

Moorhey, the only other locality where the Keuper Marls have been proved, is about 7 furlongs to the south-east of the Crosby Brickworks, and the Lower Keuper Sandstone of the village intervenes. The Marls at Moorhey, I should say, are somewhat lower down in the series than those just described. If the whole area of the pit is bottomed many interesting facts may come to light.

NOTICES OF MEMOIRS.

I.—LE DOSSIER HYDROLOGIQUE du régime aquifère en terrains calcaires, et le rôle de la Géologie dans les recherches et études des travaux d'eaux alimentaires. (Bull. Soc. Belge géol., 1901, x, pt. 5.)—In a paper of some 180 pages Mr. Van den Broeck replies to the note of Mr. Thomas Verstraeten entitled “Hydrologie des roches, nécessité de préciser les situations et les termes.” The bulk of the paper is of a controversial nature, but Mr. Van den Broeck has brought together a great deal of valuable matter relative to the subject. With a courteous consideration for his readers the author has provided a detailed table of contents, which occupies 12 pages, and from this we gather that the paper deals with the following items:—Hydrology of the Carboniferous rocks; Hydrology of the Chalk; of the district round Han-Rochefort, of Bocq and Hoyoux, and of Remouchamps; the rôle of geology in the search for water and in the application of hydrology, especially in the study of the aquiferous resources of the Carboniferous System; Hydrology of Condroz, and of the horizontal beds of Tournai. The author concludes his paper by saying that it is thanks to the progress of Geology and Spelæology that these practical questions of applied hydrology can be easily solved to the great benefit of human populations.

II.—MARYLAND GEOLOGICAL SURVEY: Eocene. (Baltimore, 1901, pp. 332, 64 plates, map.)—The Eocene deposits of the State of Maryland are described in this volume by William Bullock Clark and George Curtis Martin. The description is prefaced with an excellent map and a bibliography. The deposits are divided into two formations, the Nanjemoy above and the Aquia below. Both are rich in fossils, full lists of which are given. The systematic palæontology begins on p. 93, and is treated of by various specialists. The Vertebrata are few in number and consist of four crocodiles and two tortoises, beside the usual tertiary rays and sharks; there are also remains of *Xiphias* and *Phyllodus*. The Crustacea include some interesting Ostracods described by Ulrich. The Foraminifera, of the usual Eocene types, are described by R. M. Bagg, who is doing careful work on these Protozoa, in an area where they have been for some reason much neglected. The Mollusca by Clark and Martin, the Cœlenterata by Vaughan, and the Bryozoa by Ulrich are all well illustrated, and will be of great use for comparison. Two small *Carpolithi* are described and figured by Arthur Hollick.

III.—THE HUNTERIAN ORATION, FEBRUARY 14, 1901. By N. C. Macnamara, F.R.C.S. 8vo. London, 1901.—This Oration, to which no title is given, seems to deal with the labours of Hunter and others on the subject of craniology and the light which it is capable of throwing on the prehistoric inhabitants of Western Europe, and of the evolution of the race of men to which we belong. Mr. Macnamara points out that the inhabitants of Western Europe in the later Tertiary and early Quaternary period, as regards the ossification and form, especially of the frontal region, of their skulls, more closely resembled that of the chimpanzee than the race of men now inhabiting Europe. Our search for knowledge is still hampered by the limited supply of the remains of man, but a good deal of general evidence has been obtained from the stone implements so common when properly searched for. Mr. Macnamara believes that the evidence collected proves the existence of man in Tertiary times. With regard to the skull of *Pithecanthropus*, he concurs with the conclusion arrived at by Professor Schwalbe, that taking both its form and capacity into consideration, “it is on the border line between that of man and anthropoid apes”; it is more nearly allied to the skulls of the Neanderthal group of men than it is to the crania of the higher apes; but it is much nearer in anatomical characters to the skull of the chimpanzee than it is to the cranium of the average adult European of the present day. The fact that the inferior gyri of the frontal lobes of the brain are well marked, and that the superficies of this convolution of the brain is double that possessed by the largest known anthropoid ape, suggests that the Java man had in some slight degree the faculty of speech, and that his intellectual capacity was higher than that of any anthropoid ape we are acquainted with.

