

Notes from the Woodwardian Museum in Cambridge.

by F. von Huene in Tubingen.*

With 3 text-figures.

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Last September, I had the luck to get to know the fine paleontological collections of the Woodwardian Museum, Cambridge. Prof. T. MC. KENNY HUGHES deserves my thanks for showing me round and for his assistance.

I. Among the dinosaurs there some more recent finds from the Oxford Clay of Fletton near Peterborough seem to me to be particularly noteworthy. Three bones struck me at once; a large tibia, which recalled the same of *Iguanodon*, a not much smaller fibula and a smaller bone, appearing at first rather strange, as well as a large number of huge dermal spines. No detailed description or nomenclature will be given here, but only attention directed to these pieces.

The left tibia, which the adjacent figure should illustrate, is 78 cm in length; the uppermost end of the proximal articular head is broken off. The distal epiphysis shows the characteristic development to receive the astragalus. The breadth is 25 cm there. The medial forwards directed condyle is rather high and round. Fig. 1, b illustrates the form of the distal end best. The posterior side is broken off there. From the medial condyle an edge runs upwards on the anterior side; in the middle where it is only weakly developed, it passes to the lateral side and thickens in the region of the proximal end to a clear rough muscle attachment. This must be placed close below the anterior point of the proximal articular head. This is the case in many orthopodous *Dinosauria*.

Another bone was found together with the tibia, which I hold for the distal end of a right ischium. As such it can only belong to an *ornithopod* and is thus particularly interesting since the first few traces of this dinosaur group are known from the lower Malm. A small femur from Fletton, named *Cryptosaurus eumerus* by SEELEY, was interpreted already in 1875¹ in the same way; it belongs only to a far smaller animal. LYDEKKER also described in 1888² an ornithopod femur from the Oxford Clay of Fletton, which he united with the American genus *Camptosaurus* (MARSH); unfortunately the size is not given.

The rod-like bone in Cambridge, which will be considered here shows at the end interpreted by me as distal a rough, swollen natural end surface of horse-shoe shape (see Fig. 2), the other side is broken off. The piece is 42 cm long. One might hold it for a fibula (the end named distal interpreted as proximal) if in the middle of the piece preserved a very clear rough muscle or ligament attachment were not present. The whole piece is slightly curved and rather flattened. I had previously never seen such a bone. In order to arrive at the position of the bone in the skeleton with any probability, in such

* Original reference: Huene, F. v., 1901. Notizen aus dem Woodwardian-Museum in Cambridge. *Centralblatt für Mineralogie, Geologie und Palaontologie*. 1901: 715-719. Translated by Michael Benton, 3/76; transcribed by David Weishampel 6/99.

¹ Quart. Journ. 1875, p. 149-151, pl. VI.

² Quart. Journ. 1888, p. 45-48.

cases the "alternative method" is simplest: the bone cannot belong to the head, ribs are also excluded, clavicles more than unlikely, the ligament attachment in particular contradicts this, radius, ulna and fibula also impossible, femur excluded because of the end surface, thus only ischium and pubis are left over. Here the *Sauropoda* are eliminated at once. The pubis of the *Theropoda* cannot come into question because of the ligament attachment and the end surface. The postpubis of the *Ornithopoda* is certainly pointed rod-like, as is the ischium of the *Ornithopoda*. It must probably be one of these 2; both interpretations refer to the same group. The doubtful bone is thinner in the middle (fracture place) than at the distal ends. In *Iguanodon* the postpubis is pointed extraordinarily thinly, on the other hand the ischium is, just as here, rather thickened at the end and slightly curved on the high edge exactly in the same way; certainly the mentioned muscle attachment is also missing here. Assuming that this is an ischium, the thought suggests itself that the end of the shorter postpubis in this genus was linked with the ischium by ligaments. On the postpubis a similar combination of another bone would be unthinkable. Thus the above interpretation seems most likely to me.

In his time SEELEY figured a similar bone from the Gosau Cretaceous¹; only the distal end is missing, but the very characteristic trochanter-like ligament attachment is present. He interpreted the piece then as a femur, regarding the ligament attachment as a *trochanter quartus*, but now in a lengthy conversation added the possibility that this piece regarded by him earlier as a femur could be an ischium. Indeed I will not maintain with too much certainty that this interpretation must be correct but it seems to me to have a lot in its favour. If it is correct, an *ornithopod* of the size of *Iguanodon bernissartensis* is indicated by the tibia and the ischium. For this, together with *Cryptosaurus eumerus* SEELEY and *Camptosaurus leedsi* LYDEKKER, is one of the oldest *Ornithopoda* and as such of great interest.

It is not excluded that the 2 bones mentioned here coincide with LYDEKKER's *Camptosaurus leedsi*, only then the *Camptosaurus* from Fletton must differ from the American (*C. dispar* MARSH) by a considerably shorter postpubis. Otherwise I believe rather that it is a question of a separate genus which continues into the Gosau Cretaceous; this must be identical with SEELEY's *Radinosaurus* (*loc. cit.*).

