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## Botanical Medicine Monographs and Sundry

### **BITTER ALOES: A CONFESSION OF BEWILDERMENT.**

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By J. F. BROWN.

Almost the first step in an alphabetical progress through materia medica, brings the student face to face with the numerous contradictions which cluster round the subject of this paper, making it appear almost an insoluble conundrum.

You will be relieved to hear that I shall pass by all questions of botanical origin or of chemical formulae, and consider only those others which have been suggested by a collation of the statements *ad rem* published in the *Pharmaceutical Journal* at different times, and contained in a few standard authorities. All these agree that the drug is the inspissated juice which has exuded or been pressed from superficial vessels in the leaf, and that the different varieties fall naturally into two classes, of which Socotrine and Barbadoes are convenient types.

With the single but weighty exception of the late Peter Squire, all represent the first class as usually prepared by solar heat, the second by artificial evaporation. There is a consensus of opinion on the solitary point that the latter process is injurious to the quality of the drug, which is, however, unsupported by facts. On almost every other point there is an amusing see-saw of learned evidence, worthy of the famous trial at law of the simple question—what is coal?

Thompson ascribes the superiority of Socotrine aloes to the greater proportion of extractive contained therein. Squire gives the proportions of extract as 75 per cent. and 50 per cent. for Barbadoes and Socotrine respectively.

Squibb ascribes the more drastic nature of Barbadoes to its having been prepared by boiling; but it is questionable whether the two classes differ essentially in their operation, or merely in degree, needing only readjustment of doses to overcome it. A more important question, indeed the cardinal point in discussing the therapeutics of aloes, is, whether aloin is the true active principle or measure of value of the drug. In spite of the boiling, it is the Barbadoes variety which has generally been used as the source of this principle. Tilden, however, regards Barbaloin, Socaloin and Nataloin as unmistakably different substances. In the hands of Plenge, Tilden's process gave yields of 3 per cent. from Socotrine and 9 per cent. from Barbadoes respectively. An alternative process, in which Socotrine was treated by boiling in alcohol for two hours, gave 10 per cent. of aloin; but it is difficult to reconcile this method of separation with Squibb's statement that, with the exception of about 6 or 7 per cent. of impurities, the whole of the drug is soluble in alcohol.

Tilden considers that all varieties owe their bitterness to the aloin they contain, and he obtained 20 per cent. from Barbadoes by treating it as for extract, evaporating the liquid resulting from 1 lb. of aloes to 32 fluidounces, which must consequently have been a 10 per cent. solution of aloin.

Craig states that aloin constitutes 25 per cent. of aloes, yet Mitchell obtained only between 8 and 9 per cent. from Barbadoes, and oddly enough, states that the residual liquid from 1 lb. yielded 10 oz. of "very good" extract.

It appears then that the boiling, which is so strongly deprecated both in obtaining the crude drug and in making its galenical preparations, is consistent with a larger yield of aloin and greater purgative power in the aloes so prepared.

Most curious is it also to note that while the sun-dried Socotrine is generally regarded as the standard quality and described by Tilden and Rammell as consisting mainly of crystallized aloin with some resinoid the authentic specimen procured by Professor Balfour, when examined by Dott, yielded only 2 per cent. of the former to 56 per cent. of the latter, and was regarded as more historically interesting than medicinally valuable.

If the reason for this be sought for in the fact that it had been kept for three years, we are confronted by the statement of Tilden that aloin is not easily decomposed by heat in neutral or slightly acid solution, which latter condition is stated by Branson to be natural both to the juice of the leaf, and an aqueous solution of the drug; also by the well-known practice of storing a certain variety of aloes, whereby it is believed greatly to improve. Prolonged exposure to moist heat is said by Tilden to convert aloin into a brown substance, called by Craig "changed" aloin, and stated by him to retain its therapeutic activity, since numerous experiments on human beings and rabbits showed that 1 or 2 grains acted as a mild aperient. So that Aitken's complaint of the injury done to the extract by the employment of steam heat in its preparation seems hardly well founded.

Royle and Headland state that aloin heated to 212° F. is rapidly oxidized and decomposed, but Tilden considers the presence of alkali essential to rapid oxidation, and notes that potassium carbonate is specially conducive to this change.

