Process for         Dyeing           Turkish Money         6106           Turkish Weights, &c. 6107, &c.           Turlington's Balsam         5304           Turnbull's Prussian Blue         2674           Turner's Cement         2228           Turner's Cerate         5289           Turning, Brass for         3372           Turning Metals, Petroleum fer 3449	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics	Tuberose, Essence of       954         Tuberose Pomade       1263         Tuberose Roots, to dry       1889         Tuberose Roots, to preserve       1888         Tubes, Glass, to bend       3851         Tubing, Rubber, to make, Gastight       4033         Tulip Roots, to preserve       1888         Tumors, to remove       5769         Tangstates       4212         Tungstate of Soda       4212         Tungstic Glue       2281         Turkey Corn, Tineture of       4492         Turkey Red, French Process for       189         Turkish Money       6106         Turkish Weights, &c.       6107, &c.         Turington's Balsam       5304         Turner's Cement       2228         Turner's Cerate       5289         Turner's Work, to polish       3009         Turning, Brass for       3372	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics after Drinking to excess 5818 Tonic after Drinking to excess 5818 Tonic Elixir 5118, 5407 Tonic, Hair 1180 Tonic Infusion 5120 Tonic Mixture 5123 Tonic Mixture, Aromatic 5124 Tonic, Orange 5122 Tonic Pills 5125, 5166, 5216 Tonic Tineture 5126 Tonic Tineture 5126 Tonquin Oil 1246 Tonquin Pomade 1246 Tools, Edge, Caution in grinding 6253 Tools, Edge, to grind 6253 Tools, Edge, to make, of Steel and Iron 3380 Tools, Edge, to sharpen 6251 Tools, Edge, to sharpen 6251 Tools, Edge, to sharpen 6251 Tools, Emery Wheels for grinding 6268 Tools, to temper 3285, &c. Tooth Ache, Remedies for 5867, &c. Tooth Cements 5878, &c. Tooth Powders 13288, &c. Tooth Powders 1288, &c. Tooth Powders 1288, &c.	Tuberose, Essence of         954           Tuberose Pomade         1263           Tuberose Roots, to dry         1889           Tuberose Roots, to preserve         1888           Tuberose Roots, to preserve         1888           Tubing, Rubber, to make, Gastight         4033           Tulip Roots, to preserve         1888           Tumost, to remove         5769           Tungstates         4212           Tungstate of Soda         4212           Tungstic Acid         4212           Tungstic Glue         2281           Turkey Corn, Tincture of         4492           Turkey Red, French Process for         189           Turkish Money         6106           Turkish Money         6106           Turkish Weights, &c.         6107, &c.           Turnbull's Prussien Blue         2674           Turner's Cerate         5289           Turning, Brass for         3372           Turning Metals, Petroleum for 3449           Turnings, Artificial Manure for 1827	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics after Drinking to excess 5818 Tonic after Drinking to excess 5818 Tonic Elixir	Tuberose, Essence of         954           Tuberose Pomade         1263           Tuberose Roots, to dry         1889           Tuberose Roots, to preserve         1888           Tuber, Glass, to bend         3851           Tubing, Rubber, to make, Gastight         4033           Tulip Roots, to preserve         1888           Tumors, to remove         5769           Tungstates         4212           Tungstate of Soda         4212           Tungstic Acid         4212           Tungstic Glue         2281           Turkey Corn, Tineture of         4492           Turkey Red, French Process for         Dyeing         189           Turkish Money         6106         506           Turkish Weights, &c.         6107, &c.           