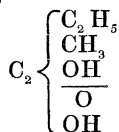
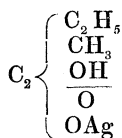


These solutions react powerfully acid, and readily decompose carbonates. The analysis of this acid gave numbers closely corresponding with the formula



We have prepared silver ethomethoxalate by treating the free acid dissolved in water with carbonate of silver. This salt crystallizes in splendid mammillated masses half an inch in diameter, which are tolerably soluble in water. It gave numbers, on analysis, in accordance with the formula



February 23, 1865.

JOHN P. GASSIOT, Esq., Vice-President, in the Chair.

The following communications were read :—

- I. "On New Cornish Minerals of the Brochantite Group." By Professor N. STORY MASKELYNE, M.A., Keeper of the Mineral Department, British Museum. Communicated by A. M. STORY MASKELYNE, M.A. Received February 13, 1865.

(Abstract.)

On a small fragment of Killas from Cornwall, I 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 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 :—

$$\begin{aligned} 110 \bar{1}10 &= 56^{\circ} 16' \\ 100 \bar{1}10 &= 61^{\circ} 52' \\ 001 \bar{2}01 &= 51^{\circ} 46' \end{aligned}$$

conducting to the parametral ratios

$$a : b : c = 1 : 0.5347 : 0.6346.$$

The crystals are twinned after the manner of cerussite, the twin axis being normal to the plane (110).

$$\begin{aligned} \bar{1}10 (110) \bar{1}10 &= 112^{\circ} 33' \\ 100 (110) 100 &= 123^{\circ} 44' \\ \bar{1}10 (110) 1\bar{1}0 &= 67^{\circ} 26' \end{aligned}$$

Cleavages seem to exist parallel to 001 and 100. The planes 001 and 100 are very brilliant. The plane of the optic axes, as seen through a section parallel to the plane 001, is parallel to 100. The normal to 001 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 $3Cu'' H'_2 O_2 + Cu'' SO_4 + 2H'_2 O$, 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
	<hr/> 243.72 100.00	<hr/> 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 $28^{\circ} 30'$, 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 $3\text{Cu}''\text{H}'_2\text{O}_2 + \text{Cu}''\text{SO}_4 + \text{H}'_2\text{O}$, 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 $G = 3.87$ to 3.9), 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 .

II. "Preliminary Notice on the Products of the Destructive Distillation of the Sulphobenzolates." By JOHN STENHOUSE, LL.D., F.R.S., &c. Received February 15, 1865.

The salt which I have hitherto chiefly employed is the sulphobenzolate of soda, $\text{C}_{12}\text{H}_5\text{Na}_2\text{SO}_3$, which was prepared according to Mitscherlich's* directions, by precipitating crude sulphobenzolate of lime by carbonate of soda, separating the carbonate of lime produced, and evaporating the clear solution to dryness. The finely powdered salt, which had previously been thoroughly dried, was introduced into a small copper retort and subjected to destructive distillation, when a considerable quantity of carbonic acid was evolved, and a brownish-coloured oily liquid, covered by a layer of water, collected in the receiver.

This oil was separated from the water and distilled in a retort furnished with a thermometer. The liquid began to boil at 80°C ., and then rose slowly to 110°C ., when only a small quantity of water, and an oil consisting chiefly of benzol, came over. The boiling-point then rapidly rose to 290°C ., at which temperature the greater portion of the liquid distilled over, leaving a black residue in the retort.

The oil boiling at 290°C . is of a pale yellow colour, heavier than water, and has an aromatic and slightly alliaceous odour. It contains a considerable amount of sulphur.

When this oil is brought in contact with nitric acid, a very violent action ensues with evolution of nitrous fumes, and when the resulting solution is poured into water, a crystalline mass of a pale yellow colour is obtained. This, when dried and washed with ether to separate a small quantity of adhering oil, is dissolved in hot spirit, from which, on cooling, two colourless crystalline substances separate.

The first of these, which constitutes the bulk of the product, forms beautiful rhombic plates, which, when crystallized out of benzol, may be

* Fogg. Ann. vol. xxxi. pp. 283 & 634.