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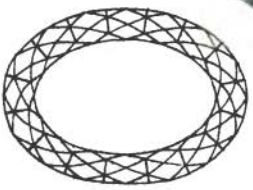

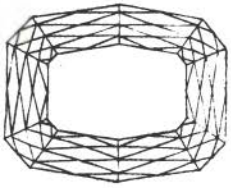

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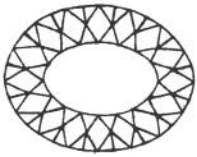

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A

TREATISE ON DIAMONDS

AND

PRECIOUS STONES;

INCLUDING THEIR

History—Natural and Commercial:

TO WHICH ARE ADDED,

THE BEST METHODS OF CUTTING AND POLISHING THEM.

BY JOHN MAWE,

AUTHOR OF TRAVELS THROUGH THE DIAMOND DISTRICT OF BRAZIL, MINERALOGY OF DERBYSHIRE, &c.

SECOND EDITION.

Here the soft Emerald smiles of verdant hue,
And Rubies flame with Sapphires heavenly blue,
The Diamond then attracts the wond'rous light,
Proud of its thousand dyes and luxury of light.

TASSO.

London:

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DEDICATED

(BY PERMISSION,)

TO HIS ROYAL HIGHNESS

THE PRINCE REGENT.

SIR,

THE Favour which your Royal Highness has been pleased to confer on the author, by permitting him to offer this work to the public under the Sanction of so Illustrious a Patron, commands this acknowledgment of his Gratitude.

It was not, Sir, merely the wish of prefixing your Illustrious name to this volume, which prompted the

author to solicit the permission which has been thus indulgently granted to him: It appeared, that a Treatise on Gems and Precious Stones, which are more exclusively appropriated to the service of the Great, should, with peculiar propriety, be inscribed to your Royal Highness, whose exalted Rank and acknowledged Taste, render you, Sir, the natural Patron of the most rare and beautiful productions of the Mineral Kingdom.

With these Sentiments of Gratitude and Respect,

I have the honour to remain,
Your Royal Highness's obliged,
And obedient humble Servant,
JOHN MAWE.

PREFACE.

THE object of the Author in the following pages, has been to present to the Amateur of Gems, and of other precious Stones, a popular, but at the same time a useful History of these beautiful Substances. Accordingly, he has not only selected from the systematic Works of highest Authority, the most important technical Characters by which each Species is distinguished, but has added, from various sources, and partly from his own observation and experience, such other Particulars, relative to their commercial History, and to their employment in Jewellery, for the purpose of personal decoration, as he conceives to be generally interesting.

In consequence of the great stress laid

upon Colour, as an essential character of Gems, both by the wearers of them, and by those who deal in them, he has annexed a few coloured Plates, to shew (what indeed all scientific Mineralogists have long been acquainted with) that though certain suites of Colours belong to particular Species, yet each Species admits only certain varieties of tint. Thus red, yellow, orange, blue and white, occur both in the Sapphire and in the Topaz; notwithstanding which, the corresponding colours of each Mineral, are sufficiently distinguishable, by a marked difference of tinge or of intensity. So it is with regard to the other characters. All the Gems, when compared with other Minerals, are hard; but each may be distinguished from the rest, by the degree in which it exhibits this quality.

It is only, therefore, by a careful *comparative* examination of Gems, that the Jeweller, or the Amateur, can be certain of their genuineness; and, considering the value of these substances individually, and the vast sums that are vested in them collectively, it is really surprising to observe the gross mistakes committed in this respect, by those, who from interest, and from a familiar acquaintance with them, ought to be the least likely to fall into error. Not only one Species is both bought and sold for another, as Tourmaline for Emerald, Garnet for Ruby, Aquamarine for Topaz; but the fraudulent compositions of itinerant dealers, such as Doublets, Pastes, &c. too frequently pass current for the genuine produce of the Mine.

If the Volume that is here offered

to the Public, should contribute to secure the honourable Dealer in Gems, and the liberal Purchaser from the arts of the unprincipled, and should induce those into whose possession these rare and beautiful Productions of Nature chiefly fall, to regard them as somewhat above the class of merely expensive baubles, the Author will consider the time that he has devoted to this purpose, by no means spent in vain.

Much of the original information contained in this Treatise, is the result of the Author's recent travels in Brazil; a Country, rich beyond comparison, in its mineral Productions; and which, the protection of His Royal Highness the Prince Regent of Portugal, has enabled the Author to explore, under advantages, never before conceded to any one.

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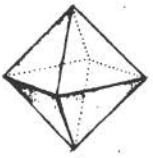

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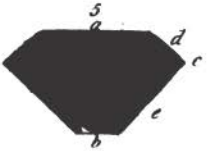

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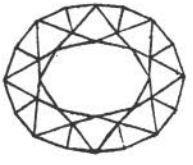

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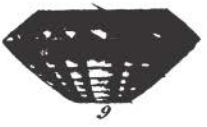

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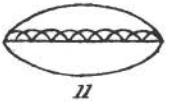

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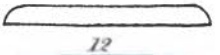

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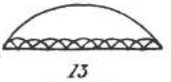

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LIST OF PLATES.

PLATE I.

No. 1. Is the Plane and Profile of a Blue Topaze in the Author's Possession. Sold for £250.

2. A Chrysoberyl—the finest known. £100.

3. A perfect Amethyst. £100.

4. A superlatively fine Topaze. £100.

5. An Aqua-marina. £60.

The above are allowed to be the finest Gems of their Class, and to be cut in the best Style.

PLATE II.

Nos. 1, 2, 3, and 4, are natural Crystallizations of rough Diamonds, in the Author's possession.

No. 5, Is to shew the Brilliant cut. £30,000.

6, the Rose.

7, the Table.

Under No. 7, shews how dark coloured stones are cut to the best advantage.

No. 8, Star cut.

9, Small Steps.

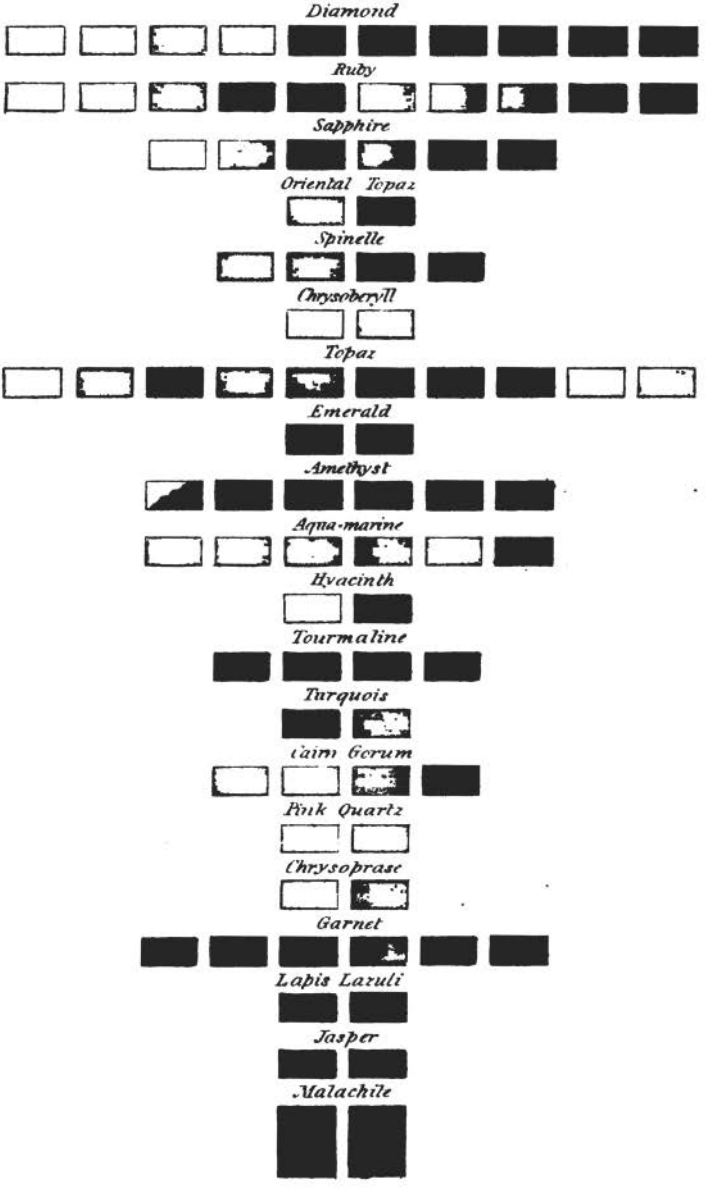
10, Large Steps.

These are the Shapes that Gems are generally cut into, and which may be modified into innumerable forms.

Nos. 11, 12, 13, are to shew Stones cut in an elliptical form, more or less round, which are not fit for facets.

PLATE III.

Is intended to shew various Colours of precious Stones.



DIAMOND.

CHAP. I.

§ 1. *Value and general Estimation of the Diamond.*

THERE are few things in the history of the human race, that at first sight appear so remarkable, as the prodigious value which, by common consent, in all ages, and in all civilized countries, has been attached to the Diamond. That a house with a large estate, the means of living not only at ease, but in splendour, should be set in competition with, and even be

deemed inadequate to the purchase of a transparent crystallized stone not half the size of a hen's egg, seems almost a kind of insanity. And it would indeed, truly deserve this name, if the purchaser parted with what the seller acquired by such a transfer. If, for the consciousness of possessing a Diamond almost three quarters of an ounce in weight, a country gentleman were to pay £90,000 in ready money, and an annuity of £4000 beside, he would very deservedly run some risk of a statute of lunacy; yet not only the above sum, but a patent of Nobility into the bargain, was given by the Empress Catharine of Russia for the famous Diamond of Nadir Shah. But in this case, although the seller acquired much, the purchaser underwent no personal privation, and in fact, notwith-

standing the costliness and high estimation of Diamonds, they are not really put in competition with the substantial comforts and conveniences of life. Among ornaments and luxuries, however, they unquestionably occupy, and have ever occupied the highest rank. Even Fashion, proverbially capricious as she is, has remained steady in this, one of her earliest attachments, during probably three or four thousand years. There must be, therefore, in the nature of things, some adequate reason for this universal consent, which it is worth while to enquire into.

The utility of Diamond, great as it is in some respects, enters for little or nothing into the calculation of its price; at least all that portion of its value which constitutes the difference between the cost of an

entire Diamond and an equal weight of Diamond-powder, must be attributed to other causes.

The beauty of this gem, depending on its unrivalled lustre is, no doubt, the circumstance which originally brought it into notice, and still contributes very materially to uphold it in public estimation; and certainly, notwithstanding the smallness of its bulk, there is no substance natural or artificial that can sustain any comparison with it in this respect. The vivid and various refractions of the opal, the refreshing tint of the emerald, the singular and beautiful light that streams from the six rayed star of the girasol, the various colours combined with high lustre that distinguish the ruby, the sapphire, and the topaz, beautiful as they are upon a near

inspection, are almost entirely lost to the distant beholder; whereas the Diamond, without any essential colour of its own, imbibes the pure solar ray, and then reflects it either with undiminished intensity, too white and too vivid to be sustained for more than an instant by the most insensible eye, or decomposed by refraction into those prismatic colours which paint the rainbow and the clouds of morning and of evening, combined with a brilliancy which yields, and hardly yields, to that of the meridian sun. Other gems inserted into rings and bracelets, are best seen by the wearer; and if they attract the notice of bystanders, divide the attention and withdraw those regards which ought to be concentred on the person to the merely accessary ornaments. The Diamond, on the

contrary, whether blazing on the crown of state, or diffusing its starry radiance from the breast of titled merit, or "in courts and feasts and high solemnities," wreathing itself with the hair, illustrating the shape and colour of the neck, and entering ambitiously into contest with the living lustre of those eyes that "rain influence" on all beholders, blends harmoniously with the general effect, and proclaims to the most distant ring of the surrounding crowd, the person of the monarch, of the knight, or of the beauty.

Another circumstance tending to enhance the value of the Diamond, is this, namely, that although small stones are sufficiently abundant to be within the reach of a moderate expenditure, (and therefore affording to all persons who are

in easy circumstances, an opportunity of acquiring a taste for Diamonds) yet those of a larger size are and ever have been rather rare; and of those which are celebrated for their size and beauty, the whole number, at least in Europe, scarcely amounts to half a dozen, and they are all in the possession of Sovereign Princes. Hence the acquisition even of a moderately large Diamond, is what mere money cannot always command; and many are the favours, both political and of other kinds, for which a Diamond of large size or uncommon beauty may be offered as the compensation, where its commercial price in hard cash, neither could be tendered, nor would be received.* In many circumstances

* Who is ignorant that the Czar Peter, with his whole army, when surrounded by the Turks, owed his

also, it is a matter of no small importance for a person to have a considerable part of

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safety to the fascinating splendour of the Diamonds of his empress? Nor is it less notorious, that the jewels of the princes of India have, on certain occasions, shone with unconquerable charms in the eyes of Europeans, both in the East and nearer home. The Regent Diamond of France, if report says true, was played with such success by the wily Seyez before the sovereign of Prussia, as to produce for the service of France forty thousand horses with their equipments.

