

Mineralogical Chemistry.

Mineralogical-crystallographical Notes. By A. VON LASAULX
(Jahrb. f. Min., 1876, 250—278).

Melanophlogite, a new Mineral.—This mineral was found by the author occurring on crystals of sulphur and coelestine from Girgenti, accompanied by numerous small scalenohedrons of calcite. It has, however, only been observed on two specimens from Girgenti. It crystallises in the regular system, in small cubes having edges $\frac{1}{2}$ to 1 millimeter in length, sharply defined, and entirely free from modification. Twins occur similar to the well-known fluor-spar twins. Small groups of cubes, having sometimes a round shell-like appearance, were observed, the individuals being pushed into each other. Small chains composed of very minute cubes, project from the summits of the scalenohedrons of calcite, and under the microscope a distinct shell-like structure is observed on the faces of the cubes, with a difference in colour, being brown in one zone and lighter coloured in the other. The faces further appeared drusy, and exhibited an extremely slight step-like formation. The cubes resting upon calcite and coelestine appear of a somewhat dark brown colour, whilst those resting on sulphur are generally colourless. The mineral has a strong vitreous lustre, and is almost transparent. Hardness, 6·5—7. Before the blowpipe it becomes first yellowish-grey, then grey-blue, and lastly, on being heated very strongly, blackish-blue, retaining its crystal form, but becoming at the same time brittle. Acids do not alter the black colour, nor can it be removed by the most intense heat: hence, it cannot be ascribed to compounds of sulphur or organic matter. By means of its property of becoming black before the blowpipe, the author was enabled to obtain tolerably pure fragments for analysis, separating it by this reaction from the coelestine and calcite; the traces of the latter, still present, were removed by means of dilute hydrochloric acid, and the intermingled sulphur by bisulphide of carbon. No metals, excepting a trace of iron, could be detected in the borax bead, but a skeleton of silica was observed. Portions of the original non-ignited mineral lost 2·86 per cent. of water on ignition. An analysis of the mineral resulted as follows:—

SiO ₂ .	Fe ₂ O ₃ .Al ₂ O ₃ .	SrO.	SO ₃ .	H ₂ O.
86·29	0·7	2·8	7·2	2·86 = 99·85

From this analysis it appears not improbable that strontium sulphate (coelestine) exists as an impurity in the mineral; and, leaving out the water, that the mineral is a rare combination of silicon and sulphur; but this must not be taken for granted until further analyses have been made. Melanophlogite occurs as a brown incrustation of minute cubes upon the macrodomes, the brachydome and brachypinacoid of coelestine. Between isolated crystals of coelestine and sulphur, it occurs encrusting calcite. On sulphur-crystals, it is never found in

aggregates, but always in single crystals, having generally a light colour, and being sometimes nearly colourless.

A new Pseudomorph.—The author observed two large rhombohedrons upon a specimen of a finely granular mixture of magnetite, iron-pyrites, and calcite, from Traversella, which exhibited on one side a large crystal of scheelite, accompanied by numerous small, well-developed magnetite crystals and brilliant calcite crystals, all of them resting in a layer of greenish talc. Of the two rhombohedrons, one only was completely developed, the other being in a rudimentary stage. They were built up of a compact aggregate of small, brilliant, well-developed calcite crystals, of the combination $R.R^3.R^3 \propto P2$, the scalenohedral faces being finely striated parallel to their combination edges with the prism. The primary rhombohedron R occurring independently, is of extreme rarity in the case of calcite; but as dolomite occurs in that form at Traversella, it was inferred by the author that the specimen under consideration was a pseudomorph of calcite after dolomite, as one of the rhombohedrons, exhibiting all its faces, was characterised by a peculiar shell-like structure, viz., the three lower faces were incrustated with a shell composed of irregularly disposed calcite crystals, and this shell-like incrustation was open near the lateral edges of the rhombohedron, whilst through this opening projected the three upper faces of the inner rhombohedral kernel. The innermost rhombohedron was cellular, showing many hollow spaces between the small crystals of which it was composed. The scalenohedral faces on the small crystals are distinguished by a distinct striation parallel to a terminal edge of the small rhombohedrons, and their presence seems to prove conclusively that the crystal is a pseudomorphous formation, being simply the primary rhombohedron R , whilst the small calcite crystals which build it up, exhibit several forms in combination. The mean of 30 measurements gave $107^\circ 2'$ as the terminal edge angle of the rhombohedron under consideration, a result which, taken in conjunction with the locality where it occurs, justifies the opinion that it is a pseudomorph of calcite after dolomite or magnesite. From the appearance of this pseudomorph the author contends that it cannot have arisen from the dolomite substance having been dissolved out and the hollow space filled up with calcite, nor could it have been formed by displacement, as the well-known law that "the substance of greater solubility cannot displace that of lesser solubility," shows, and innumerable examples of pseudomorphism prove. The absence of gypsum on the specimen seems also to show that the original dolomite crystal was not acted upon by a solution of gypsum (resulting in a double decomposition), or even by free sulphuric acid derived from the oxidation of the iron pyrites observed in the matrix. From the presence of scheelite, it appears highly probable, however, that tungstic acid was present in solution, and that, by its action upon the dolomite crystal, soluble tungstate of magnesium was formed and carried away, whilst calcium tungstate (which is insoluble) and calcite remained.

