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ARTICLE XII.

A Description of the Crystalline Form of some new Minerals.

By H. J. Brooke, Esq. FRS. FLS. &c.

(To the Editor of the *Annals of Philosophy*.)

DEAR SIR,

April 19, 1822.

HAVING lately been engaged in an examination of the crystalline forms of minerals, and in a few instances of their chemical characters, preparatory to a list I have proposed to add to an elementary introduction to crystallography, I have observed a few new results, which form the substance of the following brief notices :

Arfwedsonite.—The benefits which mineralogy has derived from the labours of Mr. Arfwedson have induced me to associate his name with this mineral, which is from Greenland, and is black and foliated, and has been hitherto called ferriferous hornblende. It differs, however, from hornblende in its angles, its specific gravity, and its hardness.

I am not aware of its occurrence in determinable crystalline forms. It has cleavages parallel to the lateral planes, and to both the diagonals of a rhombic prism of $123^{\circ} 55'$, but there is no transverse cleavage to determine whether this prism is right or oblique.

Its colour is black without a shade of green. Its cleavage planes, and its cross fracture, have a greater lustre than those of amphibole, and it is scratched by amphibole.

Specific gravity 3.44.

It sometimes accompanies the sodalite from Greenland.

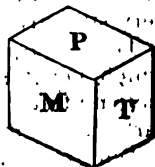
Cleavelandite.—The *albite*, and the *siliceous spar* of Haussman, which accompanies the green and red tourmaline from Chesterfield, in Massachusetts, are varieties of the same mineral. Two different names having been given to this substance, it becomes necessary either to adopt one of these to the exclusion of the other, or to assign a new one to the species.

As the *albite* is generally *blue*, and sometimes *red*,* its name is consequently bad, and *siliceous spar* might be applied with equal propriety to other substances; I have, therefore, preferred adopting the term *Cleavelandite* to denote the species, out of respect to the Professor of Natural Philosophy in Bowdoin College, United States.

This species has cleavages in three directions, parallel to the planes of a doubly oblique prism.

* The specimen which first enabled me to determine the form is bright blue. It came from Labrador, and was given me by the Rev. C. I. Latrobe. M. Nordenskiöld has favoured me with a specimen which is red.

P on M.....	119° 30'
P on T.....	115 0
M on T.....	93 30



Zoizite is crystallographically, as well as chemically, a distinct species of mineral. It has been classed by the Abbé Haüy under epidote, a mistake into which he has probably fallen from observing crystals of epidote apparently forming part of the mass of the specimens of zoizite from Carinthia.

Some specimens of it have been sent to this country from the Tyrol under the name of spodumene, and resembling that mineral in colour, and it probably accompanies the true spodumene from that locality.

A mineral called zoizite from the Oural Mountains, which has been examined chemically by Mr. Children, and found to agree in its characters with zoizite, has afforded the most accurate measurements of the prism. And Mr. Heuland has kindly supplied me with other specimens of this mineral, by means of which I have been enabled to ascertain that the angles of the prism are the same in specimens from all the different localities in which the mineral occurs.

Its form is a rhombic prism, probably oblique from an obtuse edge, the lateral planes measuring $116^{\circ} 30'$, with a bright cleavage plane parallel to the short diagonal of the prism.

Arseniferous Phosphate of Lead.—This substance occurs at Johangeorgenstadt in yellow hexagonal prisms, the terminal edges of which are replaced by single planes.

It presents crystalline faces after fusion by the blowpipe, as phosphate of lead does, and it exhales an abundance of arsenical fumes when fused on charcoal. It appears, therefore, to contain both arsenic and phosphoric acids, but I cannot find any analysis of it published.

I have taken this notice of it for the purpose of observing that the same species is found also at Beeralston in small yellow hexagonal prisms, and has been called arseniate of lead; from which, however, it may be readily distinguished by its crystalline character after fusion.

Carbonate of Magnesia and Iron.—On measuring the angles of different specimens of the substances which have been called bitter spar, or magnesian carbonate of lime, I have found one variety differing in its angle from all the others. This is the yellow variety from the Tyrol, which occurs in single crystals imbedded in talc or chlorite.