That the most absolute and despotic monarchs, such as those of India and of other eastern countries, should have what appears to us an almost insane passion for Diamonds, is not to be wondered at. To a sovereign, who can command the lives and property of his subjects by a word, the ordinary objects of human desire soon lose that stimulating interest which rarity of occurrence, and difficulty of acquisition can alone keep up. The gratifications of the senses and of unresisted sway, soon pall upon the appetite, and war and Dia-

his property in the most portable form possible; and in this respect, what is there that can be compared to Diamonds, which possess the portability, without the risk of bills of exchange? It may further be remarked, in favour of this species of property, that it is but little liable to fluctuation; and has gone on pretty regularly increasing in value for several years, insomuch that the price of stones of a good

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monds are the only objects that engross the attention; the former, because it is attended with some hazard, and is the only kind of gambling in which the stake is sufficiently exciting to banish the ennui of an illiterate despot; the latter, because the excessive rarity of large and at the same time perfect specimens of this gem, supplies a perpetual object of desire, while each new acquisition feeds the complacent vanity of the possessor. Even Prince Potemkin himself, who

quality, if estimated according to the rules laid down in Jeffries's work on Diamonds, would now be considerably too little.

§ 2. *Knowledge possessed by the Ancients concerning this Gem.*

THE properties and characters attributed to this gem by the ancients, are detailed by Pliny in his Natural History; of these

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beyond every individual of modern times, exhausted by turns, the sensualities of high and of low life, and revelled in the unbounded possession of military command, of rank, and of political influence, amused the tedium of the latter years of his life, by sitting whole hours at a time, feasting his eyes with the brilliant display of his magnificent collection of Diamonds.

some are wholly fictitious, and many more are incorrect; I shall, however, briefly recite them as contributing somewhat to the history of this substance, and as contrasting with the more accurate knowledge of it, possessed by the moderns. "The Diamond," says Pliny, "is the most costly of human possessions; it is found, like gold, disseminated through veins, and always accompanied by this precious metal. The ancient Greek writers describe it as found only in Ethiopia, between the island Meroe and the temple of Mercury, and as resembling the seed of a gourd, both in form, size, and colour." "It has of late," continues the same author, "been brought from India." The Indian Diamond is not found in the gold-mines, and appears to have some relation to rock crystal, since it

resembles this substance in its want of colour, its transparency, and the form of its crystal, which is that of two pyramids united by their bases. Its magnitude is sometimes equal to that of a hazel nut. The Diamond is distinguished from all other substances by its hardness, which is such as to break and shiver both the hammer with which it is struck, and the anvil on which it lies. It is also incapable of being made red hot by the most violent fire, on which account, it is called by the Greeks, *Adamas*, that is to say, unconquerable. But though it resists the action of fire and steel, yet if macerated in the fresh blood of a he-goat, it may, with some difficulty, be split by a hammer. The small shivers thus obtained, are much sought after by engravers on gems, for when set in

an iron handle, they enable the artist readily to cut the hardest stones. A kind of antipathy subsists between the Diamond and the magnet, so that the latter cannot attract iron, when in contact with the former. The Diamond also destroys the effect of poisons, and cures insanity.

From the time of Pliny, till about two centuries ago, there was little if any addition made to the true history of the Diamond, though the occult qualities and superstitious uses of this gem were largely dilated on by the Arabian Alchemists and their followers in Europe. In 1609, Boetius de Boot, published his valuable treatise, "De Lapidibus et Gemmis," in which, is contained a detailed account of all that was previously known or imagined concerning the Diamond, accompanied by

his own observations and remarks. In this article, although a few new errors may be detected, yet many more old ones are corrected, and some valuable additional information is communicated. He points out with considerable exactness the Diamond mines of India and Malacca, and is inclined to doubt the genuineness of all the supposed Diamonds found in Europe. He disproves, from experiment, the assertions of Pliny respecting the impossibility of breaking this substance; and also shews that it possesses no action on the magnet to prevent this latter from attracting iron.

Since the publication of the above treatise, to the present day, the attention of chemists, of crystallographers, and of mineralogists, has been on various occasions

drawn to this gem: the most intelligent of our travellers into those parts of the world where Diamonds are procured, have also furnished several interesting particulars relative to the natural and commercial history of this substance, so that at present but little remains to be added to our knowledge on this head. These particulars I have endeavoured to arrange and to explain with all due brevity in the following sections, both from my own personal observation, and from published accounts of the highest authority.

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§ 3. *Physical and Chemical Characters of Diamond.*

THE Diamond is either colourless, or light yellow, passing into wine colour, and

thence through cinnamon-brown into almost black; also pale-green, passing into yellowish-green; bluish-grey passing into prussian-blue and pink passing into rose-red: ferruginous specks are also of rather frequent occurrence. It rarely happens that the same specimen presents more than one tinge of colour; I have, however, met with a Diamond that was partly blue and partly yellow and also opalescent. A dull or faint tinge considerably reduces the value of this gem,* but when distinctly pink, blue,† or green, it is much enhanced and eagerly sought for by connoisseurs.

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* With the exception of the superficially pale-green Diamonds of the Rio Pardo, which are the finest at present in the market.

† There is at this time a superlatively fine blue.

It is found crystallized in the regular octohedron, composed of two four-sided pyramids, united by their bases, or in the wedge-shaped octohedron; the former of these being the primitive form, and the latter a mere variety of it. The faces in these crystals usually exhibit a polish and resplendent lustre fully equal to the utmost that can be communicated by art to any of the other crystals hereafter to be mentioned; hence it was, that before the method of polishing Diamonds was discovered, these *natural brilliants*, as they were called, bore a considerably higher price than the rest.

The modification of the primitive crystal is occasioned by the edges becoming

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Diamond, of above 44 carats, in the possession of an individual in London, which may be considered as matchless, and of course of arbitrary value.

somewhat curvilinear, and by each of the triangular faces being divided by three curvilinear low ridges (or very blunt edges) which intersect each other in the centre of the triangle; hence results a crystal approaching more or less to globular,* being formed of 48 triangular convex faces, arranged in groups of six each upon every one of the faces of the primitive octohedron. A variety of this modification takes place, when the edges corresponding to those of the common base of the octohedron are suppressed, as well as those curve lines by which they are bisected; hence results a rhomboidal dodecahedron. A slight variety of this, by occasioning a compression

* All the spheroidal Diamonds are ill-coloured, and cannot be polished, owing to the convexity of their lamina.

in the direction of any two opposite groups of six secondary triangles, produces the short hexahedral prism, terminated at each extremity by a very low curvilinear pyramid. All the secondary faces are dull and striated, which appearance is occasioned by the saliant edges of their laminæ, and not by any adhering crust or commencement of decomposition, as is generally supposed.

The incomparable hardness of the Diamond is another of the distinctive characters of this gem. It cuts with ease every substance, whether natural or artificial, to which it is applied. This hardness which renders it so difficult to be cut and polished, is at the same time the cause of its retaining unimpaired, under all ordinary circumstances, the polish at first communicated

to it; and as, generally speaking, the perfection of polish which a stone is capable of depends upon its hardness, so the Diamond from the intensity of this quality receives the highest possible degree of polish and of lustre. It is on account of this excessive hardness that mineralogists have been inclined to deny the occurrence of Diamond in rolled pieces, and have accordingly referred all specimens of this description to one or other of the globular modifications of the crystalline form mentioned above. I am, however, in possession of a globular Diamond, upon the surface of which neither the naked eye nor the microscope are able to discover the smallest appearance of facets. We know in general that, when two substances, greatly differing in hardness, come in collision, the effect produced

by each upon the other, is nearly in the ratio of their respective degrees of hardness; the softer one will undoubtedly be the most affected, but the hardest will by no means escape unhurt; thus the most indurated rocks are worn by the continued dashing of water, and carved idols are by degrees literally kissed away by the lips of their worshippers. With regard to the Diamond, we have the most authentic testimony that the Chinese and East Indian lapidaries are in the habit of polishing it upon a piece of corundum, the hardness of which, however, is greatly inferior to that of the gem; and the surface of corundum again, in its turn, is susceptible of being scratched and worn by continued friction with common sand. What wonder then that the Diamond itself should sometimes be found with its edges

worn down by long and powerful rubbing, (such as takes place by the action of the sea on a pebbly beach) in contact with stones comparatively so soft as ferruginous quartz! But, though possessing this intensity of hardness, the Diamond is far from being difficult of fracture; a slight blow with a small hammer will readily break it, and thus bring to view its strait lamellar structure. Some specimens, however, exhibit a confusedly curved-lamellar structure, and a more or less uneven fracture; these are called *Diamonds of Nature*, and are incapable of being split as the others are, or, like them, of acquiring the utmost perfection of polish. The fracture, strange as it may appear, is the character the most relied on by the administrators of the Diamond mines in Brasil. When a

stone is delivered to them the nature of which appears to be doubtful, they immediately appeal to the hammer, and, knocking a small portion off, examine carefully the appearance of the fracture; if this is distinctly lamellar the stone is considered as a true Diamond; if otherwise it is rejected. This test is on two accounts objectionable; for if the specimen under examination either be a Diamond of nature, or, be a strait lamellar one, but broken in a wrong direction, it will not exhibit a distinctly foliated texture; and in applying the hammer there is some risk of detaching so large a piece as to deteriorate or totally spoil the stone which has been thus exposed to such rough treatment.

The specific gravity of Diamond varies from 3.518 to 3.55. Its bulk varies from

the smallest perceptible grain to that of half a hen's egg. The peculiar and scarcely to be described grating sound produced by rubbing two Diamonds together in the hand, is remarkably characteristic of this gem; so that by this circumstance alone rough Diamonds may be accurately and expeditiously distinguished from every other rough gem.

It is singly refractive; and both in the rough and polished state acquires positive electricity by friction. It becomes phosphorescent when exposed either to the entire rays of the sun, or to the blue ones alone when separated by the prism and concentrated by means of a lens. A similar effect also is produced by fixing it to the end of a charged conductor, and taking a few electric sparks from it. Many

Diamonds however are incapable of becoming phosphorescent although agreeing in colour and transparency with those which readily become luminous. The smaller acquire this property by a much shorter exposure to the light than the larger ones do. Sometimes a Diamond that is not phosphorescent by the mere action of the solar rays, may, it is said, be made so by previously immersing it for some time in melted borax.

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§ 4. *Chemical Properties and Analysis.*

The combustibility of the Diamond which of late has been repeatedly demonstrated, was at first suspected by Newton

from the high power of refraction possessed by this substance. When placed in the focus of a powerful lens in contact with oxygen gas it presents the following phenomena. It first becomes of a clear red; and soon after is apparently enlarged in bulk, on account of its being surrounded by a faint white light, the result of its entering into combustion. Minute black spots having a leaden metallic lustre occasionally form on its surface, especially when there is a slight remission of the heat; the Diamond gradually diminishes, and at length is entirely consumed, without leaving the smallest residue. It is somewhat remarkable, that although in a state of actual ignition and surrounded with oxygen gas, it nevertheless immediately ceases to burn, as soon as the focus

of the lens is withdrawn. With regard to the effect of common fire on Diamond there are no experiments more precise than those of Sir George Mackenzie, from whom we learn the following particulars. A Diamond being placed on a thin piece of baked clay, was introduced into a muffle previously heated red hot; it soon acquired the same redness as the muffle, and in a few seconds more became visible by a bright glow. Being then removed from the fire it was found to have acquired a slight milky appearance and its lustre was impaired, but no black spots were perceived on its surface. Diamond acquires the dim milky appearance just mentioned at the temperature of 18° Wedgewood, and the highest heat re-

quired for its complete combustion does not exceed 15° of the same pyrometer.

By collecting the products of the combustion of the Diamond, as was first done with great care by Lavoisier, afterwards by Mr. Tennant, and more lately with special accuracy by Messrs. Allen and Pepys, it appears that this gem is pure carbonaceous matter, differing in no respect but its external characters from the carbon procured from the decomposition of carbonic acid.

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§ 5. *Localities and Geological Situation.*

The only places where Diamonds have certainly been found in modern times,

are the central and southern parts of India Proper; the Peninsula of Malacca, the island of Borneo, and the mountainous district called Serro Dofrio and other places in Brasil. Neither the rock in which it occurs, nor the other minerals with which it is accompanied in Malacca and in Borneo are at all known. In India it is found in detached crystals in a kind of indurated ochery gravel; but whether or not this is its native repository is uncertain.

The Diamonds of Brasil, like those of India, are found in a loose gravel-like substance immediately incumbent on the solid rock and covered by vegetable mould and recent alluvial matter; this gravel consists principally of rounded quartz pebbles of various sizes mixed with

sand and oxide of iron, and enclosing rounded topazes, blue, yellow, and white, and grains of gold. In some parts of the Diamond territory of Serro do Frio, which I visited, the gravel is cemented by means of the oxide of iron into a considerably hard conglomerate forming rocks and low hills; on the sides of these are water courses produced by the torrents during the rainy season, the beds of which are very unequal and excavated. In these hollows Diamonds are not unfrequently discovered. The usual and regular method of searching for Diamonds is to collect the disintegrated conglomerate in which they are found at the bottoms of rivers and of ravines, and by a laborious process of washing as long as the water comes off discoloured to separate the mud from the dis-

tinct grains. The residue thus cleaned is subjected to an accurate examination for the Diamonds which it may contain. These are distinguished partly by their crystalline form, but principally by their peculiar lustre, slightly verging on semi-metallic, but which cannot be adequately described by words. Diamonds of the smallest size, that is whose weight does not exceed a fifth of a carat, or even the fifth of a grain, are many times more abundant than all the rest put together: these are of no use in jewellery, but when broken and ground to the requisite degree of fineness compose the Diamond powder, a material absolutely necessary for polishing and setting facets upon the larger Diamonds. If the above mentioned conglomerate is not the

real matrix of the Diamond, its true geological situation is unknown, for it has never as yet been discovered in any other rock.