Quartz with indented edges from Oberstein and Lizzo.—After quoting the works on this subject by G. Rose, Weiss, G. vom Rath, Descloizeaux, Scharff, and Laspeyres, resulting in very contradictory state-

ments, the author proceeds at great length to give the results of his investigations, which are, briefly, as follows :—

Amethyst from Oberstein.—Druses from this locality were characterised by a thin coating or incrustation of chalcedony occurring on the faces of the two rhombohedrons in triangular patches, the indentations on the edges being extremely fine. There was not much difference observed between the faces of R and —R, although vom Rath expresses an opinion that (*Pogg. Ann., Einige Studien über Quartz*) the faces are entirely different, as they belong to two individual crystals, occurring together as penetration-twins, and accounts for the indentations observed on the edges by assuming that they are caused by the predominance of R over —R. In a previous communication, the author stated that he believed the true nature of the underlying amethyst crystals would be ascertained if once the chalcedony coating could be removed; and such proves to be the case, as he succeeded in removing it by means of a knife from the edges of the crystals, and then observed that none of the underlying forms exhibited any indentation of their edges, although they had done so previous to the removal of the chalcedony coating, and that their faces were identical in their physical characters. A section of one of the rhombohedron faces of the crystals, perpendicular to the vertical axis, was examined and found to enclose numerous long, brown, transparent, radiating, acicular crystals of the combination $\infty\bar{P}2. \infty\bar{P}\infty. \bar{P}\infty$, the enclosed mineral being pyrrhosiderite. These small crystals have grown in quartz having exactly the same appearance and optical properties as that of the quartz-kernel itself. A zone of chalcedony appears below this, and here the exterior indentation of the edges is observed, a fact which seems to prove that this indentation is not an abnormal growth, but arises rather from the retarding influence of the chalcedony coating upon the force of crystallisation, as it was observed that the incrustation adhered with greater tenacity to the faces than to the edges of the crystals. The author, therefore, concludes that vom Rath's deductions are not sufficiently borne out by facts, and ascribes the indentation to the above-mentioned cause.

Quartz-crystals from Lizzo.—These crystals are combinations of R and —R almost in equilibrium, the prism either not occurring at all, or else as an extremely fine modification of the horizontal edges of the two rhombohedrons. They are tolerably clear, but only slightly transparent, and are found in tertiary marl. All the faces are drusy, so that the signs of the two rhombohedrons cannot well be ascertained. Incrustations often occur on these faces, composed of small, completely developed individuals, and they cause fine re-entering angles upon the terminal and lateral edges of the large individuals. This indentation cannot arise through the incomplete union of two individuals according to a twin law, as in that case the indentation would be observed only on the terminal edges. It might arise, however, by an incrustation occurring upon all the faces of the crystal simultaneously, and the specimens from Lizzo show a parallel aggregation of drusy crystal individuals, completely covering the face of a large individual. Leydolt, in 1854 (*Ueber eine neue Methode die Struktur und Zusammensetzung der Krystalle zu untersuchen, mit besonderer Berücksichtigung der*

Varietäten des rhomboëdrischen Quarztes) enunciated the two following laws :—

1. By the action of a slow solvent, symmetrical depressions occur on natural or artificial crystals expressing exactly by their position and form the crystal system to which the body belongs.

