

Be this as it may, it is certain that no arrow-head, or worked flint, or other stone of any kind was so situated. The antler of the rein-deer was found lying on the floor or cake of stalagmite which covered the bed of bone-earth with all its contents, and *all* the worked flints lay at the base of this bone-bed, and therefore at a considerably lower level than the antler.

The relics of the cave mammals, with the evidences of man's existence and (as I believe) high antiquity, had all been deposited and hermetically sealed up before the introduction into the cavern of that fine relic of the rein-deer.

So far as Mr. Drake's inference is concerned, this correction is unimportant, but it seems right to prevent, if possible, erroneous statements respecting Brixham Cavern from becoming current, especially as no authorized report on it has yet been given to the world.

I am yours, &c.,

Lamorna, Torquay, June 4.

W. PENGELLY.

FOREIGN CORRESPONDENCE.

M. GAUDRY has communicated another interesting paper on his researches in Greece, in which he states that, although his researches in 1855 furnished him with the remains of a great number of ruminants, they never brought to light any tooth or skull belonging to one of the goat tribe. So in a note which M. Lartet and himself laid before the Academy in 1856, they stated their opinion that the *amalthée* might be an antelope. At the present time M. Gaudry possesses eighteen skulls, and most of them have their posterior part whole, two among them being furnished with their teeth and the bony axes of the horns. These fossils confirm the supposition that the *amalthée* is not a goat, but an antelope. M. Owen says that the grinders of the antelope are distinguished from those of the goat in not having interlobular columns, their covering of enamel being longer, and the external surface of the superior grinders having the furrows more marked and the depressions not so plainly limited by straight longitudinal borders. M. Gaudry has remarked also that with goats the superior front grinders are cut at right angles, instead of being rounded and sinuous as with antelopes; it seems that they are halves separated from the back grinders. They have not any distinct tops like those of antelopes, so much so that one cannot mark the part where the enamel begins upon the shaft. These characters give the front grinders of the goat, seen on the external surface, a look which reminds one a little of the teeth of a horse. In goats the three front grinders are very straight, the space which they occupy is far from being the third of the total length of the series of grinders, whilst in the antelopes they attain, and sometimes go beyond, the third of that length. It is true that these various characters are subject to exceptions, but at least they are more constant than those furnished by the horns, and certainly they are of greater generic value. The *amalthée* has not any of those characteristics enumerated

as peculiar to goats; it has, on the contrary, those belonging to the antelope.

The teeth of the upper jaw bone, and particularly of the lower one, have the interlobular tubercles jutting out, becoming in some specimens real columns. The principal part of the skull does not recede behind the horns as does that of the goat. It is straight and massive, and forms a right angle with the occiput. As there is no existing sub-genus of antelope in which this could be placed, the name of *tragoceras* (τράγος goat, and χέρας horn) has been proposed for it, and *Trag. Amalthæus* in the name M. Gaudry would give the above described species.

In a small skull of an antelope, still furnished with its teeth and the bony axes of its horns, the extremity of the nasal and intermaxillary bone is still preserved. This discovery allows him to determine a great many axes which, up to the present time, had been found separated, and which M. Wagner had included under the name of *Antelope brevicornis*. The skull discovered can be classed in the sub-genus gazelle. It resembles the general form of the head of the common gazelle in the direction of its horns, their point of insertion, their spread and the orbital depressions at their base.

Some specimens of the *Antelope Lindermayeri* have also been discovered, which much resemble the *Oreas canua*, though differing in detail. M. Gaudry, therefore, proposes to name it *Palæoreas Lindermayeri*.

Entire skulls of all the antelopes found at Pikermi are now in the possession of M. Gaudry. An undescribed one, much resembling the sub-genus *Antidorcas* has just been forwarded to him.

Two skulls, found in 1855, resembling *Tragoceras amalthæus* appear sufficiently distinct to constitute another species, which M. Gaudry names *Trag. Valenciennesi*, in honour of the distinguished savant to whose good counsel in palæontology M. Gaudry owes so much.

On Flint Implements. By MM. BOUCHER DE PERTHES and ROBERT.

IN our number for May we gave a *résumé* of a paper by M. Robert on the substances worked by the primitive Gauls, in which he stated his opinions on the age of the Celts, &c., which have been discovered in several parts of France.

M. Boucher de Perthes, in a memoir read before the Paris Academy of Sciences, replies to this paper, and, having arrived at a very different result from M. Robert on the subject, proceeds to state the grounds for so doing.

In the first place he says, that recent bones have never been found at St. Acheul, Abbeville, or indeed in any deposit of diluvium mixed with fossil bones. This statement differs *toto cælo* from that of M. Robert, to which we again refer our readers.

Secondly, he states that M. Robert is in error in saying that the

bones of extinct species of elephants, rhinoceros, &c., found at St. Acheul and Meuchecourt, are much worn and water-rolled, and that those of the horse, aurochs, &c., are not; they are very rarely water-rolled, and those that are belong as often to existing species as to extinct ones. (See Cuvier "Oss. Foss., Bœufs Fossiles," tome iv., p. 162, edition 4to, 1823.) No palæontologist, since Cuvier, has endeavoured to draw a chronological distinction between the bones of the elephant, rhinoceros, horse, stag, and aurochs, mixed pell-mell in the same beds of diluvium, from which the hatchets and worked flints have since been obtained. The bones found at the above-mentioned places bear no comparison, either in colour or weight, with those of the turbaries or those belonging to existing domestic animals.