The mineralogist who has been in the habit of seeing and accurately examining numerous specimens of this gem acquires a kind of tact, that enables him to distinguish at once and with little risk of mistake a *bolsa* of stones from Hindostan, and a similar one from Borneo, or from the Portuguese territories in South America: nay, even the Diamonds furnished by one part of the Serro do Frio may be discriminated from those of other parts of Brasil, or even of the same district. But these characters, although sufficiently visible to the experienced eye, are too evanescent to be restrict-

ed within technical description, and are as yet entirely unknown to the commercial dealers in precious stones.

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§ 6. *Notice of some particular Diamonds.*

THE largest of all the undoubted Diamonds is that mentioned by Tavernier as in the possession of the Grand Mogul. In form and size it resembles half a hen's egg: its weight, according to the testimony of the same traveller, (a jeweller by profession, and who himself weighed it,) is $297\frac{9}{16}$ carats, or, 156 carats being equal to a troy ounce, 860 grains. It was found about the year 1550 in the mine of Colore, not far to the east of Golconda.

An oriental Diamond formerly belong-

ing to Nadir Shah, Sultan of Persia, deserves the next place: it is without flaws or faults of any kind, and weighs 193 carats. Its form is that of a flattened ovoid, and it is about the size of a pigeon's egg. It was purchased by the late Empress Catherine for about £90,000 ready money, and an annuity of about £4,000 more.

The next in size is a rough Brasilian Diamond, found in the river Abatio in possession of the Prince Regent of Portugal weighing near an ounce troy.

The Pitt or Regent Diamond, is said to have been found in Malacca. It was purchased by Mr. Pitt, an English gentleman, then Governor of Bencoolen in Sumatra, and was sold by him for £130,000 to the Regent Duke of Orleans, by whom it was placed

among the crown jewels of France, and of which it still forms the great glory. It is cut in the form of a brilliant, and is absolutely faultless. It weighs $136\frac{6}{16}$ carats, and its value as estimated by a commission of jewellers in the year 1791, is twelve millions of livres.

Perhaps one of the largest and most beautiful coloured Diamonds is a rich sky-blue brilliant, belonging to the crown jewels of France; it weighs $67\frac{9}{16}$ carats, and is estimated at three millions of livres.

In this list I have not enumerated the supposed great Diamond of Portugal, because it is now the general opinion, both of mineralogists and jewellers, that this stone is a white topaz. It was found in Brazil, in the Diamond mines, is as yet in its rough

state, and weighs 1680 carats, above eleven ounces.*

§ 7. *Commercial History.*

The circumstances which led to the discovery of Diamonds in the various oriental countries mentioned in a former section, we are wholly unacquainted with: but with regard to the discovery of this gem in Brazil, the following I believe, will be found to be a correct account. About a century ago that part of Brazil called Serro do Frio, (the cold ridge) was explored for gold; and in the search after this precious metal

* This stone I did not see when in Brazil.

a considerable number of shining pebbles were picked up and transmitted to Lisbon. From this place they were sent to Holland for examination, and being placed in the hands of the most eminent lapidaries of that country, were pronounced by them to be real Diamonds, equal in quality to those from Golconda, or from any other part of India. In consequence of this favourable report, an importation of the article from Brazil took place so considerable, as in a few years to excite general apprehensions among the merchants, of a great deterioration in its price. To counteract this, a report was studiously circulated, that the Brazilian Diamonds were decidedly and essentially inferior to the oriental ones. By some persons it was even denied that the Diamond was really a native of America, and

the notorious fact of the importation of these gems from Brazil was accounted for by saying, that they were only the refuse of the Indian market sent from Hindoostan to Goa, from which place they passed into America on their road to Lisbon. These representations occasioned such a general prejudice against Brazilian Diamonds, that the Portuguese, finding themselves unable to stem it, had recourse to an ingenious method of eluding its effects, by secretly transmitting the produce of the Brazilian mines to Goa, and thence to Bengal. Here they were sold at very high prices, and, being made up by the Indian merchants into *bolsas*, were sent to England and to other parts of Europe, where they were received by the jewellers as genuine oriental stones. Being thus brought

into equal competition with the Indian Diamonds, they were soon found to be not at all inferior; the prejudice was removed, and at present, the real or supposed native country of a Diamond, is not an element that enters into the calculation of its commercial value.

The Diamond mines of India have long been declining; several of them are now abandoned and scarcely any of the rest contribute at present to the supply of the European market. Borneo furnishes a few bolsas, but these, to judge from such samples as I have myself seen, contain a larger proportion of coloured and bad stones than those from Brazil. In fact it may be said, that the European demand is now almost wholly dependant on the supplies from this latter country.

This lucrative commerce was formerly almost monopolized by the Dutch. The consul for that nation possessed an exclusive contract in Brazil for all that were brought to sale in that quarter, whilst in India their agents were equally active in buying up every thing that was offered there. By these means they obtained a valuable branch of trade; and at the same time secured to their working jewellers the profit of cutting and polishing, not only Diamonds, but the other most valuble gems; thus rendering the sovereign princes and most opulent individuals of Europe, tributary to them for the most valued and costly of all ornamental substances.

Besides the ordinary annual importation of Diamonds into England, there have been during the last eighty or ninety years

two remarkable influxes of them which require to be noticed. The first took place from Brazil not long after the first discovery of Diamonds in that country, and before the trade was regulated or monopolized. They were then scarcely acknowledged as true Diamonds; and from the low estimation in which they were held, excited little or no competition among the buyers: on this account the lots that were consigned to the merchants sold cheap: the jewellers however into whose hands they passed refused to dispose of them at a lower rate than usual, and by witholding them for some time obtained at length very advantageous prices for them.

The next great influx was at the time of the French revolution. The nobility and other emigrants who sought shelter

here from the commotions of their own country, brought with them large quantities of Diamonds. These, from the necessities of their owners, soon found their way to market, and were disposed of to the jewellers at prices which had a reference rather to the necessity of the sellers, than to the intrinsic value of the article; for the regular sale price of Diamonds did not suffer the smallest abatement on this account.

Perhaps at no period has the demand been greater for what may be called saleable stones, than at the present time. By saleable stones, I mean such as are usually offered for sale, and are not remarkably large. Stones of considerable size are so extremely rare, as to render their value very arbitrary. Few persons can afford

to enter into the competition, hence the first rate gems have always been slow of sale and probably will ever remain so. The present disturbed political state of Europe is peculiarly unfavourable to the sale of such Diamonds as demand the sacrifice of £50,000 or upwards for their purchase.

As a very large property both in this country and among the other nations of Europe is vested in Diamonds, it may be interesting to be informed, not only that the price of these gems has for several years been upon the whole gradually rising, but that it is likely still to continue on the advance. The best Diamond ground at present known in the world is that of Serro do Frio; and this most assuredly has passed its zenith. The quantity of ground remaining to be explored, is perfectly well

known, and the average annual produce may be estimated from that portion which has already been exhausted.

The Diamond mines in Brazil, belonging either to the Crown or to the Prince Regent, the trade in this gem, except through the medium of the Government agents, is considered as contraband. In fact, however, they are not unfrequently offered to sale by private adventurers, at prices corresponding with, and regulated by, those which are agreed to by the agents of Government, and a considerable proportion of the whole produce, finds its way to market in this unlicensed manner, notwithstanding the very severe penalties annexed to these transactions.

The Government Diamonds, however, form the chief part of the trade. These

are the produce of the different royal mines in the interior of Brazil; whence they are transmitted to the seat of Government at Rio de Janeiro: the Prince Regent there selects from the whole such stones as he chooses to add to his own collection, (which, by this means, has become the most superb of any in modern, and probably in ancient times,) and the remainder are consigned to the Portuguese Ambassador, for the time resident in England, by whom they are deposited in the Bank, for sale.

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§ 8. *Art of Cutting and Polishing Diamonds.*

The object of cutting and polishing the Diamond is twofold. First, to divide the

natural surface of the stone in a symmetrical manner, by means of a number of highly polished polygonal planes, and thus to bring out to the best advantage, the wonderful refulgence of this beautiful gem; and secondly, by cutting out such flaws as may happen to be near the surface, to remove those blemishes that materially detract from its beauty, and consequently from its value.

The removal of flaws is a matter of great importance, for, owing to the form in which the Diamond is cut, and its high degree of refrangibility, the smallest fault is magnified and becomes obtrusively visible in every facet. For this reason also, it is by no means an easy matter, at all times, to ascertain whether a flaw is, or is not superficial; and a person with a correct

and well-practised eye, may often purchase to great advantage stones which appear to be flawed quite through, but are in fact only superficially blemished.

The first thing that the artist has to do when a rough Diamond is put into his hands, is to examine carefully, in what direction the stone may be cut, so as to afford the greatest breadth, or *spread* as it is technically termed, after the flaws, if any, shall have been taken out. So great a stress is laid by modern fashion, on the superficial extent of a brilliant, that the old rules for proportioning its dimensions are now nearly obsolete: the best cutters have entirely discarded the use of measures, and in forming the facets, trust wholly to an accurate and well-practised eye. The direction being determined on, the artist

must be well aware which are the *hard points*, and which the *soft ones;* the former being those solid angles of the original octohedron, which it is necessary to cut directly across, and the latter, those solid angles which are to be obliquely divided. A degree of force which may be safely applied, and is even requisite in making a section through the former, will be very apt to flaw and tear up the laminæ when applied to the latter. On these accounts it probably is, that the fatiguing and even painful process of performing this part of the business by hand, is not yet superseded by the use of machinery.

These preliminary matters being settled, the Diamond is imbedded in strong cement, fixed at the end of a stout spindle

shaped-stick about a foot long, with that portion only projecting, the removal of which is to form the first facet. The instrument employed for this purpose is another Diamond fixed in a stick similar to the former, with one of the solid angles projecting. In order to collect the powder and shivers that are detached during the process, the cutting is performed over a strong box four or five inches square, furnished with a false bottom perforated with excessively minute holes, in order to sift, as it were, the dust from the shivers; and also with two upright iron pegs fixed on the sides, for the workman to support and steady his fingers against, while with a short repeated stroke somewhat between scratching and cutting, he is splitting off or more laboriously wearing away the Dia-

mond in that part where the facet is to be placed. This being done, the cement is softened by warming it, and the position of the Diamond is changed, in order to bring a fresh part under the action of the cutting Diamond. When in this slow and laborious way all the facets have been placed upon the surface of the Diamond, the cutting is completed. The stone, if examined by a moderate magnifier, now presents ragged rough edges; and a broken foliated surface with a glistening lustre on those facets that are nearly in the direction of the natural laminæ, and on the other facets a more even surface, but of a dull opake greyish white colour.

The shape of many Diamonds is so irregular, that it is necessary to remove pieces of considerable magnitude, in order to bring

them to a form proper for cutting. Where the lines of these proposed sections coincide with the natural lamellar structure of the stone, the workman has recourse to the delicate and perhaps somewhat hazardous operation of splitting the Diamond, by which a double advantage is obtained. In the first place there is a great saving of time, and in the second place the slices or shivers are themselves sufficiently large to admit of being cut and polished. The method of splitting is made a great mystery of, thus much however may be mentioned, that when the direction in which the section is to be made has been determined on, it is marked by a very fine line cut by the point of another Diamond; the stone is afterwards fixed by strong cement in the proper position in a block

of wood, and then by the application of a due degree of force the section is effected.