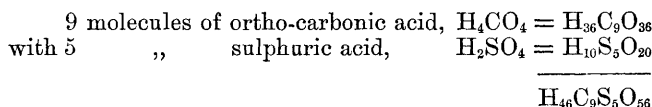
2. These depressions are equal and parallel if the mineral is a perfectly simple one, but they differ in position as the construction is regular or irregular.

According to the same author, depressions with shining faces occur on the faces of the hexagonal pyramid on simple crystals, having a parallel position on one and the same face, and occurring on R and — R. These depressions correspond exactly with the positions of the two rhombohedrons. The manner of the construction of twins is also made apparent by the above method, although previous to the etching, no trace of any difference in the individual faces could be observed. Similar phenomena were observed by Leydolt on the etched surfaces of crystal plates, cut at right angles to the vertical axis, and extremely small and fine etched figures were impressed upon isinglass films and then examined under the microscope. Von Lasaulx used these methods in his examinations of quartz. Sections at right angles to the vertical axis and exactly through the lateral edges of two crystals were prepared (one of amethyst from Oberstein, the other of quartz from Lizzo, both distinctly exhibiting indentations on the edges) and etched by the action of aqueous hydrofluoric acid (50 per cent. of acid). The amethyst crystal section was almost etched through in the course of three hours, and appeared milk-white, whilst that of the Lizzo quartz showed only a slight opacity on the surface. With the amethyst the action was in direct relation to the form; the hexagonal plate appeared like a six-rayed star, the sides being completely eaten away, whilst in the direction of the axes it was intact and projected outwards like the spokes of a wheel. Etched figures could be obtained only upon the innermost quartz-kernel of the amethyst, and were then quite as distinct as those obtained with the quartz from Lizzo. The action was stronger on the edges than on the indentations, the latter appearing slightly opaque at first, but eventually becoming deeper and broader. A small crystal of Lizzo quartz was etched whole, and small, new faces were observed, corresponding with those previously obtained by Leydolt and Descloiseaux, and no doubt belonging to — $\frac{1}{2}$ R. No twin formation was observed with indented Oberstein amethysts, or even with the quartz from Lizzo, although isinglass impressions seem to point to an irregular twin formation, which however has nothing to do with the indentations of the edges. The sextants of the section do not show that it is composed of two halves of two rhombohedrons of opposite signs, but only of secondary portions of a single individual turned about (eines verwendeten Individuums). Descloiseaux states that penetration-twins of quartz of complete regularity and symmetry are extremely rare, but von Lasaulx corrects this by stating that quartz never occurs as a penetration-twin with its components consisting of complete symmetrical individuals. All quartz twins are composed of many irregularly disposed lamellæ or crystal portions, whose structure can be ascertained only by optical examination or by etching. The

Cuprite Crystals with Indented Edges.—Small drusy crystals of cuprite from Redruth, exhibited a distinct indentation on their edges. The predominating form was the octohedron ∞O , occurring very slightly developed, also occasionally 202 and $\infty 02$. On the octohedral faces very thin, small, octohedral faces were observed, forming a thin shell over their surface. When two of these sub-individuals project past the combination-edge between O and ∞O a re-entering angle is formed at the bottom of which the strongly striated face of ∞O appears. This peculiar shell-like aggregation of sub-individuals (having the same form as the crystal-kernel) seems to occur mostly on the opposite-lying faces to an octohedral solid angle, the other faces being unaltered. Some crystals exhibit successive shell-like formations, and it is then observed that the lower ones combine together and again develop the crystal-kernel symmetrically, that is obliterating any indentations which may have existed previously on that portion of the crystal.

C. A. B.

THE author has re-examined the mineral which he named maxite some years ago. It is an ore of lead from Sardinia, and is probably a variety of leadhillite. The empirical formula is $\text{H}_{10}\text{Pb}_{18}\text{C}_9\text{S}_5\text{O}_{56}$. It may be considered to consist of—



in which 36 atoms of hydrogen have been replaced by lead.

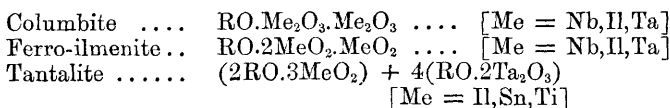
G. T. A.

