

THE
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EXHIBITING A VIEW OF THE
PROGRESSIVE DISCOVERIES AND IMPROVEMENTS
IN THE
SCIENCES AND THE ARTS.

CONDUCTED BY
ROBERT JAMESON,

REGIUS PROFESSOR OF NATURAL HISTORY, LECTURER ON MINERALOGY, AND KEEPER OF
THE MUSEUM IN THE UNIVERSITY OF EDINBURGH

Fellow of the Royal Societies of London and Edinburgh ; Honorary Member of the Royal Irish Academy ; of the Royal Society of Sciences of Denmark ; of the Royal Academy of Sciences of Berlin ; of the Royal Academy of Naples ; of the Geological Society of France ; Honorary Member of the Asiatic Society of Calcutta ; Fellow of the Royal Linnean, and of the Geological Societies of London ; of the Royal Geological Society of Cornwall, and of the Cambridge Philosophical Society ; of the Antiquarian, Wernerian Natural History, Royal Medical, Royal Physical, and Horticultural Societies of Edinburgh ; of the Highland and Agricultural Society of Scotland ; of the Antiquarian and Literary Society of Perth ; of the Statistical Society of Glasgow ; of the Royal Dublin Society ; of the York, Bristol, Cambrian, Whithy, Northern, and Cork Institutions ; of the Natural History Society of Northumberland, Durham, and Newcastle ; of the Imperial Pharmaceutical Society of Petersburg ; of the Natural History Society of Wetterau ; of the Mineralogical Society of Jena ; of the Royal Mineralogical Society of Dresden ; of the Natural History Society of Paris ; of the Philomathic Society of Paris ; of the Natural History Society of Calvados ; of the Senckenberg Society of Natural History ; of the Society of Natural Sciences and Medicine of Heidelberg ; Honorary Member of the Literary and Philosophical Society of New York ; of the New York Historical Society ; of the American Antiquarian Society ; of the Academy of Natural Sciences of Philadelphia ; of the Lyceum of Natural History of New York ; of the Natural History Society of Montreal ; of the Franklin Institute of the State of Pennsylvania for the Promotion of the Mechanic Arts ; of the Geological Society of Pennsylvania ; of the Boston Society of Natural History of the United States ; of the South African Institution of the Cape of Good Hope ; Honorary Member of the Statistical Society of France, &c. &c. &c.

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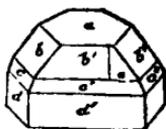
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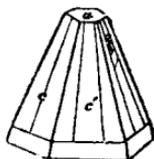
1840.

" ab $136^{\circ} 40'$; ac 118° ; ad 90° ; $b'e$ about 176° , a salient angle resulting, I conclude, from the composition of two crystals.

No. 1.



No. 2.



" No. 2 is evidently a compound crystal, but I must have better means than the single crystal has afforded, to be enabled to discover the primary form. I do not observe any rings in looking perpendicularly through a and the parallel plane, which, although the crystal is only translucent, I think I should do if the primary form were a rhomboid, or rhombohedron as now called. The lines represented on the faces of No. 2. present bold salient and re-entering angles. The only appearance of cleavage, I have found in breaking the small crystal, is parallel to the lateral planes d of the hexagonal prism, but I am not certain that these are more than planes of composition of intersecting crystals."

Chemical Examination of Greenockite, or Sulphuret of Cadmium. By ARTHUR CONNELL, Esq., F.R.S.E. (Communicated by the Author).

A fragment of Greenockite, heated in a glass tube, decrepitated and acquired a fine carmine red colour, and, on cooling, recovered its yellow tint. At a red heat it did not fuse or volatilize. It gave off no moisture.

In powder, it was readily soluble in heated muriatic acid, with strong odour of sulphuretted hydrogen. Carbonate of soda caused a white precipitate soluble in ammonia. The muriatic solution, by evaporation, afforded a white prismatic crystallization, not deliquescing in an ordinary atmosphere. This character distinguished the mineral from zinc-blende, which resembles, and suggested the idea that it might be sulphu-

ret of cadmium, as the change of colour, by heat, seemed also to indicate. This supposition was confirmed on finding that the precipitates by potash, and by carbonate of ammonia, were not dissolved by excess of the precipitants, and that sulphuretted hydrogen threw down, from a muriatic solution, with excess of acid, a fine yellow precipitate. After the current of sulphuretted hydrogen no longer caused a precipitate, the solution was neutralized by ammonia, when a few dark flocks of sulphuret of iron fell. The current of sulphuretted hydrogen was then removed, but no farther precipitate was occasioned; shewing the absence of zinc, a conclusion farther confirmed by finding that the excess of potash, and of carbonate of ammonia, used as precipitants, took up nothing. The muriatic solution of the mineral farther gave a yellow precipitate with hydrosulphuret of ammonia, and white precipitates with prussiate of potash, oxalate of ammonia, and phosphate of soda, and no precipitate with sulphuric acid. A piece of zinc threw down reduced metal as a grey ramification.