Mr. Macnamara also points out that it should be clearly understood that up to the present no *bona fide* human remains belonging to the early Palæolithic period have been discovered in Western Europe which are not of the same type as those of the Neanderthal group of men, whose fore and hind limbs indicate that they were a short ape-like and powerful race of beings whose average stature did not exceed five feet. The skulls of men found in geological formations of the Post-Glacial period have the same physical type as those of the strictly early Palæolithic epoch of Western Europe, but with increased brain capacity. These skulls, in the opinion of the author, indicate a gradual transition in form from the ape-like characters of the previous period to a higher standard, and certainly to a much greater skull capacity, especially in the frontal region. Mr. Macnamara remarks on the fact that in the recent elections held in this country, when the question at issue was one in which the whole of the people of Great Britain were deeply interested, a large proportion of the inhabitants of England and Scotland, mainly of Anglo-Saxon origin, voted together on the subject; whereas a contrary opinion regarding the same question was held by the greater proportion of the people of Ireland, and to a large extent by the Welsh, most of whom are derived from Ibero-Mongolian

ancestors. It is difficult, he says, to account for this diversity in the sentiments of the people, unless we consider it due to their racial mental qualities.

The Oration is illustrated with an excellent chart of skulls belonging to the Palæolithic, Neolithic, Bronze, and existing races of men.

IV. — GEOLOGICAL LITERATURE ADDED TO THE GEOLOGICAL SOCIETY'S LIBRARY DURING THE YEAR ENDED DECEMBER 31, 1900. (London, Geological Society, price 2s.)—This, the seventh annual record of publications received by the Society, contains 12 pages of titles of serials and academies, of which parts have been added to the library during the past year; 109 pages of titles of papers published in those parts and other separate publications received; and 80 pages of treble-entry, double-column index, analytic of the titles recorded. The work, which is compiled by the librarian, Mr. Rupert Jones, and edited by the Secretary, Mr. Belinfante, deserves to be more widely known than to the Fellows themselves, especially as it is published at so cheap a rate. It provides the best general annual list of geological literature, the index being of especial value, and might be made a really first-class record, if the Society would spend a little more money upon it and include all publications of a geological nature whether received by the Society or not. This system of recording—an alphabetical list, properly indexed—is far and away the most convenient form, and its handy size can be favourably contrasted with those clumsy quartos which are the bugbear of the ordinary man's library.

V.—BULIMINÆ AND CASSIDULINÆ.—No more useful work is done than that of monographing particular groups. Carlo Fornasini, most active of the students of the Foraminifera, has just published a paper on the Italian forms of these genera (Boll. Soc. Geol. Ital., xx), which he divides into 75 species. He has also published a paper on the Adriatic forms of the genus *Bulimina* (Mem. Ac. Sci. Ist. Bologna, ix). Taking the two papers together they form a valuable contribution to the subject, one of the most interesting points being the publication of some of d'Orbigny's original drawings of the species founded by him in 1826, and which have since remained difficult of absolute identification. Fornasini has put a note in the Riv. Ital. Paleont., vii, on the dates of O. G. Costa's works on the Foraminifera, dates unknown to Sherborn when he published his Bibliography in 1888.

VI.—OTHER FORAMINIFERAL PUBLICATIONS to which the attention of the student may be profitably directed are: Brown's list and digest of the papers published during 1899 (Zool. Record); Chapman's Foraminifera from the Lagoon at Funafuti (J. Linn. Soc. Zool., xxviii), which gives us for the first time a correct account of the distribution of these organisms across a lagoon, from side to side of the reef; Adalbert Liebus' Foraminiferenfauna des Bryozoenhorizontes von Priabona (N. Jahrb., i, 1901); and Silvestri's Nodosarine del Neogene Italiano (Atti Ac. Pont. N. Lincei, liv).

VII.—DISTRIBUTION OF VERTEBRATE ANIMALS IN INDIA, CEYLON, AND BURMAH.—Dr. Blanford, writing in the *Proc. Roy. Soc.*, lxxvii, considers that whilst it is quite possible that other explanations may be found, it is evident that the peculiarities of the Indian fauna may have been due to the Glacial epoch. During the coldest portion of the Glacial epoch a large part of the higher mountains must have been covered by snow and ice, and the tropical Oriental fauna which occupied the Himalayas, and which may have resembled that of the Indian Peninsula more than is the case at present, must have been driven to the base of the mountains or exterminated. When the country became warmer, the Transgangetic fauna appears to have poured into the Himalayas from the eastward. Dr. Blanford, after discussing the whole matter, says the theory is only put forward as a possible explanation of some remarkable features in the distribution of Indian vertebrates. At the same time it does not serve to account for several anomalies of which some solution is necessary. If thus accepted, it will add to the evidence, now considerable, in favour of the Glacial epoch having affected the whole world, and not having been a partial phenomenon induced by special conditions, such as local elevation.

