EXOTIC MINERALOGY:

OR,

COLOURED FIGURES

OF

FOREIGN MINERALS,

AS A

SUPPLEMENT

TO

BRITISH MINERALOGY.

VOL. II.

BY JAMES SOWERBY, F.L.S. G.S. W.S.

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MDCCCXVII.

ERRATA.

Preface to Vol. I. p. 1, line 4 from the bottom, for 'supersede' read 'supersedes.'

PREFACE.

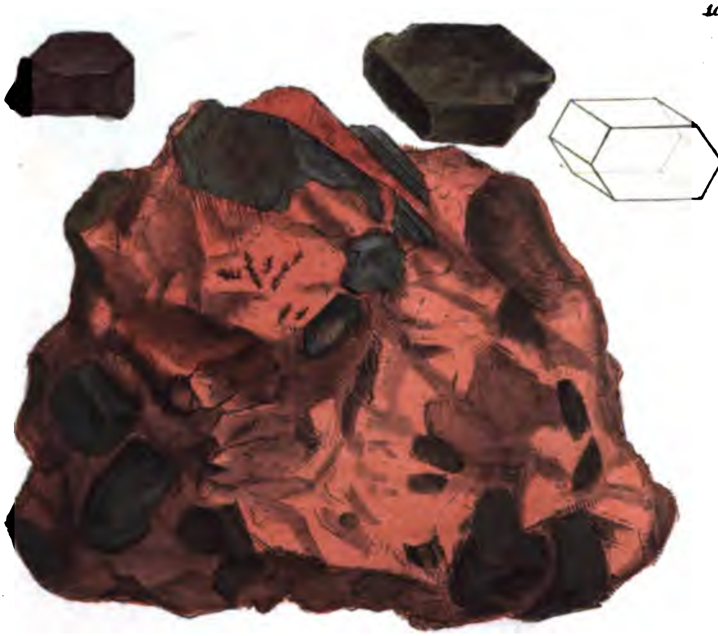
It was under the impression that about 100 plates of Minerals not known in Great Britain would have been a sufficient Appendix to British Mineralogy, for the student, that I commenced this work; but since 1811 so many new species and strongly marked varieties have crowded upon me, and so anxious have my friends been to see every thing extraordinary commemorated, that after the completion of 100 figures I still find many species not even noticed in either work; the probability therefore is, that it may be necessary to double that number, which I do not hesitate to do, knowing that the work must be proportionally more complete. For the sake of convenience I divide it into two volumes; but as that will probably be the utmost extent, I shall reserve the Index for the second.

I trust that, the utility of the work having been acknowledged by the reception the first volume has met with, the subjects contained in the second will render it equally interesting, and make the extension acceptable.

JAMES SOWERBY.

2, Mead Place,
1817.

101.



TAB. CI.

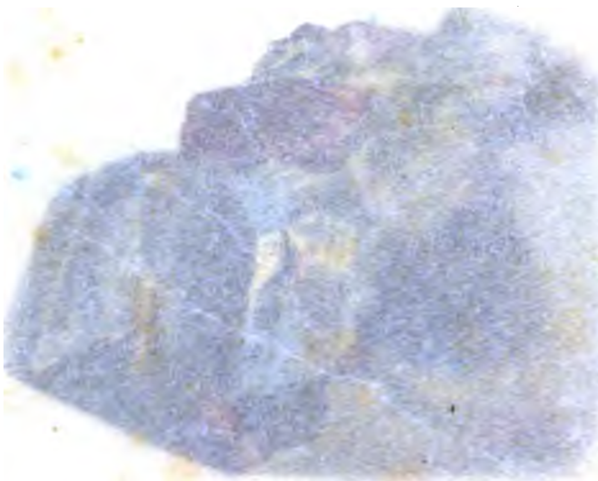
SILEX Gieseckei.

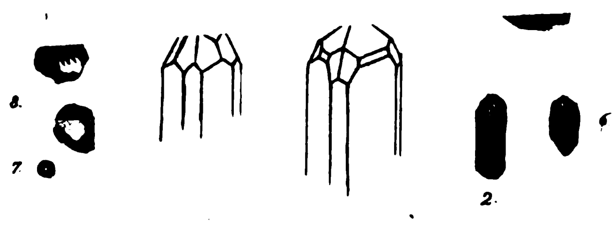
Gieseckite.

The persevering researches of Sir Charles Giesecké, in Greenland, have been productive of several new and many rare Minerals, some of which a less intelligent Mineralogist would have passed over. The fortune of war had for some time deprived him of the honour due to his discoveries; but now his merit is every where fully admitted. By way of perpetuating his name in the list of persons who have made themselves conspicuous in science, it is desirable to name some mineral after him, and we would propose the substance before us, as it appears to be quite new, and was brought by him from Akulliarasiarsuk in North Greenland. It occurs crystallized in hexahedral prisms imbedded in a claystone Porphyry, accompanied by a few crystals of red Feldspar. The crystals are usually solitary, though two or three are sometimes attached together: two of their sides are constantly wider than the remaining four; the angles measure 120°. They break easily with an uneven shining surface and blunt edges, without shewing any tendency to a foliated structure: the lustre is dull, rather waxy, and they are possessed of some transparency: the colour is olive green, varying in intensity to almost black: the hardness is between Fluor and Calcareous Spar. When heated this substance hardens, loses its colour, and with some difficulty may be fused into an opaque enamel. The sp. grav. taken from a crystal of an intermediate colour, was found to be 2.787.

The mineral nearest related to Giesechite is Pinite, but that is infusible, opaque, has a foliated fracture, and higher sp. grav.

It is to be hoped, that Sir Charles Giesecké, or some eminent chemist, will favour the scientific world with an analysis, and fuller mineralogical description than we have been able to compile from the few specimens which were in the possession of Mr. Heüland, that have come under our inspection. The one figured is placed in the cabinet of the Countess of Aylesford ; it is illustrative of all the characters, except the size of the crystals, which is sometimes much greater.

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TAB. CII.

ZIRCONIA Hyacinthus.

Zircon, or Hyacinth.

SYN. Zirkon and Hiacinth. *Kirwan*, 1, 257. *Werner*.
Zircon. *Haüy*, 2, 465. *Tabl.* 28. *Bournon Catal.* 24. *Aikin.* 184.
Jargoon and Hyacinth of Jewellers.

THE Hyacinth has of late years been found in many places besides the Isle of Ceylon, from whence it is imported for Jewellers. Usually its crystals are very small, and found in the beds of rivers among sand that appears to be either the debris of trap-rocks, or volcanic, or mixed with iron-sand, as in Ceylon, (see figs. 3, 4, and 6,) where they are also accompanied with oriental Ruby, Spinell, Tourmaline, &c. Sometimes the crystals are minute, but very clear and brilliant;---such accompany the Platinum from South America.

Larger crystals of a redish brown colour, and imperfectly transparent, are found imbedded in Sienite at Friedrickschwärn in Norway, see figs. 1 and 2. Small crystals have been met with in Basalt, Trap, and Volcanic matter, in several parts, especially in Auvergne. In all these situations the crystals are perfect all round, and very rarely grouped together. The primitive form, according to Haüy, in an octohedron (which is represented with the edges truncated at fig. 5,) whose pyramids measure 82° 50′ upon each other; this is frequently modified into a four or eight-sided prism, with a four-sided termination, or into a dodecahedron with unequal rhomboidal planes: the prism is sometimes terminated by acute eight-sided pyramids of which indications are shewn in fig. 2, and the outlines. Besides the crystallized form, Zircon is found in grains which are often colourless, or greyish, see fig. 8, with a peculiar smoky tinge that distinguishes them from Diamonds, in place of which Jewellers are tempted to use them by the play of colours they exhibit when cut. This variety is more particularly called Jargoon by the artizans. The coloured varieties loose their colour by being heated without the transparency being injured.

Fig. 1 is taken from a specimen in the British Museum; the matrix is a Sienite, composed of grey Feldspar, with an internal reflection of blue, and Hornblende; containing also Pyrites and Molybdenum.

Fig. 7, a red grain from Expailly in France.

The different varieties of Zircon afford nearly the same constituents as appears from the following analyses:

	From Ceylon, by Klaproth.		From Expailly, by Vanquelin.
Zirconia	69.0	70.0	66
Silica	26.5	25.0	31
Oxide of Iron	0.5	0.5	2
Loss	4.0	4.5	1.
	100.0	100.0	100

Zirconite from Norway, by Klaproth:

Zirconia	65
Silica	33
Oxide of Iron	1
Loss	1
	100.

The sp. grav. varies from 4261 to 4721.

103.

TAB. CIII.

ANTIMONIUM nativum.

Native Antimony.

SYN. Native Antimony. *Kirwan,* 2, 245. *Aikin,* 56.
Gediegen Spiesglas. *Emm. b.* 2, *s.* 464.
Antimoine natif. *Haüy,* 4, 252. *Tabl.* 112.

NATIVE Antimony is possessed of all the characters of the pure metal obtained by art. It is of a laminated structure; the laminæ crossing each other in ten different directions, four of them parallel to the faces of a regular octohedron, and six to the faces of a rhomboidal dodecahedron, form a very complicated arrangement. Its volatility, inflammability, and peculiar scent, are the striking features of its globule in the state of fusion. It is a rare mineral: it was first found by Swab, at Sahlberg in Sweden: it has been also found in the Hartz; the most magnificent specimens, however, have been brought from Allemont, in Dauphiny; they are large cellular masses, with compact white oxide of Antimony filling the hollows.* The matrix is Quartz. A variety occurs at the same place, composed of minute foliated grains united into a largely laminated mass; it contains a variable portion of Arsenic; it is excessively brilliant.

For the figures given of these two varieties I am indebted to Mr. H. Heüland.

Klaproth's analysis of Antimony from the Hartz gave,

Antimony	98.00
Silver	1.00
Iron	0.25
	99.25

* When fresh broken they are so brilliant that it is impossible to give any idea of the lustre in a figure.

TAB. CIV.

CUPRUM carbonatum, cœruleum.

Blue Carbonate of Copper.

SYN. Kupferlazur. *Werner.*
Mountain Blue. *Kirwan,* 2, 129.
Cuivre carbonaté bleu. *Haüy,* 3, 562. *Tabl.* 89.
Cuivre bleu. Cuivre azuré. *Bourn. Cat.* 239.
Blue Copper. *Aikin,* 89.

THIS splendid variety of a well known and British mineral is so extraordinary both in form and size, that I thought a figure of it would be acceptable. The primitive form of blue Copper has been determined by Bournon to be an upright rhomboidal prism of 56° and 124°: this form is strongly marked in the larger specimen before us, and is modified by truncatures of the acute solid angles and bevellments of two of the edges of the base, and two of the terminal edges, as shewn in fig. 1. Fig. 2 has crystals of a more complicated form, where all the solid angles are truncated, the same horizontal edges as before mentioned bevelled at a more acute angle, the obtuse vertical edges truncated, and each of the acute vertical edges replaced by two faces alternately inclined towards the horizontal edges. These crystals are attached to a mass of the same substance, and in some parts are cloathed with, or even apparently changed into velvetty green carbonate of Copper. Both specimens are from Chessy, where they were imbedded in impure carbonate of Magnesia and Iron Ochre; see tab. 99.

105.

TAB. CV.

ARGILLA ambigua.

Blue Feldspar.

Syn. Feldspar bleu céleste. *De Born. I.* 378.
Dichter felds-spath. *Emmerling, I.* 271.
Splittriger Lazulit. *Karsten, tabl.* 46.
Feld-spath bleu? *Haüy, II.* 605. *tabl.* 60.
Feldspath compacte bleu. *Bourn. Catal.* 58.
Blue Feldspar of Krieglach. *Aikin,* 188.
Blauspath. *Werner.*

This long known mineral has been so generally treated of as a variety of compact Feldspar, that modern writers seem to hesitate in considering it as a distinct species from it; but the result of its analysis should clear away all doubts on that head, even though the laminæ be found to correspond with Feldspar in their direction, being perpendicular to each other. Its relation to Azurite is closer, both in general appearance and composition, but it is softer and heavier: the Azurite is also more distinctly laminated, and the laminæ appear to be slightly inclined. Since Azurite itself, from the obscurity of its characters, is not a well established species, it is difficult to say how far Blue Feldspar may be connected with it; I therefore still consider it as an ambiguous mineral, and have named it accordingly, in the hopes that something may be hereafter discovered that will throw a light upon both species, and wipe away an unscientific appellation.

Blue Feldspar is disseminated among massy Quartz, accompanied with Talc in the fissures, in the same way as common Feldspar occurs in Granite; it has only been found in the valley of Murz, near Krieglach, in Stiria where it is abundant. I am indebted to Professor Cheirici for specimens brought by himself from that spot.

The specific gravity is from 3.046 to 3.060: before the blow-pipe it loses its colour, but does not melt alone: aided by Borax it affords a black glass.

Klaproth's analysis gives the following proportions:

Argilla	71.00
Silicia	14.00
Magnesia	5.00
Lime	3.00
Potash	0.25
Oxide of Iron	0.75
Water	5.00
	99.00

106.

TAB. CVI.

ARGILLA fibrosa.

Fibrolite.

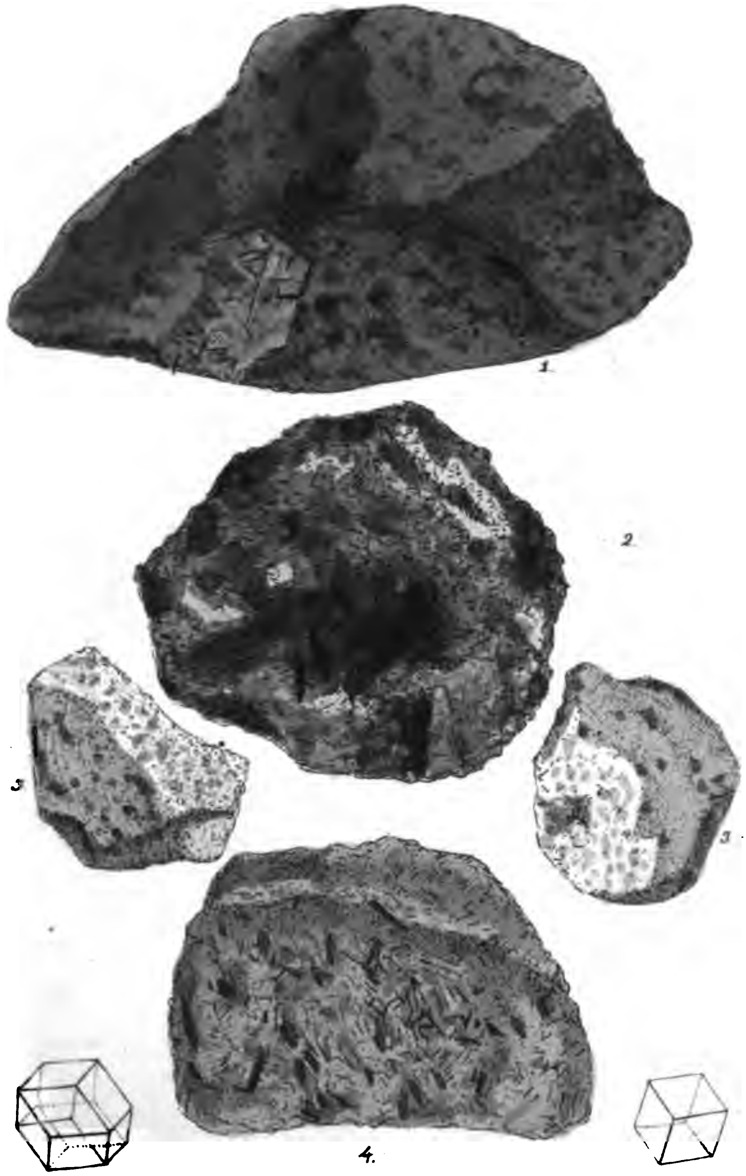
Syn. Fibrolite. *Bournon in Phil. Trans.* 1802, p. 289, 301. *Catal.* 54. *Haüy Tabl.* 60.

The Count de Bournon was the first person to describe this mineral, which he discovered among the substances that compose the matrix of Corundum, whether from the Carnatic or China. From the Count's description it appears, that it is rather harder than Quartz, of a fibrous structure, of a white or dirty grey colour, and when crystallized forms a rhomboidal prism of about 80° and 100°, but this form he has only met with once. It is infusible; the spec. grav. is 3214; upon collision it emits a deep reddish light. Bournon states, that it cannot by friction be made to give signs of electricity; but Haüy observes, that when insulated it acquires by friction a very remarkable degree of resinous or negative electricity.

Chenevix has given two analyses; one of Fibrolite, from the Carnatic, the other of that from China; the proportion of iron in the latter is the cause of its having a reddish tinge.

Carnatic.		China.	
Silex . . .	38.	Silex . . .	33
Alumina . .	58.25	Alumina . .	46
Iron and loss	3.75	Iron . . .	13
		Loss . . .	8
	100.00		100

The figures of the larger fragments are from those in the British Museum; the smaller figure is from a specimen in a matrix of reddish granite from China: for this I am indebted to the kindness of Sir Joseph Banks, bart.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TAB. CVII.

SILEX Haüyi.

Hauyne.

Syn. Haüyne. *Neergaard Journal des Mines, No.* 125, *p.* 365. *Bournon Catal.* 47. *Aikin,* 215.
Latialite. *Gismondi. Haüy Tabl.* 62.
Saphirin. *Nose.*

This rare mineral is described as occurring in rhomboidal dodecahedrons, but I have not been able to meet with a specimen in which I could discover a single regular crystal. It generally assumes the form of rounded grains dispersed through the gangue: sometimes the grains are collected into small masses, and of these masses some parts are very pale blue, or even white, while other parts retain the blue colour in all its beauty. The variety among dark brownish-green Mica, accompanied by Meïonite, &c. generally exhibits this arrangement. The variety from near Rome is generally composed of more or less insulated grains imbedded in a cellular stone, by some called Basalt, but which has much more the appearance of volcanic Scoria. The specimen I have figured of this, contains a large grain, or rather nodule, of a dull pale violet colour near the surface, and lilac in the centre: it has fortunately been broken through so as to exhibit not merely its foliated structure, but the position of its laminæ parallel to three sides of an obtuse rhomb: there are also sufficient indications of laminæ intersecting these, to prove that the nucleus is a dodecahedron with rhomboidal faces similar to that of Garnet.

Haüyne is equal in hardness to Quartz: the spec. grav. is from 3.100 to 3.333: it remains unchanged in colour, and is not melted by the action of the blow-pipe. Nitric acid allowed to remain upon its powder changes it into a white transparent jelly. The analysis by Vauquelin gave the following constituent parts:

Silex	30.
Argilla	15.
Lime	5.
Potash	11.
Oxide of Iron . . .	1.
Sulphate of Lime . .	20.5
Sulphureted hydrogen, a trace	
Loss	17.5
	100.0

We should not think the name a compliment to the penetrating crystallographer Haüy, did not the scarcity of the substance in some measure represent the rare occurrence of such a comprehensive genius.

Fig. 1 a specimen from near Rome.

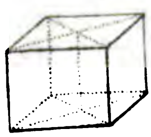
Fig. 2 the variety from the neighbourhood of Vesuvius, in a mass of Mica, with Meïonite, Epidote, &c.: this is in the cabinet of G. B. Greenough, Esq.

Fig. 3 from Albano, mixed with a white substance, probably Feldspar, in Basalt, containing Augite and Mica.

Fig. 4, from the Laager See, in a mass composed of transparent grey crystals of Feldspar, with Augite and yellow Sphène. I am under obligations to Proff. Strömeyer for the specimens from which these two last figures are taken.

The geometrical figures shew the rhomb as displayed in fig. 1 and the dodecahedron resulting from a combination of all its fractures.

102.



TAB. CVIII.

SILEX anthophyllithus.

Anthophyllite.

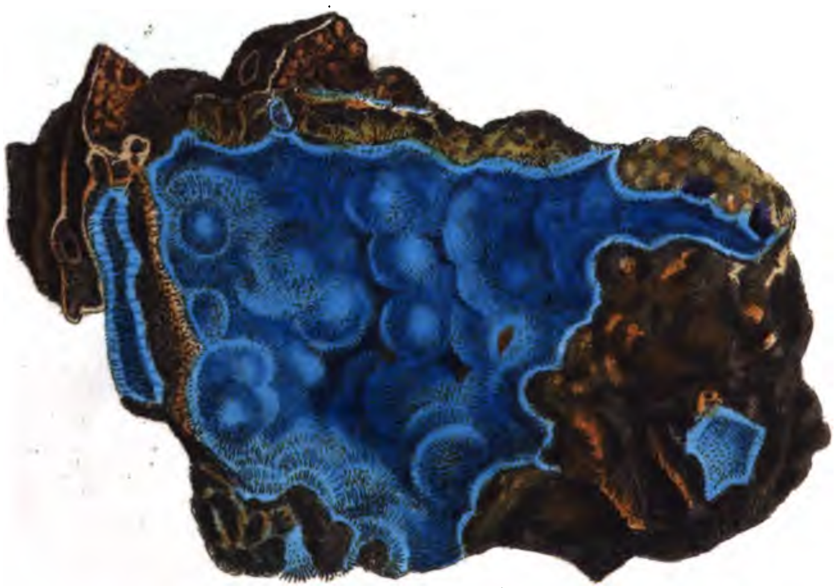
Syn. Antophyllith. *Schumacher.*
Anthophyllite. *Haüy Tabl.* 58. *Bournon Catal.* 96. *Aikin,* 223.

A mineral nearly related to Hyperstein, but softer and more distinctly laminated; it was first found at Kongsberg in Norway, aggregated with Hornblende: its structure is sometimes radiated, but the variety I have figured is in irregular crystals, interrupting one another, and united into a mass; among them is a small portion of green Hornblende; it is from Kupferberg, in Bavaria, and was sent me with a collection of foreign minerals, by my valuable correspondent, Professor Strömeyer.

Anthophyllite is very distinctly foliated in one direction, and the surface of the laminæ displays a slightly metallic lustre; sections are easily obtained, perpendicular to the laminæ, producing the other sides of a rectangular prism, these are dull: indications of sections parallel to the diagonals of the prism are also visible, as fine shining lines, when the mineral is moved between the eye and a light. It is infusible, but becomes darker coloured when heated by the blowpipe; it is nearly as hard as glass; the spec. grav. is from 3.118 to 3.285.

John gives us the following analysis of the variety from Norway:

Silex	62.66
Argilla	13.33
Magnesia . . .	4.0
Lime	3.33
Oxide of Iron . . .	12.
Oxide of Manganese .	3.25
Water	1.43
	100.00



TAB. CIX.

CUPRUM velutinum.

Velvet Copper Ore.

SYN. Kupfersammterz. *Karsten Tab.* 62. *Werner.*
Velvet Copper. *Jameson's System, ed.* 2. iii. 153.

THIS splendid and valuable copper ore not having hitherto been analyzed, it is impossible to give it a correct name or place in the system; it is distinguished from other copper ores by its colour which is a pure rather pale blue, and the extreme delicacy of its fibres, which gives it the lustre of velvet. It encrusts the surface of mammilated brown Ironstone; hitherto it has been found only at Oravicza in the Bannat, and is rare there. The British Museum is in possession of the fine specimen figured.