These various reactions left no doubt that the mineral under examination was sulphuret of cadmium, that it contained no zinc, and that the only impurity which could be detected was a slight trace of iron. The observations were farther confirmed by comparative trials made on a solution of metallic cadmium.

I was indebted to Lord Greenock for a crystal of the mineral sufficiently large to enable me to take its specific gravity, and also determine the proportions of the constituents. The specific gravity of this crystal was found to be 4.842 at 60° F. Previous to analysis, the dark and opaque portions were separated.

3.71 grains of the transparent portion of the mineral were reduced to somewhat coarse powder, and fuming nitric acid was poured on them drop by drop in a deep flask, and the whole digested with excess of acid, till all the sulphur which had separated was dissolved. Water was then added, and the sulphuric acid thrown down by muriate of barytes. The sulphate of barytes, after being well washed with hot water, was dried and ignited; and weighed 6.07 grains, equivalent to .837 grains of sulphur.

The excess of barytes was then removed from the liquid, after concentration by heat, by sulphuric acid. After again concentrating, carbonate of ammonia was added in excess. The carbonate of cadmium was separated by filtration, and well washed, dried, and ignited. The oxide of cadmium thus obtained had an ochre-yellow colour, and weighed 3.28 grains, equivalent to 2.868 of cadmium. A little of it dissolved in muriatic acid was entirely taken up by excess of ammonia.

The filtered liquid was then evaporated by heat, but no precipitation had taken place when all smell of carbonate of ammonia had disappeared; thereby confirming the previous observations as to the absence of zinc. The evaporation was carried to dryness, and the ammoniacal salt driven off by heat. A residue of .04 remained of a reddish-white colour, which, in so far as its small quantity permitted examination, was found to be, in part at least, a subsulphate of iron, insoluble in water, and scarce soluble even in acids, till previously boiled with potash; but, as the proportion of its constituents could not be determined on so little material, the iron could not be computed in any other way than by stating it as a trace in the mineral, its amount, on any view, being very small; and if more than such, this was not the stage of the analysis in which it should have been obtained.

We have thus, in the 3.71 grains of the mineral under analysis,

Sulphur,	. . . . .	.837	22.56
Cadmium,	. . . . .	2.868	77.30
Iron, traces.			
		3.705	99.86

which agrees completely with the theoretical composition of

1 atom Sulphur,	. . . . .	201.16	22.40
1 atom Cadmium,	. . . . .	696.76	77.59
		897.92	99.99

The mineral is thus a protosulphuret of cadmium, and its formula CdS . It is, so far as I know, the only *separate* ore of cadmium hitherto discovered.

It is readily distinguished by its blowpipe reaction from zinc-blende, the mineral which ranks nearest it in the system. From its decrepitating property, it is difficult to act on it *per*

se on charcoal; but when this can be accomplished, the usual yellowish-red ring, arising from the oxidation of sublimated cadmium, is formed around the fragment. When mixed with soda and acted on, on charcoal, this ring continues to be formed to the last, without any of the white sublimate which zinc-blende affords. With borax it yields a transparent yellow glass.

New Observations on the Effects of Veins of Quartz. By M. ROZET. (Communicated to the Academy of Sciences.)

In a memoir on the mass of mountains which separates the Loire from the Rhone and the Saône, previously presented to the Academy, I shewed that quartz forms conical eminences at a considerable number of points between the base of Mont-Pilat, in the *Département de la Loire*, and near Avallon, in the *Département de l'Yonne*. These cones have pierced the porphyry, granite, gneiss, slate, and carboniferous formations. They are every where accompanied by numerous veins of quartz, of the same nature as that of the cones, and which traverse the various rocks in all directions, sometimes even penetrating to lower parts of the lias. These veins, while flowing out at the surface of the granite, of which they have agglutinated the debris, have formed those remarkable rocks the *arkoses*, which M. de Bonnard was the first to notice. During that operation they have produced a number of curious effects, which I have described in my memoir; but the environs of Semur and Brionnais (*Saône-et-Loire*) having this year presented to my observation phenomena of another description, and of a certain degree of importance, I request the permission of the Academy to communicate a succinct account of them.

Around the village of Saint-Christophe in Brionnais, we see making its appearance a granite containing large rose-red crystals, which is decomposed with facility, is quarried at several points for sand, and is traversed by veins of hyaline quartz, which passes into calcedony. This granite is covered by a thick bed of reddish marls and arkoses, which supports the largely-developed lias of that part of the country. At 500