XLIV. On the supposed fresh-water origin of the gypsum strata in the environs of Paris; on the geological characters and relations of the alum shales on the northern coasts of Yorkshire: and on the orbicular blocks of sienite on Mount-Sorrel Hill, in Leicestershire

Mr. John Farey

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tudes and peculiar modes of existence in each distinct class,—a sort of animal biography, wherein the species is personified in the diversified details of the individual : and applying this to the case under consideration, surely the animals which almost daily appear upon our tables have a paramount claim to our consideration, over those which can never extend beyond administering to, certainly a laudable but yet, a mere curiosity. I am, sir,

Your most obedient humble servant,

Princess Street, Manchester,
April 6, 1810.

JOHN CARR.

XLIV. *On the supposed Fresh-water Origin of the Gypsum Strata in the Environs of Paris ; on the Geological Characters and Relations of the Alum Shales on the Northern Coasts of Yorkshire : and on the Orbicular Blocks of Sienite on Mount-Sorrel Hill, in Leicestershire.* By Mr. JOHN FAREY.

To Mr. Tillock.

SIR, IT has given me great pleasure to find, that the doubts which I ventured to express in pages 134 and 139 of your Philosophical and Geological Magazine, as to the accuracy of Messrs. Cuvier and Brogniart's opinions, on the *fresh-water origin* of the lower part of the series of strata described in the IVth article of their memoir on the basin of Paris*, are in the way of being cleared up, by the researches of Messrs. Desmarests, the elder and younger, and M. Prevost, who have found numerous *sea-shells* in the third or lowest gypsum mass, notwithstanding M. Cuvier and his associate had said (page 50 of your translation) "we are not acquainted with any fossil in this mass, which is the third of the quarries : " what therefore must become of the opinion of M. Lamanon, adopted by them and others, as to the gypsums of Montmartre and the other hillocks of the basin of Paris, having been crystallized in fresh-water lakes ? or, thought of the unphilosophical expression used on the occasion, that *one fresh-water shell* therein, was " sufficient to demonstrate the truth of the opinion of M. Lamanon ? " In a calcareous marl, below what is called the little plaster bed in this mass, the fossils appear numerous, and are, *ampullariæ*, *calyptræ*, *cerites*, *cithereæ*, *cockles*, *corbulæ*, *crab's shells* and *claws*, *echini spatangust*, *glosopetræ*,

* Page 49 of the present volume.

† At Gignon lime quarries (p. 118) our authors observed *echini cypeastræ*.
murices,

murices, solens, tellinæ, turritellæ, vertebræ of fish, vor lutes, &c. Below the above, three small beds of plaster and some strata of marle occur, without shells; and lower, a bed of calcareous marle, in the midst of which is a plaster or gypsum bed, which contains cerites of the genera petri-colum and terebrale; many of which *sea shells* are perfectly similar to those in coarse limestone at Grignon, and other places, not only in marles here, lying between beds of gypsum, but in the gypsum itself, although several naturalists have questioned the reality of such an occurrence. The above particulars I have learnt, from a notice in Mr. Nicholson's Journal of the present month, which contains other interesting particulars. Should M. Desmarests and Prevost have presented any memoir on the above subject, you will not, I hope, fail to translate it at length, on its reaching this country.

In the respectable journal above mentioned, Mr. Richard Winter has given an interesting account of the manufacture of *alum* in the neighbourhood of Whitby, and of the strata whence the raw material or alum-shale for making this useful article is procured; of which geological particulars I beg to present a brief sketch, for the purpose of soliciting further information, through the medium of your Magazine, such that may enable us to fix the place of these strata in the British series.

Alum-shale, a blueish gray argillaceous schistus, occupies the coast of Yorkshire for about ten miles southward, and 18 miles northward of the town of Whitby, and extends inland a great distance; cliffs of this shale appear on the shore which are from 100 to 750 feet high, and on which the sea is continuing to make its inroads. A ferruginous sand-stone (perhaps the same with that of Woburn), iron-stone, and shale, or clay of its decomposition, covers the alum-shale stratum, having an easy dip to the southwest. The sand-stone appears from 4 to 50 or more yards thick; producing ochrey springs at its bottom; it hardens by exposure in buildings: a thin bad seam of coal or jet, (probably bituminized wood,) seldom exceeding two inches in thickness, is sometimes found under or in the lower part of the sand-stone: the slines or length-way joints of the strata of stone and shale range N. and S., and the end or cross joints E. and W.

