

ON THE PTERODACTYLE, AS EVIDENCE OF A NEW SUB-CLASS OF VERTEBRATA (SAURORNIA). By HARRY SEELEY, F.G.S., of the Woodwardian Museum, Cambridge.

THE author described the basi-occipital, basi-temporal, basi-sphenoid, ex-occipital, supra-occipital, parietal, alisphenoid, squamosal, petrosal, quadrate, quadrato-jugal, orbito-ethmo-sphenoid, vomer, os articulare, proximal end of the lower jaw, the pre-maxillary, maxillary, and dentary bones of the head: and all the characters concurred in suggesting that, but for the teeth, there is nothing to distinguish the Pterodactyle from a Bird. It approached most nearly to the common Cock. The pectoral arch was also described, and the furcula shown to be attached to the radial processes of the humeri. The author then went through the comparative osteology of the remainder of the skeleton, and showed that it supported the conclusion from the skull.

The writings of Buckland, Owen, Huxley, Cuvier, Von Meyer, Goldfuss, Wagner, Quenstedt, and others, were then reviewed, and shown to contain nothing which really supported the hypothesis that Pterodactyles were Reptiles. The *Sauropsida* were therefore divided into three sections,—*Aves*, *Saurornia*, and *Reptilia*;—the *Saurornia* being Birds with teeth; with peculiar wings; tarsus and metatarsus separate; and reptilian types of vertebræ, like the fossil Birds *Pelagornis* and *Palaocolymbus* of the Upper Greensand.

Mr. Seeley then described as new species, *Pterodactylus Huxleyi*, *Pt. machærorhynchus*, *Pt. Hopkinsi*, *Pt. Oweni*, and *Pt. (?) Carteri*; completed the descriptions of Professor Owen's species, *Pt. Sedgwicki*, *Pt. Fittoni*, *Pt. Woodwardi*, and *Pt. simus*; and identified *Pt. Cuvieri*; thus adding six: so that now there are ten species from the Upper Greensand; one, *Pt. Cuvieri*, being common to the Greensand and Chalk.

[As the Monograph of the *Saurornia* and *Aves* from the Greensand is ready for publication, Mr. Seeley would be glad if gentlemen having specimens of Pterodactyles or Birds would favour him by communicating the nature of their fossils.]

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## CORRESPONDENCE.

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### 'PRÆGLACIAL' AND GLACIAL DRIFT.

*To the Editors of the GEOLOGICAL MAGAZINE.*

GENTLEMEN,—Would your correspondent Mr. Kinahan be so kind as to state his reasons for supposing that the gravelly drift *underlying* the Boulder-clay, is 'the drift of the country *before* the Glacial Period?'

I believe that wherever there is a sufficiently thick remnant of Glacial Drift, it will be found to consist of three divisions:—*Firstly*, a bed of clean sand and shingle, containing Glacial Shells and some transported materials; but not such a large number of Erratics as the true Boulder-clay; *secondly*, true Boulder-clay with Glacial Shells, and generally, though not invariably, transported blocks;

*thirdly*, a bed of clean sand and gravel underlying the clay, and containing similar shells and a few boulders, exactly like the top bed.

This three-fold division is, of course, not invariable; as sometime one or two of the members may be absent and the true Boulder-clay, or the Upper Gravel, may rest on the fundamental rock. It is, however, well developed in the Severn-valley above Ironbridge, where each bed in consecutive superposition attains a thickness of 60 or 70 feet. The middle bed, or Boulder-clay proper, although very various in its composition, does not graduate into either the top or bottom gravel, but can be defined to a few inches. The Shells, however, of the whole range, including the underlying gravel, are precisely identical; and their general series indicate a cold climate.

It would be interesting to know whether the gravelly drift of Ireland, underlying the Boulder-clay, is merely this bottom-bed of gravel or whether its fossil fauna gives evidence of its deposition before the Glacial Period; also whether there is any marked absence of the glacial striations which have been noticed where the Boulder-clay proper rests immediately on a hard fundamental rock.

