

NOTICES OF MEMOIRS.

ABSTRACTS OF PAPERS READ BEFORE THE BRITISH ASSOCIATION AT OXFORD, AUGUST 9-14, 1894.

I.—THE CARBONIFEROUS LIMESTONE, TRIASSIC SANDSTONE, AND SALT-BEARING MARLS OF THE NORTH OF THE ISLE OF MAN. By Professor BOYD-DAWKINS, F.R.S.

THE Ordovician slates, quartzites, and conglomerates, and the associated volcanic rocks of the "massif" of the island gradually pass underneath the sand, shingle, and clay of the Boulder-clay series in going northward along the coast towards Kirk Michael, until they disappear altogether from the cliffs and the shore. They stand up conspicuously along the ancient shore-line extending from Kirk Michael to Ballaugh, Sulby, and Ramsey, commanding the low, sandy, and marshy region which forms the northern portion of the island, contrasting in its flatness with the lofty rolling Ordovician hills behind, culminating in Startfell, Snaefell, and North Barule. This contrast is obviously the result of a difference in the physical character of the rocks in the two districts. The problem as to which rocks underlie the glacial strata in the former, which had occupied the author's mind for many years, is now partially solved by the three borings which have been made under his advice by Messrs. Craine in 1891-94 in search of the Coal-measures of the Whitehaven field, at the Point of Ayre, at Blue Point, and at Shen Moar. The boring at Shen Moar revealed the existence of the Carboniferous Limestone at a depth of 167 feet 6 inches below the drift. The next bore-hole, at Blue Point, about 40,050 feet to the north-east of that at Shen Moar, revealed the presence of more than 60 feet of Red Sandstone buried 171 feet beneath the drift. The Red Sandstone in this section is, in his opinion, identical with the St. Bees sandstone, or lowest member of the Triassic formation in the district of the Lakes. This is greatly strengthened by the discovery in the third boring at the Point of Ayre, to the east of the lighthouse, of the Triassic marls with salt, at a distance of a little under five miles from Blue Point. The diamond drill was used from a depth of 452 feet to the bottom. The total thickness of the salt-beds amounts to 33 feet 6 inches, and the bore-hole happened also to intersect a brine run 2 feet 6 inches in depth. If this section be compared with that published by Mr. Dickenson of the saliferous marls of Duncrue, near Carrickfergus, it will be found to be practically identical. The same series of salt-bearing marls is also worked at Barrow-in-Furness and at Preesal, near Fleetwood. The salt-beds in each of these cases are variable in thickness, and those in the Isle of Man are thinner than in the other localities. It must, however, be remembered that the Manx boring has not been put down to a sufficient depth to test the true thickness of the salt-field. The discovery is of great theoretical importance, because it links on the deposit at Barrow with that of Carrickfergus, and shows the

Irish Sea was an area in which the salt-bearing Triassic marls were deposited. It points towards the truth of Mr. Dickenson's suggestion that the Cheshire salt-field was formerly continuous with that of Ireland. These marls have since been broken up, faulted, and denuded away in many places. It is an open question how far those of the Isle of Man are now continuous under the sea eastwards to Barrow and Fleetwood, and to the north-west in the direction of Carrickfergus.

All these rocks are buried under a great thickness of boulder sand, gravel, and clay, amounting at the Point of Ayre to 298 feet. To this also must be added the height of the drift hills close by, formed of the same materials, which would give the total thickness as not less than 450 feet in the extreme north. The rocky floor on which it rests dips rapidly to the north-east towards the deeper part of the Irish Sea.

The discovery of this salt-field is likely to add a new industry to the resources of the Isle of Man.

II.—FOSSIL PHYLLOPORA OF THE PALÆOZOIC ROCKS. ELEVENTH-REPORT OF THE COMMITTEE, CONSISTING OF Professor T. WILTSHIRE (Chairman), Dr. H. WOODWARD, and Professor T. RUPERT JONES (Secretary). Drawn up by Professor T. Rupert Jones, F.R.S., F.G.S.

1. A NEW species of Beecher's phyllocaridal genus *Elymocaris*, from the collection of Dr. G. J. Hinde, F.G.S., has been figured and described in the GEOLOGICAL MAGAZINE for July, 1894, p. 292, Pl. IX. Fig. 7. It was found at Arkona, Ontario, Canada, in the Hamilton group of the Middle Devonian series.

Its nearest known ally is *Elymocaris capsella* (Hall and Clarke), from the Hamilton group of New York State, Palæont. New York, vol. vii. 1888, p. 181, pl. xxxi. fig. 4. It differs, however, in details of outline, ornament, and ocular spot. The new species is named *E. Hindei*, after its discoverer.

2. Two imperfect sets of abdominal segments, impressed on a piece of Moffat Shale (from Garpel Linn), have been noticed in association with a carapace of *Discinocaris Browniana*, and therefore probably belonging to individuals of either that genus and species, or of *Aptychopsis*, or possibly *Pellocaris*, which also occur in the Moffat Shales. The two above-mentioned specimens are figured and described in the GEOLOGICAL MAGAZINE for July, 1894, p. 291, Pl. IX. Figs. 4a, 4b. Fig 3 shows the associated carapace. They belong to the Carlisle Museum.

We have noticed similar abdominal segments, but differing somewhat in size, associated with *Hymenocaris* in the Tremadoc slates, and with *Ceratiocaris* in the Upper Silurian beds. As such body-rings belong to various groups of these low-class Crustacea, it is not extraordinary that the above-mentioned genera should each possess the same kind of structure in the abdominal region.