The Diamond being thus, by the joint action of splitting and cutting, brought to the required form, the next object is to polish the facets, and at the same time to redress any little inequalities that may have taken place in the cutting. The polishing mill is an extremely simple machine, consisting of a circular horizontal plate of cast iron 14 or 15 inches in diameter, (called a skive,) suspended on a spindle, and capable of being put into rapid motion by means of a larger wheel 5 or 6 feet in diameter, and turned by an assistant. From the centre to the circumference of the iron plate are lines or shallow grooves formed by rubbing it in that

direction with a fine-grained gritstone; these grooves serve to retain the mixture of oil and Diamond powder with which the plate is charged. In order to keep the Diamond perfectly steady while the polishing of each facet is going on, the following contrivance is had recourse to. A copper cup (called a *dopp*,) about three quarters of an inch in depth and in width, and furnished with a stem about four inches long of stout copper wire, is filled with plumbers' solder, which also projects in a conical form beyond the rim of the cup: in the apex of this cone, the solder being softened by heat, the Diamond is imbedded with one of the facets projecting. The stem of the cup is now put into very powerful pincers, which screw up with a nut and a wrench or lever, and thus hold it per-

fectly tight. The handles of the pincers (called *tongs*) are of wood, are broad and terminated by two feet, about an inch high, so that when laid horizontally they are supported exactly as a pair of candle snuffers is, the studs fixed to the handles of the snuffers representing the legs of the pincers, and the single stud near the point of the snuffers representing the inverted copper cup holding the Diamond, and at the same time having its stem strongly griped by the pincers. In this position the Diamond is placed on the plate, the pincers resting on their legs on the wooden bench or table that supports the plate, and pressing at the same time against an upright iron peg; the broad part of the pincers between the legs and the Diamond, is then loaded with weights, both to steady

the machine, and to increase the pressure of the Diamond against the skive. Matters being thus adjusted, a little oil and Diamond powder is dropped on the plate, it is set in motion at the rate of about 200 revolutions in a minute, and the process of grinding down, and at the same time of polishing is begun. The Diamond is taken up and examined from time to time, and is adjusted so as to give the facet its true form. The heat occasioned by the friction is at all times pretty considerable, and when the pincers are heavily loaden it occasionally increases to such a degree as to soften the solder and displace the Diamond. This is a serious accident, frequently occasioning a flaw in the Diamond, and always tearing up the surface of the skive,

so as to damage it very considerably. There is room on the skive for three or four Diamonds at the same time; and to give each its proper share of attention is as much as one person can well manage. The completion of a single facet often occupies some hours.

Diamonds are brilliant cut, rose cut, and table cut. The brilliant is deservedly in the highest estimation, as it is the form which shows to the greatest advantage the peculiar lustre of this gem. The proportions and method of forming the brilliant are described by Jeffries; and with regard to the shape and position of the facets no change has hitherto taken place, although, from the present fashion of preserving as great a spread or surface as possible, the

rules for proportioning the dimensions of the brilliant are by no means strictly adhered to.

The brilliant* may be considered as formed of two truncated pyramids united together by one common base, the upper pyramid being much more deeply truncated than the lower one. The plane formed by the truncature of the upper pyramid is called the *table* (*a*); that formed by the truncature of the lower is called the *collet* (*b*); the common base is called the *girdle* (*c*); the space between the table and the girdle is the *bizel* (*d*), and that between the girdle and the collet is the *collet-side* (*e*). Both the table and the collet are regular octagons; the bizel is formed by eight

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*Pl. 2. Fig. 5.

lozenges and twenty-four triangles; the collet side is occupied by four irregular pentagons alternating with as many irregular lozenges, radiating from the collet as a centre, and usually called the *pavilion facets*, and bordered by sixteen triangular facets, adjoining the girdle. The brilliant is set with the table side upwards, and the collet side implanted in the cavity made to receive the Diamond.

The regular rose Diamond*, is the form given to those stones the spread of which is too great in proportion to their depth to admit of being brilliant cut, without a great loss of substance. It is formed by covering the whole surface of the stone with equilateral triangles, each pair being

* Pl. 2. Fig. 6.

placed base to base, so as to form a kind of rhomb.

The table Diamond is the least beautiful mode of cutting, and is applied only to those stones or rather fragments, which with a considerable breadth have only a very trifling depth.

Good stones, from one to four or five carats, if skilfully cut either into brilliants or rose Diamonds, lose in the process somewhat less than half their weight; hence the value of a cut stone is twice that of a rough stone of equal weight, independently of the cost of cutting.

The Diamond-cutters of England are confessedly the best in Europe, but their number is unfortunately so small as to occasion many stones to be sent to Holland; where, from the greater number

and more active competition of the artists, the price of workmanship is considerably lower, but in at least an equal degree inferior to that of London. Brilliant cut Diamonds are so infinitely superior to the others, that of late many rose-cut stones from Holland have been recut into brilliants, notwithstanding the additional expence and the loss of size necessarily attendant on this operation.

Diamonds themselves are always equally in fashion, but the mode of setting them varies according to the caprice of taste or the desire of novelty: hence the jeweller has perpetual opportunities of exercising and displaying the inventive elegance of his taste in the assortment of hues and the arrangement of groups. He will cluster together the smaller stones so

as to aggrandize and enhance the effect of the whole; the larger and more perfect ones will generally be set open and displayed to the greatest advantage, while the inferior ones will be assisted by setting them solid on black, or, if need be, with coloured foil. But whatever be the occasion that calls forth his art, whether the construction of a star, a bandeau, a tiara, a plume, a necklace, or an ear-drop, he will bear in mind that his greatest merit is the concealment of his art: the display of belts and borders of gold can add nothing to the superlative splendour of the Diamond. Silver fades in the presence of gold, gold itself yields to the more brilliant and costly materials of the jeweller, and of these the most beautiful, the most costly, the very perfection of the

gem creation is a colourless brilliant without speck or flaw, large enough to attract notice, yet not so bulky as to be cumbersome in itself, or too disproportionate to the smaller ones with which it is associated.

CHAP. II.

ORIENTAL RUBY, SAPPHIRE, ORIENTAL AMETHYST, AND TOPAZ.

As the Diamond differs essentially from all other gems in its chemical composition, a question has been started, whether it properly belongs to the class of precious stones. This question can be answered only by an inquiry into the meaning annexed to the terms gem and precious stone. Upon this we may remark in the first place, that neither of the terms is strictly speaking scientific, and therefore, their meaning must be determined by common acceptation. Now,

I believe, the whole of the properties essentially connected with either the one or the other term are the following. That the substance should be a native mineral, and not an artificial glass or paste; that it should be possessed of great hardness, of high lustre, of an agreeable tone of colour; that it should be (comparatively speaking,) of rare occurrence, and of small bulk. In all these qualities the Diamond and the earthy gems so perfectly agree, that the mere chemical difference, when considering them as objects of beauty or luxury, may without inconvenience be entirely overlooked. Without further delay therefore, I shall proceed to the description of the Oriental Ruby, the most beautiful and precious of all the coloured gems.

The ORIENTAL RUBY, though differing in some particulars from the Sapphire, is considered by the generality of modern mineralogists as belonging to the same species; and certainly the crystallographical characters and chemical composition of these two gems present a very remarkable analogy. In several subordinate characters however, as well as in the estimation of the public, there is a difference of sufficient importance to justify me, I trust, in separating them; more especially as the present work is intended for the use of the amateur rather than for the scientific mineralogist.

The most esteemed, but at the same time the rarest colour, of the Ruby is pure carmine or blood red of considerable intensity, forming when well polished a blaze

of the most exquisite and unrivalled tint. It is however in general more or less pale and mixed with blue in various proportions; hence it occurs rose red and reddish white, crimson, peach blossom red, and lilac blue (the latter variety, when it occurs, going by the name of ORIENTAL AMETHYST, and forming the passage between the Ruby and Sapphire.) It is met with in small angular and rounded pieces, and crystallized in rhomboids, in hexahedral prisms and in pyramidal dodecahedrons variously modified: the crystals are almost always small, and when not worn by rubbing have a brilliant external lustre. When broken the Ruby presents a lamellar structure with natural joints in three directions parallel to the faces of a rhomboid, and these faces have a highly shining vitre-

ous lustre. It is more or less transparent, passing to semi-transparent; in hardness, it ranks the third of all known substances, yielding only to the Diamond and the Sapphire. Its specific gravity is about 3.9.

From the analysis of this gem, by Mr. Chenevix, it appears to consist of

90.	Alumine.
7.	Silex.
1.2	Oxide of Iron.
98.2	
1.8	Loss.
100.0	

According to M. d'Arcet, no change is produced in the colour or transparency of this mineral, by the most intense heat.

Pegu is the native country of the Ruby, and it is said to be found in the sand of certain streams near the town of Sirian, the capital of that country; it also occurs with Sapphire, in the sand of rivers in Ceylon. It has occasionally been met with, imbedded in Corundum, but the geological history of this gem is, as yet, very imperfectly known.

Rubies of small size and inferior quality, are not rare; they are semi-transparent, flawed, and foul, have a bad pale colour, mixed more or less, with a chatoyant milky lustre. But rubies that are perfect both in colour and transparency, are much less common than good Diamonds, and when of the weight of three or four carats, or upwards, are more valuable even than the latter gem.

The King of Pegu, and the Monarchs of Ava and Siam, monopolize the fine Rubies, as the Sovereigns of the Peninsula of India have done, with regard to the Diamond. The finest Ruby in the world, is in the possession of the first of these Kings; its purity has passed into a proverb, and its worth when compared with gold, is inestimable. The Subah of the Deccan, also, is in possession of a prodigiously fine one, a full inch in diameter. The European Princes cannot boast of any of first rate magnitude.

The ORIENTAL SAPPHIRE, ranks the next in value to the Ruby; when perfect, its colour is a clear and bright Prussian blue, united to a high degree of transparency. It seldom, however, occurs in this state, more generally the colour is a pale blue,

passing by degrees, into entirely colourless; not unfrequently, the pale varieties are further deteriorated by streaks and spots of a dark inky blue. It occurs in rounded pieces, and, rarely, in crystals of a small size, but for the most part, considerably larger than the Ruby. The primitive crystal of this substance, like that of the preceding gem, is a slightly acute rhomboid, the alternate angles of which measure 86° 38′ and 93° 22′: it also presents nearly the same varieties and modifications of its primitive form. When broken, it displays a conchoidal fracture, seldom exhibiting any appearance of a lamellar structure; in hardness it surpasses the ruby, and yields only to the Diamond. Its specific gravity varies from 4 to 4.1.

Before the blowpipe it is infusible with-

out addition. Its component parts according to an analysis, by Mr. Chenevix, are

92. 0	Alumine
5.25	Silex
1. 0	Oxide of Iron
98.25	
1.75	Loss.
100. 0	

The pale varieties when exposed to a strong fire become entirely colourless without undergoing any other alteration; after this, when cut and polished, they have been often sold for Diamonds; on this, (somewhat fraudulent) account, they bear a considerable value.

Another remarkable variety of this

beautiful gem is the Asterias or Star-stone. This is a semi-transparent Sapphire, often with a reddish purple tinge, in which the summits of the primitive rhomboid are replaced by secondary planes that present a varying chatoyant lustre. If these crystals are cut *en cabochon*, or in the form of an ellipse, taking care that the summit of the ellipse shall be situated exactly over the point corresponding with the summit of the rhomboid, there will be produced the appearance of a star, with six rays from which, when held in the sunshine, a bright yellowish white light streams forth in beautiful contrast to the rich purplish blue of the other part of the stone.

The largest Sapphire that I have ever seen, weighs about 310 carats, (two ounces) and among the crown jewels of France, is

a fine rhomboidal crystal of the same, of the weight of 166 carats.

The best Sapphires come from Ava and Pegu, where they accompany the Ruby. They are also frequent in the sands of certain streams in the island of Ceylon, but these latter are usually of a pale colour, and are also deformed by streaks and blotches of an inky hue. In France, they have been met with in the sand of the brook Expailly, in Forez, but of so inferior a quality, that the jeweller has never been able to make any use of them.

Besides the Ruby and Sapphire, or the red and blue varieties of the Oriental gem, (called by Hauy, Telesia, and by Bournon and Greville, perfect Corundum,) there are some other varieties, depending merely on colour, that require a short notice. Some-

times this gem is met with of a yellow colour, and more or less mingled with red; in this state, it is called ORIENTAL TOPAZ; its value is inferior to that either of Ruby or Sapphire; it is, however, a very beautiful substance. The most esteemed colour is a bright jonquil yellow, and next to that, the pure lemon yellow. The rich reddish brown variety, is often called Oriental Hyacinth, and when it occurs of a greenish yellow, tending more or less to olive, which is very rarely the case, it is known by the name of ORIENTAL EMERALD, or ORIENTAL PERIDOT. Two or more colours occasionally occur in the same crystal; thus, in the Greville collection, at the British Museum, is a specimen blue and red at the two extremities, and yellow in the middle. Such specimens have no par-

ticular commercial value, but are very interesting to the Mineralogist, as shewing how little the mere colour is to be depended on in characterizing mineral species.

The cutting and polishing the gems mentioned in this chapter, as well as those which yet remain to be treated of, forms the business of the lapidary, an art resembling, yet wholly distinct from, that of the diamond cutter. The form most proper to be given to any particular gem being determined on, it is cemented to the end of a stick, and the facets are set on, not by cutting its surface laboriously, by means of a Diamond, but by applying it to the mill. This mill is a plate of copper, or of an alloy of lead and tin, to which a horizontal motion is given by very simple machinery. Its surface is charged with

Diamond powder and oil, or with fine emery and water: the former of these, however, is greatly preferred, the rapidity with which it works being such as amply to make up for the difference in price between the two materials. A thick peg of wood, called a guage, pierced with small holes in all directions, is set upright on the lapidary's bench, close to the mill; and the process of setting the facets takes place in the following manner:—

The stone is placed on the surface of the mill, the opposite end of the stick to which it is cemented being inserted in one of the holes of the guage. In this position, it is kept steady by the workman with the right hand, while with the other, he puts the mill in motion, by turning a winch. The direction of the motion given to the

mill is such as tends to draw the stick out of the guage, for, if given in a contrary direction, it would soon flaw and tear up the laminæ of the stone. Such is the efficacy of Diamond-powder, that an impression is almost immediately made on the hardest of the earthy gems; and the skill of the lapidary depends on regulating the velocity of the mill, and pressing with more or less force on the stick, with an almost imperceptible tendency to one or other direction in different stages of the work; examining each facet at very short intervals, in order to give as great precision as possible, to its size and form. This part of the business being completed, the cutting mill is taken out, and replaced by one of brass, on which the polishing is performed by means of fine emery, tripoli,

and rotten-stone, exactly in the same manner as practised in the first stage of the process for setting the facets.