Its form is an obtuse rhomboid, measuring $107^{\circ} 80'$, the corresponding angle of the true bitter spar being $106^{\circ} 15'$.

On observing this difference in the angle, I dissolved a portion of the yellow crystals in dilute sulphuric acid, and obtained from

the solution crystals of sulphate of magnesia, tasting, however, very strongly of iron.

There was no residuum except a small quantity of the talc which penetrated the fragment I examined,* and the solution gave no trace of lime; the mineral appears, therefore, to be a carbonate of magnesia and iron.

Ten grains kept for some time at a red heat lost 4.82, and the colour became a snuff-brown.

Ten grains dissolved in dilute muriatic acid left a small insoluble residuum, apparently of the talc in which the mineral is imbedded. A few drops of nitric acid being added to peroxidate the iron, a precipitate was obtained by succinate of ammonia, which, when washed, and heated to redness, to destroy the succinic acid, weighed 1 gr.

From this experiment, the mineral might consist of 1 atom of carbonate of iron, and 9 atoms of carbonate of magnesia.

For if to the apparent loss by heating 4.820 we add the increase occasioned by the peroxidation of the iron, we shall have the true weight of the matter driven off.

1 gr. peroxide of iron, equivalent to .815 protoxide,	
difference	0.185
	5.005
0.815 protox. of iron requires of carbonic acid for saturation	0.500
0.500 carbonic acid	0.500
1.315 carb. iron	4.505
8.605 carb. mag.	4.100
9.920	8.605

If we consider 7.25 as the equivalent for carbonate of iron, and 5.25 as that of carbonate of magnesia, we should have

$$7.25 : 5.25 :: 1.315 : 0.95 \text{ nearly}$$

$$\text{And } 0.95 : 8.605 :: 1 : 9 \text{ nearly.}$$

But a more accurate analysis might possibly vary these proportions.

Latrobeite.—It is to the Rev. C. I. Latrobe that I am indebted for specimens of the mineral to which I have given this designation. And mineralogy is also indebted to him for the researches he has himself made, and caused to be made by others, in remote districts seldom visited by Europeans.

The mineral in question came from Amitok Island near the coast of Labrador; it is accompanied by mica and carbonate of

* The true bitter spar leaves a pulpy residuum of sulphate of lime when dissolved in dilute sulphuric acid.

lime, and imbedded in a grayish-coloured substance which I suppose to be also new to mineralogy.

The colour of latrobite approaches to pink like some of the deep coloured varieties of lepidolite.

Its specific gravity is about 2.8.

It scratches glass, and is scratched by felspar.

It has cleavages in three directions, parallel to the lateral and terminal planes of a doubly oblique prism, P on M, $98^{\circ} 30'$; P on T, 91° ; M on T, $93^{\circ} 30'$. (See the figure already given.)

The plane parallel to P is very dull, and the measurement obtained from it not to be confidently relied on; those parallel to M and T afford good reflections, but one of these is brighter than the other.

I send herewith specimens of the arfwedsonite and latrobite, which you will, perhaps, take the trouble to analyze at your leisure; and I remain, yours truly,

H. J. BROOKE.

ARTICLE XIII.

On the Discovery of Acids in Mineral Substances.

By James Smithson, Esq. FRS.

(To the Editor of the *Annals of Philosophy*.)

SIR,

April 12, 1823.

ACIDS, it is well known, have been repeatedly overlooked in mineral substances, and hence dubiousness still hovers over the constitution of many, although they have formed the subjects of analysis to some of the greatest modern chemists.

To be able to dissipate all doubts—to ascertain with certainty whether an acid does or does not exist, and, if one is present, its species, and this with such facility that the trial may be indefinitely renewed at pleasure, and made by all, so that none need believe but on the testimony of his own experiments, is the degree of analytical power which it would be desirable to possess.

So far as I have gone in these respects, I here impart:

As the carbonates of soda and of potash precipitate all the solutions of earths and metals in acids, so do they decompose all their salts by fusion with them. Fusion with carbonates of soda or potash affords there a general method of separating acids from all other matters.

Lead forms an insoluble compound with all the mineral acids except the nitric. It may consequently be immediately known whether a mineral does or does not contain an acid element by