

NOTICES OF MEMOIRS.

I.—NEW SPECIES OF FOSSIL SPONGES FROM THE SILURO-CAMBRIAN AT LITTLE METIS ON THE LOWER ST. LAWRENCE. By Sir J. WILLIAM DAWSON, LL.D., F.R.S. (Including NOTES ON THE SPECIMENS by Dr. G. J. HINDE.) Transactions of the Royal Society of Canada, vol. vii. section iv. 1889, pp. 31–55, pl. iii. and 27 figs.

IN some black shales, belonging to the Quebec Group of Logan, exposed on the shores of the Lower St. Lawrence, Sir W. Dawson discovered some thin bands, largely filled with sponge-remains. In some instances the general form and outlines of the sponges have been preserved in a compressed condition, but more often the thin beds consist of a mass of spicules irregularly commingled together. In all cases the original siliceous structure of the spicules has disappeared, and they are now composed of pyrites. The sponges appear to belong almost exclusively to the Hexactinellidæ; the genus *Protospongia* is represented by six new species, *Cyathospongia* (*Cyathophycus*), Walcott, by one species, and *Hyalostelia* one species. A new genus, *Acanthodictya*, is proposed for cylindrical sponges with a dense fringe of spicular rays on the exterior, and some small oval sponges, in part at least apparently composed of simple acerate spicules, are placed in the new genus *Lasiotrrix*. The specimens of *Protospongia* are more complete and better preserved than any hitherto known, and they are furnished with anchoring spicules, a structural feature not previously recognized in this genus. In one species, *P. tetranema*, the number of the anchoring rods is limited to four, and the author thinks they consisted of a single cruciform spicule of which the rays were bent upward and lengthened, forming a stalk for the sponge. It may be, however, that the rods are simple, and that the apparent union at their distal ends is not original, but produced in the fossilization. In another species, *P. coronata*, there is a distinct collar of curved spicules surrounding the cloacal aperture. Judging by the characters of the detached spicules many other additional species were probably present in these sponge-beds.

The only other recognizable fossils found in connection with these sponges are a small Brachiopod referred to *Obotella* (*Linmarsonia*) *pretiosa*, Billings, and some slender plant (?) remains which are named *Buthotrephis pergracilis*. The exact horizon of the black shales is not precisely determined, but Sir W. Dawson regards them as probably near the base of the Levis division, or equivalent to the English Arenig.

II.—*THORACOSAURUS MACRORHYNCHUS*, BL., AUS DER TUFFKREIDE VON MAASTRICHT. By ERNEST KOKEN. Zeitschr. deutsch. geol. Gesell., 1888 (1889), pp. 754–773, pl. xxxii.

A FINE Crocodilian cranium, evidently from the Maastricht Beds, now preserved in the Leiden Museum, forms the subject of this memoir. A detailed description and comparison proves the

fossil to be specifically identical with the so-called *Gavialis macrorhynchus*, made known by Gervais from the Upper Cretaceous of Mt. Aimé; and Dr. Koken further agrees with Dr. Leidy in referring this European type to the genus *Thoracosaurus*, which was originally founded upon a cranium from the Upper Cretaceous of New Jersey, U.S.A. The type-species of *Thoracosaurus* is said to possess antorbital vacuities, but these are not observed in the Maastricht fossil, and the author suggests that accidental fractures may have been mistaken for such in the New Jersey skull. Detailed comparisons are instituted, and the subject develops into an interesting treatise on the classification of the Crocodilia. Dr. Koken considers that *Thoracosaurus*, *Tomistoma*, and *Gavialis* are direct descendants of the Macrorhynchidæ, *Gavialis* being the most specialized form of this group, and having no intimate connection with the Teleosauridæ, which are regarded as a marine family that became extinct before the end of Mesozoic times. A long statement of anatomical facts leads to the conclusion that the Parasuchia are as nearly related to the Lizards as to the Crocodiles; and it is suggested that they may appropriately rank as equivalent to a group comprising all other so-called Crocodiles, an order Crocodiloidea being instituted, with the two suborders Parasuchia and Crocodilia. Agreeing with Lydekker, Dr. Koken considers that there is no satisfactory line of demarcation between the Mesosuchia and Eusuchia; but the arrangement adopted in the British Museum catalogue is characterized as unnatural and a purely stratigraphical classification. Amphicœlian and procœlian genera are now placed together in each of the three surviving families of Crocodilidæ, Alligatoridæ, and Macrorhynchidæ; the first arising with *Bernissartia*, the second with *Goniopholis*, and the third with *Pholidosaurus*, etc., this again subdividing into Tomistomatinae and Gavialinae. Incidentally it is pointed out that sclerotic plates are not peculiar to *Geosaurus*, as once stated, but that feeble ossifications occur also in the recent *Alligator*; and there is some evidence of *Cricosaurus* having possessed a dermal armour, thus differing in that respect from *Geosaurus*, as described. In a postscript, the author notes with satisfaction some recent observations of Mr. Hulke (Proc. Zool. Soc., 1888), which are in accordance with his own views.

A. S. W.

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III.—PREMIÈRE NOTE SUR LES TÉLÉOSTÉENS DU BRUXELLIEN (ÉOCÈNE MOYEN) DE LA BELGIQUE. By LOUIS DOLLO. Bull. Soc. Belge Géol., Paléont., Hydrol., vol iii. (1889), pp. 218-226.

**M.** DOLLO discusses the spines and other fragments of a Siluroid fish met with in the Bruxellian Beds of Belgium, already recorded under the name of *Silurus Egertoni*, Dixon. He concludes that these remains are specifically identical with the English Bracklesham fossils originally thus named, and agrees with the recent determination of the species as a member of the genus *Arius*.

