THE

ANNALS

OF

PHILOSOPHY.

NEW SERIES.

JANUARY TO JUNE, 1824.

VOL. VII.

AND TWENTY-THIRD FROM THE COMMENCEMENT.

London:

Printed by C. Baldwin, New Bridge-street;

FOR BALDWIN, CRADOCK, AND JOY,

PATERNOSTER-ROW.

1824.

when one part of 8 A S is replaced by F S. Anorthite has only been found hitherto in masses of carbonate of lime at Mount Somma, near Vesuvius, where it is accompanied only by green translucent pyroxene.

Observations.—The mineralogical formula indicated above, appears to be the result of the analyses: I cannot, however, warrant its exactness, because I could only operate upon very small quantities; the first time with 0·628 gr.; the second time with 1·482 gr.: it is the result of this last analysis I have given. The formula would be analogous to other formulæ already known, if there was 9 A S, instead of 8 A S. Then it would be the same as that of meionite and paranthine, the formula of which is C S + 3 A S, with this difference, however, that one-third of C S in anorthite would be replaced by M S. Anorthite would then be referred to meionite, in the same manner as idocrase is to garnet, or, according to my brother's analysis, pyroxene to wollastonite.

I have provisionally given the name of anorthite to this mineral, derived from *ανορθος*, which signifies without right angles; because its crystalline form is principally distinguished from felspar, in not being at right angles to each other. Haüy, to whom the name of felspar did not seem proper, had suggested for this mineral the name of *orthose*, from two of its cleavages being at right angles to each other.

Article XII.

Observations on the preceding Paper, with an Account of a new Mineral. By M. Levy, MA. of the Academy of Paris.

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

SIR, *Dec.* 20, 1823.

Since the notice you inserted in one of the preceding numbers of the *Annals of Philosophy* of the division I had made of the specimens commonly ranked under the name of felspar, into two distinct species, viz. felspar and cleavelandite, I have seen in the last number of the Annales de Chimie a paper by M. Rose, of Berlin, upon the same subject. An abstract of this paper is inserted in the present number of the *Annals*, and contains, in addition to the essential part of what I intended to publish, not only new analyses of both felspar and cleavelandite, and their specific gravities, but also the complete determination of two new species, viz. labrador and anorthite. In consequence of this, I shall limit what I proposed to send you, to a very few observations, which M. Rose's paper does not render useless.

M. Rose has adopted, as appears from a determination of Weiss, an oblique rhombic prism for the primitive of felspar. I had assumed the same form, from the observation of the crystals of that substance I had an opportunity of examining in Mr. Turner's collection, as well as from the very figures given by Haüy, and the measurements given both by him and Mr. W. Phillips. M. Rose has not stated the reasons which induced Weiss to alter the determination of Haüy; and as I believe they are not generally known, since Mr. Brooke and Mr. W. Phillips, in their late publications, have adopted the primitive form of Haüy, I shall briefly explain by what considerations I was led to the same result as Weiss.*

On looking at the figures given by Haüy in the last edition of his treatise on mineralogy, as well as on looking at any crystal of felspar, it will easily be seen that every one of them may be derived from an oblique rhombic prism, the lateral planes of which would be, for instance, the plane he has marked *l*, and the face opposite and parallel to T, and the base the plane P. If the primitive were not such an oblique rhombic prism as I have just described, one would expect to meet with a crystal containing the face T without the face *l*, or the modification *z* without the modification *z'*, or *s* without *s'*, or *n* without *n'*, but the constant simultaneous occurrence of these groups of modifications perfectly symmetrical relative to the planes P, *l*, T, both in their positions and incidences, is certainly decisive. Moreover, in the form I have adopted, if a cleavage be found parallel to M, it must be at right angles to the base P, because M is equally inclined upon *l* and T, or because it is parallel to a plane through the oblique diagonals of the bases. This cleavage, as it is well known, exists in felspar, and is found perpendicular to P. This angle of 90° would again be a very singular occurrence if the primitive were a doubly oblique prism. The only argument in favour of Haüy's determination is, his assertion that there is a cleavage parallel to T, and none parallel to *l*, as should be the case, if *l*, as I have assumed, was one of the lateral primitive planes symmetrical to T. To this may be answered that even the cleavage parallel to T is in most cases very difficult to obtain, that this is not the only example of an oblique rhombic prism, in which one of the lateral planes is more easily obtained by cleavage than the other.† It is the case, for instance, in chromate of lead. Moreover, in some of the flesh-coloured specimens, I have succeeded in obtaining a cleavage parallel to *l*, by detaching first a thin lamina parallel to P. Finally, Haüy mentions the primitive he has adopted as one of the forms offered by nature: this form I have never seen; and I doubt very much its existence, because it could not be derived from an oblique rhombic prism from which all the others are so obviously deduced.

