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"Nec aranearum sane textus ideo melior quia ex se fila gignunt, nec noster vilior quia ex alienis libamus ut apes." JUST. LIPS. *Polit.* lib. i. cap. 1. Not.

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common temperatures and at the proper degree of concentration this substance shows two luminous bands, one of which is very intense and embraces the whole of the red and yellow, and part of the green; the other, comparatively weak, is situated in the violet. On applying heat, this violet band gradually diminishes in intensity, and two new bands of absorption, of which previously no trace was visible, appear in the red. They increase very rapidly in breadth, especially the less refrangible of the two, as the temperature rises; so that, when the boiling-point is approached, they have completely obliterated the entire bright band in which they appeared, with the exception of a very narrow weak stripe in the extreme red.

In order to explain these phenomena, one might be disposed to assume that the elevation of temperature occasioned chemical changes to take place in the liquids—that, for instance, a few atoms of water were fixed or given off—were it not that, so far as the observations have yet gone, a sudden alteration of absorbing-power never occurs, but the changes take place in a perfectly gradual manner.

On the other hand, these phenomena are quite analogous to those observed by Brewster* and others in relation to the absorbing-powers of certain gases, in which, as the temperature rises, the absorption-bands increase in number and width.

LXV. *Proceedings of Learned Societies.*

ROYAL SOCIETY.

[Continued from p. 398.]

Feb. 23, 1865.—John P. Gassiot, Esq., Vice-President, in the Chair.

THE following communications were read:—

"On New Cornish Minerals of the Brochantite Group." By Professor N. Story Maskelyne, M.A., Keeper of the Mineral Department, British Museum.

On a small fragment of Killas from Cornwall, a discovered, several months ago, a new mineral in the form of minute but well-formed crystals. The specimen had come from Mr. Talling, of Lostwithiel, a mineral-dealer, to whose activity and intelligence I am indebted for the materials that form the subject of this paper. After a little while he found the locality of the mineral, and sent me other and finer specimens; but these specimens proved to contain other new minerals besides the one already mentioned. Two of these minerals are described in this paper, and a third will form the subject of a further communication.

I. *Langite.*

The first of these minerals which I proceed to describe is one to

* Phil. Mag. S. 3. vol. viii. p. 386.

which I have given the name of Langite, in honour of my friend Dr. Viktor von Lang, now of Gratz, and lately my colleague in the British Museum. It occurs in minute crystals, or as a crystalline crust on the Killas, of a fine blue with a greenish hue in certain lights. The crystals are prismatic. The forms observed are (1 0 0), (0 0 1), (1 1 0), and (2 0 1) & (0 1 0), the normal inclinations giving the following angles, which are the averages of many measurements:—

$$1\,1\,0\ \ \bar{1}\,1\,0 = 56^\circ\ 16'$$
$$1\,0\,0\ \ 1\,1\,0 = 61\ \ 52$$
$$0\,0\,1\ \ 2\,0\,1 = 51\ \ 46$$

conducting to the parametral ratios

$$a : b : c = 1 : 0{\cdot}5347 : 0{\cdot}6346.$$

The crystals are twinned after the manner of cerussite, the twin axis being normal to the plane (1 1 0).

$$\bar{1}\,1\,0\ (1\,1\,0)\ \bar{1}\,1\,0 = 112^\circ\ 33'$$
$$1\,0\,0\ (1\,1\,0)\ 1\,0\,0 = 123\ \ 44$$
$$\bar{1}\,1\,0\ (1\,1\,0)\ 1\,\bar{1}\,0 = 67\ \ 26$$

Cleavages seem to exist parallel to 0 0 1 and 1 0 0. The planes 0 0 1 and 1 0 0 are very brilliant. The plane of the optic axes, as seen through a section parallel to the plane 0 0 1, is parallel to 1 0 0. The normal to 0 0 1 would seem to be the first mean line, and it is negative. The optical orientation of the mineral is therefore 𝔟, 𝔠, 𝔞.

The crystals are dichroic.

1. Seen along axis *c*, 𝔠, greenish blue.
   𝔟, blue.
2. Seen along axis *a*, 𝔠, darker greenish blue.
   𝔞, lighter bluish green.

The specific gravity of Langite is 3·48 to 3·50. Its hardness is under 3. It will not abrade calcite.

Before the blowpipe on charcoal it gives off water, and fumes and becomes reduced to metallic copper. Insoluble in water, it is readily dissolved by acids and ammonia. Heated, it passes through (1) a bright green, and (2) various tints of olive-green, till (3) it becomes black. Water is given off the whole time, and finally it has a strongly acid reaction.

The first stage corresponds to the loss of one equivalent of water; the second reduces its composition to that of Brochantite; at the third it loses all its water.

The chemical composition of Langite is represented by the formula $3Cu''H'_2O_2 + Cu''SO_4 + 2H'_2O$, which requires the following numbers:—

	Calculated percentage.		Average found.
4 equivalents of copper	126·72	=52·00	52·55
4 equivalents of oxygen	32·	=13·13	13·27
1 equivalent of sulphuric anhydride	40·	=16·41	16·42
5 equivalents of water	45·	=18·46	18·317
	243·72	100·00	100·56

I have met with a small and old specimen of Connellite with a twin crystal of Langite associated with it.