It has been conjectured, but I do not know upon what grounds, that it is a combination of Oxide of Copper with Silex.

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TAB. CX.

CERIUM fluatum.

Yttrocerite.

SYN. Yttrocerite. *Gahn and Berzelius in Thompson's Annals*, ix. 72.
Double Fluate of Cerium and Yttria. *Ib.* ix. 453.

FOR the discovery of the various minerals that contain Fluate of Cerium, we are indebted to the researches of Gahn, Berzelius, Wallman, and Eggertz: they have been found in the neighbourhood of Fahlun, both in the mines of Broddbo and Finbo. The most abundant is that known by the name of Yttrocerite, and which appears to be a mixture of the Fluate of Cerium and the Fluate of Yttria, with Fluate of Lime; the purple colour common to which it often possesses. The following description of this is extracted from Thompson's Annals:

"Its colour is various, violet, greyish red, white, grey, often all mixed in the same specimen. In amorphous masses, varying in size from a thin crust to half a pound in weight, disseminated through quartz. Lustre glistening. Opake. Scratched by the knife and by quartz. Scratches Fluor spar. Spec. grav. 3. 447.

"Before the blowpipe it loses its colour, and becomes white; but does not fuse of itself, but when mixed with Gypsum readily melts into a bead. When in fine powder it dissolves completely in boiling muriatic acid, and the solution has a yellow colour; its constituents are—

Lime . . .	47.68 to 50.00
Yttria . .	9.11 to 8.10
Oxide of Cerium	18.22 to 16.45
Fluoric acid .	25.05 to 25.45
	100.01 100.00
Or Fluate of Lime .	65.162 to 68.18
Fluate of Yttria .	11.612 to 10.60
Fluate of Cerium	23.226 to 20.22
	100.000 99.00

A Fluate of Cerium, crystallized in six-sided prisms, containing of fluate of protoxide of Cerium 30.43, and of fluate of peroxide of Cerium 60.00 has been found, but specimens have not reached England. Another fluate, holding double the quantity of Cerium, amorphous, and strongly resembling porcelain Jasper, is also mentioned. A fourth mineral, more common than either of these, consisting of a variable proportion of the fluates of Cerium and Yttria, occurs in the quartz in small nodules or surrounding, or even mixed with Gadolinite; it is so soft that it may be easily scratched by the nail: its colours are deep red, pale red, white, nearly yellow, or reddish brown: this is the double fluate of Cerium and Yttria above quoted; it is found at Finbo.

Besides the substances already mentioned in these minerals, there was discovered by Berzelius, in the deuto fluate of Cerium, in amorphous masses from Finbo, which is analogous to the crystallized kind before mentioned, a new earth agreeing in some of its characters with Zirconia, but differing in several others, especially in not being precipitated from its solutions by sulphate of Potash; this earth was also found in the double fluate of Cerium and Yttria, but its presence was not manifest in every specimen examined, and its existence could not be discovered by any effect it might have produced on the external characters. In the fifth volume of the Afhandlingar i Fysik, Kemi och Mineralogi, a full detail of these minerals, along with the other productions of the mines in the neighbourhood of Fahlun, is contained, together with an account of the properties of this new earth, which Berzelius proposes to name Thoria, from Thor, an ancient Scandinavian deity.

The upper figure represents a thin crust of the first mentioned fluate, called Yttrocerite, forming a film upon the surface of a fissure, in a mass of Pyrophysalite: this is from the British Museum.

The lowest figure is from an irregular mass of the same in white Feldspar, with Quartz and greenish Mica; lent me by John Dunston, Esq.

The other figure is from a rare specimen sent to the British Museum by Berzelius; it is the red kind, in some of which the Thoria has been discovered: it is a small reddish nodule, surrounded by green Mica, and imbedded in an aggregate of white Feldspar and Quartz.

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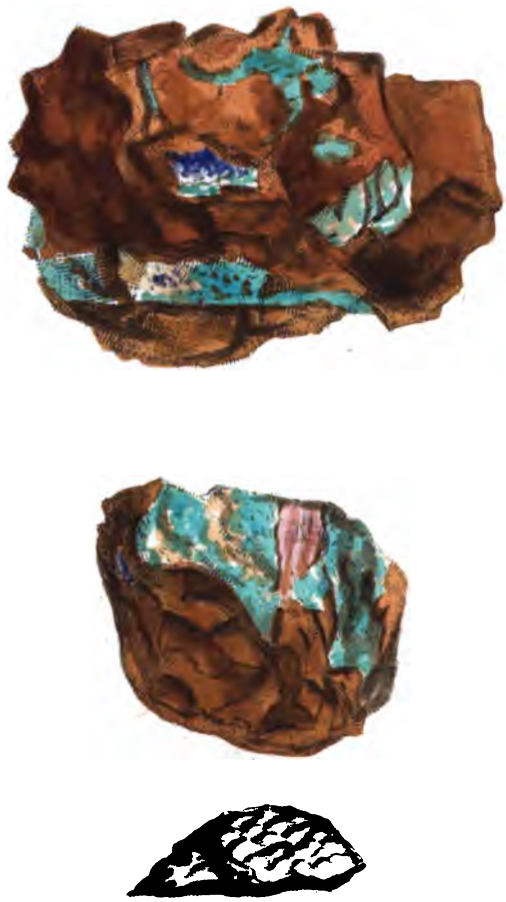

TAB. CXI.

ARGILLA allophanes.

Allophane.

SYN. Allophan. *Strömeyer annalen der physik. J.* 1816. *St.* 10. *Thomson's Annals of Phil.* ix. 244.

THE specimens of this new mineral were communicated by Professor Strömeyer; they were found at Gräfenthal, near Saalfeld.

Allophane; so called from its deceptive aspect, arising from its situation and colour, whence it might be taken for an ore of Copper, and not an earthy mineral: occurs in a mammillated form, lining, or filling the hollows of a vesicular ochraceous Iron stone, and is accompanied by blue and green Carbonate of Copper. Its fracture is perfectly conchoidal, it is soft and very brittle; the external surface is dull: the lustre of the fractured parts is vitreous: it is transparent. The specific gravity varies from 1.852 to 1.889.

Strömeyer has given the following analysis, from which it appears to be an Hydrate of Argilla and Silex, coloured by Carbonate of Copper.

Argilla - -	32.202
Silica - -	21.922
Lime - -	0.730
Sulphate of Lime	0.517
Carbonate of Copper	3.058
Hydrate of Iron	0.270
Water - -	41.301
	100.000

TAB. CXII.

SILEX dipyrus.

Dipyre.

SYN. Dipyre. *Haüy* iii. 242. *Tabl.* 55.
Schmelzstein. *Werner.*
Dipyre. *Aikin,* 208.

DIPYRE has hitherto been found only in one place, where it was discovered so long ago as 1786, by Lelièvre and Gillet Laumont, on the right bank of the gave de Mauléon, in the Hautes Pyrenees, imbedded in a grey clayey earth, accompanied by green or white Talc and cubical Iron pyrites. It is either in very small prismatic crystals that are scattered through the gangue, or in small masses of a fibrous structure. The crystals are rectangular prisms, with two or four of their vertical edges truncated, so as to produce six or eight-sided columns: the ends appear to be uneven, at least I have not met with any that exhibit even faces. They are imperfectly transparent in some parts, and opaque in others, with a weak lustre, wherefore, they have a slightly pearly aspect: Haüy describes the longitudinal fracture as displaying laminæ parallel to all the eight sides of the prism; the cross fracture is conchoidal. It is hard enough to scratch glass, but very brittle; the massive variety (see the lower fig.) has sometimes a loose structure. When slightly heated it emits a faint light; before the blow-pipe it readily melts with intumescence into a semitransparent globule. The specific gravity is 2.630.

Analysis by Vauquelin.

Silex - - -	60
Argilla - - -	24
Lime - - -	10
Water - - -	2
	96

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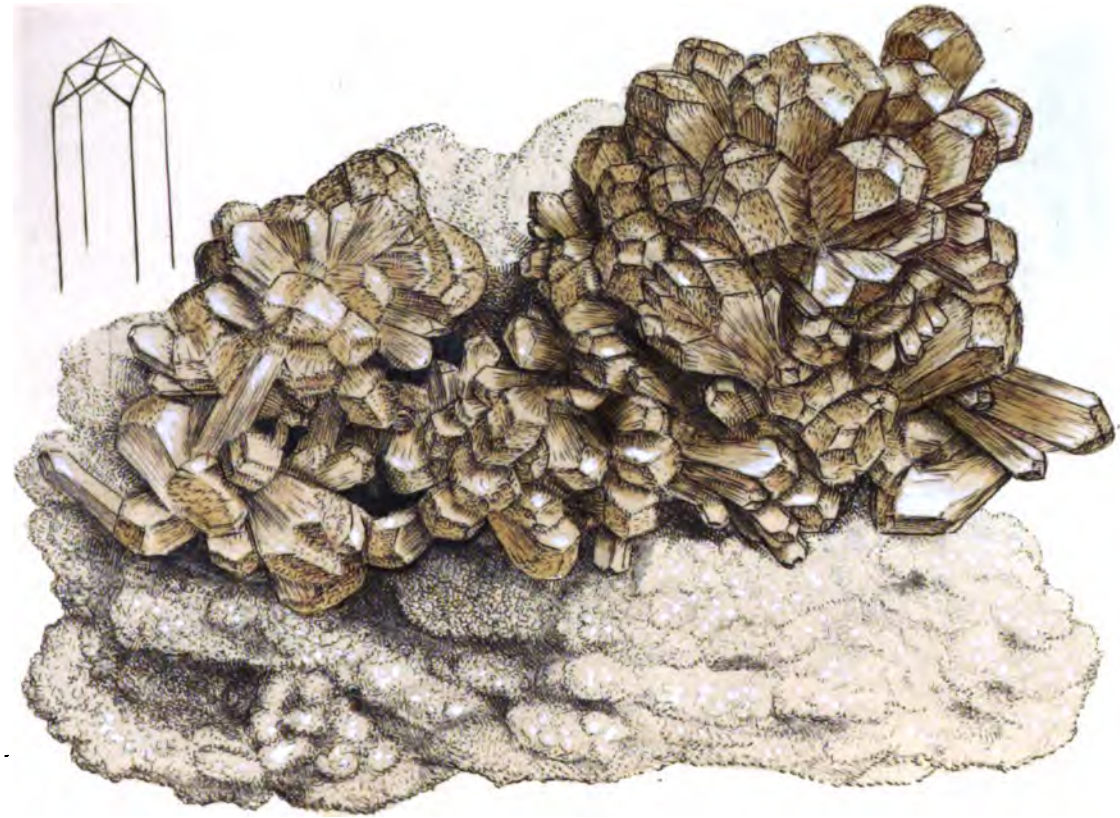

TAB. CXIII.

SILEX fulgens.

Stilbite.

SYN. Silex fulgens. *Brit. Min. tabs.* 259 & 524.
Strahl Zeolith. *Werner.*
Zeolithe rayonnée. *Broch.* i. 301.
Stilbite. *Haüy* iii. 161. *Tabl.* 48. *Aikin* 209. *Bournon Catal.* 101.

The present specimen of Stilbite is a variety by no means uncommon, although not met with in the British islands; its beauty renders it interesting.

The crystals are in prismatic groups, curiously expanded at each end, but still retaining the general form of the elongated dodecahedron, exhibited at the top of the plate; the surface of the specimen beneath the Stilbite is encrusted with mealy Zeolite (or nearly pulverulent Mesotype); it is from Ferro.

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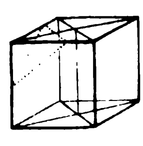


TAB. CXIV.

SILEX laminosus.

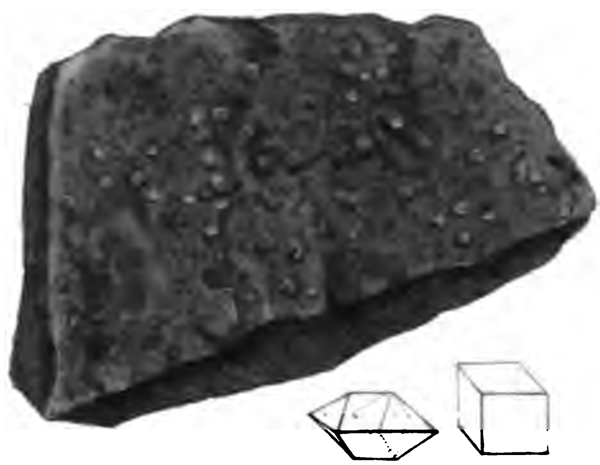
Schaalstein.

SYN. Schaalstein. *Werner.*
Tafelspath. *Karsten Tabl. s.* 44.
Spath en tables. *Haüy Tabl.* 66.
Tabular spar. *Aikin* 183.

SCHAALSTEIN is well recognized by its foliated fracture, with laminæ parallel to the faces of an apparently rectangular prism, and by falling to pieces after a slight effervescence in Nitric acid. Its analysis also places it at a distance from any other mineral that bears an external resemblance to it. Haüy speaks of fractures in the direction of the diagonals of the prism, parallel to the sides of which it most easily breaks (which, by the bye, he says is slightly rhomboidal) and of other oblique joints; but the cross fracture is so splintery, that it must be a difficult matter to ascertain them with precision. It is seldom translucent, and in general is full of minute cracks in every direction; it is soft enough to yield to the knife, but scratches glass. The spec. grav. is 2.86. It has been found in the island of Ceylon, accompanying the Cinnamon-stone (see tab. 83,) and at Dognatska in the Bannat, in foliated Limestone of a blueish colour along with granular Hornblende of a light green colour and brown Garnets; specimens from this latter place have been selected for figuring.

The following is Klaproth's analysis:

Silex	-	-	-	50
Lime	-	-	-	45
Water	-	-	-	5
				100



TAB. CXV.

SILEX Melilithus.

Melilite.

SYN. Mèlilite. *Delamétherie Thèorie de la Terre,* 2, 273. *Fleuriau de Bellevue Journal de Phys.* 51, 455. *Haüy Tabl.* 64. *Aikin* 214.

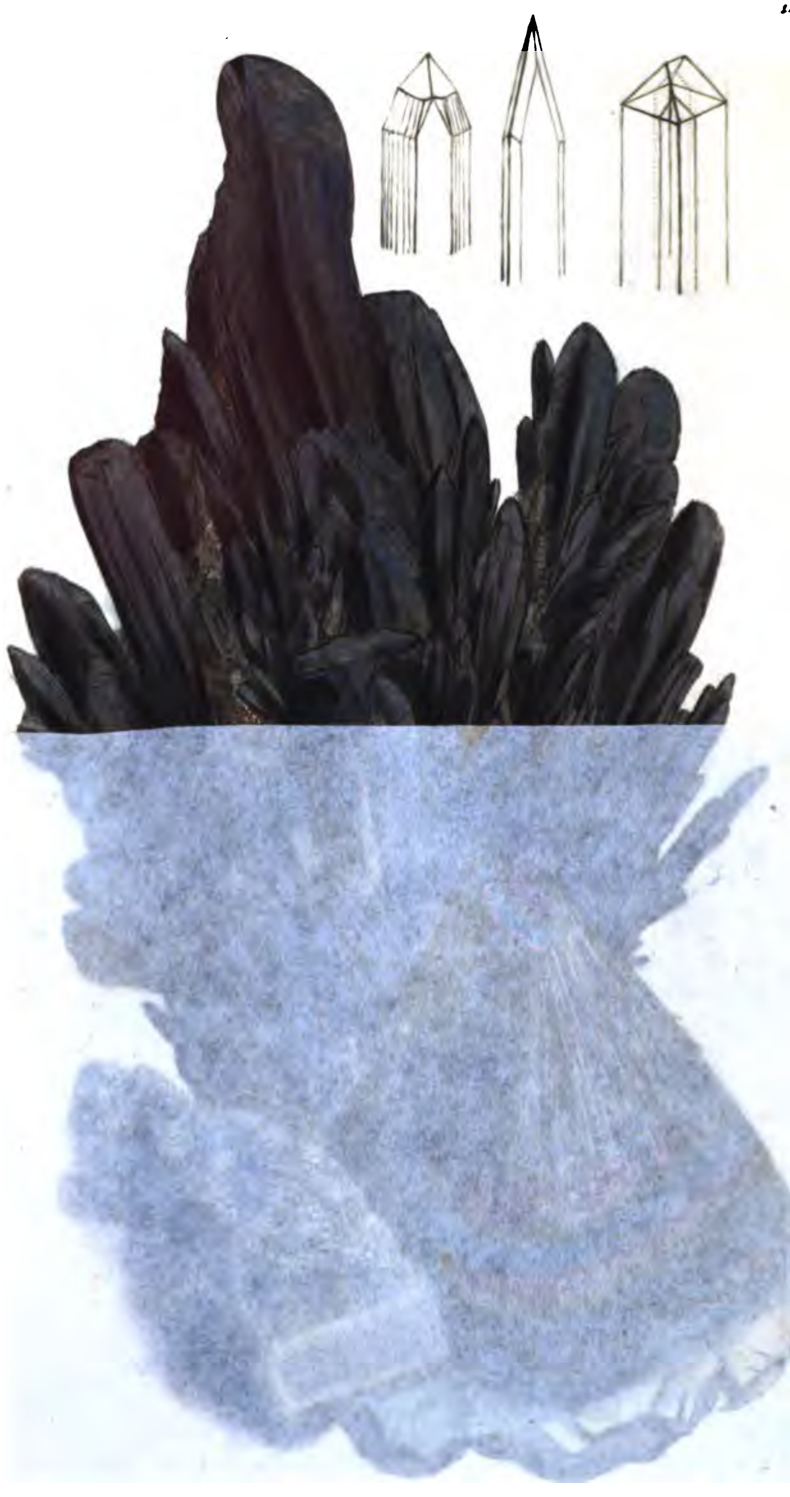
THE most complete account of this mineral is given by Fleurian de Bellerne, and it seems to have been but little noticed by later mineralogists. It appears to constitute a considerable part of the mass of Lava, at Capo di Bove, near Rome, and with which the streets of Rome are paved; it manifests itself in the stone by its yellow colour, and upon the surface of fissures, in crystals; the larger ones are rectangular parallellograms; they are partly imbedded, and are often coated with an opaque lighter coloured crust; besides these, are very minute crystals, scattered almost loose over the surface, in the form of octohedrons composed of flattish pyramids joined by their rectangular bases, which are of a darker colour, but should seem to be of the same nature. They are accompanied by a variety of Nepheline, called Pseudonepheline, and minute crystals of magnetic Iron. Melilite is fusible, without ebullition, into a bottle green transparent glass; its powder thrown into nitric acid forms a jelly, but fragments only lose their colour, and become porous and more difficult to melt. The primitive form appears to be a rectangula prism, parallel to the sides of which it may be split with some difficulty. Fleuriau observes, that the incidence of the faces of one pyramid of the octohedron upon those of the other appears to be 115° for one set, and 70° for the other; he has also observed the primitive crystal truncated upon two or four of its edges. We are not acquainted with any analysis.

TAB. CXVI.

ANTIMONIUM sulphureum.

Sulphuret of Antimony.

SYN. Antimonium sulphureum. *Brit. Min. t.* 365.
Antimoine sulfuré. *Haüy* 4, 264. *Tabl.* 112. *Bournon Catal.* 398.
Grau Spiesglaserz. *Werner.*
Grey Antimony. *Aikin* 123.



TAB. CXVI.

ANTIMONIUM sulphureum.

Sulphuret of Antimony.

SYN. Antimonium sulphureum. *Brit. Min. t.* 365.
Antimoine sulfuré. *Haüy* 4, 264. *Tabl.* 112. *Bournon Catal.* 398.
Grau Spiesglaserz. *Werner.*
Grey Antimony. *Aikin* 123.

Sulphuret of Antimony has been found in Great Britain only in acicular crystals or foliated masses; in other countries it frequently occurs in large groups of well-defined crystals, such as that now figured, probably from Auvergne, which is lent me by my friend, Mr. Plasted. The lesser figures are intended to represent the plumose variety, or that in minute down-like fibres, and the Iridescent scopiform one. The former is among loose minute crystals of Quartz, upon Sulphate of Barytes; both are from Hungary.

The primitive form of this ore is by Haüy supposed to be an octohedron, divisible by three planes, which united together, would form a rectangular prism; the fractures parallel to this octohedron are very deficient in neatness and lustre, while two of the three that form the prism are tolerably well distinguished, and the third presents a surface equal to the most perfect mirror, and is very easily obtained in the longitudinal direction of the crystals; it is with good reason, therefore, that Bournon has adopted this prism for the nucleus, independently of its being the simplest form; the proportions of the terminal faces to the height of the prism, has been determined by Bournon, to be as the numbers 24, 16.8, and 21. The pliability of this substance, first observed by Bournon, is analogous to that of crystallized Sulphate of Lime, and probably, like it, depends upon the proportions of the sides of the nuclei to each other.

I have given outlines of two crystals from the large specimen, and of a third out of a specimen from Wolfsberg, in the Hartz, by favour of Professor Herrmann: the latter is a rare modification to find complete; the commencement of it is shewn in one of the others.

The grouping of the crystals in the large specimen is rather whimsical; one small one in particular lying across the summit of another has been bent, and seems so placed on purpose to exhibit the character of pliability.

TAB. CXVII.

SULPHUR nativum.

Native Sulphur.

Syn. Sulphur nativum. *Brit. Min.* ii. 173. *t.* 190.
Soufre. *Haüy Tabl.* 68. *Bournon Catal.* 162.
Sulphur. *Aikin* 58.

Crystallized Sulphur has hitherto not occurred in Great Britain, it becomes therefore a fit subject to figure in an appendix to British Mineralogy. I have selected for this purpose the most magnificent group of crystals ever brought to England; but as the mass upon which they repose is very broad, I have omitted a great portion of it, using principally the central parts, and condensing them a little. The crystals, although large, are not so remarkable for size as for their perfection and elegant distribution over a surface composed of acute crystals of Corbonate of Lime, covered by an opaque rough crust. It is the produce of a mine at Conilla, near Cadiz, which was opened many years ago by the King of Spain, for the express purpose of extracting a few of its magnificent treasures, with some of which the late Mr. Forster was indulged: the mine was immediately closed again, and I am told the works were destroyed by the French, while they blockaded Cadiz, towards the close of the last war. For the figure I am indebted to the liberality of Mr. Heüland, who now possesses the treasures above alluded to, and which I have often admired.