In Paris's "Pharmacologia" it is held that the purgative property of an alkaline solution diminishes, *pari passu*, with the bitterness; Branson remarks that the decoction becomes less purgative by keeping, and Tilden states that the oxidized and tasteless alkaline solution has no effect, but W. Young found that the varying degrees of bitterness did not affect its aperient activity. My own very limited experience leads to a doubt whether a sample of concentrated decoction, which from keeping has ceased to be unbearably nasty, is therefore necessarily inefficient.

Cathartic remedies excel most others in the completeness with which their action is demonstrated; that such clouds of doubt, therefore, obscure the truth with regard to one of the best known of this class lessens our wonder at the virtues alternately affirmed and denied to belong to those whose working is less palpable

The uncertainty as to the dose of aloin will illustrate my meaning. T. and Smith state the relative proportion as 1 to 5 of aloes ; but Tilden took 1/2 to 1 grain without effect , although it does not appear that he controlled the test by taking 5 grains of aloes. Dr. Craig gives the dose as 1/2 to 1 grain, the B.P. 1/2 to 2 grains, Squire 1 to 2 grains, Mitchell 1 to 3 grains, and Martindale 1 to 4 grains. Stillé and Maisch regard aloin as probably two or three times as active as good aloes, and quote Dr. Harley to the effect that 1 1/2 grains will produce two or three copious evacuations in a strong adult, and that 2 1/2 grains are a powerfully cathartic dose.

This is rebutted by Dobson and Tilden's published record of fifty cases, principally adult males, in which all three kinds were given in doses not exceeding 2 grains, with effect described as "slight and very uncertain."

Barbaloin, especially with soap, appeared slightly the strongest of the three, but nataloin in 6-grain doses failed to act in some, in other cases acted freely in smaller dose. The authors conclude that aloin acts as well as an equal dose of aloes and gripes less. By A. P. Brown aloin is considered not more active than an equal dose of aloes, and the resin inert, while Proctor's personal experience is that aloes, aloin, uncrystallizable extract and insoluble portion all acted equally well.

That the solubility of aloin in water should be variously stated as 1 in 60, 1 in 90, and 1 in 500, and as insoluble—freely soluble—soluble 1 in 30 of alcohol—is only part of the puzzle.

It is agreed that the resin is very uncertain when used hypodermically, but Tilden and Craig take diametrically opposite views as to whether it is "changed" (possibly dehydrated) aloin, or something essentially different. The latter gave 8 grains with good effect, but 12 grains of a sample specially prepared free from aloin by Messrs. Smith failed to operate. Craig's own process consisted in dissolving well-washed resin in spirit, and precipitating by the addition of boiling water. Fifteen per cent. of the product was insoluble in spirit, and gave 23 per cent. of ash. It is known that the insoluble part of aloes is to some extent rendered soluble by prolonged contact with hot water, but this experiment points to such treatment rendering that insoluble in alcohol which had previously dissolved.

The successful hypodermic administration of aloin seems to render needless the elaborate building up of those composite pill structures, with casings of various degrees of solubility, which were recently recommended.

Would it be too much to ask some competent student of therapeutics, if the ever-rising flood of novelties will permit, to try and throw some light upon the action of this old and familiar drug. My own diffident guess is that when submitted to the process of digestion, and especially to the eminently solvent properties of the bile, the whole of the drug, save only the desert sand and comminuted monkey skin casually and occasionally accompanying it, is capable of producing its well-known benign effect.

## PHARMACEUTICAL COLLEGES AND ASSOCIATIONS

*Philadelphia College of Pharmacy.*—The preliminary examinations of the Junior Class were held in November and December last, and passed off satisfactorily. The following questions embrace those of the two preliminary and of the final junior examination, which latter took place on February 19th.

### BOTANY AND MATERIA MEDICA.

- 1.—Explain the nature of a *living cell*, and of its contents. Name some of the *cell markings*, and state how they are produced.
- 2.—Explain the nature of *closed* and of *open fibrovascular bundles*. In what plants or class of plants is each kind found, and in what manners is each kind arranged in the stems of these plants ?
- 3.—Explain a) *the growth of leaves*, b) their *anatomical structure*, and c) the different forms of *venation*.
- 4.—Give a brief history of the *development* of *stamens* define their *position* in the flower, and name for each variety of position some officinal flowers or herb..
- 5.—Give the botanical name, the habitat, the shape of the leaves, the color of the flowers, and the medical properties of each of the following officinal herbs: *Thoroughwort, Grindelia, Tansy* and *Wormwood*.
- 6.—Give the botanical characters of the natural order of Rosaceae. In what respects do its three principal *Suborders* differ ? Mention some drugs or useful plants from each of these Suborders.

