

insatiate minds, a brief statement how far back an 'ancestral' lineage has extended, zoologically and stratigraphically, in order of time. Though it is not an easy task for any geologist to arrange chronologically the sedimentary deposits between the lowest accepted Silurian and the zone at which all differences of opinion cease as to the existence of life, merely because we have, as yet, in Britain discovered no trace of its existence. But confessedly there is an enormous lapse of time between these two limits; and, as an undoubted discovery of life-remains has been made, very nearly upon the lower confines of the older series of strata, we may reasonably ask for search—a constant and active search—into rocks of ages intermediate in time.

In the Longmynd rock, suggested to be of Cambrian age, near Church Stretton in Shropshire, Mr. Salter discovered some traces of vermicular life (Worm-burrows, 'Arenicolites') and a fossil organic relic, supposed at first to belong to a Trilobite, but since discovered to be a part of the shelly covering of the extinct phyllopodous crustacean, *Ceratiocaris*. Several other endeavours have been made since to discover more, or even a correspondent fragment, of this ancient shrimp-like Crustacean; but even a pilgrimage undertaken by Prof. Morris and myself to the classical spot, to which we were guided by Mr. Marston, of Ludlow, failed; for, although we broke a few hundredweights of the shaly stone of the mountain, no remains of the ancient crustacean rewarded our labour. Still I am convinced that at some future time the swelling hills of the Longmynd will disclose, to geologists who can spare more time to their investigation, a more satisfactory account of those relics of ancient life which they undoubtedly contain.

Here, then, studies open out to us which will repay those who take them up; for what can be a grander thought for an enthusiastic field-geologist, who looks upon a mountain which he has formerly considered as of 'granitic' or 'azoic' age, than that such a monument of the world's existence contains, close-treasured within its rocky bounds, evidences of a more ancient life-light than that which had previously illumined the confines of his knowledge?

ABSTRACTS OF FOREIGN MEMOIRS.

ON BRACKISH WATERS AND THEIR DEPOSITS. By Dr. LORENZ. (Proceed. Imp. Acad. Vienna, Dec. 10, 1863.)

ACCORDING to Dr. Lorenz's observations in the Adriatic, especially at the mouth of the Fiumara, fresh water poured into a tideless sea, somewhat deep near the shore, forms a rather limited brackish stratum spreading over the salt water in form of a wedge, the lateral planes of which at first converge in a steep and subsequently in a very acute angle. At the mouth of the Fiumara, the horizontal extent of this wedge is to its initial vertical altitude as 700 to 1. The conditions at the mouth of the Elbe are quite differ-

ent; this river flowing into a sea shallow throughout, and regularly stirred to its bottom by very violent tidal currents. In the summer of 1863, Dr. Lorenz, having ascertained the specific gravity of water taken in different depths at fifty points along a line of nine geographical miles from Neuhaus to Heligoland, states with confidence that there is no brackish stratum spreading over perfect sea-water at the mouth of the Elbe; the brackish water, gradually passing into completely salt water, extends to the sea-bottom. The water here, however, taken as a whole, is divisible into a system of obtuse wedges; so that constantly a wedge of fresh water, with its edge turned seaward, is sliding over a wedge of somewhat more saline water. The components (length, thickness, and angles of convergence of the lateral planes) of these wedges, when construed by means of average values for any fresh-water current, may serve as a basis for an empirical formula, by the aid of which (the transversal section and velocity of this current, the depth and shape of the marine basins into which it flows, and the nature of the tides in it being known), the dimensions of the bulk of brackish waters and the distribution of salinity in them, may be approximately determined. Besides the physical interest connected with them, such determinations are highly interesting, in respect to their influence on the distribution of both living and fossil organic beings.

COUNT M.

ON THE LIASSIC CRINOIDAL LIMESTONE OF FREILAND, IMBACH-GRABEN, AND GROSSAU, LOWER AUSTRIA. By PROFESSOR PETERS. (Proceed. Imp. Geol. Institut. Vienna, March 15, 1864.)

THE limestones of the first two of these localities, closely allied to the Hierlatz-strata of the Eastern Alps, contain *Rhynchonella furcillata*, Theod., *Waldheimia Lycetti*, Dav., *Terebratulida subovoides*, Roem., *Rhynchonella Moorei*, Dav. (a species of the West-European Lias, also found lately in the Banat), *Rh. tetrahedra*, Sow., *Rh. calcicosta*, Quenst., variously shaped and partly gigantic *Spiriferinae*, of the type of *Sp. rostrata*, Schloth., mixed with species characteristic of the Hierlatz-strata. The limestone of Grossau, chiefly composed of *Pentacrinus basaltiformis*, lies between Carboniferous Gresten-strata and an extensive series of Liassic variegated marls. Among the seven species of Brachiopods occurring in it, three correspond to those of the Hierlatz-strata, and two or three are Extra-Alpine forms, far spread in the Middle Lias of Germany and North-western Europe. All the three localities are consequently intimately connected with the Middle Lias of the Extra-Alpine regions; and may point to the conclusion, that the Limestone of Hierlatz also is not an absolute equivalent of the Lower Lias. The discrepancies between the Alpine and the Extra-Alpine Liassic deposits may be explained by the geological perturbations which influenced the Southern and North-western German Lias and their faunæ, as also by immigrations from the Eastern faunæ under the influence of marine currents, dependent on the extent and conformation of the coast.—COUNT M.