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IV.—“UEBER DEN HAUTSCHILD EINES ROCHEN AUS DER MARINEN MOLASSE.” By Prof. A. BALTZER. Mittheil. Naturf. Ges. Bern, April, 1889.

**A**N unusually large dermal tubercle of a Ray from the Molasse of Mägenwyl, Canton Aargau, is described and figured by Prof. Baltzer. The specimen measures about 0·05 in length, is of oval outline, and appears to consist of four broad, conical tubercles fused together. A microscopical section proves the Selachian nature of the fossil, and it seems to be related to the dermal tubercles already described under the names of *Acanthobatis* and *Dynatobatis*. The author does not suggest a generic or specific determination; but a postscript states that Dr. Jaekel regards the specimen as referable to the genus *Trygon*, and will shortly describe this with other evidence of the same fish from the Swiss Molasse.

V.—A CRITICISM OF DR. CROLL'S THEORY OF ALTERNATE GLACIAL AND WARM PERIODS IN EACH HEMISPHERE, AND OF INTERGLACIAL CLIMATES. By H. H. HOWORTH, M.P., F.S.A. (Memoirs Manchester Lit. and Phil. Soc. ser. 4, vol iii. 1890.)

**B**RIEFLY stated, the conclusions to be drawn from Dr. Croll's theory, are “that there has been throughout geological time an alternate glaciation of each hemisphere, ultimately caused by changes in the eccentricity of the earth's orbit, and directly engendered by the greater amount of warm water forced into each hemisphere by the alternately greater potency of the Trade winds North and South of the Equator.” The author grants two of Dr. Croll's postulates, namely, that climate is largely dependent on the distribution of ocean currents, and that these are chiefly dependent on the winds; but he maintains that there is no evidence that the south-east trade winds are stronger than the north-east, the fact that they blow across the equator being accounted for by the situation of the parallel of greatest mean heat being to the north of that great circle. Here we have the largest area of land, or the “furnace” which causes the winds to blow across the equator; and thus Mr. Howorth argues that the circulation of the trade winds does not depend on special differences between the temperature of the equator and that of the north or south poles, at different periods.

There is no evidence to show that any great changes have taken place in the relative distribution of land and water since the Glacial epoch, whereby the parallel of greatest mean heat might have been shifted southwards; nor can Mr. Howorth find evidence to show extensive glaciation in the southern hemisphere, as compared with the northern.

The weakness of the evidence of Glacial periods in older geological eras is discussed by the author, and coming to the Glacial period itself, he points out the uncertainty of the evidence. “We have not yet (he says) found a key by which we can give a rational explanation of the true succession of so-called glacial deposits in two adjoining counties, much less in two larger geological areas.” He

admits that mammoth's teeth and remains of other animals, contemporaries of man, have sometimes been found over and sometimes under Boulder-clay. This fact, no doubt, needs explanation, and can (he believes) be completely explained by an entirely different cause (as he proposes to show elsewhere). It certainly does not (in his opinion) support the theory of interglacial warm climates.

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R E V I E W S.

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I.—ÜBER DIE GATTUNG *PRISCITURBEN*, KUNTH. VON G. LINDSTRÖM. Bihang till k. Svenska Vet.-Akad. Handlingar, Band 15, Afd. iv. No. 9 (1889), pp. 1–11, Taf. i., ii.

ON THE GENUS *PRISCITURBEN*, KUNTH. By Professor G. LINDSTRÖM, of Stockholm.

THE type forms of the genus *Prisciturben*, described by Kunth<sup>1</sup> as a Perforate Coral from the Silurian strata of Öland, have been unfortunately lost, and, owing to the death of this author, nothing but the description and figures remain by which the genus can be identified. Prof. Lindström thinks that the original specimens must have been derived from Gotland instead of Öland; for whilst nothing at all corresponding to the genus has been recognized from this island, there have been found in Gotland forms which agree in so many respects with Kunth's descriptions that there can be no doubt that they belong to the genus. The specimens in question are thin laminate expansions, with a concentrically rugose epitheca on the lower surface, and on the upper numerous small calices are irregularly grouped. The interspaces between the calices—described by Kunth as the *cœnenchyma*—are papillate and covered with delicate open channels radiating from various centres, and in this substance the calices are usually so immersed that their lateral walls are entirely concealed. The calices occur in all stages of growth; in the smallest, hardly 1 mm. in diameter, there is but a single septum developed on the lower side of the oblique calices; at a slightly older stage there are two additional septa, one on each side of the primary; these are followed by yet other two, similarly situated, and then a single septum appears on the upper side of the calice directly opposite the primary. In full-sized calices, which are not more than 4 mm. in diameter, there are from 30 to 36 septa, alternately large and small, and their outer margins are considerably thickened. The walls of the calices are faintly ribbed and sharply marked off from the *cœnenchyma* in which they are imbedded. The development of the septa in this Coral follows precisely the same course as that which Prof. Lindström has already noticed in many other Rugose Corals, as in *Goniophyllum*, *Cyathophyllum mitratum*, *Diphyphyllum*, sp., etc., but, curiously enough, this unequal development appears only to occur in species which in their earliest stages of growth are vermiform or tubular in shape, and attached by one side, whilst in species which are free and have a direct vertical

<sup>1</sup> Zeitschr. d. deutsch. Geol. Gesells. 1870, pp. 82–87, pl. 1, figs. 2a–2b.