The alum shale contains several species of *ammonitæ*, abundance of *belemnitæ*, bones of animals, *nautili* of two or three species, *shells* of various kinds, *trochitæ*, and *vertebræ* of fishes or animals. It likewise holds nodules of

indurated clay, which contain *native alum*; geodes of iron-stone that contain *naphtha*; pieces of petrified, charred and bituminated *wood*, or *jet*: red *iron-stone*, in strata of a few inches to two feet thick, four or five in number, at about 200 feet from the top of the shale: *calcareous spar*, about half an inch thick, in the vertical slines and end-joints of the shale above mentioned: *whin-dykes* are said also to traverse these strata, and to have charred the coals in their vicinity? The specific gravity of the alum-shale is about 2.48; it decomposes into clay on long exposure: its upper part is richest in sulphur, and produces about one ton of alum from 130 tons of shale, or 00.77 per cent.: the lower part of the shale is very bituminous, hard and slaty; a spontaneous and slow combustion ensues when the alum-shale is mixed and sprinkled with sea-water.

Such are the interesting geological facts, which Mr. Winter has laid before the public, respecting the aluminous shale strata of Whitby; concerning which, it is further desirable to know, the names of the different species of imbedded shells and other organic remains, with reference to published descriptions and plates of them, or drawings and descriptions of such as have not yet been described by naturalists; and an account of the strata that underlay the alum-shale, as well as of those which overlay the ferruginous sand-stone. To ascertain these last particulars, it may be necessary to examine the extremities of the alum-shale on the sea-shore, and to trace its edges or boundaries for some miles inland; carefully distinguishing between the *alluvial* matters, properly so called, consisting of or containing *rounded stones* and broken and heterogeneous mechanical mixtures, and the regular stratified matters, which will somewhere be found in a regular range, covering the ferruginous rock and other strata which Mr. Winter has described; the nature and peculiar fossils of which strata, it will be very desirable to obtain an account of.

In Derbyshire, some are of opinion, that the great or limestone Shale which there covers the mineral limestone and basaltic strata, as shown in Plate II of your thirty-first volume*, (and of which *Mam Tor* is composed,) is the same soil or assemblage of strata, which produces alum at

* And is described by Mr. Whitehurst in his "Inquiry concerning the Earth," 2d edit. p. 189; where however he is wrong in saying, that this shale contains no vegetable impressions, since such occur at Shaw-Engine mine there mentioned, and numerous other places. Mr. Mawe, in his "Mineralogy of Derbyshire," p. 24, has copied this error, and added a still greater one, viz. that this shale "is not stratified."

Dr. Healy's cupping instrument

Dr. Healy's theory of Vision

Whitby and the adjacent parts of Yorkshire; and at Shaw-Engine mine in particular, near Eyam N. (where this stratum has been penetrated 360 feet deep to come at the vein of lead ore in the first limestone) alum is said to form a crust on the parts of the shale exposed. I cannot however consider this shale, and that at Whitby, as belonging to the same soil, but believe the latter to correspond with the great or clunch Clay of Bedfordshire, Cambridgeshire, Lincolnshire, &c., underlaying the Woburn Sand and ferruginous sand-stone strata, as hinted above: which clay abounds with selenite and pyrites, and at its exit from the island on the south coast in Dorsetshire, if I mistake not, takes fire on contact with the sea-water, as at Whitby; and whose highly bituminous shales, towards its lower part, have occasioned the useless expenditure of such immense sums of money in search of coals in this and past ages, in all its course through the English counties. At the east end of Bolinbroke town in Lincolnshire, in 1807, I observed these bituminous shale beds, and within a few miles, an expensive boring was at that time making, in search of coal-seams, which existed only in the ideas of the adventurer. Ludi Helmontii of various sizes and shapes, some long and cylindrical in shape, (of which sir Joseph Banks has specimens at his seat at Revesby) with thin shells investing them, which seem to prove their *animal origin*, are found at Bolinbroke, and elsewhere: Quere,—Are ludi found in the Whitby shales? or large anomia gryphus, perforated, or worm-eaten as it is called, near to the sand-stone?