VIII.—SPHERICAL CONCRETIONS OF GRAPHITE.—The spheroidal concretions of graphite in the Granite of the Ilmenj were first noticed by Auerbach in 1856, and afterwards described by Rose in 1872. Messrs. Vernadsky and Schklarevsky now show (*Bull. Soc. Imp. Nat. Moscou*, 1900, No. 3) that the inclusions in these concretions consist of crystals of the minerals characteristic of the Granite—orthoclase, muscovite, biotite, and quartz. The result of their investigations also show that this form of graphite cannot have had a pseudomorphic origin, as considered by Rose, but ought to be considered as a concretion in a granitic magma, analogous to other cases of large spheroidal inclusions in granite.

IX.—GEOLOGY OF SCOTLAND.—The Geological Society of Glasgow has recently distributed vol. xi, pt. 2, of their *Transactions* for 1897–99, but has dated it 1900. We had hoped that this reprehensible practice had been discontinued in this country, and hope that on the next occasion the Society issues publications it will date them accurately. There is a great deal of interesting matter, of which the following is the chief. The late Dr. Heddle's paper on the structure of Agates occupies twenty pages, and is well illustrated; it may be termed a systematic treatment of the subject. Each form is described in detail, and the whole are grouped in a convenient arrangement according to structure. William Gunn gives a detailed description of the old volcanic rocks of Arran, with notes on the sedimentary rocks associated with them, and an account of the faunæ of those beds. Robert Craig writes of the Greenhill quarries, Kilmaurs, Ayrshire, now closed, and gives an historical sketch of the various discoveries made in them. Peter Macnair treats of the physical geology and palæontology of the Giffnock sandstones, and their bearings on the origin of sandstone

rock generally. This is illustrated. He refutes the view that they were of fresh-water origin, and supposes that the contained organic remains have been destroyed, with the exception of the annelid burrows, which he points out are invariably the last things to disappear from percolated sandstones. John Smith has a paper on the Barite veins of south-west Scotland, which mineral he regards as probably an exfiltration product, leached out of the rocks by water, and afterwards re-deposited by the same agent in the veins, but he cannot yet say which of the rocks it was originally derived from. The same writer has a note on the 'China-clay' mine and the Water-of-Ayr stone bed at Troon, and gives some details of localities for radiolarian cherts in Scotland. Two other papers from his pen are "The Permian outlier of the Snar Valley, Lanarkshire" and "Spango Granite," the boulders of which latter he considers were weathered into shape and ready for transport long before the Glacial Epoch. The other original papers, which are all in abstract only, are: Goodchild, the Dolerite of Aberdour; Macnair, the problem of the marginal Highlands; Smith, detached microliths from the Pitchstone Sill at Corriegills (in full, with a plate); Ballantyne, a Bute post - Glacial shell - bed; Cowie, Glacial phenomena of Loch Ranza Glen, Arran; and Horne, the Silurian Volcanic rocks of the southern uplands of Scotland.

X.—GEOLOGY IN NORFOLK.—There are only two papers on Norfolk Geology in the Transactions of the Norfolk and Norwich Naturalists' Society, vol. vii, pt. 2, 1901. The first, by F. D. Longe, is on the formation of flints in chalk. The second, by Professor Newton, records the occurrence of bones of the common Crane, from peat, obtained so long ago as 1867-69, while excavating the Alexandra Dock at Kings Lynn. These bones show a remarkable variation in size of the tibiæ. In the course of his examination of the Woodwardian Museum collections for purposes of comparison, Professor Newton found a right tarso-metatarsus of the Pelican, which further confirms his own and Dr. C. W. Andrews' statement that the Pelican was once a native of the Fens in this country.

XI.—THE GEOLOGICAL DISTRIBUTION OF EXTINCT BRITISH NON-MARINE MOLLUSCA.—R. Bullen Newton contributes a valuable paper on this subject to the Journal of Conchology. He shows at a glance the geological range of every recorded species of terrestrial and fluviatile shells, excluding only those with manuscript names, or any forms insufficiently described, from the strata of the British Islands. In his list, as no synonymy is attempted, he has introduced the original generic name under which the shell was described, and gives a bibliography of the subject. From a note appended to his paper, we learn that this list was lent to another person for incorporation in a recent publication, but on reference to that publication we find that Mr. Newton's generosity has been studiously ignored by the author in his preface, though the list has apparently been extensively used.

XII.—GEOLOGY OF AUSTRO-HUNGARY.—Part iii of the new geological map of the Austro-Hungarian monarchy has just appeared. It contains two maps, those of the Oberdrauberg-Mauthen and the Kistanje-Dernis districts, with their accompanying descriptive pamphlets by Geyer and v. Kerner. In these pamphlets a full bibliography precedes the descriptive text.