M. B. de Perthes then asks, why the flood, which destroyed the habitations of man, and washed the bones of extinct species from the diluvium to mix with the drowning carcasses of animals, did not wash up the bones of man also, and, supposing they burned the dead, the urns which contained the calcined dust? Why, too, does not the resulting bed contain remains of dwellings, bricks, glass, metals, or indeed of any index of the first stage of civilization presented by the lacustrine deposits of Switzerland?

M. B. de Perthes then argues on the age of the flints as shown by their own colour, &c., and by the accompanying beds always being exactly similar, and then proceeds to ask, if the men of those days inhabited the deep vallies and were surprised by inundations which washed away their habitations and all they contained, how it is that these hatchets have been found more than thirty metres above the level of the vallies, found, too, associated with elephantine remains; and how is it, again, that only these have been so carried? He concludes his paper in these words:—"If the diluvium where the bones and hatchets have been found, is not the veritable diluvium, where is it? Cuvier, Brongniart, M. Elie de Beaumont himself, and more recently Verneuil, Lartet, Collomb, Prestwich, Lyell, and Murchison, have been strangely deceived, since they have mistaken that for it; and stranger still, have recognized as virgin soil that which, according to M. Robert, is but a modern twice deposited alluvium.

To the above communication of M. Boucher de Perthes, M. Robert has replied at a subsequent date, to the following effect.

He considers the most serious objection raised by M. de Perthes to be contained in the following question:—"If the men of that time inhabited the deep valleys and were there surprised by the flood which washed away their dwellings and all they contained, hatchets among the rest, how comes it that these hatchets are found thirty mètres above the level of those valleys, and how have they been carried there with the bones of elephants, &c.?"

M. Robert submits the following explanation:—

"At the time of the first appearance of man in Europe, many ages after that great cataclysm which destroyed every breathing thing on

the earth, at least in our hemisphere, and with a violence sufficiently powerful to snatch from the ocean the immense body of a whale and deposit it in the Paris basin, where now is situate the Faubourg Saint Germain. The valleys were filled with materials prepared by this grand bouleversement, and spread confusedly over all the continent.

For a long time they seem to have been occupied rather by chains of lakes and marshes than by rivers. The first inhabitants of these countries established themselves near these lakes, and when the inundations came, as come they do in the present day in the same valleys, they naturally left all they cared for least, such as hatchets, and sought the upland. Their burial grounds always having been put out of the reach of these overflows, one never finds human bones mixed with the bones of other animals. As to the vases, which according to M. Boucher de Perthes contained the ashes of their dead, and might have been carried away by the waters, one can easily understand why no vestiges are to be found as they were simply dried in the sun, and would not stand the slightest shock without being reduced to powder."

Thus it is that objects of human industry are mixed up in the alluvium with the remains of animals of extinct and even new species; some more or less rolled, others scarcely: and if some dépôts exist above the present level of the rivers, it is that those rivers have hewn out for themselves a bed deeper and deeper, year by year, in the deposits with which they were in the first instance surrounded.

M. Robert adds that these valleys have not been filled up very violently, for most of the flint-implements found in the valley of the Somme have a very new look about them which does not admit of their having been much water-worn, although they are side by side with rolled stones from which they might have been cut.

In alluding to the bone-caves in which human remains are associated with ancient pottery and the bones of extinct animals, M. Robert refers to the labours of M. Desnoyers, who has pretty well proved that the caverns in which this singular association is offered were inhabited by the Celts, or used as a place of sepulchre by them, ages after they had served as a place of retreat for wild beasts, especially the *Ursus spelæus*, the bones of which are always found under the superficial deposit which contains the traces of man. Cæsar, Florens tells us, ordered his lieutenant, Crassus, to shut up the crafty inhabitants of Aquitaine in the caverns in which they hid themselves, many thus perished. As to the supposed skulls of Caribs, or of African race, found in the caves of Mailet, in Belgium, they are found associated with other skulls, which by their configuration belong to the Circassian race, according to M. Desnoyer, who considers that the analogy suggested by the others is due to an artificial depression, or to an individual peculiarity.

Touching these bone-caves, M. Robert asks M. Boucher de Perthes in his turn how it happens that these primitive inhabitants of Gaul made no ornaments, or amulets, with the bones of the elephant, rhinoceros, &c., or that they have not endeavoured to make use of

the tusks of the former for weapons :—is it not because these bones, of which they could not ignore the existence, were fossils in every sense of the word, in their time, that is to say entirely deprived of animal matter and reduced to the nature of stone, and consequently improper (one must, however, except the Silurian mammoth preserved in ice) for the use they wished to make of them. It is impossible to say what period of time was necessary to change this organic matter which constitutes the solidity and tenacity of the bony substance, since the well authenticated remains of early Celtic inhabitants, which we can only allow to have been buried six thousand years, contain it still. In the supposed diluvium of the borders of the Somme one easily understands that objects of this kind are never found, as in the caverns of Aquitaine, where have been discovered so many remains of Celts and the lower animals.