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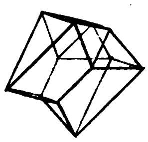

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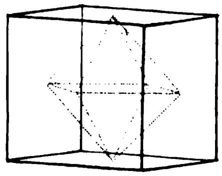

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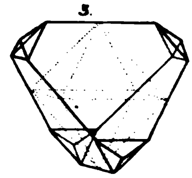

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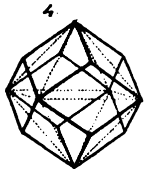

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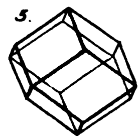

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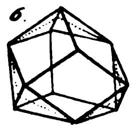

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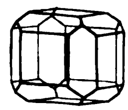

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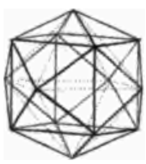

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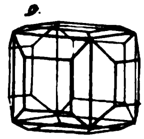

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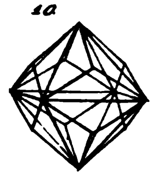

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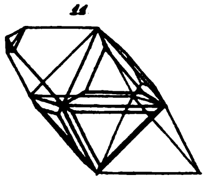

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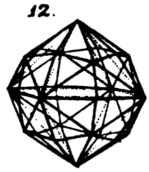

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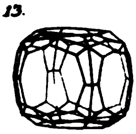

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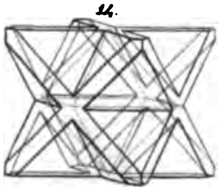

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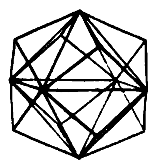

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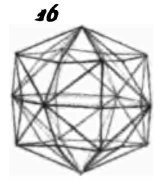


TAB. CXVIII and CXIX.

CARDO Adamas.

Diamond.

SYN. יהלם* *Exodus* xxviii. 18. Αδαμας *of the Greeks.*
Adamas. *Plinius Hist. Nat. l.* xxxvii. c. 4.
Diamant. *Haüy,* iii. 287. *Tabl.* 69. *Bournon Catalogue raisonné des Diamants dans le cabinet de Sir Abraham Hume, bart.*
Diamond. *Kirw.* 1, 393. *Aikin,* 58. *Mawe's Travels in the Brazils, p.* 137.

Of all gems the diamond has, from the remotest ages, been the most universally and deservedly esteemed; of its first discovery in India little or nothing appears to be known, and the Mines of Golconda have been for centuries tributary to grandeur, and yet do not appear to be exhausted. Of late years an immense number of diamonds has been obtained from the Brazils, particularly from the bed of the river Jigitonhonha, in the district of Serra do Frio, and also from the Rio Plata. The diamonds are found in a kind of gravel, called Cascalhão, containing milky and other quartz pebbles, blackish fragments of Chert, magnetic Iron in minute grains, and Gold dust mixed with light coloured earth. Sometimes the pebbles are cemented together by brown oxide of Iron, in the

* Either from הל (or יהל) to emit light; or from הלם to beat, as *αδαμας* is from *α* not, and *δαμαω* to subdue, from its invincible hardness (see Parkhurst's Lexicon): the former derivation is preferred by several learned Hebraists, as I am informed by Mr. Joshua Van Oven, who himself rather inclines to it.

form of a Breccia, that is distributed in rounded lumps among the gravel, and sometimes encloses gold and diamonds. The gems are usually minute, weighing frequently less than a grain; many are however found that weigh five or six carats; a few have been picked up of a much greater size, some of which have been cut, others are still kept rough. The largest of the cut ones is that mentioned by Tavernier, as belonging to the Great Mogul, it weighs 297 carats and nine-tenths; it is said that before it was cut it weighed 900: it was found in the middle of the sixteenth century, in the mine of Colore, near Golconda. Various other large diamonds are on record; the most curious is a sky-blue one, among the crown jewels of France, weighing 67 carats and two-sixteenths; but, perhaps, the most beautiful one is the Pit diamond, it weighs 136 carats. Daniel Eliason, Esq. has in London, a nearly perfect blue* Brilliant, of 44½ carats, that is superior to any other coloured diamond known.

The finest rough diamond is probably one mentioned by Mawe, in his travels in the Brazils† as belonging to the Prince Regent of Portugal; it obtained the pardon of three Exiles, who found it in the bed of the river Abaité, in the interior of the Brazils: it is an octahedron, weighing seven-eighths of a troy ounce.‡

Diamonds have never yet been found in the rock, if it were a rock, in which they were first formed; they are always crystals, that are perfect all round, as if they had been deposited in a soft mass or fluid: the crystals are

---

* Remarkable for so little of the purple, that paste which is liable to that tinge, cannot be found to imitate it.

† To this very interesting work I must beg to refer, for the particular account of the diamond mines, and the method of washing and picking the Cascalhao for them

‡ There is in Sir Thomas Cullum's possession a glass model, curiously cut, with concave facets, said to be of a Brazilian diamond, in the Royal Cabinet at Lisbon, which weighed 1680 carats; its length is 4 inches, depth 2, and width 2½: this stone has generally been spoken of as still uncut and is by most considered to be a Topaz.

rarely grouped two or three together, and except the primitive, a regular octahedron, they have almost constantly convex faces; the faces are sometimes so convex, or the clusters of crystals so arranged, as to produce spherules.

The crystallization was but little known until Bournon's Catalogue of Sir Abraham Hume's collection was published, from which it appears that 20 modifications have been calculated, and 72 more pointed out: as many of these modifications differ from each other only a few degrees in the inclination of the planes they produce upon the primitive, it is evident that the succession of several of them will have the appearance of a single rounded face.

Tab. 118. Contains portraits of a series of diamonds, sufficiently extended to shew the general characters of their form and modifications, which are further illustrated by outlines in *Tab.* 119.

Tab. 118. *fig.* 1. A tetrahedron, with two angles truncated in its passage to the octahedron.

Fig. 2. An octahedron; diamonds of this form have flat faces with sharp edges, and generally polished; but some oriental ones are rough, as if corroded.

Fig. 3. A large irregularly crystallized diamond; some of the faces of this belong to the octahedron; it is of a fine water, and was the property of Messrs. Rundell and Bridges, who kindly permitted me to draw it, previously to its being cut into brilliant: it weighed 91 carats.

Fig. 4. A group of three minute octahedrons from Mrs. Mawe's cabinet. The upper fig. is magnified.

Fig. 5. An octahedron mackled.

Fig. 6. A cube, from the Grevillian collection; the primitive face remains in place of one of the angles.

Fig. 7. The passage from the octahedron towards the cube: an oriental diamond of Mrs. Mawe's.

Fig. 8. A dodecahedron with rhomboidal planes, from Mr. Heüland's collection.

Fig. 12. A short dodecahedron, with minute grains of a green substance, resembling Talc, adhering to the surface; this is a common occurrence, and seems to indicate that diamonds were deposited in a rock, resembling amygdaloid, belonging to the Floetz-trap formation.

Fig. 9. A similar dodecahedron, mackled upon a plane passing through six of the faces of the dodecahedron and the axis, and parallel to a face of the octahedron: some portions of the faces of the primitive remain, and form re-entering angles. Mr. Heüland.

Fig. 13. In this diamond the planes of the dodecahedron occur upon the angles of the tetrahedron; other facets are also seen upon the angles. From Mrs. Mawe.

Fig. 10. A pearly opaque diamond, an octahedron, the upper half of which is modified in the same way nearly as fig. 17.

Figs. 11, 17, and 18. Three modifications differing in the angle, each consisting of 24 faces, placed over the edges of the octahedron, and inclined towards the angles. Fig. 18 is depressed; this diamond possesses the remarkable property of absorbing the sun's rays, and retaining them sometime after it is removed into a dark place, so appearing luminous; a property frequently absent.*

Fig. 15 is of the same form as fig. 18, but it is perforated by two holes, and has also a considerable rugged cavity on each side, as if some other substance had formerly adhered to it. From the British Museum.

Fig. 21. A similar diamond; in one side of this is a large brown ferruginous speck, which, if worn out, might leave a hollow similar to the one in the last. This appears

* Possibly the diamond in Aron's breast-plate possessed this quality, which might give rise to the hebrew name.

to be of a deep brown colour ; but it is probable the colour is borrowed from the speck. Mrs. Mawe.

Fig. 16. The same modification as number 11, united with the cube ; coated with a green substance.

Fig. 22. A fine yellow diamond in the form of an acute rhomb, with various modifications. Mr. Heüland.

Fig. 19. Similar to fig. 17 ; elongated in the same way as fig. 22, and in a greater degree.

Figs. 20 and 23. Octahedrons modified by the application of obtuse trihedral pyramids upon their faces, producing two facets upon each edge, inclined towards the centres of the primitive faces.

Fig. 24. An oriental diamond.

Fig. 25. A diamond included in ferruginous breccia, or pudding-stone.

Fig. 26. A very fine well crystallized diamond, shewing one of the many modifications not calculated by Bournon that produce four faces upon each edge of the primitive, inclined from each other : a single black speck near the surface is seen reflected several times over.

Fig. 27. Two diamonds united together ; the last mentioned modification is completed in these, forming an obtuse six-sided pyramid upon each face of the octahedron. The same modification occurs in Nos. 24 and 25.

Nos. 25, 26, and 27, as well as Nos. 34 and 35, are among Mr. Heüland's treasures ; for the loan of them I feel much indebted.

Fig. 28. A triangular table, produced by the mackling of two very flat crystals, modified like No. 26.

Fig. 29. Similar to No. 27, with the addition of the faces of the cube.

Fig. 30. May be described as two tetrahedrons with truncated edges, crossing each other, or as a cube with a deep notch in each edge ; in the latter point of view it belongs to the first modification described by Bournon, as producing re-entering angles. It is a very rare form; the crystal was in Mr. Mawe's possession when I sketched it, but the gentleman who afterwards obtained it from him, has most unfortunately lost it.

Fig. 31. A trihedral pyramid is applied upon each face of the octahedral nucleus of this crystal; the pyramids are so high, that their faces incline towards each other; they meet upon the edges of the octahedron. This is the second of Bournon's modifications with re-entering angles.

Fig. 32. The faces described in No. 31, in this are combined with those of the cube and octahedron; along the edges of the latter they form furrows. This crystal helps to explain No. 30.

Fig. 33. This pretty octahedral crystal, after having undergone the modification upon its edges, like No. 11, has had hexahedral plates applied upon its faces, with their edges inclined towards each other, in consequence of their decrease being less rapid than that which produces the rhomboidal face of the dodecahedron.

I am under obligations to Mrs. Mawe for the sight of this uncommon form, as well as for Nos. 28, 29, 32, and 37.

Fig. 38. The octahedron included within this large crystal has first the faces of the cube upon its angles, and those of the dodecahedron upon its edges: plates have afterwards been applied partially upon the faces of the cube, and extended over those of the octahedron, so as to produce four deep notches upon each face of the cube, and a furrow over each face of the dodecahedron. This and No. 36, are from the Grevillian collection at the British Museum.

Fig. 37 is of a similar form, with the facets rounded into each other.

Fig. 36. A group of two very rugged crystals of a similar form. Each crystal of this group, as well as No. 38, was formerly considered as a group of eight others. In the same way *figs.* 30 and 31 might be taken for groups of eight modified tetrahedrons around an octahedron.

Figs. 35 and 34 are supposed to be clusters of minute crystals. Such diamonds are called diamonds of nature by the jeweller, who can make but little use of them in consequence of their irregular hackly structure.

TAB. CXIX.

Fig. 1. The primitive included in a cube, see figs. 6 and 7, tab. 118. Bournon's 20th modification.

Fig. 2. The primitive mackled, see fig. 5, ib. This mackle has often several modifications applied to it; see fig. 28, tab. 118.

Fig. 3. A modified tetrahedron, see figs. 13 and 22 tab. 118, and figs. 11 and 15 of this plate.

Fig. 4. A regular dodecahedron: the nearer diamonds are to this form the better they are suited to the purposes of the glazier. Bournon's 2d modification.

Fig. 5. A shortened dodecahedron; the narrow or shortened faces are parallel to a regular hexahedral prism.

Fig. 6. The same as the last; mackled upon a plane perpendicular to the sides of the hexahedral prism.

Fig. 7. The cube and dodecahedron together.

Fig. 8. A 6-sided pyramid placed upon each face of the octahedron, with planes inclined along the edges and towards the angles of the octahedron: see figs. 11, 15, 17, 18, and 21, tab. 118. The 14th to the 19th modifications of Bournon.

Fig. 9. The same united with the cube: see fig. 16, tab. 118.

Fig. 10. A 3-sided pyramid placed upon each primitive face, so obtuse as to produce two facets upon each edge, inclined from the edge towards the centre of the face of the octahedron. Bournon gives six modifications analogous to this, his 2d. 3d. 4th. 5th. 6th. and 7th.; see figs. 20 and 23. tab. 118.

Fig. 11. Two tetrahedrons applied to the opposite faces of an octahedron, to explain fig. 22. tab. 118.

Fig. 12. Six-sided pyramids placed upon the octahedron, producing four facets upon each edge: see figs. 24 to 28, tab. 118.

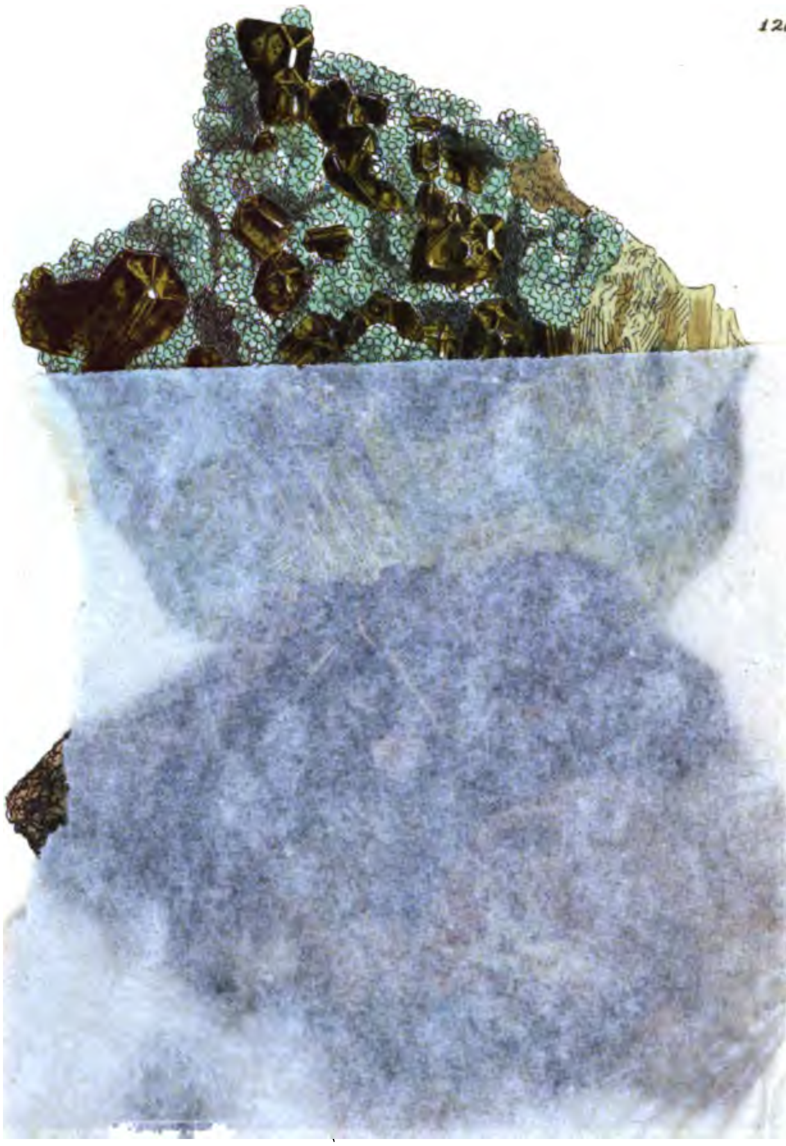
Fig. 13. The same joined with the cube: see fig. 29.

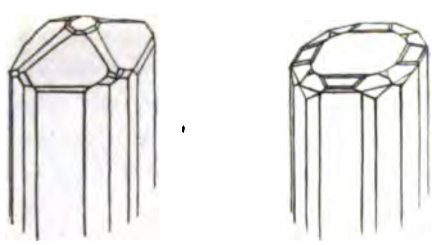
The remaining figures are to illustrate figs. 30, 31, 32, 33, and 38, of tab. 118, consisting of modifications that produce hollow angles, and notches or furrows upon the edges. Figs. 14, shewing Bournon's 8th modification, being the production of a regular tetrahedron placed upon each face of the nucleus: in the other modifications the pyramids added to each face are lower than the tetrahedron, but higher than those producing the modifications before noticed.

The analysis of the diamond having been performed by several experienced chemists, and among others by my much lamented friend, Smithson Tennant, Esq. has proved it to be nearly pure Carbon. Mr. Tennant proved that by uniting it with iron it produced steel, and that by combustion with nitre it produced the same quantity of carbonate of potash, that an equal weight of pure charcoal or coak would do.

Its hardness will distinguish it from every other substance, as it will scratch every other gem, and cannot be scratched by any thing except another diamond.

The statement of Pliny, that it will resist the blow of a hammer, although exaggerated, holds good when the diamond is struck in a direction contrary to that of its laminæ, but if struck upon the edges or angles of the primitive form, or nucleus, it easily splits, exhibiting brilliant flat faces. The spec. grav. is about three and a half times that of water.





TAB. CXX.

SILEX Idocrasis.

Idocrase.

Syn. Silex Idocrasis. *Brit. Min.* 4, 133, *t.* 371.

Idocrase. *Haüy Tabl.* 34. *Bournon Catal.* 43. *Aikin*, 224.

Such brilliant specimens of Idocrase I believe are not to be found in any other than Mr. Heüland's cabinet. The Irish variety, figured in British Mineralogy, is so unlike these, that they would hardly be recognized as the same species, were not intermediate varieties, often before us. The green specimen is from Ala, in Piedmont; it is accompanied by green mica: the other from Locana, in the same country.

I have added a single crystal from Wilui, Baikal: it approaches in dullness to the Irish, but is of a greener and more intense colour.

TAB. CXXI.

ANTIMONIUM Niccoliferum.

Nickel-Antimony.

Syn. Antimoine sulfuré nickelifere. *Haüy, Lucas* ii. 471. *Vanquelin Annales du Mus.* xix. 52.

Nickel-Antimony was first sent to Haüy by Mr. Hovel, previous to the year 1812. It was examined by Ullman, whose experiments were confirmed by Klaproth, and it has ever since been considered as a distinct mineral, although Vanquelin suspects that it is a mixture of an ore of nickel, with sulphuret of Antimony. It approaches in colour nearly to sulphuret of Antimony, being a little redder, and has its foliated structure but disguised by an uneven granular texture. Vanquelin observes, that the most remarkable circumstance attending this ore, is the absence of Cobalt, which generally accompanies nickel. It is found near Freussbourg, in Nassau, in a gangue of spathose Iron, with Copper pyrites, Quartz, and Galæna. I received it from Prof. Strömeyer. The specific gravity, according to Vanquelin, is 5.65. Klaproth found in 8 parts, 4 of Antimony, 2 of Nickel, 1 of Iron, and 1 of Sulphur. Vanquelin says it contains half of Antimony; that the next greatest quantity is Nickel, then Arsenic, Sulphur, and Iron, in the order they are named in; and a very minute portion of Lead. John gives us the following analysis:

Antimony, with Arsenic	61.68
Nickel - - -	23.33
Sulphur - - -	14.16
Silica, with Silver and Lead	0.83
And a trace of Iron -	
	100.00

122.

TAB. CXXII.

CERIUM oxyferriferum.

Allanite or Cerine.

SYN. Cerium oxyferriferum. *Exot. Min. t.* 58.
Cerine of the Swedish Mineralogists.

THIS variety of Allanite, for it appears to be no other, has been known but a short time; it occurs in flat elongated black crystals, that shoot irregularly into the copper pyrites, or among the fibrous Hornblende, that accompanies the Cerite (see tab. 25.) found at Riddarhytta, in Westmannland, in Sweden.

The crystals are seldom well defined, but they will, upon a careful inspection, be found to be rhomboidal prisms, with two broad sides, the obtuse angle seems to be a few degrees less than 120, they may be distinguished readily by their uneven fracture in all directions, and the total want of laminæ, from Hornblende.

Mr. Hisinger has given the following analysis*:

Silica - -	30.17
Alumina - -	11.31
Lime - -	9.12
Oxide of Cerium	28.19
Oxide of Iron -	20.72
Oxide of Copper	0.87
Volatile matter -	0.40
	100.78

* See Thomson's Annals, ix. 78.

SILEX Zoisii.

· *Zoisite.*

Syn. Zoïsite. *Werner and Karsten. Haüy Journal des Mines, No.* 113, *p.* 465. *Tabl.* 44. *Bournon Catal.* 67 & 68. *Aikin* 223.

Zoïsite, so named in honour of Baron Von Zoïs, having been described as a new mineral by Werner and Karsten, has, by several authors, at the head of whom is Haüy, been referred to Epidote: still, however, mineralogists seem unsettled; and while some consider the difference of lustre and colour as important characters, others, laying aside these, seek for a radical distinction in the form of the nucleus: thus Bournon doubts whether the terminal plane of the prism be perpendicular to the sides. Bournon also notices what he considers a characteristic difference in the proportions of Silex and Iron contained in it. Without venturing an opinion until further researches shall make us better acquainted with the substance, I give a figure from an authentic specimen sent me by Prof. Strömeyer: it was obtained from Fichtelberg, in Bareuth: the crystals shoot through a large grained white Granite, in which the Feldspar predominates: the Feldspar is often interposed between the laminæ of the Zoïsite.

I add, also, a representation of a substance from Scotland, I think from Glen Elg, nearly resembling the Zoïsite, but less regularly foliated, and of a more waxy lustre, characters by which it approaches to Diallage: it is in a matrix of white compact Feldspar.

Analysis of Zoisite from the Alps, by Klaproth:

Silex	45
Alumine	29
Lime	21
Oxide of Iron	3
Loss	2
	100

Analysis of Zoisite from the Valais, by Lauguier:

Silex	37
Alumine	26.6
Lime	20
Oxide of Iron	13
Oxide of Manganese	0.6
Water	1.8
Loss	1
	100

TAB. CXXIV.

CALX phosphata, (var.)

Compact Phosphate of Lime or Phosphorite.

SYN. Phosphorite. *Werner.*
Gemeiner Phosphorit. *Hausm.* s. 123. *Karsten,* s. 52.
Chaux phosphatée Terreuse. *Haüy, II.* 239. *Tabl.* 8.
Apatite, γ, massive. *Aikin,* 172.

THE Spanish massive variety of Phosphate of Lime has been known many years, and valued for its phosphorescent quality when heated: if closely examined it is found to be composed of dull laminæ arranged in the form of feathers, or diverging from numerous lines branching through the mass, but betrays no external character that would lead any one to consider it related to the crystallized Phosphate or Apatite, although its analysis shews it to be essentially the same. It is found in a considerable bed near Lagrofan, in Estremadura, Spain. Another variety is found at Schlackenwald in Bohemia; it is vessicular, in some parts semitransparent, and appears to be composed of irregular crystals collected together into a mass; among them some traces may be perceived of the hexahedral prism. Pulverulent Phosphorite has been found at Marmarosch, near Sigeth, in Hungary, and I have been told in some part of England, but I cannot learn where.

Pelletier and Donadei have given the following analysis of the variety from Estremadura, which shews it has some admixture, as is commonly the case with amorphous substances :

Lime	59
Phosphoric acid . .	34
Fluoric acid	2.5
Carbonic acid . . .	1
Muriatic acid . . .	0.5
Silex	2
Iron	1
	100.0

The pulverulent variety from Hungary gave Klaproth the following ingredients :

Lime	47
Phosphoric acid . . .	32.25
Fluoric acid	2.5
Silex	0.5
Oxide of Iron . . .	0.75
Water	1
Quartz and argillacious matter	11.5
Loss	4.5
	100.0

TAB. CXXV.