### THEORY AND PRACTICE OF PHARMACY.

- 1.—Define *specific gravity* and *specific volume*, and give the specific gravity and specific volume of the officinal liquid which weighs 647 grains to the fluidounce, water weighing 455.7 grains at the same temperature. Show all of the figures used in making the calculation.
- 2.—Define *evaporation*, *distillation* and *sublimation*.
- 3.—Describe a *method of filtering* through paper substances which are solid or semi-solid at ordinary temperatures and which require the constant application of heat to retain them in a liquid condition; illustrate the subject with a drawing
- 4.—Describe the *process of decantation* and illustrate its effectiveness by an example showing the production of an insoluble salt by the mixture of two simple solutions.
- 5.—Give the process for making Acidum Nitrohydrochloricum, U.S.P. What are its

properties and uses? What compound is produced during the process, and what precautions are necessary in dispensing the Acid ?

6.—How would you prepare by an officinal process, an antidote to poisoning with Arsenic? Describe its mode of action upon this poison.

#### CHEMISTRY.

1.—What is the use of the *Barometer*? Explain the principle upon which it is based. Why is *mercury* used rather than water in the ordinary barometer ?

2.—What is the action of a *glass prism* upon a ray of white light passing through it? Enumerate the simple *colors* of the *Spectrum*. What is the *Spectroscope*, and what is it used for?

3.—How are *binary molecules* named? Give an example. Define an *acid*, a *base*, and a *salt*. Are *haloid salts* binary or ternary molecules ?

4.—Write out the reactions for making *chlorine* by the two methods generally used. For *what element* has chlorine an especial affinity? Give illustrations. What are the *pharmaceutical* and *practical uses* of chlorine?

5.—What is the difference between an Acid Sulphite and a Neutral Sulphite? Illustrate by giving the formula of an officinal Salt of each class. How do Thio-Sulphates differ in formula from Sulphates and Sulphites? Illustrate by example, using officinal Salts.

6.—Name the officinal varieties of Carbon. State the source of each and mention the points in which they differ. State the pharmaceutical and technical uses for each of these varieties.

#### QUESTIONS BY THE COMMITTEE.

1.—Name and describe five implements or appliances in common use at the prescription counter. Give a short description, and an explanation of the use of each.

2.—Describe the occurrence of Sulphur in nature. In what forms is Sulphur found in the shops? Give the officinal names of these several varieties. To what impurities are these liable ?

3.—Give a typical formula for an officinal fluid extract. State why the process of evaporating the weak percolate to a soft extract is preferred to the former method of adding the evaporated liquid to the reserved portion.

4.—How does the descending axis of Monocotyledonous and Dicotyledonous plants usually differ in structure and development? Briefly describe the chief distinctive characteristics of the ascending axis, and leaves of the Monocotyledons and

Dicotyledons.

#### SPECIMENS.

Santonica.  
Lobelia.  
Lavandula.

Aqua Anisi.  
Liquor Ferri chloridi.  
Spirit. Æther. nitrosi.  
Syrupus Zingiberis.

Acidum Sulphurosum.  
Potassii chloras.  
Magnesii sulphas.

In *Operative Pharmacy* the students were required to prepare Syrupus Ferri iodidi and Unguentum Hydrargyri nitratis.

The re examination of those junior students who failed in the February examination in one or more branches will be held on Friday afternoon, September 30th, at 3 o'clock.

The examination of the senior students took place from Saturday afternoon, February 26th, until Thursday, March 3, operative pharmacy and chemical analysis being the subjects reserved for the last day.

#### MATERIA MEDICA AND BOTANY.

A.—*Senega root*.—Give the botanical name, the natural order, and the habitat of the plant. Describe the drug, explain its structural characteristics, and state how it may be distinguished from *false Senega*, sometimes seen in the market. Name the principal constituents of the drug and give the percentage of the acrid principle. What are the medical properties of Senega, and in what doses is it given?

B.—*Jalap*.—Give the botanical name, the natural order, and the habitat of the plant. Describe the drug and explain its structure. What percentage of resin should it contain? State the behavior of this resin to simple solvents, and to chemical solvents. How would you distinguish it from the resins of *false Jalaps*? Give the medicinal dose of Jalap and of the resin.