The above mentioned broad fibula, which is smaller than the tibia, could probably belong to a carnivorous *dinosaur* ("*Megalosaurus*"?).

A large number of huge dermal spines from Fletton deserve notice because of their size and completeness. Fig. 3 will illustrate them. There are about a dozen long curved spines. They belong without doubt to the tail of a stegosaurid and indeed probably to the English genus *Omosaurus*. According to MARSH *Stegosaurus* should bear several pairs of long spines at the end of the tail. Those present at Cambridge are not paired, but clearly arranged in a single row. Several of them fit exactly together with their base so that they thus come from a single individual. The last, smallest piece, with very broad base, is curved strongly backwards and divides into 2 parallel branches. The length is 50 cm, measured with the curvature. Those following are much slimmer and frayed out at the point; the fourth last piece has a length of 83 cm. These caudal spines could only be curved backwards, since the last piece curves over too strongly for it to lie forwards on the broad caudal and dorsal spines. In MARSH's reconstruction the weakly concave side

¹ Quart. Journ. 1881, p. 32, fig. 6 (*Rhadinosaurus*)

of the spines is curved forwards. If this suggestion is correct for *Stegosaurus*, clear differences between *Omosaurus* and *Stegosaurus* would exist in this. Beyond these spines a damaged dorsal ridge plate (?) of 55 cm height and an anterior caudal ridge plate of 50 cm height, determined by SEELEY as *Omosaurus leedsi*, are present. On the figure I have added the latter.

Thus the Woodwardian Museum contains from the Oxford Clay of Flettton, among dinosaur remains, representatives of the *Orthopoda*, and indeed both of Stegosauridae (*Omosaurus*) and of *Ornithopoda* (*Cryptosaurus*, *Camptosaurus*) and of *Theropoda* ("*Megalosaurus*"). Further, LYDEKKER in 1893¹ described from there lower jaw remains and a tooth of a theropod as *Sarcolestes leedsi*. Then the British Museum, London possesses very fine remains of a huge *Diplodocus*-like dinosaur, thus a *sauroropod* from the same locality, which Dr. C. W. ANDREWS was kind enough to show me.

II. Besides these large vertebrates I paid attention in Cambridge also to the splendid Silurian collections which largely arise from SALTER. There I had the opportunity in particular to see new good specimens of *Pterotheca undulata* SALT. which interested me very much because of *Aulacamerella*². A long time ago Dr. CH. SCHUCHERT had written to me from Washington that in his opinion *Pterotheca* and *Carinaropsis* from the Lower Silurian of England and North America stand very near *Aulacamerella*. But *Pterotheca* is placed in the Pteropoda, while I held *Aulacamerella* for a brachiopod. Since then I had no opportunity to see specimens of this genus¹. But now, after I saw *Pterotheca* and similar forms, I am also convinced of the relationship with *Aulacamerella*. Now it is no longer puzzling why only "ventral valves" were ever found. The so strikingly high keel of the brachiopods is quick in order! Naturally I have vainly sought a hinge, but what was said otherwise (*loc. cit.*) on the myalium etc., remains completely correct for the other brachiopods.

III. In MASKE's collection at Cambridge I now finally also had the opportunity to see *Pseudocrania divaricata* M'COY, closer knowledge of which was very much lacking in my work on the Silurian Craniadae of the Baltic lands². I was doubtful that whether it is not identical with *Pc. depressa* or *planissima* EICHW. But now I see that it is a completely independent position. The pallial ridges are branched as in *Pc. antiquissima* EICHW., the whole inner surface is rather strongly concave and provided with a deeply pressed in short gut groove. The posterior edge is as in *Pc. curvicosta* HUENE, also the ribbing of the outside recalls this species most, only the ribs stand much closer, about as in *Pc. depressa*, but slimmer and finer than there.

Figure Captions

¹ Quart. Journ. 1893, p. 284-287 and pl. IX.

² Verh. kais. russ. mineral. Ges. St. Petersburg. 38, 1900.

¹ Also in the private collection of Herr E. MASKE, Assistant of the Geological Institute, Gottingen, I saw recently a fine specimen (now the seventh) of *Aulacamerella macroderma* EICHW. from a Lyckholm boulder of Konigsberg. Herr MASKE has always held the fossils for a pteropod.

² Verh. kais. russ. mineral. Ges. St. Petersburg. Vol. 36, 1899, p. 322.

Text-Figure 1. Left tibia of an *ornithopod* from Fletton, 1/12 nat. size; seen from the front; 1a, distal end from below.

Text-Figure 2: Right ischium of an *ornithopod* from Fletton, 1/12 nat. size. a) from lateral side. b) from under side. c) from medial side.

Text-Figure 3. Caudal spines of a *stegosaurid* from Fletton, greatly reduced.