

ELEMENTS
OF
MINERALOGY.

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OF THE ACADEMIES OF STOCKHOLM, UPSAL,
BERLIN, MANCHESTER, PHILADELPHIA, &c.

SECOND EDITION,
WITH
CONSIDERABLE IMPROVEMENTS AND
ADDITIONS.

VOL. II.
SALTS, INFLAMMABLES, AND METALLIC
SUBSTANCES.

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C H A P. XIX.

MOLYBDENITE.

MOLYBDENUM OF HIELM.

By this name I distinguish the Regulus produced from Molybdena by the indefatigable skill and industry of Mr. HIELM.

Its colour is externally whitish-yellow, but in its Fracture whitish-grey.

Lustre 2. Hitherto procured only in brittle agglutinated masses.

Specific Gravity when first assayed in water, appears variable for some days, until its interstices have perfectly absorbed that fluid, and then 7,500.

The Nitrous Acid attacks it with effervescence, and converts it into a Calx, endowed with Acid properties.

The Vitriolic Acid concentrated and boiling, also attacks it, and acquires first a green, then a blue colour from it, but by long boiling it loses all colour. The Marine has no effect on it, nor even Aqua Regia, unless it contains $\frac{4}{5}$ of Nitrous Acid.

It differs from all other Metallic Substances by being nearly infusible in our furnaces; it is probably the impossibility of exhibiting it in the form of a round button, that made KLAPROTH think he had not succeeded in reducing it. However by Mr. PELLETIER'S account, it was evidently reduced, and Mr. HIELM produced a still purer

purser and more perfect Regulus.* In a red heat it calcines. While in its Reguline State it gives no colour to Borax, which property proves its different states.

This substance is also capable of existing in the state of an Acid.

The Molybdenous Acid is nothing more than the Calx of Molybdenite Oxygenated as perfectly as possible.

It is generally procured by the desulphuration and Oxygenation of the Sulphurated Ore of this Semi-Metal, namely Molybdena. Now Molybdena may be desulphurated and oxygenated either by combustion, Detonation with Nitre, or solution in the Nitrous Acid.

To procure a pure Acid by the Combustion of Molybdena requires particular attention and much skill; the process hath hitherto properly succeeded only in the hands of Mr. PELLETTIER. By heating Molybdena in perfect contact with the open Air, its Acid or Calx sublimes in the form of white flowers, resembling the Argentine flowers of Antimony, which are formed by an analogous operation. In general these flowers are yellowish or bluish, either retaining Vitriolic Acid, or not perfectly desulphurated and oxygenated.

The Molybdenous Acid procured by the detonation of Nitre and subsequent extrication of the Alkaline basis, by any of the common Mineral Acids, generally retains some portion of Alkali which tho' it renders it more soluble than a more perfect Acid Calx, yet in other respects weakens its Acid properties.

* See 27 Roz. Jour. and Schewd. Abhandl. for 1789, 90, and 92.

The most perfect Acid is that which results from the solution of Molybdena in the Nitrous Acid, yet to Oxygenate it perfectly, it requires to have twenty times its weight of Nitrous Acid, in five successive portions distilled over it, being thenedulcorated and dried, it is as white as Chalk.*

However it still retains some Vitriolic Acid, from which it is in great measure purified by repeated fusion in close vessels. A more perfect but more laborious mode of purifying it may be seen in Mr. HIELM's memoir among these of the Academy of STOCKHOLM for 1788.† Perhaps also it may be well purified by adding to its solution, the solution of Muriated Barytes.

The Molybdenous Acid thus purified, is of the Specific Gravity 3,750. If less pure its Specific Gravity is lower.

Soluble in 570 times its weight of Water, at the Temperature of 60 degrees of Fahr.

Precipitable BROWNISH-RED, by tincture of Galls, or Prussian Alkali. It reddens Litmus, and takes Sulphur from its Hepars. Its affinity to Sulphur, seems to surpass that of any other body to that substance.

SOLUBLE in Vitriolic Acid, which it renders BLUE when cold, tho' colourless when heated, also in the Marine, which it renders blue when concentrated and heated. But INSOLUBLE in the Nitrous Acid.

The solution of the Molybdenous Acid, acts also on the imperfect Metals, as Tin, Zinc, &c.

* See Klaproth's Method. 3 Berl. Beob. 73.

† Page 276. of the German Translation. and Vol. II. p. 306. of the English Translation of Crell's Journal.

rendering them BLUE, particularly when heated, as they strip it of its Oxygen.

It also precipitates the nitrated solutions of Silver, Mercury and Lead, and also Muriated Lead, and the solutions of Barytes in the Nitrous or Marine Acids, but not those of the other Earths. It is more active when heated than when cold. Molybdenated Barytes is soluble in cold water.

It unites and effervesces with Alkalis, and with the Earths forms difficultly soluble compounds.

Heated in close vessels it melts; in open. it sublimes; before the blow-pipe on Charcoal it is speedily absorbed. With Microcosmic Salt it becomes GREEN, with Borax GREY, and slowly also GREEN.

With fixed Alkalis it effervesces but is not discoloured.

SPECIES I.

MINERALIZED BY SULPHUR.

MOLYBDENA, OR MOLYBDEN, WASSERBLEY

OF THE GERMANS, BLEYERZ OF

THE SWEDS.

Its colour is light Lead-grey, often with a shade of Red.

Found Massive, disseminated, or imbedded, rarely crystalized, and then in Hexahædral mostly equilateral tables, small or middle sized.

Lustre 3. 2. Metallic. Transparency 0.

Fracture curved FOLIATED. Fragments 1. Its lamellæ slightly flexible.

Hardness

Hardness 4. Specific Gravity 4,7385. BRISON. 4,569. KARSTEN. I found that of the Specimen O. 3211. which was not quite pure 4,848.

Streak Bluish-grey and Metallic, powder-bluish.

Feels somewhat greasy, stains the fingers, and marks bluish-black.

Effervesces with warm Nitrous Acid, leaving a greyish Calx undissolved. Insoluble and Indecomposable in the Vitriolic and Marine Acids, tho' in a boiling heat it gives a green colour to both if concentrated. Insoluble in Alkalis in the moist way.

In a low red heat and open vessels it remains unaltered, in a stronger it is decomposed in some measure, with a Sulphureous smell, and part sublimes in the form of white or yellow flowers which become darker on cooling, the Residuum appears yellowish and semi-vitrified.

In close vessels it is not altered.

Before the blow-pipe on a Silver Spoon it emits a white smoke, which condenses into a white powder, that becomes blue in the internal, and loses again its colour in the external flame.

By Borax and Microcosmic Salt it is but little altered, but with fixed Alkali it effervesces, and gives a REDDISH Pearl colour.

In Molybdena the Metallic part or Molybdenite is in a Metallic state, as PELLETIER has well remarked.

The experiments of ISELMAN, disproving the existence of Sulphur are far from being conclusive.*

* See 34 Roz. Jour. 127.