tracts. I understand that Captain Lyons intends to visit England early in the ensuing summer in order to select a staff of young geologists to work under him in Egypt. Ample provision has been made in the estimates for equipment, tents, camels, and attendance. It will of course only be possible to carry on outdoor work during six months in the year; but the geological structure of the country is of great interest, though on the whole, simple; and the formations are distributed on a large scale. For young geologists who wish to extend their knowledge of other countries the work ought to prove attractive, and with due care, will be healthy. Camping in tents in the desert is, as I can state from experience, exceedingly enjoyable, and when to this is added the delight of riding on camels and donkeys, there is nothing more to be said in order to secure numerous volunteers for the work! EDWARD HULL.

ERRATUM AND NOTE TO ARTICLES ON EOZOÖN.

SIR,—I observe in the beginning of the second paragraph of my Article in December 1895, p. 545, an error which may puzzle some readers. The words "*old calcite and serpentine lagoons*" should be "calcite and serpentine layers." A less important error is the substitution of the name "Lorne" for "Lowe" in the description of Fig. 2 in my first Article in October 1895, p. 447.

In the second Article I should perhaps have mentioned that in the Glauconite Limestone of Levis (Ordovician), and in that of Kempfen, Bavaria (Eocene), as well as in Cretaceous and Modern greensands, while some grains of glauconite fill cavities of fossils, others, and often the great majority, are independent and amorphous. Thus in mode of occurrence the hydrous silicates of later limestones do not differ from that in the Grenville Limestone.

January 3, 1896. WM. DAWSON.

ON THE TRUE MEANING OF THE TERM BOLDERIAN.

SIR,—Professor Dewalque, of Liége, in a letter you have lately published (1st December, 1895), criticizes the use I made of the term "Bolderien," established by Dumont, for some beds of the Belgian Tertiary formation. But this courteous censure seems to me without sound ground, and I think he has misunderstood Dumont's statements.

If we turn to the Journal of the Royal Academy of Brussels, for 1849, where Dumont created the term "Bolderian," we read: "The Bolderian system is divided into two stages; one is a marine stage in which the lower part consists of glauconiferous sands, and the upper part is composed of yellow sands, in these come, in order, the fossiliferous sands of the Bolderberg; the other stage is a fresh-water formation, consisting of sands and lignite, of which traces are found under the Campinian deposit."

There is no doubt about this, the type of the Bolderian system, in its lower part, is indicated as composed of marine fossiliferous sands found in the hill of Bolderberg, near Hasselt, and includes the fossiliferous bed so well known in that locality.

This opinion is repeated in various other publications; we can see in the explanation of the geological map of Belgium, published by Dumont, in 1892, the following lines: "Miocene=System Bolderian — gravels, glauconiferous sands, white sands, shelly gravels, and various other sands."

In Dumont's private notes, published not many years ago by M. M. Mourlon, we find the same version. Dumont says in his description of the Bolderberg Hill: "This gravel contains pebbles of flint from the size of a nut to the size of an egg, and a great many shells more or less well-preserved; they were living during the time of the deposition of the sand in which they are found."

We could multiply these quotations, but when Mr. Dewalque says that the Bolderian is a white unfossiliferous sand, he speaks of *his* Bolderian, but not of the original Bolderian of Dumont. On the other hand, the Bolderberg fauna is clearly Upper Miocene, we find that this fauna is extremely close to the fauna of Edeghem sands, near Antwerp, of which the malacological fauna has been described by Nyst, in 1861, as true Miocene. More than 90 per cent. of the species are common to the two localities, and we think there is good ground to say that the Bolderian was contemporaneous with the Anversian. The term Anversian was introduced into the science by Mr. Cogels, in 1879, to indicate the level of the Edeghem sand, or lower black sands of Antwerp.