Mr. Winter mentions the Whitby strata, as passing into the interior of Yorkshire and into Lancashire; but is it not more probable, that the ancient alum-works in Lancashire and the western parts of Yorkshire, which he alludes to, were situate on the shale of Castleton Mam Tor, above mentioned? and not on the Whitby shales; since the former contains sulphur sufficient for the production of the sulphuric acid, necessary in the production of alum. An alphabetical list of all the places, exactly describing their situation, where alum has at any time been made in the north of England*, which perhaps Mr. Winter by the assistance of his friends could furnish, would prove of considerable use towards deciding the geological questions above stated, as to the number and relations of the rich alu-

* Benjamin Martin's Natural History of England, vol. ii. p. 229, mentions alum as among the mineral products of Derbyshire; but I found no works, nor heard of any, in my recent examination of that county.

minous soils, in the British series of strata. The Whitby strata I have never had an opportunity of seeing, or any other where alum is manufactured; nor do I recollect what Mr. William Smith has ascertained, relative to the Whitby and other alum-shales. The valuable information which Mr. Winter has already given on this subject, is, as I hope, but the prelude to further details, which would greatly oblige,

Sir, your obedient servant,

No. 12, Upper Crown Street,
Westminster, April 5, 1810.

JOHN FAREY.

P. S. The perusal of an extract in your last Number (p. 222), respecting the orbicular blocks of granite of Talavo and Sartene, and the doubts expressed, whether the latter received their present form by the effects of attrition or decomposition, induce me to state, that in a cursory examination of Charnwood Forest in Leicestershire, in August 1807, previous to entering on my Derbyshire survey, I found on Mount-Sorrel common, on the north and north-west of the windmill, several isolated blocks of sienite, from one to several feet of solid content each, which appeared at first sight like rounded stones, almost half imbedded in the soil; but on a closer examination I found them to be perfectly similar in kind to other blocks nearly cubical, which were lying about on the grass, of which blocks seats are made at the doors of many of the houses in Mount-Sorrel town, which most travellers that way must have observed. Seeing reasons for referring the rounding of the blocks in question to decomposition rather than attrition, I attempted, and succeeded in two or three instances, in turning over these blocks, by which it appeared evident to me, that attrition had had no share in giving them this semi-orbicular form; the bottom in contact with the soil, presenting a perfect face of the cubical form peculiar to these blocks, and no appearance of breaking or other violence: in a further search on this common, I found such a series of these blocks in all stages of their decomposition, as to leave no doubt on my mind on the subject.

In the progress of my subsequent survey, I have found numerous instances of round masses of granite, of very different species apparently, some very large, but none of these boulders admitted of any hesitation in referring their form to attrition, or in considering them as the alluvial ruins of very distant regions. One of these granitic boulders I found in the Buts pasture at Ashover, on the limestone; some in Bretby Park, on the red marle, some on Maccles-
field

field common, Cheshire, on the coal-measures, some in alluvial marl on Werneth-Low Hill in Cheshire, (as mentioned vol. xxxiv. p. 30,) and in vast numbers in the vale of the Goyte from Whaley-bridge downwards, and in its various branches in Derbyshire and Cheshire: in numerous other places, single blocks are found. What I wish to impress on geological observers is, the necessity of stricter attention to alluvial matters, and not hastily to conclude whether round stones are boulders, or were formed by decomposition.—J. F.

XLV. *On Crystallography.* By M. HAUY. Translated from the last Paris Edition of his *Traité de Minéralogie*.

[Continued from p. 201.]

ON THE NOMENCLATURE OF MINERALS.

MINERALOGY and the other natural sciences have been cultivated during a long course of years, without men of science being aware of the great influence possessed by words, the signs of our ideas, in facilitating the acquisition of their ideas themselves. The language of the sciences was not submitted to any fixed rule; the caprice of the nomenclators themselves decided both the choice and the number of the words which composed each denomination; and these words, frequently improper, or even calculated to lead to a fallacious interpretation, presented the double inconvenience of injuring the operation of the memory and of obscuring intellectual perceptions.

At length Linnæus undertook to make natural history speak a rational and methodical language, by reducing every denomination to two words, one of which should be common to the species denominated, with all those which belonged to the same genus, and the other should serve as the distinguishing sign of this species. The example of this illustrious man has been followed by all those who have since cultivated the study of nature with most success; and the authors of modern chemistry have adopted a similar precision in the idiom of that science, in which it is conjoined with a peculiar advantage originating from the very basis of the subject. It consists in this, that here, to name and to define are one and the same thing; and a mere collection of the names, such as fluete of lime, sulphate of barytes, &c. presents an abridged treatise on the science.