SILEX mesotypus, *var.* natrolithus.

Mesotype, or Natrolite.

Syn. Natrolith. *Werner, &c.* *Haüy Tabl.* 64. *Bournon Catal.* 107.
Mesotype γ (Natrolite.) *Aikin*, 212.

The peculiar colour of this variety of Zeolite caused it to be taken for a new species; and its being found by Klaproth to contain 16 per cent of Soda, that opinion was confirmed in the minds of several eminent mineralogists. Mr. Smithson having since found 17 of Soda in Mesotype, and the form of the spiculæ of Natrolite being the same as the crystals of Mesotype, there appear to be no longer any solid grounds for giving that mineral a higher rank in the system than that of an elegant and distinct variety.

Of the specimens figured one is from the British Museum, and another was presented to me by Prof. Strömeyer. They all come from Hohentweil in Swabia. It fills fissures in clink-stone porphyry. It is also said to occur in one or two of the western isles of Scotland.

Analysis by Klaproth:

Silex	48
Alumine	24.5
Soda	16.5
Water	9.0
Oxide of Iron . . .	1.75
Loss	0.25
	100.00

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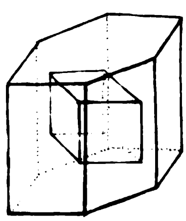

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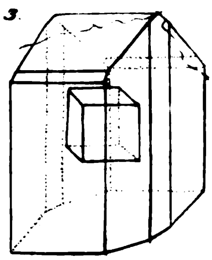

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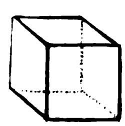

TAB. CXXVI.

SILEX Wollastoni.

Wollastonite.

This mineral appears to be known from only one specimen, which was in La Metherie's collection, and passed along with it into the hands of Mr. Heüland. Having free access to the rarities in this gentleman's possession, I have taken an early opportunity of making known the general appearance of an unique specimen, leaving the more minute detail to one or two friends who have commenced the investigation, and who will I hope obtain some knowledge of its composition, and favour the world with the result of their labours. In the mean time the following observations may serve to assist the figure:— It has much of the aspect of white tremolite, but is more compact, and in shorter bars. The crystals are thick prisms of six, eight, or more sides: four of the sides are larger than the rest, and so placed, that if alone they would form a prism of about 87 and 93 degrees: this prism is divisible with ease in the direction of its short diagonal, producing a brilliant face, and is also foliated parallel to two of its sides: the cross fracture is between conchoidal and hackley: it possesses various degrees of transparency, with a low degree of lustre: it yields with difficulty to the edge of a knife, dividing into fibres mixed with powder. One of the crystals exposes two terminal faces, inclined upon that face of the prism parallel to which the crystal is foliated: these, if accurately measured, may lead to the knowledge of the integrant molecule. The specimen is from Capo di Bové, near Rome.

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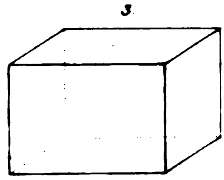

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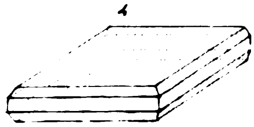

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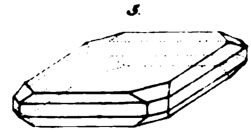


TAB. CXXVII.

TELLURIUM plumbiferum.

Foliated or Plumbiferous Tellurium.

SYN. Nagyagerz. *Emmerling II.* 463. *Werner.*
Tellure natif *(var.)* aurifère et plombifère. *Haüy IV.* 327.
Tellure natif auro-plombifère. *Haüy Tabl.* 119.
Tellure lamelleux. *Bournon Catal.* 447.
Black Tellurium. *Aikin,* 141.

THIS variety of native Tellurium appears to be the most abundant, and at the same time the most impure; nevertheless it preserves, according to Bournon, to whom we are indebted for a full account of the crystals of all the varieties of Tellurium, the characters of the primitive form, and shews the structure of the crystals most perfectly. The primitive form of native Tellurium is not according to that acute crystallographer, an octahedron, as Haüy from imperfect specimens was led to conclude it to be, but a rectangular prism, whose height is to its width as 7 to 10.

Foliated Tellurium is found among Quartz, and pale rose-coloured Carbonate of Manganese in veins in porphyry, at Nagyag in Transylvania: it is sometimes accompanied by Yellow Tellurium, which is distinguished by its brittleness, and by Blende. The specimens represented are in the British Museum.

Analysis by Klaproth:

Tellurium	32.2
Lead*	54
Gold	9
Silver	0.5
Copper	1.3
Sulphur	3.0
	100.0

* The Lead although considerable in quantity seems only to loosen the aggregation of the molecules of the Tellurium, without so combining with them as to form new molecules, and produce a specific distinction: it is probable, also, that the proportion is variable.


1.
2.

TAB. CXXVIII.

URANIUM oxidulatum.

Suboxide of Uranium.

SYN. Pecherz. *Werner.*
Pech-Blende. *De Born. Catal. de Raab II.* 159.
Urane oxidulé. *Haüy IV.* 280. *Tabl.* 113.
Urane oxydé noir. *Bournon Catal.* 420.
Pitch-Blend. *Aikin* 138.

THE mineral before us, is that combination of Uranium in which Klaproth first discovered the metal he found afterwards in a higher state of oxidizement in Uranite. It may be known from all other minerals by its deep brown black colour, hardness, opacity, dull lustre, the absence of a regular foliated structure, its weight, the spec. grav. varying from 6.3785 to 7.5. and its infusibility.

One specimen was given me by Prof. Strömeyer, the other by Mr. Herman: they are both from Johanngeorgenstadt: the matrix is chiefly brown Iron-stone and Iron Pyrites: one is mixed with Cobalt and Blende, the other with Galæna.

A variety of Asphaltum accompanies the Uranite in some of the Cornish mines, which has been taken for the suboxide of Uranium, but it may soon be recognized by its softness and combustibility.

Klaproth's analysis of Pitch-Blende is,

Suboxide of Uranium . .	86.5
Sulphuret of Lead . . .	6
Oxide of Iron	2.5
Silex	5.0
	100.0

TAB. CXXIX.

CARBO fragilis.

Anthracite, or Stone Coal.

SYN. Carbo fragilis. *Brit. Min. tabs.* 410 & 49.
Plombagine charbonneuse, Authracolithe. *De Born. Catal. II.* 296.
Kohlenblende. *Wid. s.* 653.
Carbon loaded with stony matter. *Kirwan, II.* 57.
Anthracite. *Haüy, III.* 307. *tabl.* 69. *Bournon Catal.* 164.
Blind Coal. *Aikin* 60.
Glanz kohle. *Werner.*

THERE are two principal varieties of Stone Coal; one that occurs in large beds or strata, connected in general with bituminous Coal, the bitumen of which being dissipated by some causes associated with the introduction of Whin Dykes through the strata, has left the Carbon in the form of Coak, of Plumbago, or of the bituminous Coal itself: the other variety occurs in small quantities in mineral veins traversing Gneiss, Mica Slate, and Transition Rocks: we have no means of tracing the origin of this variety from animal or vegetable substances, but it may possibly result from the decomposition of bitumen, such as is found in some of the copper veins of Cornwall: that it was once more bulky than at present is evident from the number of cracks that pervade it, and which are often filled with iron pyrites, or other foreign matter; to this variety the name Anthracite appears to have been originally attached: I do not know that it has been met with in any part of Great Britain. At Kongsberg, in Norway, it is found upon Quartz, accompanied with Carbonate of Lime, Fluor, native Silver, &c. Bournon mentions a specimen from this place, in which the Anthracite is both pulverulent and in globules, as if it had run into that form. The mine at Kongsberg is said to be in Mica-slate. It is found also in Spain, Switzerland, the Hartz, and Schemnitz in Hungary.

The specimen figured is part of a vein of Iron-stone, containing much Quartz, crystallized in the hollows, which contain besides the Anthracite, specular Iron and Iron Pyrites. It is one of Prof. Strömeyer's kind favors: it was collected at Lerbach, in the Hartz.

TAB. CXXX.

ARGILLA cruciformis.

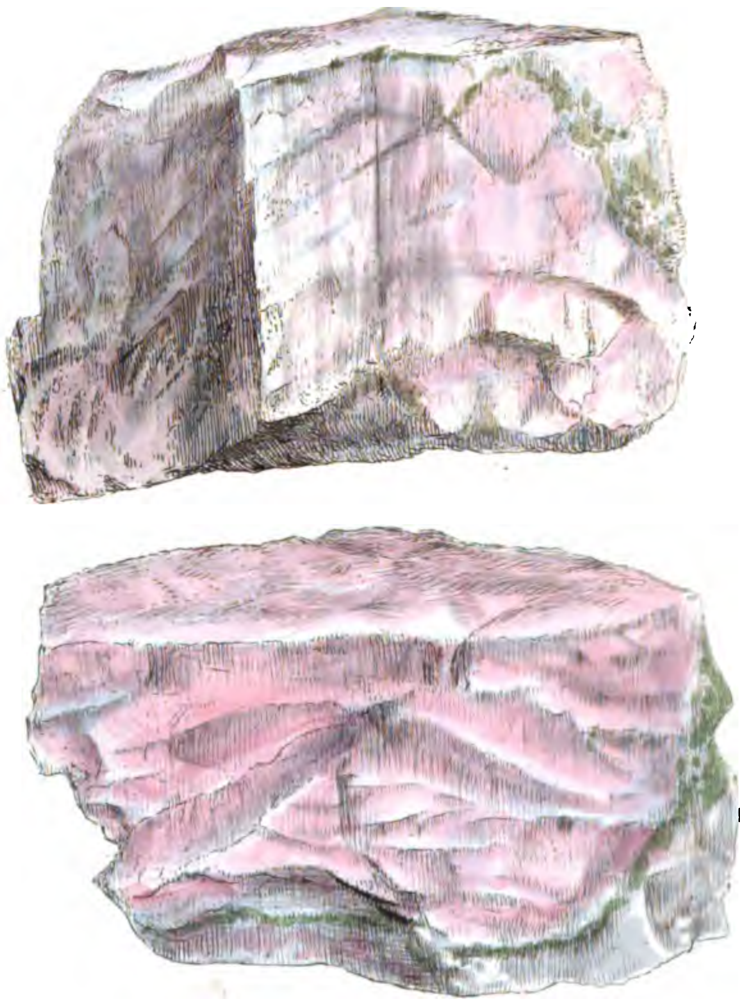
Staurotide.

SYN. Argilla cruciformis. *Ex. Min. t. IX.*
Staurotide. *Haüy, Tabl.* 43. *Bournon Catal.* 76.
Staurolite. *Aikin,* 189.

THE cruciform variety of this mineral has already appeared in this work; in the description of it, mention is made of the substance occuring in Scotland: British Mineralogy being concluded without a figure of it, I have added one here, along with the red kind in single crystals, from St. Gothard; it is the dark grey specimen: I am indebted to the Rev. P. Forbes for it, who found it in Mica slate at Boharm, in Elginshire. The same gentleman favoured me with some masses of Cyanite, from the same place, in which were a few minute crystals of Staurotide of a red colour, and transparent like that from St. Gothard; the masses also contained Quartz, Mica, and decomposing Feldspar. St. Gothard has hitherto produced the most perfect specimens, as the crystals in them are sharply defined with various modifications upon their ends; have some transparency and a clear colour. The cruciform variety on the other hand often exhibits larger crystals, but they are rough, and of a dull colour, being mixed with the substance of the rock they are imbedded in, which is a grey micacious slate (see tab. IX.) The grey specimen from Scotland presents a still less pure variety, which retains none of the red colour of the unmixed substance, and in which the crystals are thin and badly defined: they do not appear to cross each other in pairs, but run in all directions through the Mica slate they occur in. Crossed crystals of Staurotide have been found by Dr. Fitton, in a micaceous compound at Glenmalur lead mines, in the county of Wicklow,* but it does not appear to be common.

An enlarged figure of two crystals, with wedge-shaped terminations, crossing each other obliquely, is added at the bottom of the plate from a specimen found in Brittany.

* See Geological Trans. Vol. I. p. 275.



TAB. CXXXI.
SILEX petalithus.
Petalite.

SYN. Petalitte? *D'Andrada, Journal de Physique* 51, 244.
Berzelite. *Clarke in Annals of Philosophy* XI. 365.

MR. D'Andrada gave an account of a new mineral in the 51st volume of the Journal de Physique, to which he gave the name Petalitte:* this mineral remained unknown to English mineralogists until Mr. Swedenstierna sent a considerable quantity of a substance, much resembling rose Quartz, to London, under that name. Mr. Swedenstierna also sent it to Dr. Ingle, at Cambridge, where it was analyzed by Professor E. D. Clarke and the Rev. Mr. Holme, and found to be sufficiently distinct from Quartz. Dr. E. D. Clarke, however, doubts whether it be really the Petalitte of D'Andrada, and wishes to call it Berzelite. At present we must abide by the authority of the Swedish mineralogist. The eye may distinguish it from Quartz by its inferior lustre; by the uneven appearance of the cross fracture, and by a tendency to divide in certain directions, with flat spining faces, that may be readily discovered. These divisions, according to Dr. E. D. Clarke, are parallel to the sides of a rhomboidal prism, whose obtuse angle equals 100°. My specimen exposes surfaces of laminæ, parallel to a four-sided prism of about 86 and 94°; these surfaces are

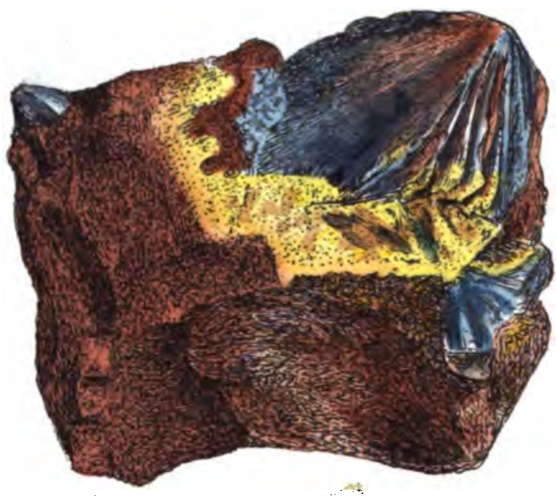
* M. D'Andrada's description does not precisely agree with the mineral before us, which can hardly be called, "en masses qui sont des réunions de pièces separées, *grenues*;" neither is its spec. grav. above 2.620.

equally shining, but not very bright; they are a little curved, which may cause them to give a different measure from that assigned by Dr. Clarke. Fractures are also visible in several parts in the direction of the long diagonal of the base of this prism; they produce surfaces of considerable brilliancy, but of less extent than those of the prism, upon which they are equally inclined. Dr. Clarke found the specific gravity of a nearly white specimen to be 2.45.: he also found that by a long continuance of an intense heat from a blow-pipe, the surface was glazed, and became full of minute bubbles. The colour varies from white to a pale rose colour; the whiter varieties have often a tinge of grey: when breathed upon it emits a peculiar odour, less suffocating than that of argillacious Limestone. It is found accompanying Spodumen, Quartz, Mica, &c.

The analysis by Mr. Arfredson, a pupil of Berzelius's, has afforded one of the most extraordinary results obtained for some years; it has proved the existence of an alkali before unknown, which resembles Soda in some respects; but its salts differ in many properties from those of either of the fixed alkalies, particularly in their easy fusibility. This alkali has received from its discoverer the appellation Lithion, or, Lithina, to denote its origin in the mineral kingdom.

Analysis by Arfredson.*			By Clarke.†	By Holme.†
Silica	80		80	$76\frac{2}{16}$
Alumina	17		15	$20\frac{4}{16}$
Lithina	3	Manganese	2.50	$2\frac{2}{16}$
		Water	0.75	$0\frac{10}{16}$
		Loss	1.75	0
	100		100.00	$100\frac{2}{16}$

* Annals of Philosophy, Vol. II. p. 291. † Ib. Vol. II. p. 198.



TAB. CXXXII.

MOLYBDENUM oxygenatum.

Oxide of Molybdenum.

SYN. Molybdänocher. *Karsten, tabellen s.* 70.
Molybdène oxydé. *Bournon, Catal.* 424.
Molybdena-Ochre. *Jameson, ed.* 2. *Vol. III. p.* 494.

THIS is a rare and little known mineral; it is recognized by its situation among sulphuret of Molybdenum, by the decomposition of which it seems to be produced: it varies in colour from pale yellow to a delicate green, and is generally in the form of a compressed powder. The specimen figured is from Bitsberg, in Sweden. Jameson relates that "it is found investing and intermixed with Molybdena, in the granite of Corybuy, at Loch Creran, and at Nummedalen, in Norway."

TAB. CXXXIII.

FERRUM carbonatum, (globosum.)

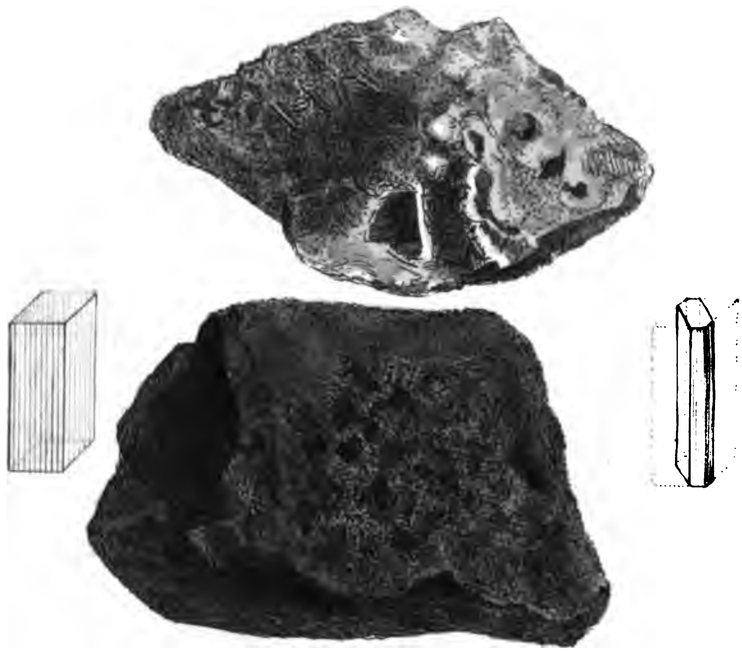
Carbonate of Iron, Sphærosiderite.

Syn. Sphærosiderite. *Strömeyer.*
Ferrum carbonatum. *Brit. Min. t.* 517.

Sphærosiderite, so named from its globular form, is a remarkable variety of spathose Iron ore. The spheres which frequently intersect and unite with each other, are composed of diverging radii, and exhibit the foliated fracture, characteristic of the species; they are contained in the hollows of a mass, composed principally of the same substance. Professor Strömeyer, to whom I am indebted for specimens, has found it to be pure carbonate of Iron: it is found at Steinheim, near Hanau.

A fibrous variety of the same substance has been sent me by Mr. Rashley, from Cornwall, since the conclusion of British Mineralogy: it occurs in veins traversing chlorite slate, in Tincroft mine. I have added a figure of it.

134.



TAB CXXXIV.

VISMUTHUM sulphureum.

Sulphuret of Bismuth.

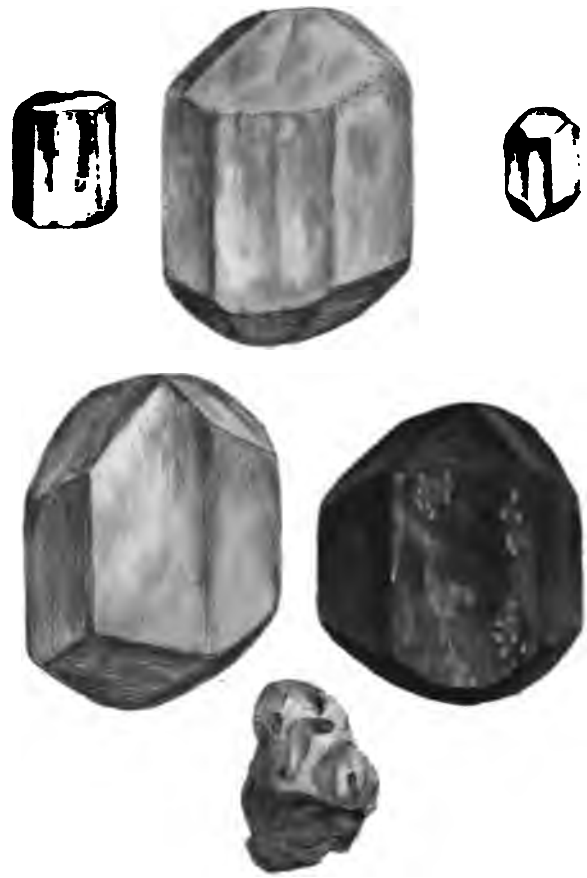
SYN. Wismuth Glanz. *Werner.*
Sulphurated Bismuth. *Kirwan II.* 266.
Bismuth sulphuré. *Haüy IV.* 190. *Tabl.* 105. *Bournon Catal.* 377.
Sulphuretted Bismuth. *Aikin* 121.

SULPHURET of Bismuth is an old well-known, but not abundant mineral; its form and brittleness distinguish it from native Bismuth, and its lighter steel grey colour, inclining to yellowish, from Sulphuret of Antimony. Its easy fusibility is also a useful character; a fibre of it melts as soon as it comes in contact with the flame of a candle: The form of its nucleus, according to Haüy, is a slightly rhomboidal prism, divisible in the direction of its short diagonal: this section produces a brighter face than those of the prism, and is more readily perceived. Bournon has determined the primitive form to be a rhomboidal prism of 60° and 120°: the crystals that afforded the Count the means of ascertaining this point, were very small and thin plates, but well defined and brilliant, and shewed the fracture parallel to their edges, and also in the direction of their diagonals: such crystals are extremely scarce.

The spec. grav. according to Brisson, is 6.4672, or Kirwan 6.131.

Saye obtained from it 60 per cent. of Bismuth and 40 of Sulphur.

It has been found in Bohemia, Saxony, Sweden, and according to Aikin, in Herland mine, Cornwall.



TAB. CXXXV.
SODA borata.
Borax.

SYN. Borax and Tincal. *Kirwan* 2, 37.
Soude boratée. *Haüy* 2, 366. *Tabl.* 20. *Lucas, pt.* 2. p. 88.
Borate de Soude, Borax. *Bourn. Catal.* 193.
Baurach of the Arabs. Tinckal of the Indians.