No inconsiderable degree of judgment is required in determining the form and proportions best adapted to set off any particular stone to the best advantage, modified as this must necessarily be by the original breadth and depth of the gem. If the colour of a stone is full and rich, if its transparency is perfect, and its refractive power considerable, the best form to give it is the brilliant :* if, on the other hand,

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* The form given to the most perfect coloured stones by the French artists, is that of a square or octagon, with a single delicate step between the table and the girdle, and three or four steps between the girdle and the collet.

the colour is dilute, the most advantageous method of cutting it, is to cut the table side brilliant fashion, and the collet side in steps, Pl. 2, Fig. 9 and 10, by this means, the table itself will be left dark, while all the light reflected from the steps on the under side of the stone, will be thrown up into the facets by which the table is surrounded. When the stone possesses a varying chatoyant lustre, such as the Star-stone, the Opal, the Labrador Felspar, or Malachite, its form is to be made more or less hemispherical, or elliptical,* without any flat facets, but polished to the highest possible degree of perfection. In France, certain

* The flatter the ellipse, the more the varying lustre is diffused over the surface of the stone, as, on the other hand, with a high ellipse, it is condensed on a single spot.

dark coloured stones, as the Garnet, and certain semi-transparent ones, as the Chryosprase, are cut *en cabochon*, with a single or double row of small facets surrounding the base.

CHAP. III.

RUBY, SPINELLE AND BALAIS—EMERALD—CHRYSOBERYL—TOPAZ.

THE colour of the Ruby, when perfect, is a full carmine red, in which state it is known by the name of Spinelle Ruby; when the tinge verges upon rather pale rose red, it is called Balais Ruby; when the red has a decided shade of orange, it usually goes by the name of Vermeil; when of a yellowish red, it is called Rubicelle: in other varieties, the red by mixture with blue, becomes crimson, violet, and finally indigo blue, which latter is sometimes so deep, as to be scarcely dis-

tinguished from black; sometimes, though rarely, a greenish blue is observable; these latter varieties scarcely belong to the Jeweller, but are called by the Mineralogist, Ceylanite and Pleonaste. Its primitive and most usual form, is the regular octohedron; it also presents the cuneiform octohedron, and a few other varieties; sometimes it occurs in rolled grains. In size it very rarely exceeds eight or ten carats; the planes of the crystals are smooth and brightly shining, with a vitreous lustre, and usually exhibit a lamellar structure; the fracture is flat conchoidal, and sometimes imperfectly foliated; the lighter coloured varieties, when not foul or flawed, are transparent; the dark coloured are semi-transparent, or even only translucent on the edges. Its hardness is superior to that

of Quartz, but not equal to that of the Oriental Ruby, and the Spinelle is considerably harder than the Pleonaste. Its specific gravity varies from 3 . 6 to 3 . 7. It is singly refractive, and is infusible without addition before the blowpipe.

The Spinelle has been analyzed by Vauquelin, and the Pleonaste by Collet Descotils, with the following results :—

SPINELLE.

82 . 47 Alumine.
8 . 78 Magnesia.
6 . 18 Chromic Acid.

97 . 43

PLEONASTE.

68 . Alumine.
12 . Magnesia.
2 . Silex.
16 . Oxide of Iron.

98 .

The Spinelle occurs in Cambaya, in the kingdom of Pegu, and in Ceylon;* the Pleonaste or Ceylanite, was first discovered in Ceylon, and has since been met with in Norway. They appear to belong to rocks of the primitive class, being found imbedded in calcareous spar, and in adularia, accompanied by magnetic pyrites and crystals of mica.

The Spinelle works easily, takes a high polish, and is a very beautiful gem; large specimens are excessively rare; but of the smaller ones, the number used in jewellery is considerable. It is generally set in rings and broaches, surrounded by brilliants, being too expensive for necklaces.

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* The Brazilian Ruby is a pink coloured Topaz.

The EMERALD ranks next to the Ruby in public estimation, and in commercial value. It is distinguished from all other gems by its colour, which is a pure unmixed green, tending neither to blue on one hand, nor to yellow on the other. In intensity it varies from the palest possible tinge, to a full and pure body of colour, than which nothing can be more beautiful. The dazzling crimson of the Ruby, the golden yellow of the Topaz, the sky blue of the Sapphire, rich and exquisite as they are, after a time fatigue the eye, which wandering to each in turn is by each both gratified and rendered irritable. With what quiet pleasure does the sight then turn to and dwell upon the refreshing green of the Emerald, the only gem which, to adopt the language of Pliny,

fills and fixes the attention without satiating it; calling up in the mind, the full verdure of spring, the untarnished vigour of vegetation, with all the sweet remembrances and associations connected with the youth of the year, the spring of life!

The primitive crystalline form of the Emerald is a regular hexahedral prism, the lateral faces of which are squares; and this is varied by secondary faces placed on the edges and solid angles. The terminal faces of the prism are rough, the lateral faces are smooth; differing in this latter respect from the Beryl or Aquamarine, the lateral faces of which are always longitudinally striated. Its fracture is small and imperfectly conchoidal, exhibiting at the same time, more or less,

the foliated structure of the stone; its lustre is shining and vitreous. When free from flaws it is transparent and doubly refractive. Its hardness somewhat exceeds that of quartz. Its specific gravity is about 2.7. Before the blowpipe it is fusible with difficulty into a grey, rather frothy glass. It is composed according to Vauquelin of

64 . 5	Silex.
16 .	Alumine.
13 .	Glucine.
3 . 25	Oxide of Chrome.
1 . 6	Lime.
98 . 35	

It appears from the Natural History of Pliny, that the true Emerald was certainly known to the ancients, although many

other minerals of a green colour were popularly confounded with this gem. Necklaces of Emerald have been disinterred from Herculaneum, and an Emerald at present in the Museum of Natural History at Paris is known to have formerly adorned the Tiara of Pope Julius the Second, who died 32 years before the conquest of Peru by Pizarro; therefore the gem in question was probably from Ethiopia, the country whence the ancients derived their Emeralds*. For the last two centuries and upwards the only country known to yield Emeralds is Peru; here they occur in the Viceroyalty of Santa Fé

* In the collection of M. de Drée is an antique bust of Drusus, son of the Emperor Tiberius, cut in Emerald, and forming a ring stone.

and in the valley of Tunca, between the mountains of New Granada and Pompayan. They are found in veins traversing clay slate, and in cavities in certain granites: they are accompanied with quartz, calcareous spar, felspar, mica, and pyrites.

The largest known specimens of Peruvian Emeralds are near six inches in length by two inches in thickness; these however are very rare, and it is still more rare to find specimens of considerable magnitude free from impurities and of a good colour. This gem was well known to the native Peruvians, by whom it was held in high estimation, and was chiefly employed in decorating their idols of massive gold; they were acquainted with the art of polishing and drilling it. A similar use is made of this stone by the modern Peruvian

catholics, who employ the inferior water-worn varieties to adorn the pedestals of the crucifixes, and to stud the other ornaments used in their religious ceremonies. A favourite mode of setting them, among the opulent inhabitants of South America, is to make them up into clusters of artificial flowers on gold stems.

The Emerald is much esteemed in European jewellery, and merits the very best workmanship. It appears to the greatest advantage when table-cut and surrounded by brilliants, the lustre of which contrasts agreeably with the quiet hue of the Emerald. It is sometimes formed into pear-shaped ear-drops, which have a beautiful effect when playing pendant within an oval set with Diamonds. Another fashionable mode of making it up, where ex-

pence is not regarded, is in necklaces and tiaras. The most choice and perfect stones are generally set in rings.

Chrysoberyl or Cymophane.

This gem, from the little attention that has been paid to it in Europe till of very late years, has not yet risen to the rank which it may deservedly claim. In Brazil it stands at the very head of the earthy gems, but its European value is inferior to that of those which have been already described in this treatise.

Its colour is a mixture of green and golden yellow in various proportions and of different degrees of intensity. It occurs generally in rolled pieces, and sometimes crystallized in compressed hexahedral prisms and in double six-sided pyramids. Its weight rarely amounts to ten carats.

Its fracture is generally conchoidal, but it also presents natural joints in two directions parallel to the sides of a rectangular parallelipiped; its internal lustre is brightly shining, between resinous and vitreous. It is sometimes transparent, but often is only semi-transparent, and then generally exhibits a bluish-white opalescent light floating in the interior of the stone*. Its hardness is very considerable, as it scratches quartz with great ease. Its specific gravity is about 3.8. It is doubly refractive, and becomes easily electric by friction. It is infusible before the blowpipe, and accord-

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* Such specimens are popularly called opalescent chrysolites and are less esteemed by the jeweller than the transparent varieties. Sometimes one part of a stone is opalescent and the other transparent.

ing to an analysis by Klaproth*, is composed of,

71. Alumine.
18. Silex.
6. Lime
1.5 Oxide of Iron.

96.5

It occurs in the sand of Ceylon together with the Sapphire and Ruby; but more abundantly and of larger size in Brazil, accompanied by the Diamond, and imbedded in that peculiar conglomerate which has already been described in our account of the last mentioned gem.

The colour, the high lustre, and the ex-

* It is by no means certain however, that the subject of this analysis was a Brazilian Chrysoberyl.

quisite polish which the Chrysoberyl is capable of receiving, enables it almost to sustain a competition with the yellow Diamond. It is, however, a stone very difficult to work, and there is scarcely a lapidary capable of doing justice to it. A considerable quantity was imported into this country from Brazil, a year or two ago, the greater part of which were entirely spoiled by inferior workmen, and the rest were so ill cut that they remained almost unnoticed and without value. The finest specimens, provided they have sufficient depth, should be cut in pavillion facets like the brilliant; the thinner ones ought to be carefully cut in delicate steps. It has great brilliancy by candle-light, and possesses the very valuable and rare quality of sustaining the rival presence

of the Diamond without injury. The smaller stones appear to most advantage in circular ear-drops, and set round high coloured gems. The larger specimens form necklaces, and ring stones of exquisite beauty either with or without Diamonds. The opalescent Chrysoberyl derives a value in the eyes of the amateur from the very circumstance which diminishes its worth in the estimation of the jeweller; it has often a very good colour, and when cut *en cabochon* as a ring stone, is exceedingly beautiful. This fine gem may be said to be coming into great repute, and in all probability will soon rank very high in estimation among the first circles of fashion.

TOPAZ.

There are three varieties of this gem

known in jewellery; all of them from Brazil, and requiring to be separately described: they are distinguished by their colours into yellow, blue, and white.

The colour of the yellow Topaz is wine yellow, of different degrees of intensity, and the fuller this is, provided it remains bright at the same time, the more the stone is esteemed: by exposure to a gentle heat the colour passes into pink or pale crimson; this however is rather a hazardous experiment, as Topaz is very liable to crack and flaw by the action of fire. Some rare varieties are naturally of a pink colour, and these are commonly known by the name of *Brazilian Rubies*. It occurs in rolled pieces, but generally crystallized in the form of a compressed rhomboidal prism, terminated by tetra-

hedral pyramids variously modified. The sides of the prism in those parts adjacent to the obtuse angles are for the most part perfectly smooth, while those adjacent to the acute angles are deeply striated so as to be very sensibly curvilinear. It is rare to meet with a prism regularly terminated at each extremity, one end being generally implanted in the matrix. In size it varies, from very small to a considerable bulk; the largest specimen upon record is in the Museum of Natural History at Paris, its weight being about four ounces and a quarter: its cross fracture is perfectly foliated but its longitudinal fracture is small and imperfectly conchoidal; its internal lustre is vitreous and of great brilliancy; when free from flaws it is usually transparent and doubly refractive. Its

hardness is superior to that of quarts, but it yields a little to the file. Its specific gravity as ascertained on a polished specimen of great beauty, and of the weight of above 160 grains is 3.53. When warmed it becomes positively electric at one extremity, and negatively at the other.

Before the blowpipe it is infusible, and is composed, according to an analysis by Vauquelin, of

50.	Alumine
29.	Silex
19.	Fluoric Acid
98.	

This gem is obtained from the neighbourhood of Villa Rica in Brazil, where it occurs in small veins of a talcose matter together with rock crystal and specular

iron ore. The flawed and bad specimens are perhaps a thousand times more numerous than the good ones, and the merchantable produce of the mines is sensibly diminishing; on which account good stones are rising in value. The searching for Topazes and bringing them into a state fit for sale, employs a considerable number of men; after being cleared from the adhering foreign substances and other impurities they are transmitted to Rio de Janeiro, where they are disposed of to the lapidaries.

There are few gems such universal favourites as the yellow Topaz when perfect; the rich warm tone of its colour, the vivacity of its lustre, which it retains even by the side of the Diamond, and its large

size when compared with many other of the precious stones, are characters which very deservedly entitle it to distinction; it bears accordingly a high price when of prime quality.