I think it will be found that the Moel-Tryfaen gravels, the shells of which are still more decidedly Arctic than those of the Severn-valley drifts, probably preceded the true Boulder-clay in deposition; as they are covered up with a tough clayey deposit containing transported materials, many of which occur as large blocks weighing several hundredweights. This top bed is noticed, in the 'Supplement' to 'The Antiquity of Man,' as being only 1 foot 9 inches thick; but since the visit made to Moel-Tryfaen by Sir C. Lyell and Mr. Symonds in 1863, the operations of the Alexandra Slate Company have exposed it to a thickness of from 6 to 15 feet. It has a very irregular, though well defined, junction with the underlying sand-beds. It contains many more large blocks than the sand, and closely resembles in appearance much of the Boulder-clay of the Severn-valley. In addition to the species recorded by Mr. Darbshire Mr. Gwyn Jeffreys has determined the following from among a number of fragments that I collected from the sand-bed at Moel-Tryfaen,—*Tapes virginea*, *Trophon Barvicense*, *Cardium fasciatum*, and *Balanus crenatus*.

A few weeks ago I obtained, between Coddendam and Crowfield in Suffolk, a number of fragments of shells from the outcrop of a bed of clean gravel, which at the latter place is *overlain* by 60 feet of Boulder-clay; but none of them differed from what occur throughout the Glacial Drift of this (Severn-valley) district.

Whilst on the subject of the Glacial Period, it may be worth while recording the existence of an unusually large transported block of grey granite in a pond at the back of Hodnet Hall near Market-Drayton in this county (Shropshire). It measures 8 feet in length, 6½ feet in width, and from 5 to 6 feet in thickness; it is of a rounded form and must weigh from 6 to 8 tons. The country in the neighbourhood is thickly strewn with blocks of granite and greenstone; but none of them at all approach the block at Hodnet in size; indeed it is much larger than any transported block I

have seen in the Midland Counties. Thick beds of sand and gravel, containing fragments of Shells, occur to the north of Hodnet.—  
I am, &c. GEORGE MAW.

BENTHALL HALL, near BROSELEY : Oct. 22, 1864.

DISCOVERY OF THE SKELETON OF *LEIODON ANCEPS* IN THE  
CHALK AT NORWICH.

*To the Editors of the GEOLOGICAL MAGAZINE.*

AT the base of the high hill enclosed by the boundary of St. Leonard's Priory are some extensive chalk-pits, which, from having been described in Cunningham's Map of Norwich as 'the place where men are customably burnt,' are now known as Lollard's Pit. From the large quantity of chalk yearly removed from this spot, a greater number of the Chalk fossils in the hands of the Norwich collectors are obtained from these pits than from others in the neighbourhood. In 1858 a few vertebræ of *Leiodon anceps* were discovered, and identified by a tooth which was in their immediate proximity. During the past week a number of bones of the same skeleton have been discovered, including about 6 vertebræ, a hundred fragments of other bones, and 4 teeth, two of which are the large cultrate two-edged teeth so much in request among collectors, and two are of the smaller kind from the inner part of the mouth.

It is much to be regretted that so interesting a specimen is in so delicate a state that the bones can only be extracted in fragments; but, however the collector may be disappointed, to the Palæontologist this discovery is a ray of hope that at some future time a better preserved specimen may be discovered.—Yours truly,

NORWICH: Oct. 20, 1864.

T. G. BAYFIELD.

MISCELLANEOUS.

THERE has lately been found, and added to the national collection, in the valley-gravel near Vauxhall, south of London, a skull of *Bos frontosus*, Nilsson, nearly entire, and having the characteristic downward curve of the horn-cores. The frontal, maxillary, and palatine bones are nearly perfect, and there are six molar teeth *in situ*. This is the second instance of this species being met with in England. The other specimen was from the Bawdsey Bog, near Felixstow, Suffolk, and was figured in the 'Geologist' for 1862, pl. 15, p. 441. Both the skulls exhibit similar points of difference from the cast of the typical *Bos frontosus* described by Professor Nilsson in K. Vetensk. Akad. Öfversigt, 1847, p. 116, and subsequently figured and described by him in the Ann. and Mag. Nat. Hist. vol. iv. 2nd ser. 1849.—W. D.

WE notice with regret the death of Mr. A. G. BAIN, who was the first to show by map and section, as well as by great collections of fossils, the geological structure of Cape Colony. He died at Cape Town, on the 20th October last, having just landed from England.