THIS useful salt has been imported from the East for the use of metallurgists and Jewellers for a long time, and yet its natural situation in the earth was unknown to Europeans until the latter part of the last century. The first correct account of it is given in the 2d volume of the Annales de Chimie, p. 299; where M. Saunders states, that it is dug from the sides of a lake, 15 days journey N.W. of Tissoolembo in Thibet: this lake is 20 miles in circumference; its waters are nearly at the same level at all seasons: it has no river running from it, but has several salt springs that supply the evaporation: it is frozen over during a great part of the year, so as to prevent the workmen from obtaining the salt. The nature of the rocks that surround the lake we are not acquainted with; but the springs from them contain much Muriate of Soda besides Borax. It is probably the constant evaporation of the water of these springs from the surface of the lake, that causes the Borax to be deposited in its bed as fast as the workmen can dig it. Several other lakes and low pieces of ground, that were formerly lakes, both in Thibet and Persia, afford abundance of Borax; it is collected in impure masses and imbedded crystals, which are preserved from efflorescing by a coat of soapy matter: it is sold in the Indian markets by the name of Tinckal. When purified it assumes the appellation of Borax, from its Arabic name. It occurs also in China, Ceylon, and Saxony. The mines of Viquintipa, those in the neighbourhood of Escapa, in Potosi, have furnished a considerable supply to the native Americans, who have used it to assist in smelting the ores of copper which are abundant in that district: it is by them called Quemason, a term nearly synonimous with Flux.

Haüy describes the crystals as derived from a rectangular prism; while Bournon observes, that the base of the primitive is perhaps somewhat different from a right angle; and says, that the suite of crystals in his (now the King of France's) collection is sufficient to demonstrate what the primitive is.

The large crystals before us are from Persia; one of them is not cleared from the crust of soap with which it was preserved. The small crystals are probably artificial; they are in the state in which they were imported from India.

TAB. CXXXVI.

SILEX pruinosus.

Siderite.

SYN. Sidérite. *Bernhardi et Trommsdorff, Journal des Mines* 27, 447.
Quartz-résinite bleu grisâtre. *Lucas, pt.* 2, *p.* 512.

THIS mineral is evidently a mixture of two species; whether either of them be a variety of one already known is at present uncertain. The dark blue veins consist of a substance resembling the variety of Quartz distinguished as Semi-opal, of a mamillated form, but of a very different colour, and more transparent. Among this, especially upon its surface, is a pale blue pulverulent substance, which is the colouring matter of the Quartz-like part, the strength of tone being the effect of the transparency. In many parts the blue substance exhibits a scopiform fibrous structure; and where this structure is most distinct, the internal fibres of each bundle are found sometimes of a deep green colour, possessing some transparency, and a degree of hardness sufficient to resist the knife: hence it is evident, that the blue substance results from the disintegration of a mineral related to Actinolite or Tremolite. The blue colour is not destroyed by acid. The matrix, which has hitherto been called Granular Gypsum, is Carbonate of Lime in rhomboidal crystals, with convex faces, whose angles approach nearly to 90°: from the slow effect of acids upon them it appears that they contain Magnesia. The interstices between the crystals are filled in the opener

parts with white Lithomarga: in the more compact parts there is a good deal of the fibrous substance in minute specks, and in its unchanged state, of a dull green colour: there are also a few specks of Copper Pyrites.

This compound mineral has sometimes been referred to Dicroïte, but I have not been able to observe a difference of colour, by looking through it in different directions; and as it does not occur in crystals, there do not appear to be sufficient grounds for their union: there is, however, much analogy; and it is highly probable, that Dicroïte, Siderite, and Prasem, will all one day be found to be similar combinations, but of different species, with Quartz.

Siderite has only been found in the vicinity of Golling in Salzbourg

TAB. CXXXVII.

TELLURIUM auro-plumbiferum.

Yellow Tellurium.

Syn. Or Gris jaunâtre. *De Born.* 2, 464.
Tellure natif aurifère et plombifère. *Haüy* 4, 327. *Tabl.* 119.
Tellure gris. *Bournon Catal.* 449.
Yellow Tellurium. *Aikin* 140.
Weiss Sylvanerz. *Werner.*
Gelberz. *Karsten.*

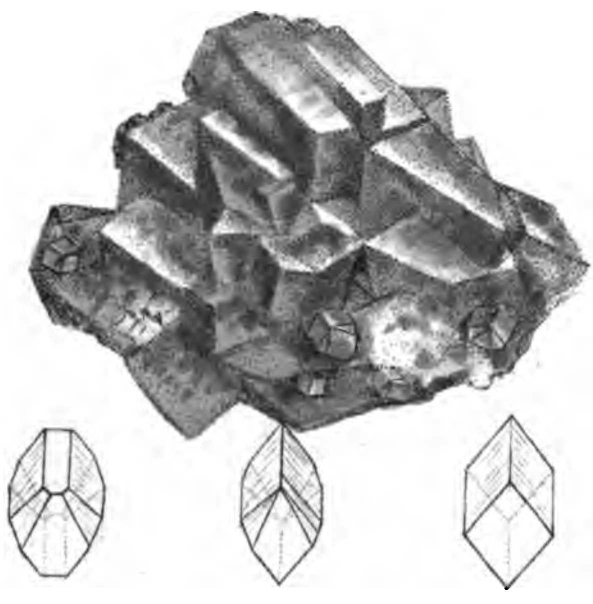
Yellow Tellurium is found in the same vein in Porphyry as the foliated Tellurium, tab. 127; it is distinguished from it by its colour, brittleness, and acicular or prismatic form; the form, however, sometimes approaches to tabular, and it has been found, but rarely, in octohedrons, with their angles more or less deeply truncated. Most authors agree in making the different ores of Tellurium, varieties of native Tellurium, and Bournon has found the primitive form of each to be the same.

The specimen before us contains, besides the yellowish grey needles of yellow Tellurium, a mixture of foliated Tellurium, with Sulphuret of Manganese, among Quartz and rose-coloured Carbonate of Manganese, upon a part of the clay-stone Porphyry rock which the vein traversed.

The following is the analysis of this ore by Klaproth:

Tellurium	44.75
Gold	26.75
Lead	19.50
Silver	8.50
Sulphur	0.50
	100.00

I am indebted to Mr. Heüland for the use of this specimen.



TAB. CXXXVIII.

SILEX axinimorphus, *var.* scintilans.

Spinthere.

SYN. Spinthère. *Haüy* 4, 398. *Tabl.* 67. *Lucas, pt.* 2, 238.

THIS is an ambiguous mineral; the form of the crystals is more symmetrical than is usual in Axinite, and they are softer and have less lustre than the common kinds: these circumstances may naturally be caused by an admixture of Lime as well as Clorite in them. Haüy and Lucas appear to be uncertain whether Spinthere be only a variety of Axinite, while Bournon and other eminent Mineralogists are decidedly of opinion that it is nothing else. It is found in small very oblique rhomboidal prisms, the three obtuse edges of which are commonly displaced by dissimilar narrow faces. The terminal planes are commonly so large that the crystals look like very obtuse rhombs; but sometimes they are so small, that the crystals are rather tall prisms, the acute edges of which being truncated, they become six-sided: this happens in minute crystals that are often grooped together. The scintillating appearance observed by Haüy is produced by a number of minute facets parallel to the faces *g g* in his fig. 240, pl. 86, which are the same as two of the smaller faces upon my figure.

The Spinthere rests upon primitive crystals of Carbonate of Lime, which are covered with a crust of Chlorite that also penetrates those of the Spinthere; it is accompanied by cubes of Iron Pyrites. It has only been found at Maromme, in the department of the Isère in Dauphiny.

TAB. CXXXIX.
PETUNSE globiferus.
Globular Feldspar.

SYN. Porphyre Napoléon. *Rampasse.*
Feldspar Globeux. *Lucas, pt.* 2, 151.
Roche porphyroïde globuleuse. *Faugas de St. Fond, Géologie,* 2, 245.
Porphyre globuleux, *ib.* 2, 683.
Amygdaloïde porphyroïde. *Brongniart Journal des Mines,* 34, 41.
Pyroméride globaire. *Haüy, in a memoir by Mr. Monteiro, Journal des Mines* 35, 347 *et* 407.
Globular Porphyry, vulg.

Mr. Rampasse, during a fruitless search after the original situation of the Orbicular Sienite, in the mountains of Corsica, about 1805, met, between Monte-Pertusato and the valley that leads to Santa Maria la Stella, with a block, resembling porphyry, but in place of crystals of Feldspar, it presented globose aggregations of that substance, composed of diverging bars, enclosed in a compact coat; the basis consisting of compact Feldspar, in small masses and grains, cemented together by a substance of a much darker colour, which seems to be a kind of impure Quartz, similar to the variety known by the name of Hornstone, and which often acts as the basis of true Porphyries. The Quartz also fills up the minute interstices between the bars of Feldspar in the balls. Some years afterwards Mr. Mathieu was so fortunate as to discover the same kind of rock in its original repository, in the form of large veins, projecting like immense walls from the mountains of true Porphyry, that they

traversed, but which being of a looser construction, had weathered away before them. The district in which these veins occur is bounded on the north by Marzolino, on the south by Bussaggia; it comprises the country of Ozani and also Girolata, an extent of about eight square miles and a half, composed of barren mountains. The balls are found in several places in abundance, separated from the rock as at Bocca-Vignola and at Elbo. Much variety is observable in the colour and proportion of the parts of this curious rock; in some veins the balls are only a few lines in diameter; in others they are three or four inches: in some the basis is of a deep red, and the balls pale, with specks of red; in others the colour is more uniform, and the cement is in some abundant, in others hardly distinguishable. Besides the Feldspar and Quartz, this rock does not appear to contain any mineral except a few crystals of cubic oxide of Iron, of a dark colour, and brown oxide, which modifies the colour of the basis, and renders the parts where it abounds more liable to disintegration. The Feldspar in no part exhibits the foliated structure of crystals, but is every where compact and opaque, while the cement is in parts translucent, and, according to Monteiro, crystallized in some of the fissures. Respecting the origin of the rock little can be said with any degree of certainty; the arrangement of the parts seems to be the effect of a kind of imperfect crystallization, similar to what is produced frequently in Scoria and Glass, when kept some time in a certain temperature, and then cooled suddenly.* The infusible nature of the substance in which the Feldspar has shot, renders the idea of the igneous formation inapplicable, and obliges us to imagine some solvent of Silex, in which the Feldspar might crystallize. A similar observation will apply to many other rocks, whose formation is concealed by that veil of mystery, through which we admire the works of Omnipotence, without being able to discover the instruments they have been wrought by: an innate desire in man to remove this veil, is a source of industry, conducive to his happiness; and every advance he makes serves to expose the difficulty of the task, and by displaying new wonders, increase his desire for knowledge, and enlarge his ideas of the incomprehensible Author of All.

* The formation of globes of a radiated structure is, by Watts, supposed to be the first step towards the formation of Basalt.

TAB. CXL.

PLUMBUM arsenio-phosphatum.

Arsenio-phosphate of Lead.

SYN. Muschliches and Fasriges Phosphorblei. *Karsten, tabs.* 68, 69, and 99.
Plomb phosphaté arsenié. *Haüy* 3, 496.
Plomb phosphaté arsenifère. *Haüy Tabl.* 83.
Plomb phosphaté. *Bournon Catal.* 349.

BEAUTIFUL yellow crystals of Phosphate of Lead, holding much arsenic acid in combination, were discovered some years ago at Johanngeorgenstadt, in Saxony, and have ever since been much admired. Different opinions exist respecting the propriety of considering them as of a distinct species from Phosphate of Lead, along with a mamillated variety found at Rosiers, in the department of Puy de Dôme, which is similar in composition to it. Haüy and Bournon consider the arsenic acid as accidental; the first inclining to an opinion that the arsenic acid is united with a portion of Lead, and mixed with the Phosphate in the form of Arseniate of Lead. Whether it be a combination, or only a mixture, will long remain a question.

The gangue of the specimens figured is granular Quartz, stained upon the surface with oxide of Iron.

Analysis of the yellow crystals from Johanngeorgenstadt:

	By Laugier.		By Rose.
Oxide of Lead . .	76.8	. . . . .	77.5
Phosphoric acid . .	9.0	. . . . .	7.5
Arsenic acid . . .	4.0	. . . . .	12.5
Water	7.0	Muriatic acid	1.5
Silex Alumine and Iron	1.5		
Loss	1.7	. . . . .	1.0
	100.0		100.0

Analysis of the mamillated variety from Rosiers:

	By Fourcroy.		By Klaproth.
Oxide of Lead . .	50	. . . . .	76
Phosphoric acid . .	14	. . . . .	13
Arsenic acid . . .	29	. . . . .	7
Oxide of Iron . . .	4	Muriatic acid	1.75
Water	3	. . . . .	0.5
		Loss . . .	1.75
	100		100.00

The action of the blowpipe, with charcoal, readily points out the nature of a doubtful specimen, by dissipating the arsenic in fumes with the scent of Garlic, leaving the Phosphate of Lead in a facetted button of opaque glass.

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TAB. CXLI.

PLUMBUM Scheelatum.

Scheelate of Lead.

SYN. Bleischeelin (scheelsaures oxydulertes Blei.
Tungstate of Lead. *Heüland in Annals of Philos.* 12, 454.

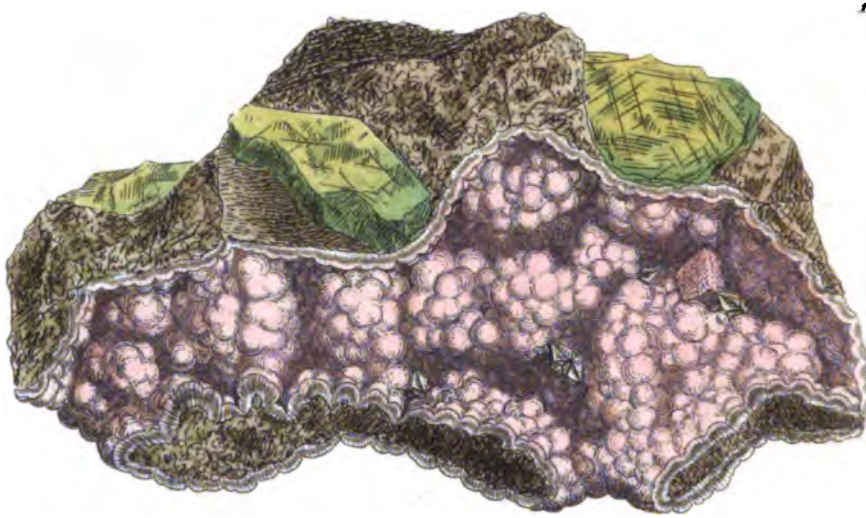
THE present mineral was communicated by H. Heüland Esq. as a new ore of lead, from Zinwald in Bohemia, with the German name Bleischeelin, and supposed to have been examined by Prof. Lampadius. I have not yet met with any published account of such a mineral,* or any analysis of a lead ore containing scheelic (Tungstic) acid: it is at present too rare in this country to admit of its being examined chemically, except by the aid of the blowpipe, and the number of experiments that an accidentally detached crystal has afforded, even with that instrument, have been but few. When first exposed to the flame it decrepitates; when powdered, it melts upon charcoal into a black slaggy brittle globule, without exhibiting any traces of lead; but with soda and charcoal it is reduced to the metallic state, with borax it acts much in the same way that molybdate of lead does, producing with a small portion an opaque white globule mixed with blue clouds, which upon the addition of more borax becomes transparent, and of a pale brown colour. As the molybdate of lead is easily reducible upon charcoal, the result of the first experiment seems sufficient to dis-

* Except De Lametherie's name for Molybdate of Lead.

tinguish them. The forms most common to scheelate of lead are elongated square prisms, square acute pyramids generally truncated and double pointed foursided crystals whose sides are curved, and the points sometimes truncated, the terminal angles of the pyramids are in some instances replaced by small brilliant facetts, from the enlargement of which would result acute octahedrons, and indeed there are upon the specimen two minute octahedrons so produced, with flat shining faces and sharp points. None of the crystals exhibit a foliated structure internally, but are ragged upon the surface, with sparkling facetts parallel to the modification last mentioned. The internal fracture is ragged without much lustre. The acute form of the crystals distinguishes them from the more usual ones of Molybdate of Lead; but I have seen similar ones among the masses of tabular crystals of that species from Carinthia; they, however, are immediately reduced to Lead upon Charcoal.

The gangue of Scheelate of Lead is Mica, upon crystals of Quartz, with Scheelate of Iron (Wolfram) in hexahedral prisms, composed of concentric coats. Mr. Heüland has one specimen besides that figured; it is of a darker colour, and the crystals assume more the form of spiculæ.

142.



TAB. CXLII.

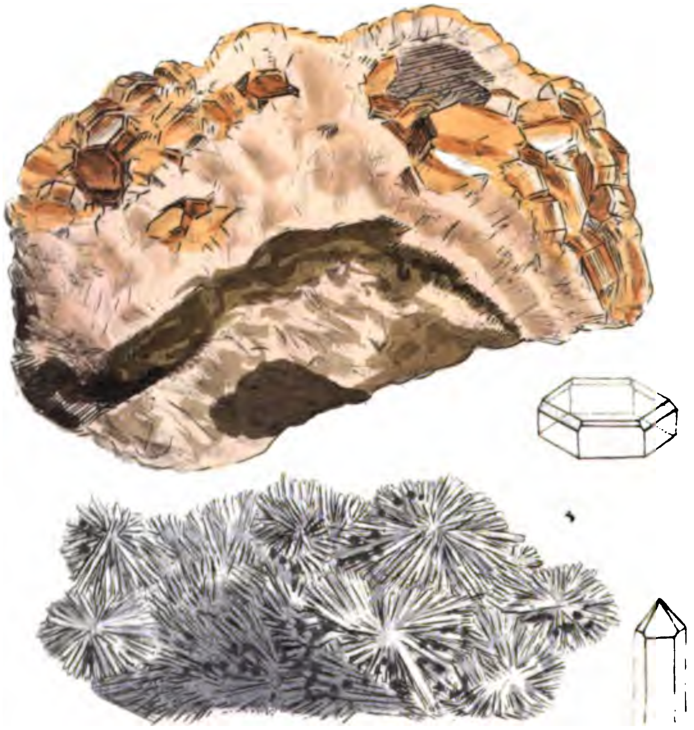
SILEX Datholithus, (var. botryoides.)
Botryoidal Datholite, or, Botryolite.

SYN. Silex boratum, siliciferum. *Ex. Min.* 21.
Botryolith. *Hausman, s.* 122.
Chaux boratée siliceuse concrétionnée mamelonnée. *Haüy Tabl.* 17.
Botryolite. *Aikin* 174.

THROUGHOUT the mineral kingdom each species is found to occur under several various general forms, with few exceptions; in many the different forms may be traced from one to the other; but in some they are very dissimilar and without any intermediate link; of the latter class are the two leading varieties Datholite, which have been looked upon as distinct species by many Mineralogists, although they are not more dissimilar than many varieties of Carbonate of Lime, &c. are to each other: but external form cannot be admitted as a specific distinction, since it is so variable in substances of the same composition. The mammillated, or botryoidal Datholite, is composed of concentric coats of diverging fibres, closely compacted together, and forming a dull smooth surface. It is found in the Kjenlie Mine, near Arendal, in Norway, from whence the specimen figured was brought.

The matrix of the specimen figured is chiefly Carbonate of Lime, with Quartz, Hornblende, and green Phosphate of Lime.

From the British Museum.



TAB. CXLIII.

STRONTIA carbonata.

Carbonate of Strontia.

SYN. S. carbonata. *Brit. Min. tab.* 65.
Strontiane Carbonatée. *Haüy Tab.* 15.
Strontian. *Werner*. *Aikin* 166.

THE variety of Carbonate of Strontia, exhibited in the upper figure upon this plate, is very unlike that given in British Mineralogy, and so much like in its contour to Carbonate of Lime, that it becomes truly interesting; the fracture, however, displays a surface and lustre very different. It is from the Leogang, in Salzburg, and is very rare.

Mr. Heüland's cabinet.

The lower figure is an attempt to picture the beautifully white and brilliant variety from Braunsdorf, in Saxony, which is accompanied with Iron Pyrites, upon Carbonate of Lime. The modifications upon the crystals are probably the same as upon the above specimen; but the faces upon the edge of the prism are so much enlarged as to form acute pyramids.

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TAB. CXLIV.

TELLURIUM argento-auriferum.

Graphic Tellurium.

SYN. Aurum graphicum. *De Born.* 2, 470.
Tellure natif graphique. *Haüy,* 4, 326.
Tellure natif auro-argentifère. *Haüy Tabl.* 119.
Tellure graphique. *Bourn. Catal.* 451.
Native Tellurium α. *Aikin,* 140.
Graphic Tellurium. *Nonnul.* Graphic Gold. *vulg.*
Schrifterz. *Werner.*

THIS is the only kind of Tellurium hitherto unfigured in this work. It is the most showy species, but not the rarest. Its crystals approach nearest to those of Native Tellurium, see tab. 64.; and are arranged against one another so as to form the frame-work, as it were, of hexahedral or trihedral tables, and various other forms, which have led to the idea of the primitive crystal being an octahedron. It occurs upon the surface of Quartz, in fissures in a grey porphyry, that contains also Pyrites, Blende, and native Gold. Offenbanya, in Transilvania, is the only country that has produced it.

Klaproth obtained from 100 parts :

Tellurium	60
Gold	30
Silver	10

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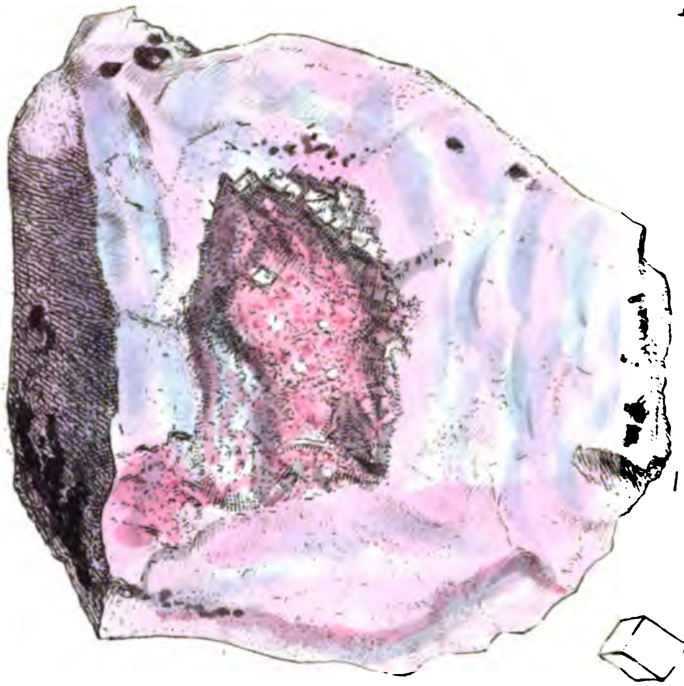

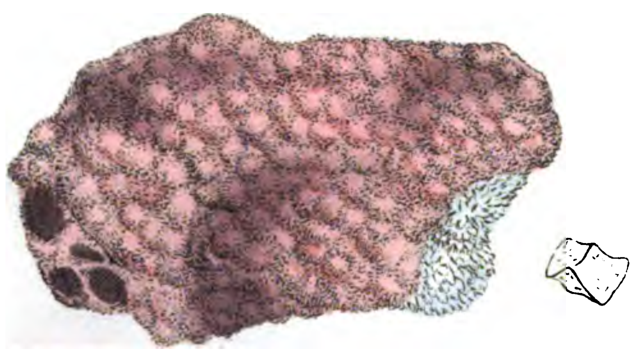

TAB. CXLV.