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ON THE DISCOVERY OF THE PELVIS OF *DINOTHERIUM*; AND ON THE AFFINITIES AND HABITS OF THE GENUS. By the Rev. J.-M. SANNA SOLARO.*

M. SANNA SOLARO has discovered, at Escanecrabe, Dép. Haute-Garonne, a pelvis of a *Dinotherium*, a portion of the animal hitherto unknown: its weight is 160 kilogrammes (352½ lbs.). M. Lartet, who also has examined the specimen, is of opinion that it belongs to a species of much larger dimensions than *D. giganteum*. The diameter of the pelvic arch is 1·8 metres (nearly 6 feet); the height 1·3 metres (4 ft. 3 in.). Certain peculiarities of form, and its colossal dimensions, must modify our ideas regarding the size and habits of this animal.

M. Solaro compares the pelvis of his *Dinotherium* with that of the Elephant, Tapir, and Megathere, with which it has some affinities; but it presents also many points of difference. Besides the strange conformation of the pubic bones, sufficient alone to distinguish it at a glance from all other pelvises, there is a remarkable peculiarity, not known in any other animal,—namely, a triangular depression at the side of the cotyloid cavity, and between it and the lower projection of the iliac bones. In this depression there was found a bone which certainly formed an articulation. The corresponding depression of the other part was wanting; but there occurred at the side of the pelvis another and more complete bone, though perhaps not entire. The head of this bone is triangular, and its dimensions correspond with those of the aforesaid depression. M. Solaro regards this bone as indicating a *marsupial* affinity, though it is true, that among other Didelphic Mammals, the marsupial bones are not articulated to the ilium; but it is to be borne in mind that the head of the *Dinotherium* differs remarkably from that of Proboscidians and other animals, and there is no reason why the marsupial bones should not be articulated to the ilium instead of to the anterior part of the pubis.

If, then, the *Dinotherium* was an aplacental mammal, its habits could not be those assigned to it by Dr. Buckland, namely, habitually living and feeding in lakes, and occasionally frequenting their margins. In the first place, it could not live in the water, at least during the second period of gestation, without exposing its young to injury; and, as from the long time the young are carried in the pouch (in the Kangaroo, an animal of diminutive size in comparison, it is eight months), the animal would have to habituate itself to other than its ordinary kind of nutriment. Secondly, the author is of opinion that a lacustrine vegetation would be inadequate for the supply of food for such a gigantic animal; and he adds that we have a further evidence of this in the conformation of its teeth,—for, from the nature of the tissues of the roots of aquatic plants, a very slight effort would be sufficient to triturate them; but the deep grooves and trenchant ridges of the grinders of this animal indicate, on the contrary, that the vegetables upon which the animal browsed offered a

* Mémoire sur le Premier Bassin de *Dinotherium* découvert dans le Département de la Haute-Garonne par le R. P. J.-M. SANNA SOLARO, de la Compagnie de Jésus. Large 8vo. Toulouse, 1864. pp. 19. 3 plates. See also 'L'Institut,' Oct. 5, 1864, p. 319.

greater resistance than would be presented by the root, stems, and leaves of lacustrine plants.

The author is inclined to believe that, like the Elephant, the *Dinotherium* used its tusks as offensive and defensive weapons, and especially to break down and to hold up branches, so as to enable it to reach with its trunk the tender growths of the trees, which were probably its food; and that they further served to effect a passage through the underwood of dense forests. The neck of the animal was very short; and the trunk must have been of great length, and was used, probably, for putting the young into the pouch, as well as for getting food.—R. T.

PHOTOGRAPHY APPLIED TO PALEONTOLOGY. (Specimen Photographicum Animalium quorundam Plantarumque Fossilium Agri Veronensis. Dr. A. B. Prof. MASSALONGO descripsit. MAURITIUS LOTZE photographice expressit.) 4to. p. 101. 40 plates. Verona, 1859.

IN this work Professor Massalongo has described, and M. Lotze photographed, 2 species of Ophidia, 12 Fishes, and 8 Acotyledonous, 2 Monocotyledonous, and 23 Dicotyledonous Plants. The descriptions of the genera and species are given in Italian and Latin in parallel columns. The specimens described are all from the rich Eocene deposit of Monte Bolca, abounding in Fish- and Plant-remains, and from which some fossil Snakes have also been obtained. The delicate cream-coloured matrix offers such a strong contrast to the bright rich iron-stained fossil-remains that a better series to submit to the art of the photographer could hardly have been chosen. Every minute bone in the skeleton, and every fin-ray of the Fishes can be clearly seen; but the Snakes do not print at all well, little more than a black outline of their forms being preserved. Among the Fishes: *Platax Plinianus*, Massal., *Semiphorus velifer*, Agass., 2 sp. of *Acanthurus*, *Scatophagus frontalis*, Agass., *Ephippus longipennis*, Agass., *Pychnodus gibbus*, Agass., and among the vegetable remains, *Araucarites Venetus*, Massal., *Getonia Bolcensis*, Ung., *Sterculia prisca*, Massal., and 2 sp. of *Dombeyopsis*, are excellently reproduced. Some of the leaves and other plant-remains are not so satisfactory, and we must still admit our preference for good lithographic plates.

REVIEWS.

ON THE GEOLOGICAL POSITION AND AGE OF THE FLINT-IMPLEMENT-BEARING BEDS, AND ON THE LOESS OF THE SOUTH-EAST OF ENGLAND AND NORTH-WEST OF FRANCE. By JOSEPH PRESTWICH, F.R.S., F.G.S. (From the Philosophical Transactions, Pt. II. 1864.)

IN the earlier days of the study of Geology in this country, the attention of observers was, as might have been expected, principally directed to the vast successive formations of which the crust of the earth is composed, in order to establish the stratigraphical relation of the various beds, and to determine the nature of the