* See *Annals of Philosophy* for November.

† See Brooke's Familiar Introduction to Crystallography, p. 189.

The form M. Rose has taken for the primitive of cleavelandite differs only in its angles from that I had assumed. He gives for the incidence of T on M 117° 53′. I have constantly found it upon brilliant cleavage planes 119° 30′, or between 119° 30′ and 120°, which makes a difference of 2° between our measurements; mine agrees with that obtained by Mr. Brooke, and I believe also by Mr. W. Phillips. This difference will of course change most of the angles calculated by M. Rose, but not so materially as to make it necessary to trouble you with the result of my own calculations.

The flat crystals from St. Gothard are, as M. Rose had suspected, cleavelandite. It was indeed the observation of specimens of that locality which are not hemitrope, as most crystals of that substance are, that led me to the distinction of the two substances, and which gave me the best data for the determination of the primitive form. Mr. Turner's collection contains a great variety of forms of that locality; one of the most complicated I have represented in fig. 10. In some of the crystals, the planes l have marked $d^{\frac{2}{3}}$ and d' are wanting, and then the crystal has precisely the same form as some of the varieties of felspar. In the same collection are found crystals which are not hemitrope, from the Tyrol and from Siberia. Those from this last locality are very large, and contain only the modifications p m t and $o^{\frac{1}{2}}$ or o^2, and the figure of the plane m is triangular. However, most of the crystals are hemitrope, but their form is generally much more complicated than those M. Rose has figured. He says in his paper this substance is never found laminar, but from North America, and from Silesia. I have seen specimens in large laminæ, each of which is formed by the juxta-position of two laminæ parallel to the face T of the primitive, so as to present, when cleaved parallel to P, the same re-entering angles offered by the hemitrope crystals of that substance.

I shall feel obliged if you can spare room for a short description of, I believe, a very scarce and new mineral from Vesuvius. I have observed it upon a specimen Mr. Heuland purchased at the sale of Mr. Desse, to add to his private collection. This substance occurs in small brilliant colourless and translucent crystals. They are sufficiently hard to scratch rock crystal. Mr. Children, who kindly undertook to examine a small quantity of it, found it to be mostly composed of silex and magnesia. The only form I have observed is represented by fig. 12, and the crystals cleave easily in the direction of the plane p. The angles I have measured with the reflecting goniometer led me to adopt for the primitive form of this substance, a right rhombic prism, fig. 11, the lateral planes of which correspond to the planes marked m in fig. 12, and the base to the cleavage. The incidence of the two lateral planes of the primi-

tive is 128° 54′, and the ratio of one side of the base to the height nearly that of 4 to 7. The other incidences are:

$$(b', p) = 126° \quad 6'$$
$$(b', g') = 110 \quad 23.$$

This substance is accompanied by pleonast and olive-green pyroxene.

I have chosen for it the name of *forsterite*, in honour of the late Mr. Forster, who has so much contributed to the advancement of mineralogy by his extensive connections in that branch of science in every part of the world, and by having laid the foundation of one of the finest private collections, now in the possession of Mr. Heuland.

ARTICLE XIII.

ANALYSES OF BOOKS.

Philosophical Transactions of the Royal Society of London, for 1823. *Part II.*

THE following are the papers contained in this unusually voluminous part of the Philosophical Transactions.

XIII. *On a new Phenomenon of Electromagnetism.* By Sir Humphry Davy, Bart. Pres. RS.

We have reprinted this communication in the present number of the *Annals*.

XIV. *On Fluid Chlorine.* By M. Faraday, Chemical Assistant in the Roy[illegible]stitution. Communicated by Sir H. Davy.

In the nex[illegible]mber of the *Annals*, we intend giving a full account of the [illegible]tents of this paper, as well as of another, by the same chemist, on the Liquefaction of other Gases.

XIV. *On the Motions of the Eye, in Illustration of the Uses of the Muscles and Nerves of the Orbit.* By Charles Bell, Esq. Communicated by Sir H. Davy.

A brief abstract of this valuable paper will be found in the report of the proceedings of the Royal Society in the *Annals* for May, 1823; but we extract the section "*On the two conditions of the eye, its state of rest, and of activity,*" on account of the peculiarly important nature of its contents.

"The eye is subject to two conditions: a state of rest with entire oblivion of sensation, and a state of watchfulness, during which both the optic nerve and the nerve of voluntary motion are in activity. When the eye is at rest, as in sleep, or even when the eye-lids are shut, the sensation on the retina being then neglected, the voluntary muscles resign their office, and the