C.—*Broom*.—Give the pharmacopoeial name of the drug; also the botanical name, the natural order, the habitat, and the officinal part of the plant. Describe the drug, and give its medical properties, and its dose. What important principles does it contain?

D.—*Mezereon*.—Name the plant or plants yielding it; also the natural order, and the habitat. Describe the physical characters of the drug, and its structure. What constituents have been obtained from it? Which of the constituents is acrid? Give the medical properties of the drug, and its dose.

E.—*Staranise*.—Name the plant and the natural order, the habitat, and the part used. Describe the drug, stating also the relative weight of its different parts, and the proportion of volatile oil yielded by these parts. Name some other drugs or plants,

yielding volatile oils chemically identical with that of staranise.

F.—*Flaxseed*.—Name the plant, and the natural order. Give a description of the drug, and explain its structural characteristics. Name its important medical constituents, and state the location of each in the tissues. In what percentage is one of the principles obtained by cold and hot pressure?

G.—*Lupulin*.—What is lupulin? Name the plant, and the part of the plant yielding it. Describe its physical properties, and its structure. Name its important constituents, and explain the change taking place on exposure. Give the medical properties of lupulin, and its dose.

H.—*Lactucarium*.—Name the plant and its natural order from which lactucarium is obtained. How is lactucarium procured? What are its physical properties? State the effect of simple solvents upon it, and give the percentage soluble in diluted alcohol. Name its bitter and other important constituents. What effect has alkali upon lactucarium? State the medical properties, and the dose.

I.—*Papaveraceae*.—Name the plants of this order, yielding officinal drugs, and give the parts used; also, the most important constituents of each, a characteristic property or reaction of each constituent named, and the medicinal dose of each drug.

K.—*Adulterations*.—Describe the processes by which you would detect the following adulterations: 1., Oil of sassafras in oil of gaultheria; 2., Gum arabic in opium; 3., Starch in gamboge; 4., Salicin in quinine; 5., Rosin in resin of scammony.

## THEORY AND PRACTICE OF PHARMACY.

A. 1.—What is the specific gravity of the officinal liquid of which one fluidounce weighs 478.03 + grains?

2.—What is the liquid, and what is its specific volume?

3.—How many fluidounces of the liquid are there in a kilogramme?

4.—How many grains of the liquid are therein a cubic-centimetre?

B.—Give the unabbreviated officinal names, ingredients, brief outlines of process and describe the appearance of *Solution of Chlorinated Soda*, *Fluid Extract of Indian Cannabis*, *Aromatic Wine*, *Compound Tincture of Cinchona* *Basham's Mixture*, *Infusion of Digitalis*, *Compound Extract of Colocynth*, and *Vinegar of Opium*.

C.—Give the English names, ingredients, brief outlines of process, and describe the appearance of *Abstractum Jalapæ*, *Ceratum Sabinæ*, *Tinctura Nucis Vomicae*, *Emplastrum Belladonnae*, *Infusum Sennæ Compositum*, *Confectio Sennæ*, *Mistura Chloroformi*, and *Pyroxylinum*.

D.—Give the officinal ingredients and quantities used in making one pound

Avoirdupois, each of *Dover's Powder*, *Oleate of Mercury* and *Tincture of Iodine*.

E.—Define the term, *vinous fermentation*, name the substances which must be present, and state the conditions requisite for the successful preparation of *wine*. Describe the various stages in the process for making *malt* and name the ferment which is active in the formation of malt. What does good *extract of malt* consist of, and what is its most valuable constituent?

F.—What are the officinal tests for the identity of *Sulphate of Quinine*? Explain the action of the officinal test (Kerner's) for impurities in Sulphate of Quinine. What impurities is this test designed to detect? What is the smallest percentage of these impurities that it is expected to discover?

G.—What are *Compressed Pills*? Draw a sketch or describe in words a form of apparatus, which may be used in making them upon a small scale, give a description of a machine for making them upon a large scale, what are the advantages and disadvantages attending the use of these pills.

(MM.—The test goes on—and on—bear in mind these are not Board Certification tests, but rather “finals” for the students. Students were also required to identify by appearance, texture and (when appropriate) taste forty unlabeled plants, extracts, finished preparations and compounded chemicals.  
*...and there were giants in those days...*)