Turlington's Balsam         504           Turner's Cement         2228           Turner's Cerate         5289           Turners' Work, to polish         3009           Turning, Brass for         3372           Turning Metals, Petroleum fer         349           Turnips, Artificial Manure for         1827           Turnips, to preserve         188	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics after Drinking to excess 5818 Tonic after Drinking to excess 5818 Tonic elixir 5118, 5407 Tonic, Hair 1180 Tonic Infusion 5120 Tonic Mixture 5123 Tonic Mixture, Aromatic 5124 Tonic, Orange 5122 Tonic Pills 5125, 5166, 5216 Tonic Tineture 5126 Tonquin Oil 1246 Tonquin Pomade 1246 Tools, Edge, Caution in grinding 6253 Tools, Edge, to grind 6352 Tools, Edge, to make, of Steel and Iron 3280 Tools, Edge, to sharpen 6351 Tools, Emery Wheels for grinding 6268 Tools, to temper 3285, &c. Tooth Ache, Remedies for 5867, &c. Tooth Cements 5878, &c. Tooth Powders 1288, &c. Tooth Powders 1288, &c. Tooth Washes 1323, &c. Toopaz, Insitation 2354, 2434	Tuberose, Essence of         954           Tuberose Pomade         1263           Tuberose Roots, to dry         1889           Tuberose Roots, to preserve         1888           Tuberose Roots, to preserve         1881           Tubing, Rubber, to make, Gastight         4033           tight         4033           Tulip Roots, to preserve         1888           Tumors, to remove         5769           Tungstates         4212           Tungstate of Soda         4212           Tungstic Acid         4212           Tungstic Glue         2281           Turkey Corn, Tincture of         4492           Turkey Red, French Process for         Dyeing           Turkish Money         6106           Turkish Weights, &c. 6107, &c.           Turlington's Balsam         5344           Turnbull's Prussian Blue         2674           Turner's Cement         2228           Turner's Cerate         5289           Turning, Brass for         3372           Turning Metals, Petroleum for 3449           Turnips, to preserve         1888           Turpentine         4316	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
Tonics after Drinking to excess 5818 Tonic after Drinking to excess 5818 Tonic elixir 5118, 5407 Tonic, Hair 1180 Tonic Infusion 5120 Tonic Mixture 5123 Tonic Mixture, Aromatic 5124 Tonic, Orange 5125, 5166, 5216 Tonic Pills 5125, 5166, 5216 Tonic Tineture 5126 Tonquin Oil 1246 Tonquin Oil 1246 Tonquin Pomade 1246 Tools, Edge, Caution in grinding 6252 Tools, Edge, to grind 6252 Tools, Edge, to sharpen 6251 Tools, Edge, to sharpen 6251 Tools, Edge, to sharpen 6251 Tools, Edge, to sharpen 6268 Tools, to temper 3285, &c. Tooth Ache, Remedies for 5867, &c. Tooth Cements 5878, &c. Tooth Powders 1328, &c. Tooth Powders 1288, &c. Tooth Washes 1333, &c. Tooth Washes 1323, &c. Tooth Washes 1323, &c. Toota 1281, &c. Tooth Washes 1323, &c. Toota 1281, &c. Tooth Topaz, Imitation 2316	Tuberose, Essence of 954 Tuberose Pomade 1263 Tuberose Roots, to dry 1889 Tuberose Roots, to preserve 1888 Tuberose Roots, to preserve 1888 Tuberose Roots, to preserve 1888 Tuberose Roots, to preserve 1888 Tuberose Roots, to preserve 1888 Tuberose, Tubing, Rubber, to make, Gastight 4033 Tulip Roots, to preserve 1888 Tumors, to remove 5769 Tungstates 4212 Tungstates 4212 Tungstate of Soda 4212 Tungstic Acid 4212 Tungstic Glue 2281 Turkey Corn, Tineture of 4492 Turkey Corn, Tineture of 4492 Turkey Red, French Process for Dyeing 189 Turkish Money 6106 Turkish Weights, &c. 6107, &c. Turlington's Balsam 5304 Turnbull's Prussien Blue 2674 Turner's Cement 2228 Turner's Cerate 5289 Turner's Cerate 5289 Turner's Work, to polish 3009 Turning, Brass for 3372 Turning Metals, Petroleum for 3449 Turnings, to preserve 1888 Turpentine 4316 Turpentine 5099	Uva Ursi, Fluid Extract of4577 Uvanterin Brown Dye for Cottons
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