It is chiefly employed for necklaces, ear-drops, bracelets, and broaches. No little skill and taste is required in cutting and duly proportioning this gem; the table should be perfectly symmetrical and not too large; the bizel of sufficient breadth, and the under side should be formed in delicate steps, and not in pavillion facets. It works easily on the mill, and the lapidaries are in general tolerably well acquainted with it, yet it is by no means common to meet with one that is entirely well cut. Perhaps the most perfect stone in the king-

dom for size, for colour, and for fineness of workmanship is that represented in the frontispiece of this work.

The blue Topaz, or Brazilian Sapphire of some authors, although known to and described by Romé de Lisle, was confined to the cabinets of the curious till the return of the author of this book from Brazil, who, having had the good fortune to acquire some very fine specimens of this variety, brought them with him to England; where he is happy to say, they have obtained the most illustrious patronage. Its specific gravity as deduced from a large and very fine polished specimen is 3.6,*

* Hence it may readily be distinguished, even when cut, from the blue aquamarine, the specific gravity of

therefore somewhat exceeding that of the preceding variety. In its crystalline form and other physical and chemical characters it presents little if any peculiarity; its locality, however, is totally distinct from that of the yellow Topaz, since it occurs, together with the Chrysoberyl, in that conglomerate which we have already mentioned as the repository of the Diamond. It is as yet very rare, and in size is found to vary from one or two carats to three ounces and upwards. The largest and most perfect specimen that has ever been met with is in the possession of the author: it is without flaw or imperfection of any kind, and

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which does not exceed 2.7, and of which the lustre is also of course inferior.

its weight after having being cut and polished is an ounce and a quarter; a portrait of it may be seen in the frontispiece of this work. To display this stone to the greatest advantage, the utmost skill of the lapidary is required, several of mine having been entirely spoiled by the common mode of cutting. It requires the greatest exactness of proportion; the table should be rather small, the bizel deep, and the under part from the girdle to the collet graduated into fine and delicate steps with equi-distant ribs: it then reflects a full celestial blue colour throughout the stone, more especially round the girdle. I am of opinion that rose cutting, though seldom practised, would perhaps have a good effect, especially in small specimens of this gem.

Sometimes the tint is so dilute as to re-

quire the assistance of foil; and this is one of those cases that afford an opportunity to the jeweller of exhibiting his taste and dexterity to the greatest advantage. He will not by the use of a coarse deep coloured foil give an entirely foreign and adventitious hue, but will employ all his resources in suiting the colour to the natural tinge of the stone; and, faithful to the leading principle on these occasions, of obtruding his art as little as possible, will err, if he errs at all, rather in defect than in excess.

The white Topaz is perfectly colourless. It is in considerable estimation in Brazil, where it is known by the name of *minas novas*. It occurs generally of small size, and is employed in circular ear-rings, or for the purpose of being set round yellow

Topazes. Its lustre considerably exceeds that of rock crystal, and the most advantageous way of cutting it is as a brilliant with a small table; in which case it should be set open.

Topazes are found in several other parts of the world besides Brazil; many come from New Holland and Siberia, of which the best are the colourless ones; the others are of a greenish yellow tinge, and mostly pale. Saxony also furnishes Topazes of a pale straw yellow. Pale greenish ones of considerable size have recently been found in the Highlands of Scotland, and small colourless ones at St. Michael's Mount in Cornwall. But all these, however interesting they may be to the mineralogist, are of little or no value in the finer kinds of jewellery. A nobleman of

Scotland may prefer having his arms engraven on Scottish Topaz, or a Cornish lady may think a necklace of Topazes from St. Michael's Mount a very appropriate ornament; but independently of these national and local attachments there can be no question that the Topazes of Brazil in intrinsic beauty and impartial estimation are infinitely superior to those of every other country.

CHAP. IV.

CHRYSOLITE—AQUAMARINE—TOURMALINE—HYACINTH, AND JARGOON.

So many different substances have been called by the name of Chrysolite, by lapidaries and even by mineralogists, that much confusion has hence arisen. Not only the Chrysoberyl, but the greenish yellow varieties both of Topaz, of Sapphire, and of Aquamarine, and even of Apatit and Idocrase, have in popular or scientific language borne the name of Chrysolite. The real Chrysolite however, or Peridot, to be described in the present article, is

the only mineral possessed of all the following characters.

Its colour is a mixture of blue and yellow, in which the latter generally preponderates, producing a greenish yellow; sometimes however, the colour is grass green, and even bluish green, mixed more or less with brown. It is usually met with in angular and rolled pieces, rarely crystallized; its regular form is an eight, ten, or twelve sided prism, variously terminated at the extremities, and often compressed so as to become almost tabular. Its fracture is conchoidal with a brilliant vitreous lustre: it is transparent and doubly refractive in a high degree: in hardness it is not greatly superior to glass: its specific gravity is 3.4.

Before the blowpipe it is infusible with-

out addition. It is composed, according to Vauquelin, of

50 . 5	Magnesia
38 .	Silex
9 . 5	Oxide of Iron
98 . 0	

It comes to us from the Levant, and is said to be found in Upper Egypt, but of its geological relations we are wholly ignorant: although very inferior to the gems already described, being deficient in hardness and in play of colour, it is not unfrequently worked up into necklaces and similar articles; and when the different stones match well in colour, are carefully cut, and well polished, their effect is upon the whole very good. In order to give the highest polish to this stone, a copper

wheel is used, on which a little sulphuric acid is dropped. A highly suffocating odour is given out during the process, being occasioned no doubt by the oxidation of the copper, and the decomposition of the acid; hence it is probable that the oxide of copper is the true polishing powder in this case, and its superiority to the emery and other substances generally employed by the lapidary is owing to its greater softness. It is likely therefore that the most advantageous way of working this soft stone would be to turn it over to the glass cutters.

Being too soft for ring stones, it is generally used in jewellery, for necklaces, and ornaments for the hair. The best method of cutting it is in small steps, that it may shew the colour to the greatest advantage.

Aquamarine or Beryl.

The principal colour of this gem is pale sea green, (whence its name) passing on the one hand into greenish blue, and light sky blue, and on the other into greenish yellow, and wine yellow. Sometimes the same crystal presents two or more colours, and sometimes it is iridescent. Its primitive crystalline form is the same as that of the Emerald, which circumstance, together with the striking analogy exhibited by the analysis of these two substances, has induced some very able modern mineralogists to consider them as one and the same species. The Emerald and the Beryl however, differ so materially as gems in the public estimation, that we shall on this account follow the example of Werner, and treat of them as distinct substances.

The usual form of the Aquamarine is a prism of six or twelve sides, deeply striated longitudinally, so that it often approaches towards cylindrical; sometimes a thick prism divides at one extremity into a multitude of needleshaped crystals, so as to resemble a painter's brush; sometimes the crystals are jointed, the upper extremity of each piece being concave and the lower convex; sometimes a crystal will present the appearance of having been broken across, and afterwards ill mended, the two pieces not being in the same perpendicular, and the place of the fracture being surrounded as it were with a callus. The size of the crystals varies extremely from mere threads to prisms a foot or more in length, and about four inches in thickness; these latter however are never sufficiently transparent

and perfect for the use of the jeweller. Its cross fracture is conchoidal; its longitudinal is more or less foliated. Its hardness is somewhat superior to that of rock crystal; and its specific gravity is about 2.7.

Its constituent parts, according to an analysis by Vauquelin, are,

68 . Silex.
15 . Alumine.
14 . Glucine.
2 . Lime.
1 . Oxide of Iron.

Aquamarine occurs imbedded in graphic granite, also in mineral veins with clay, garnet, fluor spar, and topaz. The best are procured in Brazil, in Siberia, and in Ceylon. It is also found, but of very in-

ferior quality, in North America, in France, and in Scotland.

Aquamarine, though one of the cheapest of the gems, and the most abundant, is in considerable demand, and is esteemed a fashionable stone. The finest in colour that I ever saw was brought by me from Brazil; it weighed when cut and polished an ounce and a quarter troy. A profile of which may be seen in the frontispiece. Aquamarines occur in general of a sufficient size for necklaces, in which form they are usually worn; they are also used for broaches, and not unfrequently for sealstones, and intaglios. The large prisms are in esteem among the Turks for handles of stilettos.

This gem is a pleasant one for the lapi-

dary to work, as it stands cutting and polishing without risk. Want of lustre, and paleness, and weakness of colour, being the defects to which it is chiefly subject, it is requisite that a good stone should have a sufficient depth in proportion to its spread, and that it should be formed with a small table, a high bizel, and with the under part cut into delicate steps.

The only substance with which the common Aquamarine is likely to be confounded is the blue Topaz, from which however it is readily distinguished by its *inferior* specific gravity, and consequently inferior lustre. The Beryl*, or greenish yellow variety of Aquamarine is sometimes mistaken for the Chrysoberyl; but though resembling

* When of a good colour it is best cut in star facets.

this gem in colour, it is greatly inferior to it in lustre, hardness, and specific gravity.

Tourmaline.

The colour of Tourmaline is green, with more or less of a tinge of brown or blue; hence it passes on one hand into yellowish and reddish brown, hyacinth red, and even crimson red, and on the other hand into indigo blue, sky blue, and violet. The colours are mostly dull and somewhat muddy, and often are so dark as to appear nearly black. It occurs sometimes in rolled pieces, but generally crystallized. Its primitive form is an obtuse rhomboid, which may be considered as composed of two trihedral pyramids united by their bases. The actual crystals are prisms of three, six, nine, or twelve sides; and the

terminal pyramids scarcely ever correspond to each other in the number or situation of their faces. It varies greatly in the degree of its transparency; those specimens which possess this quality in the greatest perfection being, as may be supposed, best fitted for the use of the jeweller. Its hardness somewhat exceeds that of quartz. Its specific gravity varies from 3.0 to 3.3. When warmed to a degree not greater than that of boiling water it becomes electric; and if in this state a thread of silk tied at the end of a stick of sealing-wax be presented to the crystal, the silk will be attracted by one extremity, and repelled by the other. It is fusible before the blowpipe into a spungy greyish-white enamel. According to the most recent analysis it is composed of from 40

to 43 per cent. of silex, and nearly the same proportion of alumine; of about 10 per cent. of soda, and of a variable proportion, never exceeding 8 or 9 per cent., and often much less, of iron, and manganese.

Tourmaline is found in Granite and other primitive rocks in various parts of the world; but the most beautiful are imported from Ceylon and Brazil. The yellowish green and Hyacinth brown varieties chiefly come from the former place; the smoky green and blue varieties from the latter, whence they are often called Brazilian Emeralds and Sapphires. Of these I have had crystals in my possession an inch and a half long, and three quarters of an inch in diameter. They are held in considerable estimation in Brazil, being worn in rings

chiefly by the dignitaries of the church. In Europe this gem ranks among the less valuable ones, on account of its little lustre and the smoky or muddy tone of its colour; yet, when well selected, when cut thin, and set with a suitable foil, it possesses considerable beauty.

The red Tourmaline is found in Siberia, Ava, and Ceylon, and when free from flaws is a very fine stone. The most splendid specimen of this variety is in the Greville collection at the British Museum: it was presented to Col. Symes by the king of Ava, and is valued at £1000 sterling.

JARGOON.

The colour of Jargoon is grey with tinges of green, blue, red, and yellow, of various degrees of intensity; but generally smoky

and ill defined. It usually occurs in worn angular pieces, or in small detached crystals,* either octohedral, which is the primitive form, or with a four sided prism interposed between the terminal pyramids. The surface of the crystals is smooth and brightly shining, approaching nearer to the lustre of the Diamond than any other gem. Its fracture is conchoidal. It is doubly refractive, but seldom perfectly transparent. Its hardness is somewhat superior to that of quartz. Its specific gravity varies from 4.3. to 4.6. On exposure to the blowpipe it loses its colour, but is infusible. Its component parts, according to Vauquelin, are,

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* Rarely exceeding six or eight carats.

66 . Zircon.
31 . Silex.
2 . Oxide of Iron.

99

It occurs chiefly in the sand of a river in Ceylon, accompanied by Sapphire, Spinelle, Tourmaline, &c.

This gem is a remarkable proof of the caprice of fashion. About a century ago, when it was regarded as an inferior variety of real Diamond, few of the precious stones were in greater request, especially for mourning ornaments, for which the dark tone of its colour combined with its almost adamantine lustre was supposed peculiarly appropriate. At present it is entirely discarded and bears no price in the market, nor any place in the public esteem.

HYACINTH differs from Jargoon merely in colour. It is of a red orange passing into poppy colour; and when bright and free from flaws is a very superb ring-stone. It is of rare occurrence however in modern jewellery: the largest pieces are sometimes employed as seal stones.

CHAP. V.

OPAL — AMETHYST — ROCK CRYSTAL — GARNET — ADULARIA — LABRADOR SPAR — CAT'S EYE.

