THE

ANNALS

OF

PHILOSOPHY.

NEW SERIES.

JULY TO DECEMBER, 1822.

VOL. IV.

AND TWENTIETH FROM THE COMMENCEMENT.

London:

Printed by C. Baldwin, New Bridge-street;

FOR BALDWIN, CRADOCK, AND JOY,

PATERNOSTER-ROW.

1822.

had so severe a winter as the last. At Jumnotri, the inclination of the granite rock is from 43° to 45° from the horizon; the apex being to the SW. or towards the plains.

As the season was not sufficiently advanced to allow of my passing to the Ganges by the Chīā or Cīlsaum mountains, both of which are at present impassable from the depth of snow on them, I returned to Catnaur, and going up the Shialba glen, crossed the ridge, which divides the two rivers at the Jackeri Ghāt, and descended by Bauna to Barahat, from whence I proceeded up the Ganges to Reital, and continued my route beyond Gangotrī, as before mentioned.

I shortly hope to be able to present to the Society the result of my trigonometrical operations to determine the heights and positions of all the peaks of the Himālaya visible from Seharanpur, and also an account of the sources of the Tonse and Jāhnavī rivers, and of the upper part of the course of the Setlej.

Article III.

On a New Lead Ore. By H. I. Brooke, Esq. FRS. & FLS.

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

SIR, *July* 6, 1822.

The third volume of the Edinburgh Philosophical Journal contains a notice from me of three varieties of lead ore which had not been before accurately described. I have now to add a fourth, of which only a very slight account has been given by Mr. Sowerby in the third volume of his Brit. Min. p. 5, under the name of blue carbonate of copper.

It is only within a few days that I have had an opportunity of examining this substance.

The specimens I have seen, as well as that figured by Mr. Sowerby, were found at Wanloch Head or Lead Hills.

The facility with which this species may be cleaved, the brilliancy of the cleavage planes, and the angle at which those planes incline to each other were indications that the substance was not carbonate of copper; and it appears on examination to be a compound of sulphate of lead and hydrate of copper, and may be denominated *cupreous sulphate of lead.*

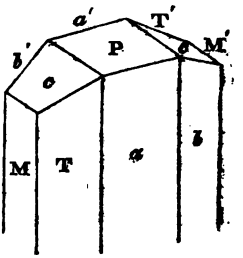
The colour resembles the brightest specimens of blue carbonate of copper.

Specific gravity about 5·3, but as the specimens I possess are not perfectly free from included particles of carbonate of lead and of cupreous sulphato-carbonate of lead, it is probable that the specific gravity of more perfect specimens may differ in a

small degree from that which I have given. A fragment of 1·4 grain, which is more transparent than the general mass of the substance, has indicated a specific gravity of 5·43.

It scratches sulphate, but is scratched by carbonate of lead.

For the purpose of enabling me to describe the crystalline form more accurately than I could have done from my own specimens, Mr. Sowerby has favoured me with a couple of small crystals whose form is rudely represented by the annexed hastily drawn figure.



The cleavages are parallel to the planes M and T. That parallel to M may be effected almost by pressure between the fingers. I have not observed any transverse cleavage, but as the plane P is at right angles to M and T, and as the plane M does not meet the planes *b'* and T at the same angle, the primary form may be regarded as a right prism whose base is an oblique angled parallelogram.

The measurements are as follows, the letters *b'*, *a'*, T', and M', being placed above the edges of the planes to which they relate:

M on T	102°	45′
b'	104	50
c	120	30
P	90	0
T on *a*	161	30
M' on *b*	104	50
T'	102	45
P on *a*, or *a'*	90	0

If we suppose the plane *b* to result from a decrement by one row on the acute lateral edge of the prism, the terminal edge of the plane M would be to that of plane T nearly as 11 to 23, and if the planes *c* and *c'* are produced by a decrement by one row, on the terminal edges, the height of the prism will be to the greater terminal edge as 13 to 23 nearly.

The specimen I possess is so small, and so little of it is perfectly pure, that I have not been able to submit more than a few grains to analysis. The result of this has given the following proportions of the constituent parts of the mineral:

Sulphate of lead	75·4
Oxide of copper	18·0
Loss by heating	4·7
	98·1

As there was not any effervescence perceptible during the solution of the mineral in sulphuric acid, the loss by heating must have been occasioned by the loss of water only; and if we

assume as the equivalent for sulphate of lead, 190 = 1 oxide of lead + 1 sulphuric acid, and for that of hydrate of copper, 122·5 = 1 peroxide of copper + 2 water, the substance would approach very nearly to a definite compound of

2 atoms sulphate of lead equivalent to ..	75·5
1 atom hydrate of copper	24·4
	99·9

H. I. Brooke.

Article IV.

Account of Dr. Hare's improved Deflagrator, and of the Fusion of Charcoal and other Phenomena produced by it.

A description of the instruments invented by Dr. Hare, of Philadelphia, and named, the one a Calorimetor, and the other a Deflagrator, has been given at p. 176, vol. xiv. and p. 329, vol. i. New Series, of this journal. A correspondence between Dr. Hare and Dr. Silliman will appear in the American Journal of Science, containing the description of a new Deflagrator, and of various interesting phenomena presented by those instruments, of which the following is an account drawn up from the letters forwarded to the Editor by Dr. Hare.

From various considerations Dr. Hare was induced to construct an instrument consisting of zinc plates surrounded by copper cases. The zinc plates were seven inches by three, and the copper cases were of such a size as to receive them much in the manner of Wollaston's construction. "There was, however," says Dr. H. "this apparently slight but really important difference, that the cases employed by me were open at top and bottom instead of opposing the edges of the zinc laterally, as in Wollaston's. One hundred galvanic pairs thus made were suspended to two beams, each holding 50. Between each case, a piece of pasteboard soaked in shell lac varnish was interposed, so that the whole constituted a compact mass, into which a fluid could not enter, unless through the interstices purposely preserved between the copper and the zinc." This apparatus was equally powerful with the original deflagrator, yet its oxidizable surface was not of more than half the extent, and it was comprised in one-eighth part the space.

In this construction of apparatus, where two or more beams of plates were used, they were fixed side by side in a frame, and connected one with another as in the common voltaic instrument. Then troughs without partitions, one for each beam,