We will give the names of some of the most typical shells found in the Bolderberg:—

Murex aquitanicus, Grat.
Terebra Basteroti, Nyst.
Cancellaria cancellata, L.
,, *acutangularis*, Lk.
,, *imbricata*, Hoernes.
Dipsaccus Brugadinus, Grat.
Pleurotoma asperulata, Lk.
,, *denticulata*, Bast.
,, *ramosa*, Bast.
,, *festiva*, Dod.
Pectunculus pilosus, L.
Conus Dujardini, Nyst.
Voluta Bolli, Kock.
Ancillaria obsoleta, Br.
Oliva Dufresnei, Bast.
Turbo muricatus, Duj.
Natica Josephinia, Risso.
Venus multilamella, Lk.
Cytherea chione, Lk.
Corbula carinata, Duj.
Corbulomya complanata, Sow.
Ostrea crassissima, Lk.

It will be at once clear to any geologist that the age of this fauna must be Miocene; it certainly cannot be Oligocene. This is a warm (southern) fauna, very distinct from the cold or temperate fauna of the Diestian deposits. The scruple of Mr. Dewalque is based on the fact that in the Bolderberg Hill, the fossiliferous bed (sometimes ferruginous) rests upon a thick mass of white sand, and is covered by a great mass of ferruginous sandstone pertaining to the Diestian formation, and Mr. Dewalque does not seem perfectly sure whether the fossiliferous bed pertains to the lower mass, or to the upper one. But we have seen that the old stratigraphists, such as Dumont, had classified the fossiliferous beds with the white sands; and since that time the best contemporary geologists, as Mr. Gosselet, have adopted the same conclusion, saying that the fossiliferous sands have nothing to do with the Diestian or upper beds.

More recently Mr. Van den Broeck discovered at Waenrode, near

Diest, in the Bolderian white sands, a fossiliferous bed not near to the top of the formation. Last summer the Belgian Geological Society made an excursion to those localities, with a view to observe again the exact position of the fossiliferous bed. The sections were exposed afresh, and all the geologists present, Mr. Lorié, from Utrecht, Mr. Lohest, pupil of Mr. Dewalque, Mr. Vincent, palæontologist, and many other distinguished Belgian geologists, also the writer of the present letter, came to the same conclusion, namely, that the fossiliferous bed is inclosed in the white sands, exactly as had been stated by Dumont many years ago.

When my honoured friend, Prof. Dewalque, says that in the eastern direction, near the valley of the Rhine, the white Bolderian sands contain Tongrian fossils, this is only an affirmation, but no evidence in favour of this statement has ever been produced. We should be very pleased to make the acquaintance of any geologist who has been so fortunate as to follow step by step the Bolderian sands from Hasselt to the Rhine!

The most recent observations seem to prove, on the contrary, that Dumont made in his Bolderian a great inversion; his Upper fluvio-marine stage is really the Lower one, and the marine shales are the Upper. The fluviatile Bolderian has been recognized in boring under Campine and Limbourg, and probably it is associated with the Rhenan lignites; it might take the name of Aquitanian. But this question is not yet perfectly solved. Last month Mr. Van den Broeck came to the conclusion that the Bolderian sands were very close to the Upper Rupelian sands, and that all these sands were united, by repeated alternation, with the Rupelian clay (*Argile de Boom*) and by no means form a good horizon. But even if the fluviatile Bolderian is not valid and is a bad subdivision, containing sands which can be better classified in three or more different stages, it remains always a good marine Bolderian, a sound type well characterized by its palæontology, and indicated by its stratigraphy. We think that we can, without any hesitation, maintain the old name of "Bolderian" in its true, original acceptation.

G. F. Dollfus, F.C.G.S.

Paris, 10 *Janvier*, 1896. Président de la Société Géologique de France.

OBITUARY.

HUGH MILLER, F.R.S.E., F.G.S.

Born July 15th 1850. Died January 8th, 1896.

It is with great regret that we record the death of Mr. Hugh Miller, F.R.S.E., F.G.S., of the Geological Survey of Scotland. Bearing the same name as his distinguished father, the author of "The Testimony of the Rocks," "The Old Red Sandstone," etc. Mr. Hugh Miller inherited a taste for geological pursuits, and joined the Geological Survey in 1874. Labouring at first among the Carboniferous Rocks and Glacial Drifts of Northumberland, he was subsequently transferred to the Geological Survey of Scotland, and worked at the Old Red Sandstone around Cromarty, rendered