XIII.—LACCOLITHS OF MONTANA.—Messrs. Weed and Pirsson deal with the geology of the Shonkin Sag and Palisade Butte Laccoliths in the Highwood Mountains of Montana in the *American Journal of Science* for July, 1901. These laccoliths occur in Cretaceous beds, and show a central mass of syenite, surrounded by transition rock, which is in its turn surrounded by shonkinite, the whole having a rind of leucite basalt porphyry. The authors say that these three laccoliths form a transitional group; the Shonkin Sag is the flattest, and also the lowest, and therefore the one most protected from erosion. Its top, in fact, is just beginning to emerge, and from its laccolithic character would not be so evident if it were not for the trenching in it by the former river action which has given such good cross sections. Square Butte stands much higher and has been exposed to much greater denudation; its cover, save in small areas around the base, has been stripped off, and a considerable part of the igneous rock removed. Palisade Butte, standing at the same level as Square Butte, has suffered from the same amount of erosive agencies, but being smaller in size the relative effect has been greater and the cover has entirely disappeared, as well as a large part of the laccolith, so that around it the floor is exposed and only the central portion of the mass remains. From their observations the authors have been enabled to provide us with an excellent account of these interesting structures, which they have illustrated in a clear and exact manner.

XIV.—BITUMEN IN CUBA.—S. F. Peckham shows in the same *Journal* that extensive deposits of solid asphaltum exist near the north coast of Cuba, while springs and wells give indications of the existence of liquid bitumens of varying density beneath the surface, over an area of some 4,500 square miles. He is, however, doubtful if, in view of the enormous production which recent developments in Texas and Indiana promise, that there is at present any encouragement for even experimental drilling in Cuba.

XV.—GEOLOGY OF LONDON.—As President of the Geologists' Association of London, Mr. Whitaker in his annual address to that energetic body dealt with a subject which he has made peculiarly his own. The result is a valuable summary of the papers which have been written on London Geology (to the base of the Drift) since 1888. No less than fifty-nine papers are summarized, and thus rendered easily accessible to general readers. Mr. Whitaker regrets that tendency to over-division of the beds of the Drift so bewildering, as he says, to "simple-minded people like himself." He has also some pertinent remarks on gravels and their ages.

XVI.—SHORTER NOTICES.—A Geological Map and Report on the Tarcoola District, by H. Y. L. Brown, has just reached us. It is part of the Records of the Mines of South Australia, and deals mainly with gold supply.

THE Carnegie Museum at Pittsburgh, which was opened in 1895, is described in the Popular Science Monthly for May, 1901, by Dr. J. W. Holland, the Director. Professor Hatcher is making full use of Mr. Carnegie's special fund for research in palæontology, and it is interesting to read that the most perfect specimen of *Diplodocus longus*, six imperfect skeletons of *Brontosaurus*, and the largest known *Mastodon* are in the Museum.

MR. J. C. MANSEL-PLEYDELL has published in the Proceedings of the Dorset Field Club for 1900 a paper on the Influence of Climatic and Geological Changes upon the British Flora. His annual address for 1900 dealt with the geological history of Pisces. That for 1901, still to be published, dealt with the geological history of the Amphibia and Reptilia.

CORRESPONDENCE.

A SUGGESTED LINK IN THE 'BREAK' BETWEEN PALÆOLITHIC AND NEOLITHIC MAN.

SIR,—In the very interesting paper by Sir Henry Howorth in the August number of your Magazine, we find that to him the great gap between Palæolithic and Neolithic Man means a great catastrophe. In the present attitude of geological opinion, such a statement appears somewhat startling. But if we restrict the meaning of the word 'catastrophe,' as used by Sir Henry, to the occurrence in ancient times of climatic and physical changes of similar nature to those taking place around us at the present day, though of very much greater intensity, probably no geologist is now so rigidly uniformitarian in his views as to refuse to accept it.

The facts before us are these:—During some portion of the Pleistocene Period, probably owing to the co-operation of astronomical and geographical causes, climatic and physical changes, of an intensity which it is difficult for us to realize, were brought about. One of the results of these changes was the distribution of the Drift. There can be little doubt that when this took place man had already made his appearance upon earth. Indeed, Sir Henry is satisfied with such evidence as we possess that his existence dates back even into the previous Pliocene Period. However that may be, and whether we hold that earliest man was Eolithic or Palæolithic, all physical traces of him disappear, with the exception of his imperishable flint implements and a few doubtful bones; and when he next appears on the scene, he has undergone the very considerable advance in development indicated by his entrance on the Neolithic stage. Sir Henry holds that the great gap between Palæolithic and Neolithic man is coincident and in all probability connected with the distribution of the Drift.