THIS new mineral was discovered a few years ago in Connecticut, imbedded in granite. It crystallises in thick four-sided prisms with pyramidal terminations. It is black, opaque, and furnishes a dark-brown powder. The fracture is small-conchoidal, smooth and bright. Spec. gravity 5.32. Thin splinters heated in the blowpipe flame become rounded at the edge. The mineral gives a brown glass with borax, and on addition of saltpetre the manganese reaction shows itself. On heating it on charcoal with soda, traces of tin are found.

The formula of the mineral is $2(2\text{RO} \cdot \text{NbO}_2) + \text{RO} \cdot \text{Me}_2\text{O}_5$:



The allied minerals are—



G. T. A.

The Nickel Ore of New Caledonia called "Garnierite."

By J. GARNIER (Compt. rend., lxxxii, 1454—1455).

THE nickel ores of New Caledonia are now actively worked. They are not arseniosulphides of nickel, like those hitherto utilised, but silicates of nickel and magnesium. These ores occur imbedded in serpentine masses, which are very abundant in various parts of the island, and associated with euphotides, diorites, amphibolites, &c. Sometimes it shows itself on the different rocks as a green coating; at other times it penetrates and colours them more or less intensely, or it forms regular veins, which sometimes attain the thickness and regularity of lodes. The nickel is accompanied by iron, chromium, and cobalt. These metals, especially the two former, are present in great abundance, their mode of occurrence being analogous to that of the nickel, excepting that at those places where cobalt occurs. This latter metal is associated with manganese, forming masses more or less voluminous and pure, in the midst of brittle sandy rocks, formed from the *débris* of felspar and dolomite. The nickel ore approaches very near to the "pimelites."

D. B.

Examination of some Minerals from Chile. By A. DOMEYKO (Compt. rend., lxxxiii, 451—452).

Chloriodide of Silver and Mercury.—This mineral is amorphous, and has a yellow colour resembling that of toconalite (iodide of silver and mercury). It is reduced incompletely and with difficulty by zinc and dilute acid, but is easily decomposed by sulphuretted hydrogen. It is associated with an insoluble gangue containing barium and lead sulphates.

From the proportions in which the various elements are found, it is probable that the mercury is combined with the iodine, and the silver with the chlorine, thus:

Silver chloride.	46
Mercurous iodide	54

100

Polybasic Sulphates of Copper.—Ordinary cupric sulphate is occasionally found pure, but is usually associated with ferric sulphate, forming a species of cupro-ferric alum, of a pale blue colour.

In the valley of San Francisco, opposite Santiago, are copper mines abounding in pyrites and sulphates. One of these sulphates has been examined; it is of a sky-blue colour, and has a fibrous structure; in

composition it resembles the alums, the alumina being replaced by ferric oxide and the alkaline base by cuprous oxide. The proportion of water is variable.

H. W.

Aragonite found on the Surface of a Meteorite.

By J. LAWRENCE SMITH (Compt rend., lxxxii, 1505—1507).

THIS paper is a study of some meteoric masses originating from a region of Mexico, called the "Desert," situated in Cohahuila and Chihuahua (two provinces in the north), extending over 400 miles from the east to west and 500 miles from the north to south, along the banks of the Rio Grande. These regions, rich in meteoric irons, have been studied by Burckhardt, of Bonn. In 1854 three of these masses were described by the author. Two of them were brought to the United States, weighing 125 kilos. and 680 kilos. respectively. In 1868 eight others were described and added to the above. In 1871 a description of a larger mass, weighing about 3,500 kilos., was given, originating from the west of the region (near El-Para). The total weight of meteoric masses found in this country amounts to 15,000 kilos., a weight which surpasses that existing in various collections of meteorites.

On examining the above-mentioned eight masses in 1868, the author observed on the surface of two a white incrustation, which was not examined more closely at the time, and it is only some months since that these masses were placed at his disposal for investigation.

On the surface of one of these iron masses weighing 210 kilos., a small quantity of an incrustation was noticed which covered about 15 square centimeters of the surface of the body; another, weighing 275 kilos., showed an incrustation occupying more than 200 square centimeters of surface. The substance is so firmly attached to the iron, that if broken it separates a portion of the oxidised iron. Its thickness varies between 1 and 5 mm. It is very hard, and easily scratches calcspar. Its surface is irregular and granular. If broken perpendicularly to the iron surface, it can be easily polished. On several pieces an irregular and undulated structure with yellow and dark brown veins was observed. It effervesces with acids. The following is the composition of the mineral:—

CaCO ₃ .	Fe ₂ O ₃ .	MgO.	Insoluble.	Water.	
93·1	1·0	trace	4·6	1·0	= 99·7 C

With regard to the formation of this incrustation, the author is convinced that it was occasioned after the fall of the stone. The spot where this mass was found is situated in a valley between two parallel mountain ranges, at a distance varying from 1—3 miles. The foot of the mountains and the hills and plains show large calcareous deposits. The plain is at several places excavated by deep ravines. Several specimens of iron have been found in the middle of the deposits and in the sand. Those at the bottom of the ravines are covered with water during the heavy rains.