MANGANESIUM carbonatum.

Carbonate of Manganese.

Syn. Manganèse oxydé carbonaté. *Haüy Tabl.* 111.

Rothbraunsteinerz. *Werner?*

This species has by most authors been confounded with Brownspar; and several who have separated it from that, have united with it the Lithoide Manganese of Siberia, a variety of Feldspar, a British specimen of which is figured in British Mineralogy, (tab. 536.) Brownspar sometimes occurs of a dull rose colour, but never so bright as the rhomboidal crystals of Rose Manganese that accompany the Tellurium, Sulphuret of Manganese, Blende, Pyrites, &c. among Quartz: found at Nagyag, in Transylvania, (see tab. 91.) This variety, however, often contains much Carbonate of Lime even in the crystals; and in the amorphous part is so intimately mixed with Quartz, that it appears to form with it an homogeneous mass. The specimens from Kapnik appear to be very pure, and to contain no lime; thus proving the existence of the species. The larger specimen figured is from Nagyag: among the rose-coloured crystals of Carbonate of Manganese, are a few white rhombs of Brownspar, and some crystals of Quartz: the mass is probably a mixture of all three: Quartz is in various parts distinguishable in it in concentric coats. The black spots are Sulphuret of Manganese.

The lower specimen is also from Nagyag. The Carbonate of Manganese is in very much curved rhombs, and appears to be less pure than in the upper specimen, forming an intermediate variety between it and Brown-spar, (Carbonate of Iron.) I have received lately from Scotland, Carbonate of Iron, of a pale pink colour, crystallized in rhombs, that approaches to the Manganese; it forms another connecting variety, and serves to prove that the species is not well circumscribed.

The following is the analysis of the pure variety, from Kapnik, by Lampadius:

Oxide of Manganese	48
Carbonic Acid	49
Oxide of Iron	2.1
Silex	0.9
	100.0

The impure amorphous kind, from Nagyag, has been found by Klaproth to contain,

Carbonate of Manganese	34
Carbonate of Lime	13
Quartz	53
	100

There is probably another species of Manganese confounded with this, and differing from the Manganesian Feldspar above alluded to, containing Protoxide of Manganese combined with Silex: it is found at Kapnik.

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TAB. CXLVI.

FERRUM sulphatum, Argilliferum.

Sulphate of Iron and Argilla.

Sulphate of Iron is the common produce of the decomposition of rocks containing Iron Pyrites, and probably often contains Sulphate of Argilla; in which case it seems sometimes to have been taken for native Alum, although it wants the Alcali. The specimen before us is from Bacherstolln, in Schmölniz: it contains a considerable quantity of Argilla, but apparently no Alum; which is, however, readily produced from it, by adding a little Potash. Its sourer taste distinguishes it from pure Sulphate of Iron: it is also less astringent, and less liable to be acted upon by the atmosphere.

The specimen was lent me by H. Heüland, Esq. whose uncommon liberality deserves my warmest thanks.

147.

TAB. CXLVII.

CALX Polyhalites.

Polyhalite.

SYN. Polyhalite. *Stromeyer in Schweiggers Journal,* 21, 297 *et seq. see Thompson's Annals* 13, 112.

Fibrous Anhydrite. *Jameson, ed 2. vol. II. p.* 249.

Fasriger Muriacite. *Werner.*

A RECENT account of this mineral has been published in the following translation of part of a letter from Professor Stromeyer, as quoted above, by Dr. Thompson:

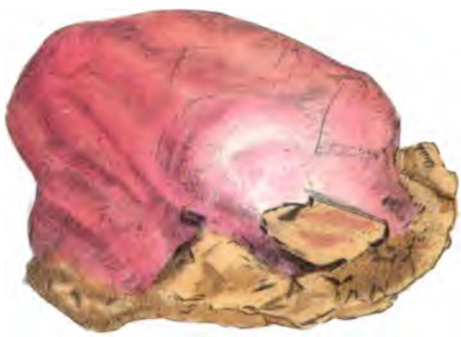
"I shall conclude this letter by informing you of a new mineral, very remarkable, on account of its composition. I have given it the name Polyhalite. According to my analysis, 100 parts of it contain the following ingredients:

Hydrous Sulphate of Lime - - -	28.74
Anhydrous Sulphate of Lime - - -	22.36
Sulphate of Potash - - - - - -	27.48
Anhydrous Sulphate of Magnesia -	20.11
Common Salt - - - - - - - -	0.19
Oxide of Iron - - - - - - - -	0.32
	99.20

"This mineral occurs in the beds of rock salt at Ischel, in Upper Austria, and has been hitherto erroneously considered by mineralogists as *Muriacite;* and under the name of *fibrous muriacite,* it has been described as a variety of that mineral substance."

The characters by which it may be recognized are its partial solubility in water, a hardness superior to Fibrous Gypsum; also a greater specific gravity, and a compact fibrous structure; between the teeth it feels rather gritty: it is nearly tasteless. When fresh broken it has a shining, slightly pearly surface, which becomes dull and rather whiter by exposure. Its fibres penetrate both ways into the Muriate of Soda, which serves for its matrix; they are of a dull red in the middle, and yellow brown at their extremities. The salt in which they are imbedded is white.

14.



TAB. CXLVIII.

MAGNESIA sulphata, var. Cobaltifera.

Cobaltiferous Sulphate of Magnesia.

SYN. Cobalt vitriolè. *De Born Catal. de Raab,* 2, 43.

Magnésie sulfatée cobaltifère. *Haüy Traité,* 2, 336. *Tabl.* 16. *Lucas Tabl. pt.* 2, 67.

Red Vitriol. *Aikin* 250.

SULPHATE of Magnesia has hitherto been found as a pulverulent crust upon the exposed surfaces of some rocks, or crystallized in brilliant spiculæ upon stones containing Magnesia and Iron pyrites, by the decomposition of which it has been produced; in this latter form it has occurred upon schale, in the Hurlet mine near Paisley: the variety figured has been long known, and having once been called Sulphate of Cobalt, although in fact it contain but a small portion of metal, it has since been confounded with that salt, but the paleness of its colour and bitter taste readily distinguish it. It has been found only at Herrengrund in Hungary: De Born mentions a specimen of it, containing a drop of water. Haüy observes that it is found in Copper mines, and is accompanied by Quartz and Sulphate of Lime. Vauquelin determined its composition. It is probable that like most of the soluble salts that occur in mines, it is produced after the vein has been exposed to the action of the atmosphere.

From the British Museum.

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TAB. CXLIX.
CALX magnesiata.
Magnesian Lime.

SYN. Magnesian Lime. *Brit. Min. Syst. Index. tab.* 217. 402, 497.
Compound spar. Muricalcite. *Kirw. I.* 92.
Chaux Carbanatée Magnésifère. *Haüy II.* 187. *Tabl.* 5.
Dolomite. *Kirw. I.* 111.
Chaux carbonatée aluminifère. *Haüy II.* 173.
Rautenspath and Dolomit of *Werner.*
Picrite. *Brong. I.* 230.
Carbonate of Lime and Magnesia. *Aikin,* 164.
Bitterspar. *Nonnul.*

THE crystallized varieties of this mineral have been long known to contain Magnesia, and from the bitter taste of the salt, consequently produced by dissolving it in Sulphuric acid, it has obtained the name of Bitter spar. Since the presence of Magnesia gives a form of nucleus different from that of Carbonate of Lime, although very nearly allied to it, it has been admitted by modern mineralogists as a well defined species, and is found to be liable to many of the various forms that are assumed by other minerals, in different states of aggregation, and most of these forms have received peculiar names; thus it occurs crystallized in several modifications, the *Rautenspath* of Werner; lenticular, and of a greenish colour, *Miemite;* massive, with a granular structure, *Dolomite and Magnesian Limestone,* and compact, with a slight

transparency, when it is called *Gurhofite*, or *Gurhofian* or *Conite*, &c. some of these varieties being named from the places where they were first found, often before their component parts were known. The Dolomite, Magnesian Limestone, and Flexible Limestone of Sunderland, all varieties of this species, have been figured in British Mineralogy; the present plate exhibits the primitive crystal, a rhomb whose angles measure 106°15 and 73°45, imbedded in green foliated Talc, or Chlorite; the acute rhomb, produced by a modification upon the lateral solid angles, receding upon the faces of the nucleus, towards the apex, and sometimes the apex is truncated: these crystals are imbedded in a granular mass of the same substance; it is from Halle in Saxony; and a variegated piece of a compact variety from Meissner in Hessia, called Conit, or Dichter Bitterkalk by the Germans, for which I am indebted to my valuable correspondent the Professor Stromeyer.

The constituent parts vary very much in different varieties, some containing little else than Carbonate of Lime, and Carbonate of Magnesia; others holding much Carbonate of Iron; the latter approach in the form and lustre, as well as composition, to pearly Brown-spar (Carbonate of Iron in curving rhombs) as the Carbonate of Magnesia is diminished in quantity the Iron is increased, and Manganese often introduced; thus rendering it difficult to determine which species many such intermediate specimens belong to; in general, however, those belonging to the Brown-spar (Carbonate of Iron) become black, when subjected to the action of the blowpipe, and produce a dark green glass when fused with Borax: they are also less readily soluble in muriatic acid than even Magnesian Lime, which itself does not dissolve so quickly as Carbonate of Lime, as is manifested by the slower evolution of gas.

TAB. CL.

SILEX fulgens. § 2. laminatus.

Foliated Stilbite.

Syn. Iehthyophthalmite. *Brit. Min. tab.* 520, *lower fig.*

Stilbite anamorphique. *Haüy III.* 163, *tab.* 49.

Stilbite, in hexahedral prisms. *Aikin,* 209.

Foliated Zeolite. *Jameson, ed.* 2, *I,* 307.

Blätter Zeolith. *Werner.*

After the plan adopted in the Systematical Index to British Mineralogy, of treating very distinct varieties, or doubtful species, as sections of the principal species they are allied to, it is found convenient to distinguish the mineral before us as a section of Stilbite, of which Haüy, and after him many other mineralogists, guided by the measures of the crystals, although not quite satisfactorily ascertained, have considered it only a variety. Its superior lustre and hardness, together with the different symmetry of its crystals, lead to the suspicion of its being a distinct species, especially when we consider that it commonly accompanies the duller, columnar crystals of Stilbite, and that the same characters remain readily distinguishable even when the colour of both is a strong brick red, as in the figures in British Mineralogy, table 260 and 520. In the description that accompanies the latter figure, we were led by the lustre to believe that, both it and the mineral now under consideration, were varieties of Ichthyophthalmite, but this opinion is not supported by analylis, and some other considerations incline us to withdraw it, particularly the direction of the striæ upon the sides not being perpendicular to the pearly faces, as they are in that substance, (see Bournon's Catalogue, p. 105.) The analysis of the Foliated Stilbite is as follows :—

	Meyer.	Vauquelin.
Silica - - -	58.3	52.6
Argilla - -	17.5	17.5
Lime - - -	6.6	9.0
Water - -	17.5	18.5
	99.9	97.6

by which it appears that the Argilla and Lime are in very different proportions to those contained in the Ichthyophthalmite, which holds above 24 per cent. of Lime, and scarcely any Argilla.

The upper specimen is a mass of Calcedony, darkly coloured by Chlorite, with a mixture of Quartz and Zeolite encrusting it; upon it are deposited several distinct crystals of the foliated Stilbite. The other specimen is part of the side of a cavity in Wacke, lined with snow-white crystals of the same Zeolite, mixed with a few crystals of prismatic Stilbite, distinguished, as is commonly the case, by a yellow tinge and less brilliancy: it is from Ferroë.

151.

TAB. CLI.

PLUMBUM sulphureum, var. prismaticum.

Prismatic Sulphuret of Lead or Galæna.

Syn. Blue Lead Ore. *Kirwan,* 2, 220. *Aikin,* 109.
Plomb noire. *Haüy Traité,* 3, 497.
Plomb sulfuré épigène. *Haüy Tabl.* 83.
Blau Bleierz. *Werner.*

The mineral commonly known in England by the name Blue Lead Ore, appears to have been considered by Haüy to derive its form from that of Phosphate of Lead by a substitution of Sulphur for Phosphoric acid and Oxygen, if such a process may be understood by the passage of the one ore into the other: the idea of its being a mixture of Phosphate and Sulphuret of Lead may be correct, but does not explain the nature of its formation. Some specimens are internally Phosphate of Lead, and in those which are wholly Sulphuret its granular texture and the uniformity of its substance shew clearly that it is not the immediate result of crystallization. It is found along with dark brown Phosphate of Lead, in large crystals, which agree with it in form, and of which I have added a figure at the top of the plate. It has often a brown surface, when it much resembles the unchanged Phosphate in external appearance, but is duller: at other times the surface is metallic, and is then generally variegated with a blue tarnish like tempered steel.. Huelgöet in Britany, and Zschoppau in Saxony, are the only places where it has been procured.

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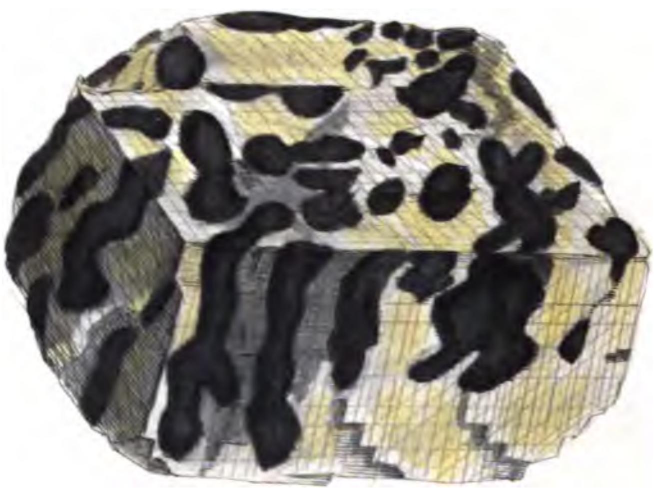

TAB. CLII.

SELENIUM Argento-Cupriferum.

Ore of Selenium.

See Thomson's Annals, *Vol. II. p.* 449.

THE only mention we have in England of the ore that contains the extraordinary new metallic substance discovered early last year, by Professor Berzelius, in the sulphur procured in roasting the Pyrites of Fahlun, and which is used for the manufacture of sulphuric acid at Gipsholm, is contained in an extract of a letter, from the Professor to Dr. Marcet, which is inserted in Thompson's Annals, as quoted above; it is as follows: "With respect to Selenium, I must inform you that I have found a fossil which contains one-fourth of its weight of it. It had been for a long time considered as an ore of Tellurium. I made an analysis of it some time ago; I could not find any Tellurium in it, but the blow-pipe always afterwards retained the odour of this metal. During my researches on Selenium, I recollected this circumstance, and the friend who possessed the mineral, sent me a sufficient quantity for an exact analysis. I find it to be composed of one atom of Seleniuret of Silver, and two of Selenuret of Copper." In this account we have no description of the mineral, but the specimen here figured was presented to the British Museum, as a Selenuret of Copper and Silver, by Berzelius himself, and is supposed to be the same ore above mentioned.

The principal mass is Carbonate of Lime, with the cleavage very regular, and the faces strongly marked with diagonal striæ. The metal appears in a state of very minute division, dispersed in elongated black clouds through it, without interrupting the flatness of the faces and only perceptible as a distinct substance in two or three fissures or porous parts of the specimen, where it occurs in very minute grains of the lustre and colour of tin.

The following are a few of the peculiarities of the new metal as collected from Berzelius' letters in Thompson's Annals. It is of a grey colour, with a high metallic lustre, or if minutely divided of the colour of Cinnabar, it is a non-conductor of heat and electricity; it has a scarcely perceptible transparency. It is easily melted, and while cooling, may be drawn out into fine threads, that appear of a ruby colour by transmitted light while by reflected light they exhibit a brilliant metallic lustre. It is volatile at a temperature approaching that of boiling Quicksilver; when heated by a candle, it burns with an azure-blue flame, exhaling a strong odour of Horse-radish. It combines with Hydrogen, forming a similar compound to Sulphureted Hydrogen Gas, but so excessively pungent, that the Professor, having breathed a bubble of it no larger than a small pea, felt a painful sensation, was seized with a giddiness, that however soon left him and remained insensible to the scent of the strongest Ammonia, the inflammation and a catarrh that followed the inspiration, lasted a considerable time.

Selenium also combines with many of the other metals; with sulphur, alkalies, earths, wax, and fat oils, it forms red compounds, and is soluble in several acids. It also combines with oxygen, producing an acid that will form specific salts with alkalies, earths, and metallic oxides. Zinc precipitates Selenium of a red colour, but in its metallic form from muriatic acid.

It is highly probable that some other ore of this extraordinary substance will be found; at present its rarity renders the one figured, it being the only specimen in England, highly interesting.

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TAB. CLIII.

SILEX Lenzini.

Lenzinite.

SYN. Alumine Hydratée Silicifere. *Léon Dufour in Journal de Phys. de Chim et d'Histoire Natur.* 86, 251.
Lenzinite. *John, ibid.* 86, 169.

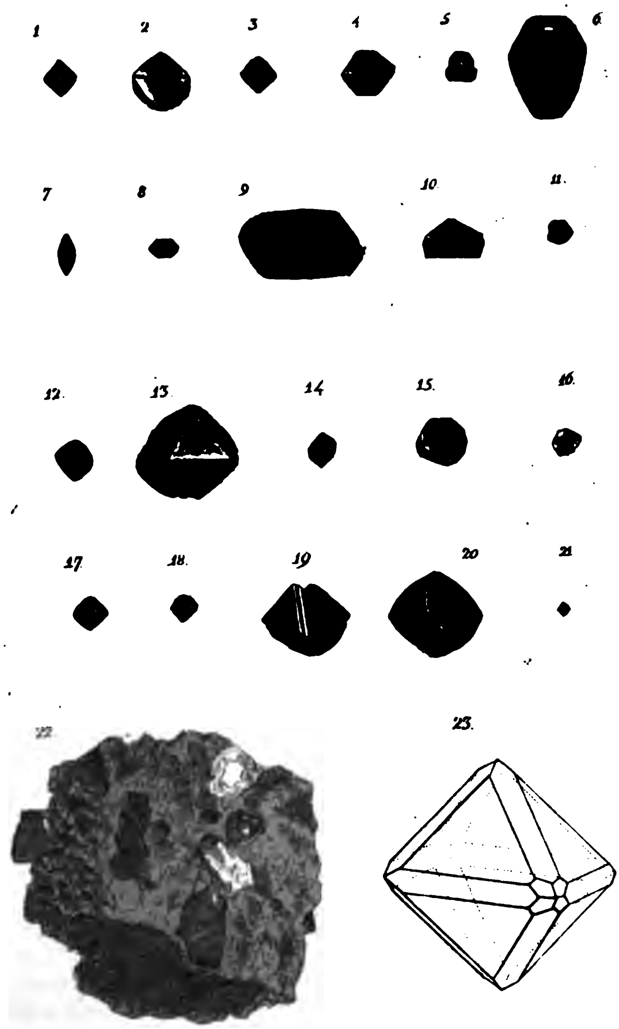
THE mineral before us has obtained the name of Lenzinite, although it be not quite identical with that so named by John. There are two varieties of Lenzinite described by this celebrated chemist; one transparent, like semi-opal; the other opaque and unctuous to the touch: they are both found at Kall, in the Eisel. Lelièvre describes, in the Annales des Mines, vol. II, p. 473, a mamillated substance, which he compares to Hyalite, that was found by him many years ago, encrusting stones in a lead mine, on the mountain of l'Esquerre, on the left bank of the Oo, in the Pyrenees; when fresh collected it was wet and soft; but when dried it became brittle and hard enough to scratch Carbonate of Lime; its analysis, as will be seen below, shews it to be somewhat similar to Lenzinite: Lelièvre named it Alumine hydratée silicifère. Mr. F. J. B. Menard seeing that memoir, recollected a tallow-like mineral, found in quarries of indurated Calcareous Marle, (Tuffau of the people of the country) near Mans, in the department of the Sarte; it occurred in nests and roundish pieces, about the size of nuts. He proposes to call it Wallerite, considering it different, although it contained the same ingredients as the mineral described by Lelièvre, and which he would call Lievrite, if that name were not adopted for another mineral (Silex Lievri, tab. 79.) Lastly, Mr. Léon Dufour found, in an alluvial deposit, the mineral now figured, at St. Sever, in the department of the Landes, about the beginning of 1818; it is in masses that are sometimes as large as one's head: its texture is very fine and even, and soft enough to yield to the nail, which gives it a polish; when fresh broken it smells strongly of apples: in general it is opaque, but some parts are semi-transparent. It hardens when heated, but is not fusible; in water it falls to pieces with a crackling noise. The following analyses shew the relationship of the substances above-mentioned; it is very probable that they are all casual productions, either deposited by water, containing the particles of decomposed Feldspar, or some other mineral suspended in it, or, perhaps, even the immediate result of the decomposition of some stone that once occupied their places in the rocks where they occur. Cimolite and Collyrite also appear to be analogous, and lead towards common Pipe Clay.

	Lenzinite.		Alumine hydratée silicifére.		
	opaline. By John.	argilleuse. Ib.	From St. Sever. by Pelletier.	From L'Esquerre. by Berthiei.	From nr. Mans. by Vanquelin.
Silex	37.5	39	50	15.0	47
Argilla	37.5	35.5	22	44.5	21
Water	25	25.0	26	40.5	30
Lime	a trace	0.5	0	0.	0
Iron	0.	a trace	0	0.	2 to 3
	100.0	100.0	98	100.0	100.

	Collyrite by Klaproth.	Cimolite also by Klaproth.
Argilla	45	23
Silex	14	63
Water	42	12
Iron		1.25
	101	99.25

I have been favoured with the Siliciferous subsulphate of Alumine by Dr. W. Henry, which he has described in Thompson's Annals, v. II. p. 432: when fresh it resembles hogs' lard, but must be considered as distinct from Lelièvre's mineral above mentioned: it is a casual production from the decomposition of the Shale in a coal mine near Oldham.

154.



TAB. CLIV.
ARGILLA Spinellus.
Spinel.

SYN. Argilla Spinellus. *Ex. M. tab.* 7. Argilla zincifera. *Ex. M. t.* 11.
Rubinus Spinellus et Balassus. *Wallerius,* 1, 247.
Spinell & Balass Rubies. *Kirw.* 1, 253.
Spinelle. *Haüy II.* 496. *Tabl.* 31. *Bournon Catal.* 33.
Celanit. *La Metherie Journal de Phys.* 1793, *p.* 23.
Pléonaste. *Haüy III.* 17. *Tabl.* 31.
Spinell, & Zeylonit, *of Werner.*

Two distinct varieties of Spinel have already appeared in this work: the pale blue from Aker, and the Zinciferous, or Automalite, from Fahlun in Sweden. It remains only to figure the more perfect form of the species, and the variety called Ceylonite. Spinel rubies have only been found on the island of Ceylon; they vary much in tint, but when the colours are bright, they have an orange hue, that distinguishes them from the oriental rubies, which if high coloured have a peculiar blueish glow, and sometimes incline to purple without losing their brilliancy. On the other hand, the orange varieties of the Spinel are rather purer than those of the oriental ruby. The green, dull blue, and greenish-black varieties of Spinel, had for some time been thought to be a distinct species, but this opinion is now given up, in conformity with the suggestions of Haüy, confirmed by the observations of Bournon. Fig. 17 shows a Spinel of the form that once characterised the Ceylonite (see fig. 23 ;) and figs. 19 and 20 are from two black crystals of Ceylonite in the British Museum. Fig. 22 shows the same variety imbedded in Augite, with Meionite, from Vesuvius. The other remarkable crystals upon this plate are, the rhomb, fig. 7; the mackled octohedron with two of the entering angles filled up, fig. 11; the approach to a tetrahedral prism, fig. 14, and to an hexahedral prism, fig. 15, by the truncation of some of the edges of the octohedron: the latter is also mackled; and a lilac octohedron from limestone, ejected by Vesuvius, and which contained myriads of such crystals, fig. 21; I am indebted to the Countess of Aylesford for a specimen of this.