THE colour of Opal is milk white or pearl grey, and when held between the eye and the light is pale rose red, and wine yellow, with a milky semi-transparence: by reflected light it exhibits, as its position is slightly varied, the clearest and most beautiful iridescent colours, particularly verdigris and Emerald green, golden yellow, fire-red, bright blue, rich violet purple, and pearl grey: all these tints are usually ex-

hibited in the same specimen, being arranged in small spangles, in which case it is called Harlequin Opal, or in broader plates, or in waved and flame-shaped delineations: sometimes only one colour is present, and of these the most esteemed are the rich orange yellow, called the Golden Opal, and the vivid Emerald green. The colours of this gem are the more bright and beautiful, from the circumstance of their being occasioned not by any particular tinge of the substance itself, but by the remarkable power which it possesses of refracting the solar rays. It occurs in rolled pieces or disseminated in small veins through a particular kind of clay porphyry. Its lustre is vitreous, its fracture conchoidal. In hardness it equals quartz, but is remarkably brittle; hence it is penetrated by cracks in

all directions, and can very rarely be obtained in pieces as large as a small nut. Its specific gravity is very low, being no more than 2.1. When exposed to the action of the blowpipe it crackles and flies, but does not melt. Its constituent parts, according to Klaproth, are,

90 .	Silex.
10 .	Water.
100	

It used to be found near Freyburg in Saxony, but is at present met with only near Kaschau, in Upper Hungary.

From want of hardness and of crystalline form, the Opal can scarcely be ranked among the gems. It has, however, in all ages and countries been very highly esteemed. A Roman senator was threat-

ened with death by Nero, unless he should give up to the emperor an Opal ring of exquisite beauty, and, strange to say, the senator resigned his life, rather than survive the loss of his ring. Among the eastern nations at the present day the Opal ranks higher than it does in Europe; nor is this to be wondered at. From the general seclusion in which not only women, but even men of rank, pass the greater part of their time, the pleasure derived from the possession of gems must depend in a great measure on their intrinsic beauty, on the degree in which they are capable of gratifying, without satiating the taste or vanity of their owners. In Europe, on the contrary, (with the exception of a few amateurs,) gems are considered as mere ornaments, being admired less on their

own account than for the general homage that they receive from others. Hence the brilliancy, the far-darting lustre of a jewel, the distance from which it concenters the gaze of by-standers on its wearer, is its supreme merit among us. The colours and fire of the Opal require a near inspection for a full enjoyment of their beauty, which undoubtedly greatly detracts from its worth as an ornament. Fine stones are extremely rare, and are generally used for ear-drops and rings; sometimes, however, they are set with groups and clusters of other gems. When plates of porphyry* can be procured sufficiently rich in veins of Opal, they form a superb material for snuff-boxes, and similar articles. Opal is,

* The matrix of Opal.

upon the whole, too soft and fragile to endure the ordinary process of the lapidary; it requires the utmost management in working, and a moment of inattention is sufficient to destroy its beauty. It is always cut *en cabochon*.

The most valuable Opals are called Oriental, and in fact small rounded pieces of it occur in the sand of Ceylon; but I believe that the jewellers derive the whole of their supplies of this substance from Hungary.

AMETHYST.

The colour of Amethyst is violet-blue of various degrees of intensity, not unfrequently passing in the same specimen from the richest tinge to almost colourless. It occurs massive, in rolled pieces, or in hexahedral prismatic crystals, terminated by

hexahedral pyramids like quartz, or rock crystal, of which indeed it is merely a variety. Its crystals are rarely so distinct as those of quartz, being for the most part laterally aggregated by the whole length of the prisms, the terminal pyramids alone being separate from each other; hence a fracture of the mass in the direction of the prisms presents a coarsely fibrous structure. Its lustre is vitreous and more or less shining, according to the degree of transparence, which varies considerably. It gives fire with steel, but yields to the file. Its specific gravity is about 2.7. Before the blowpipe it becomes colourless, but does not enter into fusion. It appears to be nearly pure siliceous earth coloured by a very minute portion of iron and manganese.

It occurs in veins, or forming the interior part of agate balls in trap rocks.

Amethyst is valued by the jeweller in proportion to the depth, the richness, and uniformity of its colour, and its perfect transparency: when complete in all these requisites it forms a stone of exquisite beauty; its colour being perhaps more generally attractive than that of any other gem, especially as it may be attained of as large a size as can be conveniently worn.

The most showy form in which Amethysts can be made up is in necklaces, and as it is not easy to find a number of perfect stones with precisely the same tint of colour, such suites are very valuable, and in great estimation among personages of the highest rank: the finest known is in

the possession of her Majesty. Amethyst is often employed as a ring stone; and when of a deep vivid tinge will sustain with advantage the presence of the Diamond; hence it is not unfrequently set round with brilliants. Pale coloured stones require the skilful assistance of the jeweller in suiting them with the proper foil; but good ones want no such help, and the less gold that is employed in making them up the better. The Amethyst is almost the only coloured stone that can be worn with mourning, a casual advantage which however adds considerably to its value.

The best Amethysts come from India and Ceylon, and although commonly called Oriental Amethysts, must be carefully distinguished from a much more valuable gem, the true Oriental Amethyst, or violet co-

loured Sapphire. Next in esteem are the Brazilian Amethysts; they are procured in the mining districts of that rich country at considerable expence. The Amethysts of the jeweller are almost entirely obtained from the above mentioned places. Siberia, and various countries in Europe, especially Germany and Spain, furnish inferior, though beautiful Amethysts, proper for snuff boxes, and other inlaid articles.

As violet coloured Quartz goes by the name of Amethyst, so when clear and colourless it is commonly known by the name of

Crystal, or Rock Crystal.

The usual form under which this variety presents itself is in distinct hexahedral prismatic crystals, implanted by one extremity in opake amorphous Quartz, and terminated at the other by a hexahedral

pyramid; the bulk of these Crystals varies from very small to a foot or more in length. The clearest and most esteemed Rock Crystal comes from the Island of Madagascar, in blocks not unfrequently from 50 to 100lbs. in weight: in Switzerland and the province of Auvergne in France, very fine specimens are procured, and inferior ones, either with regard to clearness or size, occur in almost every country in the world. In our own country the substances called Bristol, Buxton, Cornish, and Irish Diamonds, are clear pyramidal Crystals of Quartz.

Rock Crystal, according to its quality, is sold from 5 to 20 shillings a lb. for the purpose of grinding into spectacle glasses; and is employed also in lockets and inferior rings; it is sometimes made into small

vases, and occasionally it is used for seal stones. About fifty years ago it was in great request for buckles and buttons, at which time many people were employed in manufacturing and cutting it, chiefly for the Birmingham market.

The most esteemed pieces of Rock Crystal are those containing slender needles of Titanium, Crystals of Chlorite, &c.; they are not without beauty, and are made up into snuff boxes, and similar articles.

Rock Crystal occasionally is met with of a beautiful pale pink colour, in which state it is known among mineralogists by the name of Rose Quartz. As an ornamental substance it is considerably superior to the colourless Rock Crystal, but appears to be as yet almost wholly unknown to the jewellers.

The most valuable variety, however, of this mineral, next to the Amethyst, is the YELLOW CRYSTAL, known also by the names of *Topazine Quartz*, *Smoke Quartz*, *False Topaz*, *&c.* Its colour is yellow, of various degrees of density, often equalling in this respect the Saxon Topaz, though considerably inferior to the Brazilian: not unfrequently the yellow is combined with a smoky brown, forming, when this latter tinge does not predominate, a colour of great warmth and richness. It is often made up into necklaces and ear-drops, but is more generally employed as broach stones and for seals; it stands engraving excellently well, and no stone is more fashionable, or in more general use for the latter purposes. To this high degree of esteem it is indebted partly to its own

merits, and partly to national partiality. The Mountain of *Cairngouram*, in Aberdeenshire, has furnished and still continues to afford many fine specimens, chiefly of the smoky variety; these being manufactured by the lapidaries of Edinburgh, met with a ready sale among the Scottish gentlemen, as the native produce of their country: the taste or fashion soon extended itself into England, and this increased demand has induced the merchants to import from Brazil a considerable quantity of yellow Crystal, the quality of which is for the most part superior to the true Cairngouram stones, though, in compliance with popular prejudice, they are generally sold under that name. The price of inferior seal stones varies from ten shillings to three or four pounds a piece, but those of superior

beauty will bring from five to ten guineas. Those specimens that have a pure full wine yellow colour, are very often disposed of as Topazes, when cut and set in foil.

This stone is best cut in steps, when used either for seals, or for other purposes; the breadth of the table should be proportioned to the fulness of the colour; and it should be carefully set with a proper foil, if wanting in colour.

GARNET.

Although Garnet, considered as a mineralogical species, varies exceedingly in colour, in transparence, in fracture, and in other external characters, yet those that are fit for the purpose of the jeweller, are distinguished by the following properties. The colour is blood or cherry red, often on one hand mixed more or less with blue, so

as to present various tints of crimson, of purple, and of reddish violet; and, on the other hand, with yellow, forming orange, red, and hyacinth brown. It occurs crystallized, in rhomboidal dodecahedrons, imbedded in mica slate, and in other primitive rocks; or uncrystallized, in roundish grains, imbedded in serpentine, and in certain trap-rocks. Its size varies from the smallest piece that can be worked, to the bulk of a nut; when exceeding this, it is scarcely ever free from flaws, or possessed of the requisite degree of transparency. Its fracture is conchoidal; its internal lustre is vitreous, and brightly shining; its hardness exceeds that of quartz; its specific gravity varies from 3.7 to 4.2. Before the blowpipe it is fusible without much difficulty into a black enamel. It seems

liable to great variety both in the number and relative proportion of its component parts. Silex, oxide of iron, and alumine, appear to be its essential ingredients.

The Garnets of commerce come from Bohemia, from Ceylon, from Brazil, and from Pegu. The city of Sirian, the capital of the latter country, having formerly been the chief mart for the best Garnets, these are usually denominated, by corruption, Syrian Garnets, as if they came from Syria. The real native country, however, of any particular lot of Garnets, after it has passed through a few hands, can seldom be known, and hence, the merchants are in the habit of naming them Sirian, Bohemian, or Ceylonese, rather from their relative value and fineness, than from the

country from which they are supposed to come.

The Sirian Garnet is the most esteemed. Its colour is a violet purple, which in some rare specimens, enables it to enter into competition with the finest Oriental Amethyst; it is also distinguished from all the other varieties of Garnet, in preserving its colour, unmixed with the black tinge that generally obscures this gem, even when of considerable thickness, and unassisted by foil. It is a disadvantage to this stone that it loses much of its beauty by candle light, as it then acquires an orange tinge, and may thus be discriminated from the real Oriental Amethyst.

The Bohemian Garnet is generally of a dull poppy red, and when held between

the eye and the light, a hyacinth orange tinge is very discernible. In proportion as this latter colour prevails, the value of the stone is deteriorated. When, on the contrary, the colour of the stone is a full crimson red, it is called fire Garnet, or Pyrope; its value is considerable, and when perfect, and of a large size, is excessively rare, and proportionably esteemed. The best way of cutting the Pyrope is *en cabochon*, with a row or two of small facets, round the girdle of the stone, Pl. 2, Fig. 11. When cut in steps, the colour appears more or less black, but when en cabochon, the point on which the light falls, displays a brilliant fire red.

Garnet is easily worked, and when facet cut, is almost always, on account of the depth of its colour, formed into thin ta-

bles, which are not unfrequently concave, or hollowed out on their under side. Cut stones of this latter description, when skilfully set with bright silver foil, have often been sold as Rubies. This gem, though common, and perhaps rather unfashionable at present, has much intrinsic beauty. It is made up into rings, ear-drops and necklaces. A set of fine Garnets, was considered a hundred years ago, as a very magnificent ornament for ladies of the highest rank.

FELSPAR.

Several varieties of this mineral are used in jewellery, but all of them are indebted for this distinction, to their mutable reflection of light, or in one word, to their being *chatoyant*.

The purest form of Felspar, is Adula-

ria, the colour of which is greenish white; it occurs massive, or crystallized, in compressed four or six-sided prisms; it is more or less semi-transparent, with a bright somewhat pearly lustre. Its fracture in one direction, is imperfectly conchoidal, and in the other, is perfectly foliated, with a double rectangular cleavage. Its hardness is superior to that of glass, but not equal to that of quartz. Its specific gravity is about 2.5. Before the blowpipe, it melts without much difficulty, into a whitish glass. Its component parts, according to an analysis, by Vauquelin, are

64. Silex
20. Alumine
2. Lime
14. Potash

100.

It occurs in veins, in primitive mountains, particularly in that part of St. Gothard, called Mont Adula, whence its name.

Of this substance, the variety called *Moonstone*, is in considerable estimation, as an ornamental stone; it is characterized by containing bluish white spots, which, when held to the light, present a pearly or silvery play of colour, not unlike that of the moon. The finest specimens come from Ceylon; and the most valued are those, which, when cut in a very low oval, present the silvery spot in the centre of the stone. The softness of this, and of the other varieties of Felspar, compared with the gems and precious stones already mentioned, is so great, that few lapidaries know how to work it to the best advantage. It

is set in rings or broaches with small Rubies or Emeralds, with which it forms a beautiful contrast. Fine stones of this description, are scarce, and are more valued on the Continent than in England.