M. Robert concludes his paper with a quotation from M. Desnoyers, "The Gauls would not have failed to make trophies of the remains of elephants, hyenas, and other grand mammals, if they had been contemporaneous with man."

On the Cretaceous Deposits of Central Bohemia. By M. LIPOLD.

THE Quader or Cenomanian group prevails in the south and central regions of this district, while the Pläner or Turonian group, appearing in isolated hills as far as near Mezeritch, is more exclusively represented in the north-east region. The strata of both, having suffered no disturbance, lie perfectly horizontal, or with a scarcely perceivable angle of inclination. Organic remains are of rare occurrence in them, except in the case of the limestones with *Hippurites ellipticus*, appearing in the south-east, either as isolated coral-reefs or associated with sandstones of the Quader group.

On the Tertiary and Diluvial Deposits of Central and Eastern Moravia.
By M. WOLF.

THE tertiaries between Brünn and Olmütz, belonging to the marine deposits of the Vienna Basin, occupy a narrow zone running from Steinabrunn north-eastward between the ranges of the Austro-Moravian hills into Moravia, and filling up, towards Olmütz, several bays, cut into deposits of older date, as, for instance, in the Zevittawa Valley and around the Mährisch-Trüban. This northern bay near Brünn was a branch of the north-eastern arm of the sea extending, during the Miocene period, in a north-eastern direction, and connecting, after having passed over the anticlinal of Weisskirchen, the tertiary basins of Vienna and Galicia. Fossiliferous localities are rather numerous, and among them Rausnitz and Ruditz are conspicuous for numbers and variety of organic remains. Of twenty-four species collected at the second of these places, fifteen also occur at Baden (S. of Vienna), and fourteen at Steinabrunn (N.N.E. of Vienna), so that, as far as evidence

at present goes, the faunæ of these three localities may be considered as nearly, if not completely identical.

Ruditz and Rausnitz also, separated only by a distance of three Austrian (between fourteen and fifteen English) miles, possess in common only two species of Gasteropods. Ruditz is one of the highest fossiliferous localities in the Vienna basin, lying about 1400 feet above the level of the Adriatic. Leitha limestone and the sandstones connected with it, appear only as isolated but well-characterized hills, rising above the surrounding plain.

Four subdivisions may be distinguished within the diluvium of the region here in question :—1st, Erratic blocks and boulders ; 2nd, Inferior loam (Löss) ; 3rd, Terraced detritus ; and 4th, Upper or valley loam (Löss).

PROCEEDINGS OF GEOLOGICAL SOCIETIES.

GEOLOGICAL SOCIETY OF LONDON.—April 24, 1861.

1. "On the 'Symon Fault' in the Coalbrook Dale Coal-field." By Marcus W. T. Scott, Esq., F.G.S.

This communication was based on observations made during many years on a section through a part of the Shropshire Coal-field in nearly a straight line from north to south, commencing at the Greyhound Pit, near Oakengates Tunnel of the Shrewsbury and Birmingham Railway, and terminating at John Anstice and Co.'s Halesfield Pits near Madely. Particular reference was made to the explanation of the nature of the Great East or Symon Fault. The author commenced making his observations on the Malinslee and Stirchlee Royalties in 1843 ; and in 1845 he came to the conclusion that what the miners termed in this locality the "Symon Fault," that is the successive dying out of certain coal-seams, ironstones, &c., at various depths underground, was due to an old denudation which had produced an inclined surface at the expense of some of the beds before the upper measures were deposited. Having obtained, in course of time, correct sections of several pits situated in the N.—S. line above mentioned, the author, taking the "Little Flint" (the lowest workable coal) as a base-line, plotted the several shifted segments of the coal-field in a vertical plan, and thus restored the original outline of the denuded area (one side of a valley) as seen in a transverse section. Six sinkings in the N.—S. line having indicated the successive disappearance of five workable coal-beds in a distance of 2484 yards, a seventh pit, 2000 yards further south, was found to yield all the coals again, and the author thinks that between the sixth (the Grange) and the seventh (Halesfield) pit the coals re-occur successively on the opposite side of the old valley of denudation, and that they may here be sought for and worked advantageously. The line of the old valley of denudation apparently strikes the Great East fault, as laid down on the Geological Survey Map, at a considerable angle.

2. "On the Occurrence of *Cyrena fluminalis* associated with Marine Shells in Sand and Gravel above the Boulder-clay at Kelsey Hill near Hull." By Joseph Prestwich, Esq., F.R.S., Treas. G. S., &c.

The author's observations tended to show that the *Cyrena fluminalis*, instead of being limited, in its occurrence, to beds beneath the Boulder-clay (under which circumstance it is found in Norfolk), occurs in deposits of newer date ; and that the argument, that the well-known beds at Grays, in Essex, are older than the Boulder-clay, depending much on the presence of this shell, would