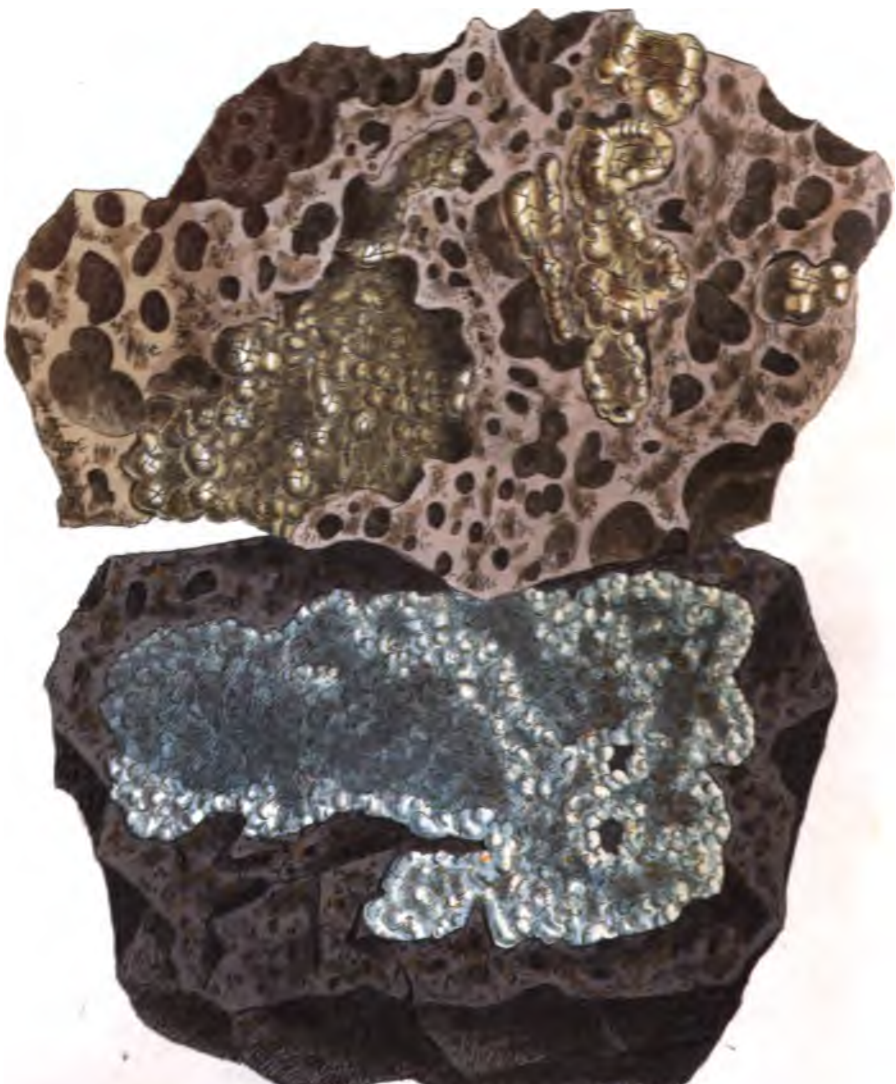
Figs. 2, 6, and 13 are from the collection in the British Museum; they are remarkable for size as well as form; the first presents an opaque surface, not uncommonly met with: it has an aspect resembling that of flint, which has been exposed to the sun and weather.

The following are the analyses of this mineral hitherto published.

	Spinel by Klaproth.		By Vauquelin.
Argilla . . .	74.50	. .	82.47
Silex . . .	15.50	. .	
Magnesia . .	8.25	. .	8.78
Oxide of Iron	1.50	Chromic acid	6.18
Lime	0.75	Loss .	2.57
	100.50		100.00

Ceylonite by Collet Descotils.

Argilla	68
Magnesia	12
Silex	2
Oxide of Iron	16
Loss	2
	100.



TAB. CLV.

SILEX Hyalithus.

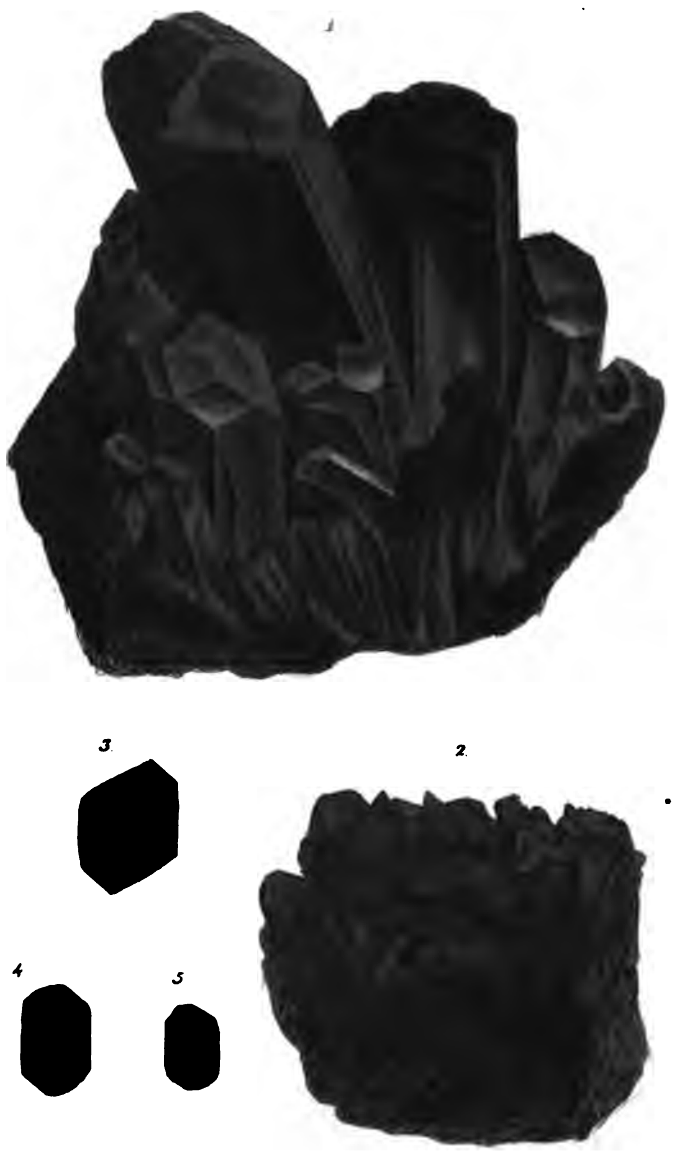
Hyalite.

Syn. Hyalite. *Kirw.* 1, 296.
Quartz concrétionné (in part). *Haüy II.* 416. *Tabl.* 25.
Muller's-glass and Lava glass, of many.
Hyalith of *Werner*.

This mineral has been long known, and yet many mineralogists are still wavering in their opinions respecting it; some considering it a variety of Quartz, or Calcedony; others joining it with Fiorite, Zeolite, &c. but all with some hesitation: in its composition it approaches to Opal, but differs in lustre, form, and texture, so that at present it seems best to insulate it. Its resemblance to gum spread in masses over the surfaces of the cavities of the Basalt in which it occurs, is so exact, in consequence of its great lustre, and the fine cracks that traverse it, that it is only necessary in its description to add, that its hardness is nearly equal to that of Quartz, and its form between botryoidal and mamillated. The upper figure represents a specimen from Frankfurt on the Mayn; the other one from Bohunitz, in Hungary; they are both in the collection at the British Museum.

Bucholz gives us the following analysis:

Silex	92.
Water	6.33
A trace of Argilla .	
Loss	1.67
	100.00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TAB. CLVI. and CLVII.

SILEX Pyroxenes.

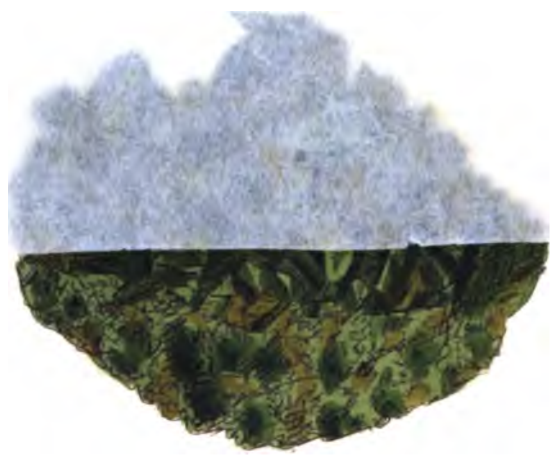
Pyroxene or *Augite.*

Syn. Schorl des Volcans. *Danbenton Tabl.* 11.
Volcanite. *Lam.* 2, 327.
L'Augite. *Broch* 1, 179.
Pyroxène. *Haüy* 3. 80. *Tabl.* 41. *Bournon Catal.* 70.
Augit and Kokkolith, of *Werner*. Also Fassaïte. *See Haüy in Annales des Mines*, 2, 164.
Coccolith. *D'Andrada, Scherer's Journ. b.* 4, 19, *s.* 30. *Haüy* 4, 355.
Yenite. *Ex. Min. tab.* 29.

Augite is very variable in its appearance, arising partly from the different forms of its crystals, and partly from its various colours; and hence it has been divided into several species, and new varieties have had names given to them as soon as found.

The most common kind is of a deep black colour, with a conchoidal fracture; it abounds in perfect crystals, dispersed through Basalt, Lava, and Trap rocks, where-ever those rocks occur (see figs. 3, 4, and 5, tab. 156); but though it has been long found in Scotland and Ireland, I have not met with specimens sufficiently illustrative to figure in British Mineralogy. These crystals are often mackled, either by reversing one against the side of another, as in fig. 5 of tab. 156, or by two or more crossing each other obliquely. A rarer and more magnificent variety is of a greenish black colour; it occurs in groups of crystals attached by their bases to the mixture of Hornblende and Augite, in which they are situated, and which forms part of the primitive Greenstone, or Hornblende rock, of Arendahl, in Norway (see figs. 1 and 2, tab. 256. A brighter green variety, which approaches much in colour to Epidote, is found handsomely crystallized upon granular Augite (Coccolite) at Traversella, in Piedmont. These crystals are much modified; the primitive planes of the prism being almost lost; the larger planes upon most of the crystals being secondary; many of the crystals are mackled, the mackling plane being in the diagonal of the prism; in some of the specimens white Carbonate of Lime relieves the green Augite very beautifully (see fig. 1, tab. 157.) Augite of a dull green colour also abounds along with Epidote, Hornblene, Meionite, &c. in the masses of primitive Limestone, thrown out with the Lava by Vesuvius. (See tab. 154, f. 22.)

Another dull green variety of Augite has lately been brought to England from Fassa, in the Tyrol, with the names Pyrgom and Fassaït, (see fig. 2 of t. 157); it is of a yellower colour than that from Traversella, but its crystals have the same general form as the smaller ones from that place; the very acute pyramids of these crystals serve to diguise them, but the black ones found in Basalt have sometimes facets much inclined towards the prisms that would, if enlarged, form similar pyramids (see fig. 4. tab. 157. The nearly colourless variety, formerly called Diopside by Haüy, including Mussite and Alalite, is the most distinct of all; but Haüy is satisfied of its identity: the Alalite is represented at fig. 3 of tab. 157; it is accompanied by orange-coloured Garnets of great beauty, and green Talc (Chlorite.) The Mussite is of a greener colour, less regularly crystallized, and



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often somewhat radiated in the mass. They are both found in the alp called la Mussa, near Ala, in Piedmont. A scopiform variety that was confounded with Lievrite, of which it was only the matrix, has been figured upon tab. 29 of this work; it has been considered by some as a variety of Epidote; but it is now determined that it is Augite.

The primitive form of Augite is an oblique prism, with a slightly rhomboidal base, whose angles measure 92°18′ and 87°42′; the base is inclined upon the obtuse edge at 106°6′, consequently the crystals found in Basalt may be known from Basaltic Hornblende, which they resemble by the near approach of the primitive planes of the prisms to a right angle; (they are the narrower faces upon the crystals figured). Augite is difficultly fusible; its specific gravity varies from 3.226 to 3.310, Haüy: its hardness rather exceeds that of glass.

	Analyses of Augite from Etna.	From Fascati.	From Norway.
Silex	52.00	48.	52.
Lime	13.20	24.	25.5
Magnesia	10.00	8.75	7.0
Argilla	3.33	5.00	3.5
Oxide of Iron	14.66	12.00	10.5
Oxide of Manganese	2.00	1.00	2.25
Loss	4.81	Potash a trace	Water 0.5
	Vauquelin 100.00	Klaproth 98.75	Simon 101.25

Mussite analyzed by Laugier afforded

Silex	57
Magnesia	18.25
Lime	16.50
Oxides of Iron and Manganese	6.00
	97.75

TAB. CLVIII.

ARGENTUM nativum

Native Silver.

SYN. Argentum nativum. *Brit. Min. tab.* 327 *and* 16.
Argent natif. *Haüy Tabl.* 73.
Argent métallique natif. *Bournon Catal.* 202.

THE native Silver figured in British Mineralogy is so ill defined that it seemed necessary to give another figure to shew how distinct it sometimes occurs; the specimens selected, and of which only parts are exhibited, are from Kongsberg, in Norway: a place celebrated formerly for the quantity of silver, and magnificence of the specimens produced by its mines, which were superior to those of Mexico or Peru, single masses of pure silver having been extracted from them, weighing more than 500lbs. weight. Better defined crystals of such a size are, perhaps, not to be met with; they are imbedded in transition Limestone.

I am indebted to Mr. Heuland for the use of them.

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TAB. CLIX.

ARGILLA silico-sulphata.

Alum Stone.

SYN. Alaunstein, *of the Germans.*
Alumenilite. *La Meth.* II, 113.
Siliciferous subsulphate of Argill. *Sowerby's List of Minerals,* 3.

THIS mineral has long been known by the German writers on mineralogy, nevertheless it has been neglected by many French authors, and appears to have been almost entirely unknown in England until some specimens were imported from Vienna in 1819. The crystallized form is a late discovery; the varieties from Tolfa near Civita Vecchia are destitute of any approach to crystallization, they are massive with a smooth and splintery or rough and rugged fracture, and want that glimmering which the surfaces of minute crystals dispersed through the masses give to the varieties from Hungary; these masses are also cellular, and the cells whose form is very irregular and ragged are lined with glistening crystals, most commonly of such small dimensions, and so closely set, that their forms cannot be distinguished; in some specimens however the crystals are larger (perhaps the 20th. of an inch wide) and arranged in little globules, and some are sufficiently insulated to shew that they are six-sided plates with alternately inclined edges, their surfaces are very brilliant and flat. The rarest form of this mineral is in well formed rhombs whose edges are the 10th of an inch long, grouped closely upon the surfaces of hollows in the same substance.

The sides of the rhombs are generally slightly curved like those of Brown spar, and their apices truncated, leading to the minute plates above mentioned (see the outlines); the plain produced by the truncation is very flat and brilliant, the others are shining; the fracture is uneven and rather dull in every direction except that perpendicular to the axis of the rhomb, in which it is foliated and brilliant. The crystals are soft enough to yield to the knife easily with a grating sound, but the cellular mass contains a greyish substance that is so hard as to injure the edge of the knife and probably contains more silex than the crystals imbedded in it, which ought to be considered as pure Alum-stone. The crystals, are transparent on the edges, the other parts opaque.

The spec. grav. varies from 2,587, to 2,633; it is difficultly fusible.

The following are the analyses given by Vauquelin and Klaproth.

	Vauquelin	Klaproth from Tolfa.	Ditto from Hungary
Argilla	43·92	19·0	17·5
Silex	24·00	56·5	62·25
Sulphuric acid	25·00	16·5	12 50
Potash	3·08	4·0	1·0
Water	4.00	3·0	5·0
	100·00	99·0	98·25

It is evident that this mineral contains all the constituent parts of Alum which has long been extracted from it, by first roasting so as to destroy the adhesion of the particles, then washing from the Silex and superabundant Argill the soluble portions and evaporating the water to obtain the alum in crystals.

Fig. 1, represents the largest crystals I have met with; they are from Beregshaez.

Figs 2 and 3 are from the cellular variety found also at Beregshaez in Upper Hungary.

Fig. 4, the most compact variety from Tolfa, it is accompanied by Quartz.


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TAB. CLX.

SILEX Salaensis.

Sahlite.

SYN. Sahlit. *D' Andrada, Werner, &c.*
Malacolithe. *D' Abildgaard, Haüy* IV. 379.
Pyroxène (in part) *Haüy Tabl.* 41 *and* 42.
Augite β. Sahlite, *Aikin* 228.
Sahlite. *Bournon Catal.* 76
Silex Salaensis, *Sowerby's List of Minerals,* 8.

AUGITE occurs under so many different appearances that it is difficult to fix upon a character by which to distinguish Sahlite from it; if it really prove to be, as Bournon and the followers of Werner assert, a distinct species; the colour suit insisted upon by the latter is of little service, since Augite is sometimes almost white; yet there is in the green varieties of Sahlite a blue cast and a kind of glaucous appearance that is not in the green Augites (see tab. 157) the different position of the nucleus, an oblique prism, in the crystal observed by Bournon would be a good character if that nucleus were not easily divisible in the diagonals of its base, producing faces corresponding with those of the nucleus of Augite, in their relative position with the termination of the prism, which in Augite is found to incline upon the angle of the prism while in Sahlite it inclines upon one of the lateral faces. The only character left by which Sahlite may be known with certainty, is the facility with which it breaks in the direction of all the sides of the nucleus and of its diagonals, but more particularly in that of the terminal faces, parallel to which numerous fissures are conspicuous in all the varieties; most of the surfaces thus produced are shining but seldom flat for any great extent; but those parallel to the terminal planes are dullest and generally flat quite across the crystal, with a peculiar lustre, and somewhat scaly surface. Augite never presents a flat fracture in this direction, but often exhibits a conchoidal cross fracture which is seldom seen in Sahlite because the other fractures are more easily made. The differences in goniometrical measures are too small and perhaps not sufficiently established to be relied upon, and if they were, it is seldom that specimens occur upon which they can be observed. The nucleus according to Bournon is a rectangular 4-sided prism with its terminal planes inclined upon two of the sides at an angle of 106° 15′

The analysis of Sahlite shews it to contain more Lime and Magnesia than is found in Augite, but the latter is so variable in its composition that little reliance can be placed on this circumstance.

Sahlite according to Vauquelin contains,

Silex	53
Magnesia	19
Argilla	3
Lime	20
Iron and Manganese	4
	99

Sahlite is named from Sahla in Sweden, where it is found in the silver mines; it is also abundant near Arendahl in Norway, where it is associated with Magnetic Iron, Mica, Hornblende, Carbonate of Lime, &c. It also occurs in a granular form mixed with granular Magnetic Iron and Mica at Sverdjo near Fahlun: this variety has often been called Coccolite (granular Augite) but differs from it in its foliated structure. In Scotland it also is found but mostly in masses composed of various sized crystals closely matted together and nearly white.

Fig. 1 represents a Scotch specimen from Glen Elg.

Fig. 2, a crystallized specimen from Arendahl, taken from the collection in the British Museum.

Fig. 3 the granular variety from Sverdjo.

Nos. 1 and 3 and the larger terminal plane in the outline are the primitive faces; No. 2 and the other narrow faces of the prism with the same terminal face are what would be the primitive faces if the crystal belonged to Augite instead of Sahlite.

161.

TAB. CLXI.

PLUMBUM Argilliferum.

Aluminate of Lead.

SYN. Plomb-gomme (of the French.) *Berzelius Nouveau Système de Minéralogie, ed.* 1819, 283.

Aluminate of Lead. *Thompson's Annals of Phil. XIII,* 381.

Native Hydrous Aluminate of Lead, *James Smithson, Esq. in Annals of Phil. XIV.* 31.

Hydrate d' Alumine et de Plomb, *M. de Laumont, in ib.*

Sel acide-phosphorique martial &c. *Extrait d'un Mémoire sur la description de plusieurs filons metallique de Bretagne, par M. de Laumont. Journal de Phys. XXVIII.* 385, F 16.

PLOMB-GOMME, as this mineral has lately been called, in consequence of its resemblance to Gum as it issues from the tree, does not appear to have been described by any author, although it was mentioned as a peculiar mineral so long ago as in 1786 in the Journal de Physique by M. de Laumont, and even a few years previously by De Lisle: if his "Plomb rouge en stalactites" which he describes of a lively red, not orange or yellow colour, be the same substance. (Vol. III p. 399.) It has been found only in one place in the mine of Huelgoat, near Poullaouen, in Britany.

It occurs in a mamillated form encrusting the surfaces of hollows among stalactitical prismatic Pyrites, (decomposing Iron Pyrites.) It is of a bright wine yellow colour perfectly transparent, and possesses a high degree of lustre. Its structure is like that of Malachite, and consists of numerous concentric layers formed of perpendicular fibres, the surface of the outermost layer is dull, but that of every internal one is highly polished and very brilliant; the hardness is superior to that of Fluor, but it yields easily to the knife; its specific gravity taken from a small piece which had several fissures in it was above 3.365. Under the action of the blowpipe it decrepitates violently; if exposed gradually to heat it becomes opaque, white, and contracts slowly in bulk, but does not melt at any temperature, nor is it altered by charcoal; it effervesces rapidly when boiled in dilute Sulphuric acid, which dissolves the Argilla, and leaves Sulphate of Lead reducible upon charcoal; when heated below redness its water is given out silently. It was ascertained by the much to be regretted and unfortunate Smithson Tennant, Esq. when last in Paris, to be a compound of Oxide of Lead, Argilla and Water; since then Berzelius has made an accurate analysis of it, which is as follows.——

Oxide of Lead	40·14
Argilla	37·00
Water	18·80
Sulphurous acid	0·20
Lime, oxides of Manganese and Iron	1·80
Silex	0·60
	98·54

Berzelius supposes the Sulphurous acid to be combined with parts of the Lead and Argilla forming Sulphites and with the Silex, Lime, &c. as accidentally mixed.

The acid stiptic taste mentioned by M. de Laumont probably arose from an admixture of Sulphate of Iron produced by the decomposition of its matrix.