D. B.

On "Sulphuric Acid Springs" of the Búdöberg, and on the Búdös Cavern. By ANTON FLEISCHER (Deut. Chem. Ges. Ber., ix, 995—998).

ON the south-western slope of the Búdöberg, at the height of 1,070 meters, is a cavern in which there collects a stratum of gas, varying in the course of the day from 1·5 to 1·9 meters in depth. This gas consists of carbon dioxide together with a little hydrogen sulphide. The sides of the cavern to the depth of the gas stratum are covered with a yellow deposit of sulphur.

South-west of the cavern, about 75 meters distant, occur three "sulphuric acid springs." The water of these springs, the flow of which is attended by the evolution of large quantities of gas, was found to contain free sulphuric acid, the other mineral constituents being chiefly alumina, ferric oxide, and lime. The author promises a fuller account of these springs hereafter.

J. R.

Composition of the Ochrey Deposit from the Mineral Water of Birresborn. By H. VOHL (Deut. Chem. Ges. Ber., ix, 987).

THE deposit is of a fine brown colour after drying. When washed with distilled water and dried at 100°, it contains, after deducting matters insoluble in hydrochloric acid, which amount to 22·78 per cent. of the whole deposit—

Ferric oxide	83·2535
Lime (carbonate)	3·7414
Magnesia (carbonate)	1·3283
Alumina	0·0318
Manganese protoxide.....	0·0665
Silica	0·8407
Phosphoric acid.....	2·5324
Arsenious acid	1·3388
Lithia	traces
Cupric oxide	traces
Water and organic matter (by diff.)	6·8666
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	100·0000

J. R.

Note on a Hydrated Silicate of Aluminium deposited by the Hot Spring of Saint Honoré (Nièvre) since the Roman Age. By A. DAUBRÉE (Compt. rend., lxxxiii, 421—423).

THE mineral consists of a white substance of laminated structure, transparent in thin sections, and capable of good polish. It adheres to the tongue, and is more coherent than chalk or mountain-meal. It acts on polarised light. On examining the polished fracture closely, minute, dark, opaque particles can be distinguished, which can be

easily detached from the matrix. Between the layers small crystalline particles of gypsum may be seen, which probably impart to the mineral its action on polarised light.

On analysis the following numbers were obtained :—

SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	CaO.	MgO.	H ₂ O.	
76·6	12·6	2·3	1·8	trace	6·3	= 99·6

Another analysis showed the presence of alkaline chlorides and organic salts. The mineral probably is precipitated by chemical action from the hot springs, which have a temperature of 31°. The mineral is probably a mixture of several species; in composition it approaches nearest to pyrophyllite and pagodite.

H. W.

Currents at the Mouths of Rivers: a Contribution to our knowledge of Ocean Currents. By F. L. EKMAN (Deut. Chem. Ges. Ber., ix, 857).

IN the case of rivers falling into the sea, an under-current of perfectly salt water, according to the depth, the nature of the bottom, &c., runs up to a greater or less distance in the opposite direction. The Gotha, for instance, half a (Swedish) mile before its entrance into the sea has water at the depth of two fathoms of almost the same saltness as sea water at a similar depth a mile and three-quarters from its mouth. Currents in general are caused not only by the difference in specific gravity, but also by the distribution of rain-fall, evaporation, heat, &c., which produce surface changes.

G. T. A.

Examination of the Organic Matter found in Ancient Soils.
By C. HUSSON (Compt. rend., lxxxiii, 454—457).

THE author in this paper arrives at the following conclusions:—1st. That bitumens having a tarry odour are of vegetable origin. 2nd. That bitumens having a fetid odour, like that of Dippel's oil, are of animal origin. 3rd. That these latter are in the secondary and tertiary strata, the last remains of the animal substance which is found already very much changed in diluvium, and exists in great part in the state of ossein in the soil of bone-caves.

H. W.