The variety called SUNSTONE, is an adularia, of a very pale yellowish colour, almost perfectly transparent, when viewed in one direction, but, by reflected light, presenting the appearance of numberless minute golden spangles, dispersed through its substance. This peculiar appearance, which is found in some other varieties of Felspar, and also, sometimes in Quartz, constitutes the essential character of *Aventurine*, and is merely an accident, occasioned either by imperceptible flaws, or by an irregularity in the arrangement of the laminæ; like other happy accidents, how-

ever, it confers an additional value on those stones in which it occurs. The Sunstone comes chiefly from Siberia. *Amazon Stone*, is a Felspar of a beautiful bluish-green colour, slightly translucent, with a considerable degree of varying lustre; and when cut properly, forms an aventurine of silvery spangles, in a green base. It comes from the neighbourhood of Lake Baikal, in Siberia, and is sometimes, though rarely, of a sufficient size to be fashioned into small vases, and other ornaments.

Labrador Stone.

This is another variety of Felspar, the proper colour of which, is smoke grey, or dark ash; but besides this fundamental colour, it presents a most beautiful play of vivid tints, varying according to the position in which it is viewed; of blue, it ex-

hibits all the varieties from violet to smalt-blue; of green, it displays the pure emerald-green, and various other tinges approaching to blue on one hand, and to yellow on the other: of yellow, the usual shades are gold and lemon yellow, verging into deep orange, and thence into rich copper red, and tombac brown. The parts exhibiting these beautiful colours, are disposed in irregular spots and patches, and the same spot, if held in different positions, displays various tints. Of these colours, the violet and the red are the most rare. The finest specimens of this stone, come from the Coast of Labrador, in blocks of sufficient size for snuff boxes, and similar articles; it is also used for broaches and necklaces. The true mode of cutting it is in plain very flat *cabochon*; and a good

deal of skill is required, in first cutting up the block, so to direct the section, that the iridescent spots on which the whole beauty of the substance depends, may be shewn to the best advantage.

CAT'S EYE.

The principal colour of this mineral, is yellowish, greenish, or ash grey, also yellowish brown, hair brown, and hyacinth red, it is found also sometimes olive green, and blackish. It occurs massive, and in roundish pieces; but is usually brought to Europe, ready cut in high *cabochon*, in which state, it presents a peculiar floating light, resembling the eye of the animal from which it takes its name. It is commonly more or less translucent, but is sometimes met with perfectly semi-transparent; when broken, it presents a small

and imperfectly conchoidal fracture, with a shining lustre, between vitreous and resinous. In many specimens there may be observed small parallel white fibres, which are supposed to be the cause of its peculiar play of light; but the semi-transparent varieties, which are equally chatoyant as the more opake ones, offer no such appearance. It is as hard as rock crystal, and easily frangible. Its specific gravity is 2.6. By exposure to a strong heat, it loses its lustre and transparency, and in very small fragments is, according to Saussure, fusible, though with difficulty, before the blowpipe. From two analyses by Klaproth, it appears to contain about 95 per cent. of silex, with minute portions of alumine, lime, and oxide of iron. It comes from Ceylon and the Coast of Malabar, but of

its geological situation we are wholly ignorant.

This stone is rarely met with of larger size than a hazle nut, most of the specimens being considerably smaller. Of the nearly opake varieties, the red and the almost white, are the most esteemed; but whether opake or semi-transparent, the great merit of the stone depends on its play of colour, which when perfect, and strongly marked, produces a very beautiful and striking effect. It is employed as a ring stone, and is in considerable estimation.

CHAP. VI.

TURQUOIS——LAPIS-LAZULI——CHRYSOPRASE——SEMI-OPAL——CARNELIAN——SARDONYX——AGATE——JASPER.

TURQUOIS.

THERE are two kinds of Turquois, one a variety of fossil ivory, the other, probably, a peculiar mineral substance.

The former (called also *Turquoise de nouvelle roche*,) is of a sky blue colour, passing into greenish-blue and apple-green, often presenting black dendritical delineations, which greatly impair the beauty and value of the substance. The remains of animal organization are visible in its texture, which

presents slender fibres of a lighter tinge than the rest of the mass, either parallel, or crossing each other, so as to form a kind of net-work, according as the section has been made parallel to the length or thickness of the tusk. Its hardness is somewhat superior to that of glass; it effervesces slightly with acids, and its specific gravity varies from 3. to 3.5. It appears from analysis, to be bone or ivory, coloured by phosphate of iron.

The other kind, called *Turquoise de vieille roche*, although nearly resembling the former in colour, may be readily distinguished by the following characters:—Its texture is perfectly even and uniform; its specific gravity varies from 2. to 2.5: it does not effervesce with acids. It is composed, ac-

cording to Descotils, chiefly of alumine, coloured by phosphate of copper.

In commerce, however, the two varieties of Turquois, are for the most part, confounded together, the distinction of oriental and occidental, in this, as in many other analogous cases, serving only to discriminate the finest from the inferior specimens, without any reference to the real or supposed place of their origin, or the difference in their chemical composition.

The most valued kinds of Turquois, come from Persia, but the best specimens rarely reach Europe, being eagerly bought up by the Grandees of Persia, and of the adjacent Mahometan states, among whom, it is held in higher estimation than it enjoys in Europe. Destitute as the Turquois is, of the lustre that characterizes the real

gems, and of the variable tints which so agreeably distinguish most of the other precious stones, being likewise opake, and not admitting of a very high polish, there is nothing but the agreeable tone of its colour which can recommend this substance to the notice of the jeweller. The latter character, however, it possesses in no inconsiderable degree, especially by candle-light.

Being at present in fashion, the demand for this stone is considerably greater than the supply; on which account, imitations of it in paste, are very frequent. In these false stones, the colour is given very correctly, but the vitreous gloss and lustre is much higher than that which characterizes the real stone; and usually minute conchoidal fractures appear in the girdle, where it is

rough, in order to receive the setting, that afford a certain mark of discrimination.

Turquois is cut in low *cabochon*, and is employed for rings and ear-drops; it is frequently surrounded with Diamonds, and contrasts agreeably with gold. In Turkey and Persia, it is used principally as a ring stone, and to adorn the handles of stilettos.

LAPIS LAZULI.

The colour of this mineral is Prussian blue, smalt blue, or sky blue; it occurs in mass, never having been found crystallized; it is usually translucent on the edges; is harder than glass, but may be scratched by quartz; its specific gravity varies from 2.7 to 2.9, probably on account of the pyrites with which it is more or less mixed. When broken, it exhibits a fine grained un-

even fracture, and a faintly glimmering lustre.

When pulverized, it effervesces slightly with acids; when calcined, and afterwards digested in acids, it becomes gelatinous. The intense heat of the blow-pipe causes it to melt into a whitish enamel; but its colour is not affected by a low red heat. The colouring matter of this stone, when extracted, by a process not necessary to be mentioned in this place, forms that beautiful and durable, but expensive pigment, called ultramarine.

It is found in Siberia, near the Lake Baikal; also in Persia, in Chinese Tartary, and in the island Hainan, in the Chinese sea. It generally occurs mixed with Felspar, Quartz, and grains of Iron Pyrites,

which last substance was formerly mistaken for specks and spangles of native gold.

The beauty of its colour has introduced this stone into jewellery, notwithstanding its want of lustre, and incapability of receiving a very exquisite polish. It is usually made up into broaches, being very rarely employed as a seal stone, on account of its comparative softness.

CHRYSOPRASE.

The colour of this mineral is apple-green, passing into grass and olive green, and greenish white. It is found massive and in thick plates, but never crystallized. Its hardness is a little inferior to that of quartz. When broken, it exhibits an even or fine splintery, or flat conchoidal fracture, with a slight degree of lustre. Its specific gravity is 3.25.

Before the blow-pipe, it is infusible, but loses its colour. It has been analyzed with great care by Klaproth, and appears to be composed of

96.16 Silex
0.83 Lime
1.00 Oxide of Nickel

97.99

It passes into Hornstone and Chalcedony, and, in fact, seems to differ from this latter, in little else than colour.

When kept long in a warm and dry situation, it is apt to lose the greatest part of its colour.

It has hitherto been found only at Kosemütz, in Lower Silesia, imbedded in serpentine, and accompanied by Quartz, Opal, and Chalcedony.

As an article of jewellery, it is in but little estimation in this country, though it holds a high rank on the continent. The Kings of Prussia, in whose territory the mine of this substance is situated, allow it to be opened only once in three years, and monopolize most of the finest specimens that are procured. Pieces for ring stones, when semi-transparent, and of a very delicate apple-green colour, will sell at Berlin or Vienna, for ten or twenty guineas. It is worn both in rings and in broaches, being sometimes set with brilliants, but oftener with pearls. The best way of cutting it is *en cabochon;* when facet-cut, as is sometimes the case, it is entirely ruined. It is seen to the most advantage by candle-light, and when well made up, is very beautiful.

CHALCEDONY—CARNELIAN—SARDE.

The usual colour of Chalcedony is milk-white, tending more or less, to smalt blue: the latter varieties are the rarest, and the most esteemed, and are called by the French lapidaries, *Sapphirine*. It is more or less semi-transparent, and often exhibits concentric bands or stripes. Its hardness is about equal to that of Quartz, and it is not very easily broken; the fractured surface is even, passing into finely splintery and flat conchoidal, with little or no lustre. Its specific gravity is 2.6. Before the blow-pipe, it is infusible, but becomes of a dead opake white colour. It occurs in clustered, stalactitic, and mammillated masses; also in veins, and in balls, called Geodes, composed of concentric laminæ. It was anciently procured from the neighbourhood

of Chalcedon, in Lesser Asia, whence its name; at present it is procured from various parts of India and Arabia, from Hungary and Saxony, from different places in Scotland, from the Ferroe and Shetland Islands, from Iceland, &c.

Chalcedony is capable of an exquisite polish, and from its hardness and toughness, is an excellent material to engrave upon; hence it is made into broaches and various other elegant and ornamental articles: those varieties are preferred by the engraver, the tint of which is perfectly uniform, and uninterrupted by zones and other accidents; these latter being most suited to broaches, small vases, and similar works.

Those Chalcedonies that contain arborescent crystallizations of iron, or of manga-

nese, are called *Mocho Stones*, and when fine, bear a high price; they are used chiefly for broaches and ring stones.

Many of the Chalcedonies, especially the oriental ones, have a yellowish, instead of a bluish colour; these are known in the market, by the name of *White Carnelians.*

From the white Carnelian to the red, the gradation is quite insensible, through various tints of yellow, to orange, flesh red, and blood red, mixed more or less with brown. The most esteemed *Carnelians* are of a perfectly uniform tinge, without any undulations, and free from that muddiness of tint to which the European specimens of this beautiful stone are so peculiarly liable. The finest pieces are brought from Arabia, and from Cambay and Surat, in India.

The bright colour and high polish of Carnelian, have rendered it both in ancient and modern times, the favourite substance for necklaces, broaches, seal stones and ring stones; many of the Cameos exhibiting the most exquisite efforts of ancient art, are cut in this stone.

It is difficult to draw the line of distinction between Carnelian and *Sarde;* the latter, however, when in its greatest perfection, is of a full rich brown, tending more or less to orange or yellow, and when held between the eye and the light, exhibits a deep ruby-red colour. The Sarde is procured from the shores of the Red Sea, but is extremely rare, when compared with Carnelian, and bears a much higher price.

Both Chalcedonies and Carnelians fre-

quently exhibit two or more colours, arranged in bands, or concentric laminæ. These varieties are called *Agates;* there are also other Agates, consisting of fragments of Jasper, of Heliotrope, of Carnelian, &c. cemented by a paste of Chalcedony; these are called ruin Agates, or brecciated Agates. To the first class, belong those beautiful glandular concretions, commonly called Scotch Pebbles, which occur abundantly in the amygdaloidal rock of Dunbar, and of the hill of Kinnoul, near Perth. Every body has seen and admired their concentric zones, of delicate colour and exquisite polish, in the form of broaches, necklaces and ear drops.

Those concentric Agates, the zones of which are very distinct, and present strongly contrasting colours, go by the general

name of *Onyx*, and when of sufficient size for Cameos, they bear a high price. Those with alternate bands of green and white, and red and white, are in great estimation; but the rarest, the most beautiful, and the most valued of all, is the true *Sardonyx*, in which plates of Sarde alternate with others of nearly opake white Carnelian.

JASPER.

Jasper is clay more or less ferruginous, penetrated and indurated by Chalcedony or Quartz. It occurs, like Chalcedony, in veins and concentric nodules; it is hard, compact, and takes an exquisite polish. True Jasper is perfectly opake, but specimens not unfrequently occur, in which fragments of Jasper are imbedded in and cemented by Chalcedony; such are usually known by the name of Jasper Agates.

Jasper presents an infinite diversity of colour, red, yellow, green, &c. sometimes only one colour is visible, but often two or more are combined in the same specimen, in bands, stripes, dots, clouds and flames. The striped green and brown Jasper of Siberia, possesses great beauty, but for jeweller's trinkets, and personal ornaments, the Egyptian Jasper or Pebble, as it is generally called, is, upon the whole, the most appropriate. Its colours are wood-brown, of various degrees, beautifully and fancifully intermixed with and contrasted by other portions of a fine cream colour, producing a striking effect, when well set, as broaches or necklaces.

THE END.

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