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*To the solid ground
Of Nature trusts the mind which builds for aye.*—WORDSWORTH

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*MIERSITE, A CUBIC MODIFICATION OF
NATIVE SILVER IODIDE.*

SILVER IODIDE is remarkable in being one of the few substances which undergo a contraction in volume as the temperature increases. This contraction is uniform until about 146° C. is reached, when there is a further sudden contraction of considerable amount, after which the substance expands. The sudden contraction at 146° is accompanied by a change in all the physical properties of the substance, the pale yellow, hexagonal modification which exists at ordinary temperatures, being then changed into a bright yellow, cubic modification. On cooling the reverse phenomena are observed.

From this behaviour it would be expected that only the pale yellow, hexagonal modification would be found as a natural mineral, and as a matter of fact the only pure silver iodide so far known is the hexagonal species iodyrite. The existence of a cubic modification has, however, long been suspected from the occurrence of iodine in the cubic mineral iodobromite ($2\text{AgCl} \cdot 2\text{AgBr} \cdot \text{AgI}$). This probably represents the artificial cubic modification which is stable above 146° , in which case the natural crystals of iodobromite should be pseudo-cubic; in fact, pseudomorphs of the hexagonal modification with the external form of the cubic modification. This would be strictly analogous to the pseudo-cubic leucite and boracite, which become isotropic when heated to a definite temperature.

The new mineral, miersite, is, however, quite distinct from these, and proves that silver iodide is trimorphous. The principal characters of the three modifications are:—

Iodyrite	Miersite	Iodobromite
Hexagonal	Cubic	Cubic
Hemimorphic	Tetrahedral	Holohedral
Twin plane, a pyramid face	A tetrahedron face	Not twinned
Cleavage, perfect basal	Perfect dodecahedral	Indistinct octahedral
Optically uniaxial	Isotropic	Optically anomalous?
Sectile	Brittle	Sectile

Between these there is a remarkable crystallographic relation: when a regular octahedron is considered as a rhombohedral crystal, the angle $70^{\circ} 32'$ corresponds to the angle $70^{\circ} 36'$ between the basal plane and a pyramid of iodyrite; the tetrahedrim, twinning, and sometimes the peculiar development of the miersite crystals make this relation still more striking.

Iodyrite, in all its crystallographic characters, is practically identical with wurtzite (ZnS), greenockite (CdS), and zincite (ZnO); these are all hexagonal and hemimorphic, possess a basal cleavage, and are optically positive, while the axial ratios vary only very slightly ($a:c = 1:0.8109 - 1:0.8196$). Many other substances may perhaps be included in this series, e.g. ice, magnesium, cadmium iodide, tridymite (SiO_2), &c. In the same way the dimorphous cubic modifications miersite, blende (ZnS), and marshite (CuI) form another parallel series, since they are all exactly alike in crystallographic characters.

It will now be seen that the same relation exists between iodyrite and miersite as exists between wurtzite and blende. This forms, as far as crystallographic characters are concerned, a perfect example of an isodimorphous group, but apparently the only relation existing between zinc sulphide and silver iodide is that their simplest conceivable chemical molecules contain two atoms.

From these somewhat remarkable relations one is inclined to ask: why should there not be a third modification of zinc sulphide to correspond with iodobromite? or why should not all these substances (e.g. ice, &c.) be dimorphous or trimorphous to fill up the gaps in these parallel series? Further, if nantokite and marshite are to be represented by the formulæ Cu_2Cl_2 and Cu_2I_2 respectively, then miersite should be Ag_2I_2 ; these double molecules, however, only depend on the vapour density of cuprous chloride, but the gaseous molecule cannot be the same as the crystal molecule, especially when there are, as in silver iodide, possibly three types of the latter.

A detailed description of miersite will be published in the *Mineralogical Magazine*. It may now be mentioned that the

two specimens preserved in the British Museum collection are from the Broken Hill silver mines in New South Wales; the associated minerals on one specimen are quartz, copper glance, and garnet, and on the other, malachite, wad and anglesite. The small crystals of miersite, which do not exceed 2 mm. in diameter, are scattered over the surface of the matrix; they are of a pale or bright yellow colour, with an adamantine lustre. The only forms present are the cube and one or both of the tetrahedra, the latter usually differing in size but not in surface characters. In many respects the mineral is strikingly similar to the yellow blende which occurs in the white dolomite of the Binnenthal in Switzerland. The bright yellow streak is sometimes deeper in colour than the crystals themselves; this is strikingly shown by perfectly colourless and transparent crystals of marshite, which also give a bright yellow streak. Exposure to bright sunlight for several days does not affect the colour of the crystals. The silver is in part replaced by copper, and as this increases in amount, there is a gradual passage from miersite to marshite: "cuproidargyrite" ($\text{AgI} \cdot \text{CuI}$) from Chili is possibly an intermediate member of this group.

The new mineral has been named in honour of Mr. H. A. Miers, F.R.S., Professor of Mineralogy at Oxford, who first correctly determined the crystalline form of marshite, a mineral so closely resembling miersite in appearance that the two species are only to be distinguished by chemical tests.

L. J. SPENCER.

*UNIVERSITY AND EDUCATIONAL
INTELLIGENCE.*

THE Maryland Senate has passed a Bill granting 50,000 dollars a year for two years to the Johns Hopkins University.

DR. CHARLES CHREE, Superintendent of Kew Observatory, has received the honorary degree of LL.D. from the University of Aberdeen.

MR. C. B. ROUSS, who gave 25,000 dollars for a physical laboratory building in the University of Virginia, has given an additional 10,000 dollars for the same object.

MR. CHESTER W. KINGSLEY, of Cambridge, Mass., has given several large gifts to various benevolent purposes, including the sum of 25,000 dollars each to the Newton Theological Seminary, Andover Academy, and Colby University; the two first named being situated in Massachusetts, and the last in Maine.

A COURSE of eight Yates lectures in Archæology will be commenced at University College, London, on May 4, by Mr. J. Romilly Allen. The subjects of the first two lectures are the origins of primitive art and the evolution of decorative art, and the general object of the course is to trace the developments of Celtic art.

THE first school of forestry in America has just been created by the legislature of the State of New York, to be connected with Cornell University, and the sum of 10,000 dollars has been granted to cover the expenses of the first year. The school is authorised to purchase forest lands to the extent of 30,000 acres in the Adirondack region.

THE University of Paris has (says the *Times*) arranged for a loan of 1,700,000 francs from the Crédit Foncier, repayable in 50 annual instalments, for the erection of new buildings in Paris and at Fontainebleau. The Faculty of Science is also about to order the construction at a cost of 25,000 francs of an equatorial, which, after figuring in the Exhibition of 1900, will be placed in the tower of the new Sorbonne.

At the graduation ceremony of the Glasgow University on April 12, the honorary degree of Doctor of Laws (LL.D.) was conferred upon Mr. Alexander Duncan, Secretary and Librarian to the Faculty of Physicians and Surgeons, Glasgow: Mr. Douglas Dunlop, Secretary-General to the Department of Public Instruction, Cairo, Egypt; Mr. John Inglis, formerly president of the Institution of Engineers and Shipbuilders in Scotland, president-elect of the Institution of Marine Engineers, London; Dr. Elie van Rijckevorsel, of the Batavian Society of Experimental Philosophy, Rotterdam; and Prof. J. M. Thomson, F.R.S., professor of Chemistry in King's College, London.

THE excursions of the London Geological Field Class will begin on Saturday, April 23, with a visit to Dorking, Box Hill,