3. A good-sized *Discinocaris Browniana* and the moiety of a rather large *Aptychopsis Wilsoni*, preserved in the Carlisle Museum,

have also been described and figured in the *GEOLOGICAL MAGAZINE* for July, 1894, p. 292, Pl. IX. Figs. 5 and 6. They are typical of the Moffat Shales.

4. It may be remarked that the figured interior of the bipartite carapace of *Macrocaris Gorbyi*, Miller, referred to in our Tenth Report, at page 468, Report British Association for 1893, appears (if looked at upside down) very much to resemble some of the bivalved *Aptychopses* figured in the Monograph of Palæozoic Phyllopoda, Pal. Soc., 1892, pl. xv., but with a more acutely sagittate outline, and without the definitely concentric umbonal striæ.

If the carapace in the drawing (fig. 43) exposes its *interior*, it seems to lie unconformably with respect to the body-rings, for they appear to be covered by the carapace upside down. If it normally covered the body it would show its *exterior*.

Is it possible that after death, the attachments of the body and carapace having been loosened, the carapace turned quite over, and the parts of the animal floated into a position reverse to what they held in life? Or have we here two valves and an imperfect body of an *Aptychopsis* which during decay were washed into a *reversed* position—that is, with the abdomen projecting from the anterior region, as is not unusual with some fossil *Ceratiocaridæ*?

5. By favour of Dr. Wheelton Hind, F.G.S., we have very lately seen, from Mr. George Wild's collection, some pyritous specimens of what seems to be a very small *Estheria* in shale from the roof of the Bullion Coal, Lower Coal-measures, lately worked at Trawden, near Colne, in North-east Lancashire.

6. A specimen of *Estheria Dawsoni*, Jones (*GEOL. MAG.*, 1870, p. 220, Pl. IX. Fig. 15; *ibid.*, 1876, p. 576; *ibid.*, 1878, p. 101, Pl. III. Fig. 2), has been obtained from the vicinity of Five-Islands, Nova Scotia, by Mr. H. Fletcher, of the Geological Survey of Canada. Like a former specimen it may be from the Horton series; and has been sent by Sir W. Dawson, F.R.S., of Montreal, for our examination.

III.—ON THE PERMIAN STRATA OF THE NORTH OF THE ISLE OF MAN.

By Professor BOYD-DAWKINS, F.R.S.

THE main features of the geology of the island are identical with those of Cumberland and Westmoreland. The Ordovician strata form the "massif" in both areas, and constitute the sea-worn floor upon which the Carboniferous rocks rest unconformably. The Red Sandstone series of Peel, 1368 feet in thickness, occupies but a very limited area, extending from the Creg Malin, along the sea-front, in a line of picturesque cliffs, about one and a half mile to the north-east, and extending inland about 1700 feet. The rocks may be divided into two distinct groups. First, the Peel Sandstone series, or Roth-todt-liegende, which presents a thickness of 913 feet, and the calcareous conglomerates and breccias of the Stack series, 455 feet thick, representing the Magnesian limestone of the Permians. These rocks are faulted into the Ordovician slates, and neither their

true base nor their upper boundary is visible. The pebbles of Carboniferous Limestone in the conglomerates point to a post-Carboniferous age, and the physical characters of both divisions are identical with those of the Permian rocks of the North of England, and more particularly with those of the Lake District, of the Vale of Eden and Barrow Mouth, described by Sedgwick, Harkness, Binney, Eccles, and Nicholson. It is clear that north-eastern Ireland, the northern part of the Isle of Man, and the area of the Lake District, including the Vale of Eden, were parts of the same Permian marine basin, in which, as it approached southern Lancashire, the waters gradually were more highly charged with mud, the calcareous element being conspicuous in the one, and being replaced in the other by thick accumulations of marl.

REVIEWS.

I.—NANNO, A NEW CEPHALOPODAN TYPE. By J. M. CLARKE. (The American Geologist, vol. xiv. pp. 205–208, pl. vi. October, 1894.)

THE author's description of this Cephalopodan type is based upon "seven specimens obtained from the Trenton shales of Minneapolis and from the Galena shales at Chatfield, Minnesota." All the specimens represent only one species, for which the name *Nanno aulema* is proposed. The species has the appearance of a short, stout, fusiform *Endoceras*, tapering rather rapidly to a somewhat acute point. The siphuncular tube (sipho) is marginal, and occupies nearly one-half of the diameter of the shell. "The septa are gently and regularly concave over most of their surface, but abruptly deflected immediately above the sipho." The conical posterior portion is aseptate; it is formed by the inflation of the siphuncular tube, which is covered by a thin layer of the test. As in the genus *Endoceras*, the siphuncular tubes (siphones) are sometimes found detached from the rest of the shell; they have then the appearance of small *Belemnites*, whose posterior extremity is somewhat inflated; the cylindrical portion bears oblique impressions as in *Endoceras*, but these are interrupted on that side of the tube which was in contact with the shell-wall. The siphuncular tubes are "completely solid in the apical portion for usually about one-half the length of the præseptal cone, but in some examples the solidification extends for the entire length of the cone and into the cylindrical part of the tube. The cavity of the sipho above this filling is a narrowly conical chamber, whose walls gradually become thinner from the apex upward, their upper edge appearing to be rounded off and finished."

"The substance of the siphonal cone and walls is invariably very compact, radially crystalline calcite." "Cross-sections of the cone in both directions indicate * * that this is composed of at least two invaginated and consolidated sheaths," similar to those found in *Piloceras*, *Vaginoceras*, and *Endoceras*, but the author did not observe any traces of a tube connecting the apices of these sheaths, such as has been described in *Piloceras* and *Endoceras*.