II. *Waringtonite.*

To a Cornish mineral associated with Langite, emerald to verdigris-green in colour, occurring in incrustations generally crystalline, and seen occasionally in distinct individual crystals aggregated loosely on the Killas, I have given the name of Waringtonite, in honour of my friend Mr. Warington Smyth. The crystals are always of the same form, that, namely, of a double-curved wedge. A narrow plane, 0 0 1, is very brilliant and without striation. It appears to be a cleavage-plane. A second, but scarcely measurable plane, 1 0 0, occurs at right angles to it, truncating the thin ends of the wedge. The prism planes in the zones 0 1 0, 0 0 1, and 0 1 0, 1 0 0 are uniformly curved. The planes of two prisms seem to exist in the zone 0 1 0, 0 0 1, but the angles, as approximately measured by the goniometer, are not very reliable; one of them, however, may be pretty confidently asserted to be very near 28° 30′, which is the mean of many measurements on four crystals. Seen in a microscope fitted with an excellent eyepiece goniometer, planes of polarization in the crystals are evidently parallel and perpendicular to the planes 1 0 0, 0 0 1; but whether a plane of polarization bisects the acute angle of the wedge, *i. e.* is parallel to 0 1 0 or to 1 0 0, or whether 1 0 0 is equally inclined to the planes forming the wedge—in short, whether the crystal is oblique or prismatic, it is very difficult to determine. The mineral frequently presents itself, moreover, in what appear to be twinned forms; but the angles between the planes 1 0 0 in the two individuals are not sufficiently concordant, as measured on different crystals, to justify a speculation on the symbols of a twin face.

Several analyses of Waringtonite concur in establishing its formula as $3Cu''H'_2O_2 + Cu''SO_4 + H'_2O$, as is seen by the following numbers:—

		Percentage as calculated.	Average found.
4 equivs. copper	=126·72	= 53·99	54·48
4 equivs. oxygen..........	= 32·	= 13·63	(calc. 13·756)
1 equiv. sulphuric anhydride	= 40·	= 17·04	16·73
4 equivs. water	= 36·	= 15·34	14·64
	234·72	=100·00	99·606

It also contains traces of lime, magnesia, and iron, and appears to be generally mixed with a small proportion of another mineral, which is probably Brochantite, as Brochantite occurs in distinct crystals on some of the specimens of Waringtonite.

Its specific gravity is 3·39 to 3·47.

Its hardness is 3 to 3·5, being harder than calcite, and about equal in hardness to celestine.

The entire difference of its crystallographic habit, the absence of the striation and marked prismatic forms so characteristic of Brochantite, its habitually paler colour, lower specific gravity (in Brochantite $G=3{\cdot}87$ to $3{\cdot}9$), and hardness sufficiently distinguish it from that mineral. The mountain-green streak offers an available means of contrasting Waringtonite and Brochantite with Atacamite, the streak of which is of a characteristic apple-green.

M. Pisani has published analyses of the two above-described minerals. In the former (possibly from having driven off part of the water in the preliminary desiccation of the mineral) he has found less water than I consider it really to contain, and he has consequently given to Langite the formula of Waringtonite.

The green mineral which he has analyzed and described as Brochantite seems, from his analysis, to have contained a slight admixture of the ferruginous matrix, and also differs from mine in the estimate of the water.

I confined my preliminary desiccation to a careful treatment of the bruised mineral with dried and warm blotting-paper, as many hydrated minerals of this class yield up part of their water when long exposed to a perfectly dry air, or to a temperature of 100° C.

"Preliminary Note on the Radiation from a Revolving Disk." By Balfour Stewart, M.A., F.R.S., and P. G. Tait, M.A.

The authors having been led by perfectly distinct trains of reasoning to identical views bearing on the dissipation of energy, have had preliminary experiments made on the increase of radiation from a wooden disk on account of its velocity of rotation, both in the open air and *in vacuo*.

These experiments were made with a very delicate thermo-electric pile and galvanometer. In the experiments in the open air the disk was of wood; its diameter was 9 inches, and it was made to rotate with a velocity somewhat less than 100 revolutions in one second.

A sensible effect was produced upon the indicating galvanometer when the disk was made to rotate, and this effect appeared to be due to radiation, and not to currents of air impinging against the pile. In amount it was found to be nearly the same as if the disk had increased in temperature 0°·75 Fahr.

In the experiments *in vacuo* the diameter of the wooden disk was over 12 inches; its velocity of rotation was about 100 revolutions in one second, and the pile was nearer it than when in air. Under these circumstances, with a vacuum of 0·6 in., an effect apparently due to radiant heat was obtained, amounting to nearly the same as if the disk had increased in temperature 1°·5 Fahr.

Bearing in mind the increased diameter of the disk, the effect is probably equivalent to that obtained in air, and these preliminary experiments would tend to show that when a wooden disk is made to revolve rapidly at the surface of the earth, its radiation is increased to an extent depending on the velocity; and it would appear that this effect is not materially less in a vacuum of 0·6 in. than in the open air.

The authors intend to work out this and allied questions experimentally, and hope, if successful, to communicate the result to this Society.