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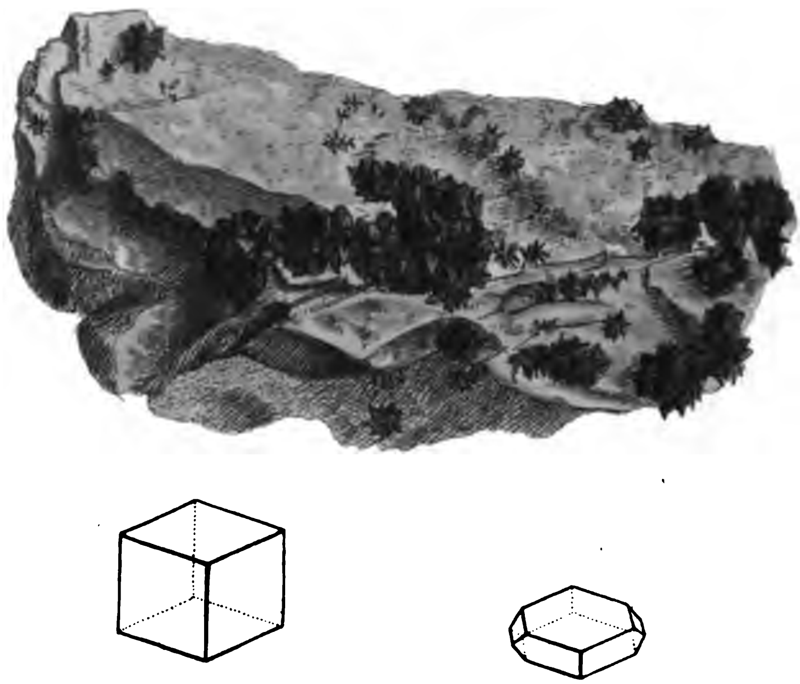

TAB. CLXII.

ARGENTUM (sulphureum) flexile.
Flexible Sulphuret of Silver.

Syn. Argent Sulfuré flexible. *Bournon Catal.* 209
Argentum flexile. *Sowerby's List,* 16.

The only account we have of this mineral is given by its discoverer, the Count de Bournon; it is extremely rare, the only specimen in England is the one figured; it was found in Mr. Partsch's cabinet of Minerals at Vienna, among the ores of Tellurium, and was brought to England with it by my son G. B. Sowerby.

The following observations are extracted from Bournon's Catalogue:

"I am unable to bring this substance under any of the known ores of Silver, from all of which it differs wholly in its specific characters. Its colour approaches black; it is tender and easily cut by a sharp instrument; but the cut surface, without being dull, has not so brilliant a metallic lustre as that of the sulphuret of Silver. Its primitive form is a rhomboidal tetrahedral prism of 60° and 120° divisible parallel to the terminal faces with almost the same ease as Mica. When its crystals are thin, which they generally are, they are nearly as flexible as a plate of Lead of the same thickness: this property is alone sufficient to characterize in this sulphuret of Silver a new species, and from it I have named it Argent sulfuré flexible, until some other name be given to it: by this character I have been led for a long while to esteem this substance as probably a grey Tellurium from Naggiag, but the examination of it made at my request by

Dr. Wollaston has done away with this opinion, as he found only Silver, Sulphur, and slight traces of Iron i it. I have met with seven modifications of the primitive crystal."

"In general the crystals are very small, their gangue in the specimens (8 in number) which are placed in this (the Count's) collection is a ferriferous carbonate of Lime, of either a deep pearl grey or flesh colour, mixed with grey sulphuret of Copper and Iron, and carbonate of Lime in lenticular rhomboids. I believe they are from Hungary."

The gangue of my specimen is similar.

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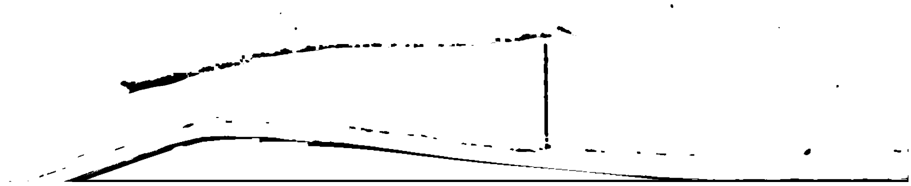


TAB. CLXIII.

FERRUM Niccoliferum.

Nickoline, or Meteoric Iron.

SYN. Meteoreisen, *Klaproth Beit. b.* 4. *s.* 99.
Fer natif Météorique, *Haüy Tabl.* 93. *Lucas Tabl. partie* 2, 358.
Native Iron, *α* Meteoric. *Aikin* 95.
Native Iron. *Bournon and Howard Phil. Trans. for* 1802.

IN British Mineralogy, tab. 101, I have given some account of the native Iron contained in Meteorolites; it was at a time when these Stones were so little understood, that the fact of their falling was doubted by most Philosophers; this is now generally admitted, and no apology is necessary for introducing the alloy of Iron and Nickel which has been found on various parts of the Earth's surface, as of Meteoric origin. The present examples being mostly free from earthy and stony materials must appear most astonishing, but they are nearly as well, although not so generally authenticated as the Stones, partly by the traditions concerning them, partly by their similarity in composition, and partly by the insulated situations they have been found in upon the surface of the ground. It appears that the ancients were acquainted with both kinds, but that the earthy masses have been much the most numerous, and venerated from the earliest periods; indeed, so much were the idolators struck with them that they considered them as marks of the anger of the Gods, or as Gods come to visit them, and upon the latter supposition built temples, in which they protected and worshipped them: such, it is supposed, the image of Diana in the temple at Ephesus originally was. That which the pagans entitled the Mother of the Gods, said to fall at Pessinus, and was taken from Phrygia to Rome in the time of Scipio Nasica, and several similar images, were probably Meteoric Stones. The stone so much venerated by the Arabs, which is set in silver in the Caaba in Mecca, the Mehometans, who destroyed above 360 other images they found there, say was brought down from heaven by Gabriel, and that it was originally white, but has contracted the blackness that now appears on it from the sins of men; this may very probably be a Meteoric Stone with its natural black crust, and not blackened either by the sins or the kisses of pilgrims as sometimes related. In the time of Pliny, who has given accounts of the falling of several Stones at various periods, and of a spongy mass of Iron that fell in Lucania, about 56 years before the Christian era, it seems that his statements were acknowledged; in the progress of time, however, these facts, although they continued to occur, became mixed so much with fabulous accounts that they were treated with ridicule or forgotten, so that translators, who could not conceive the fall of a stone to be probable, have translated passages where they may have been alluded to, more after their own ideas, and it is but lately that this knowledge has been renewed to the learned of our times. Although the fall of masses of Iron is of rarer occurrence than that of Stones, it is not very remarkable that they should be still found upon the surface of the Earth in various places where the memory of man has not preserved even a tradition of their fall; for after the Iron is once well coated with rust it does not appear to be of a very perishable nature; whereas the Stones in consequence of their loose texture, and the quantity of Pyrites contained in them, would soon decay; hence they have not been found casually, but have entirely escaped notice, unless they have been traced from a meteor or seen to fall. Out of about fourteen accounts of the fall of Iron that have been preserved either by books or tradition, it does not appear that more than three can be verified by the remains of the masses they refer to,* the Siberian, that of Agram, and that preserved at Elbogen; while eight or ten similar masses of Iron have been found in places where they could not have come from any mine, and also containing Nickel, an ingredient that is common to all the Meteorites. On the other hand there are about 170 authentic accounts of the fall of stones either in showers of thousands, or singly, out of which only about 50 of different dates have been preserved by the curious to the present day†, and none have been found remaining on the earth's surface. It is a curious circumstance, and almost promises to agree with the words in my preface to the 'List of Rocks and Strata,' where I observe, that, "Meteorites appear to have encreased in numbers within the last century or two, and it is not impossible that they may be so numerous in the course of ages as to cover a considerable portion of surface, if they have not already done so in some remote unvisited parts, for Nature generally operates upon a large scale, and is not limited by time" that in the north-east corner of Baffin's Bay there should

* The Iron has probably been worked up, as it was in China and Cordova in Spain.

† Since I published the account in Brit. Min. of the Yorkshire and Glasgow Meteorolites, there have fallen, a single stone in the county Tipperary in August, 1810, and several stones near Adare in the county of Limerick on the 10th of September, 1813. The first of these I have figured along with the full sized one I have published of the Yorkshire Stone on a large folio plate.

exist several masses of Iron, one of which is so large that the natives consider it to be part of the mountain, and that this Iron should agree in lustre and containing Nickel with the Meteoric Iron.

There are two kinds of Iron supposed to be Meteoric: one of an uniform even texture, a whiter colour than pure Iron and very tenacious and ductile; the other of a foliated structure, darker colour, and somewhat brittle, although ductile; the first is difficult to break, but the broken surface resembles that of Lead, it feels smooth to the edge of a knife; the latter splits in breaking and the fracture has a granular surface, it grates under the knife; it is highly probable that it contains pyrites between the laminæ, and that they themselves are combined with a minute portion of Carbon.

I have selected examples of both kinds for figuring: of the first there appear to be but two known, viz. the famous ramified mass weighing 1600 pounds, found by Prof. Pallas upon a hill between Krasnojark and Abaakunsk near the Oubeï and the Sisim in Siberia, and the solid mass mentioned by Barrow as having been found on a plain between the great Fish River and Graaf Reynet in southern Africa previously to his visiting that spot; both these I have figured. Of the foliated or crystallized kind, the most remarkable is that which fell in Croatia: the following account is given of it. At Hraschina, near Agram in Croatia, on the 26th of May, 1751, about 6 o'clock in the evening, a globe of fire appeared passing towards the east, it was accompanied by a sound like the rattling of chariots, and then exploded with a still more tremendous noise, giving out a black smoke, and dividing into two portions, the largest of which fell in a field and buried itself deep in the earth, which it shook like an earthquake, its weight was 71 pounds; the other fell in a meadow 2000 paces from the first, it weighed only 16 pounds. I am indebted to the Imperial Cabinet of Vienna for a small fragment of the larger mass, which resembles in appearance Fig. 5, but it is composed of smaller parts. Another mass of the crystallized kind was preserved for many years at Elbogen in Bohemia; it is said to have fallen in 1647, its weight was 200 pounds; a piece of this I have also had from Vienna, it cannot be distinguished from the last.* I have not figured either of these because the fragments were smaller, and because their characters are shewn upon a larger scale by that from Lenato. A fractured piece of the Elbogen mass has been presented to me by Prof. Stromëyer, which agrees in its form with the specimens exhibited at figs. 6 and 7; it was thought unnecessary, therefore, to figure it. Mr. Greville's piece of that from Elbogen is, however, given at figure 4.

Fig. 1 represents a specimen, from the late Mr. Greville's cabinet, of the Siberian Iron well calculated to shew its ramifying and cellular form, in the interior the cells are filled with a transparent yellow substance extremely like Olivine in all its characters and composition, it is supposed to be the same as the earthy part of the Meteoric Stones fused into a glass. Many of the cells are lined with Pyrites as is shewn at fig. 2. This is stated by the Tartars, who reverence it greatly, to have fallen from heaven.

Fig. 3. is from my specimen of the Iron found near the great Fish River; it was obtained at the Cape of Good Hope, and brought to England by Fichtel. (The piece brought to England formerly by General Prehn I

* The foliated structure of these Irons is rendered conspicuous upon the polished surface by washing it with acid, which acts more or less strongly upon it according to the hardness of the different parts. The Siberian and Cape Iron gain a fine velvety lustre by this operation, but shew a uniform surface.

understand was sent to Holland.) This is extremely pure and compact; it is considerably harder, but otherways much of the texture of Lead; it is not elastic when sawn into slices, but is easily rendered so by hammering; a shaving taken from the surface by a chizel is elastic without any further operation; it is so ductile and free from flaws that it may readily be rolled into sheets thinner than paper without cracking; its hardness is such that it takes an excellent polish, its lustre is superior to that of pure Iron, and its colour nearer that of silver. These properties rendered it an excellent material for a sword blade, consequently, upon His Majesty the Emperor of Russia visiting England, I had a slice 2 inches and three-fourths long, 2 inches wide, and nearly three-fourths of an inch thick, hammered at a low red heat into a blade 2 feet long, and 1¼ inch wide, which welded into a steel haft, and mounted, I presented to his Majesty* as a memorial of his visit. Previously to this a slice had been sawn off by Smithson Tennant, Esq. at Sir Joseph Banks's request, and upon being analyzed was found to contain 10 per cent. of Nickel: some other experiments were made with it, but the results have unfortunately not been published. At one end of the mass is a fissure filled by sulphuret of Iron that is continually decomposing and absorbing moisture which spreads over the polished surface and rusts it, otherways it does not seem so liable to rust as common Iron or Steel. The mass originally found was carried from place to place as a great curiosity; its weight was estimated by Barrow at about 300lbs.; he further observes that it had "no matrix of any kind adhering to it, nor in the cavities of its surface were

* See Phil. Magazine, Vol. 55, p. 49. His Imperial Majesty has expressed his approbation, by sending me a superb Emerald ring set with Diamonds, for which I feel highly grateful. It was brought by His Excellency Dr Crighton.

any pebbles or marks of crystallization." In sawing through it an empty spherical hollow about the size of a pea was met with.

Fig. 4. is from a piece, in the late Mr. Greville's collection, of that from Elbogen in Bohemia: it was presented to the Baron Born by the Academy of Freyberg. I have figured it in consequence of its containing a grey foliated, semivitreous, but opaque earthy substance among the Iron, which renders it intermediate between the Meteoric Stones and Meteoric Iron.

Fig. 5. is from a slice from Lenato in Hungary; the edge has been polished and the surface treated with dilute nitric acid, which exposes the direction of the laminæ of crystallization; they are considered as parallel to the surfaces of regular octahedrons intersecting one another. The whole mass weighed 191lbs.

Fig. 6 is a fragment of the great mass found by Goldberry near the right bank of the Senegal in Africa; it shews at once the foliated and granular structure.

Fig. 7. is a similar piece from St. Iago del Estro, in South America; these are extremely like each other, but the American is rather the whitest, it could not be distinguished from a broken piece of the Elbogen Iron as I have observed before; the mass this came from lies in the middle of a great plain 100 miles distant from any Rock or Mountain.

Figs. 8 and 9 represent two knives made of small flattened pieces of Iron, let into bones by the natives of the Arctic Highlands, discovered by Captain Ross. This Iron has been found to contain Nickel, which circumstance, together with the account of its being cut off with a hard stone from large masses that lie above ground upon a mountain, render it highly probable that it is of the same Meteoric origin as the above described kinds; it was, however, stated that one mass was a part of the rock, but as it was harder than the rest it was possibly something else. (See Ross's Voyage for the purpose of exploring Baffin's Bay, ed. 2, v. 1, p. 140.)

There are accounts of native Iron being met with not containing Nickel, but these are found in mines united to other minerals; the most authentic is that of Gross Kamsdorf in Saxony, it was accompanied by Brownspar, brown Iron-stone, and sulphate of Barytes: Klaproth found Lead and Copper in it.

The following are the analyses of a few of the meteoric Irons at present known:

	Iron.	Nickel.	
Siberian, sp. gr. 6487	87·5	12·5	Howard.
Bohemian, sp. gr. 6146	82·4	17·6	ib.
Agram	96·5	8·5	Klaproth.
St. Iago, America	90·	10·	Howard.
Mexico	88·9	11·1	ib.
Senegal	95·2	4·8	ib.
Arctic Highlands	97·44	2·56	Mr Fyfe.

The vitreous part of the Siberian was found by Howard to contain:

Silex	54
Magnesia	27
Oxide of Iron	17
Oxide of Nickel	1
	99

the sp. grav. is from 3263 to 3800. Bournon.

Mr. Lauguier has analyzed the Siberian Iron, uniting the earthy part with the Metallic, and obtained from 100 parts 113·1, the encrease arising from the oxygenization of the metals.

Oxide of Iron	68·2
Silex	16·
Magnesia	15·
Sulphur	5·2
Nickel	5·2
Chrome	0·5
Loss	3·
	113.1

164.

TAB. CLXIV.

HELVINE.

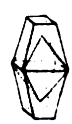
SYN. Helvin, *Friesleben's Beiträge zur Min: Kenntniss von Sachsen, b.* 1, *s.* 126. *Cordier, Ann : des Mines for* 1818. *Heuland in Annals of Phil : XII.* 453.

IT does not appear that this mineral has yet been analyzed, we are therefore uncertain what genus to place it under. It has been found only in the mine called Brother's Lorenz, near Schwarzenberg in Saxony, where it is imbedded in dark green almost compact Chlorite, accompanied by lilac Fluor, Blende, Schaalstein and Quartz, its crystals are sometimes connected together, but are rarely attached to the gangue ; the most common form is an octohedron, four of whose faces are much smaller, of a deeper colour and more transparent than the others, sometimes these faces are very minute and even quite wanting, when the crystals become regular tetrahedrous with brownish yellow angles. Its lustre is about equal to that of Garnet, the fracture is uneven and rather splintery, by close attention indications of laminæ parallel to the sides of the crystals are observable. The hardness varies in the same crystal, the opaque parts yeilding to the knife while the transparent scratch crown glass. The specific gravity is from 3. 2. to 3. 3. ; before the

blow-pipe it fuses easily into a blackish brown glass. The yellow colour resembling that of the Sun when low in the horizon has given rise to its name.

I am indebted to Mr. Heuland for the use of the fine specimens figured.

165.



TAB. CLXV.

Manganesium oxygenatum pyramidale.

Pyramidal Manganese.

SYN. Schwarzer Braunstein, *Werner*. Foliated Black Manganese-Ore, *Jameson, ed. 3, v. III, p. 263.*

THE principal characters that distinguish this rare ore of Manganese, are its dark colour, close texture, and the acute pyramidal form of its crystals; generally the crystals are so closely aggregated together as to form a solid mass, in which they are only distinguished by their foliated structure, their external form is seen where they occur upon the surfaces of hollows. The mass has much the appearance of an opaque Iron Slag, but of a purpler black colour. The fracture of the compact parts is even with a dull surface, but the crystals having a foliated structure, give a ragged shining fracture. The powder is of the same colour as the mass. It is heavier than most other ores of Manganese. Although a foliated structure is very manifest yet it is difficult to obtain regular cleavages, but I think I have succeeded in procuring several inclined upon the faces of the acute octohedron, so as to give a more obtuse octohedron for the primitive; faces parallel to this exist around the truncated apices of several crystals upon the specimen figured. Jameson says, this mineral occurs in veins in secondary Porphyry, in the Manganese formation of

Oehrenstok near Ilmenau in Thuringia, my specimen is said to be from Elgersburg near Gotha, and is accompanied by purple Fluor.

Berzelius speaks of an ore of Manganese crystallized in octohedrons, which he says comes from Piedmont, he gives the following analysis.

Silex - - - - - -	15.17
Brown oxide of Manganese -	75.80
Alumina - - - - - .	2.80
Oxide of Iron - - - - -	4.14
	97.91

Whether this be the same kind of ore as the one before us, I cannot say his description is so short, it agrees however in not being altered before the blow-pipe except externally.


1
2
3.

TAB. CLXVI.

Silex niccoliferus.

Pimelite.

SYN. Pimelit, *Brochant and Werner*. Chrysopras Erde, *Klaproth*. Nickel, silicate? Pimélite, *Berzelius nouveau Système de Min.* 202. Silex niccoliferus, *Sowerby's List of Min.* 8.

PIMELITE may be distinguished from other green minerals by its smooth greasy feel, its softness, it generally yeilds to the finger nail, and brilliant pure green colour. It occurs in the form of veins traversing Serpentine in Silesia, the finest varieties are found at Kosemütz, they are sometimes accompanied by a white earthy mineral of a less greasy feel, with a few minute glimmering scales dispersed through it, which has lately been considered as a distinct species and named *Razumoffskin*, after a Prince of that name, Mica and Tourmaline also accompany it.

The upper figure is taken from a specimen from Glassendorf, the Serpentine is partly decomposed. The middle figure is from Kosemütz, on one side is a considerable portion of yellowish Mica, and on the top a little Razumoffskin, which indeed seems to be the same substance as the Pimelite only free from colouring matter and less compact, it is probably an hydrate of Silex. The lowest specimen consists almost wholly of Razumoffskin penetrated by Tourmaline and encrusted by Pimelite of a very pale colour, the situation of which seems to support the above suggestion; it is also from Kosemütz. Klaproth has given us an analysis of Pimelite, which shews it cannot be a variety of Steatite, as some have thought; it is as follows,

Silex - - - -	35
Alumine - - -	5,10
Lime - - -	0,40
Magnesia - - -	1,25
Water - - -	37,91
Oxide of Nickel - -	15,62
	95,28

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TAB. CLXVII.

THULITE.

We know but little of this rare mineral, but an idea may be obtained of it from the figure, sufficient for impressing the name upon the memory. The following characters may also be of service in recognizing it when met with. Its structure is compact foliated with laminæ in two directions, parallel to the sides of an acute rhomboidal prism; the cross fracture is hackly and shining; it is hard enough to scratch glass strongly and is rather brittle; the most perfect parts are semitransparent and of a deep pink colour, other parts are paler by degrees until they are nearly white or yellowish white and opaque. Before the blowpipe the transparent parts soon become opaque and if the heat be suddenly raised, it intumesces much and produces a dull infusible spongy light brown slag.

The minerals that accompany Thulite are verdigrease, green Idocrase, Lilac Fluor, and Quartz. It is found in Souland, in Telemarken, Norway, and also in Greenland.

The specimen figured is in Mr. Heulands collection, it is from Norway.

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TAB. CLXVIII.

CARPHOLITE.

Syn. Karpholit, *Werner*.

The mineral before us is one of those new substances named by Werner a little before his lamented death, it appears to be perfectly distinct from every other; it consists of brilliant fragile acicular crystals arranged in stelliform groups, more or less compact, in the hollows and fissures of a rock composed of Quartz and Chlorite; it is accompanied by Fluor and phosphate of Lime. It is extremely brittle and softer than glass, before the blowpipe it swells and melts with ebullition into a dark brown globule. Its colour varies from nearly white to a deep straw yellow; its most common colour is pale straw, from which circumstance it has been named from Καρφος.

From Mr. Heuland's cabinet.

169.

TAB. CLXIX.

SPHÆRULITE.

Syn. Sphærulit, *Breithaupt.* Sphærulite, *Jameson Ed. 3, v. 3, p. 545.*

This remakable mineral occurs imbedded in Pearlstone* and bears a great resemblance to some of those opaque concretions so common in green glass or slag that has been slowly cooled, and has probably a similar origin. It consists of balls and veins that seem to be a series of balls connected together, with mamillated surfaces; it breaks into angular fragments with flat dull surfaces diverging irregularly from the centres of the balls; the lustre is like that of coloured wax, the veins and some of the balls have a crust of a darker colour than their insides, and their fissures are often filled up with a white crust. The hardness is about equal to that of Quartz, bnt it is more brittle; it is nearly infusible.

It is more readily decomposed by exposure to the weather, than even the Pearlstone in which it is imbedded, forming a gritty powder.

The specimens figured, shew a considerable variation in the size of the balls, the lower one is in a decomposing state. They are from Siebenbirgen in Transylvania, it is said to be found in Iceland.

* A variety of Pitchstone consisting of grey globules composed of concentric coats closely pressed together, it is most probably of Volcanic origin; it often, as in the present case, contains grains of Feldspar and black Mica dispersed through it.