

33. *On an ORNITHOSAURIAN (DORATORHYNCHUS VALIDUS) from the PURBECK LIMESTONE of LANGTON near SWANAGE.* By HARRY GOVIER SEELEY, Esq., F.L.S., F.G.S., Professor of Physical Geography in Bedford College, London. (Read May 26, 1875.)

IN the Christmas of 1868, when staying at Swanage, I was so fortunate as to obtain from a quarryman a portion of a large lower jaw, in association with a long vertebra, which indicate an Ornithosaurian animal of unusual size. Neck and jaw are parts to be expected in close association; but I see no reason to believe, or doubt, that the bones pertained to the same individual, though in the absence of conflicting evidence I shall be justified in attributing both specimens to the same species. As with all my findings, these were deposited in the Woodwardian Museum of the University of Cambridge, and briefly noticed in 1869 in my 'Index to the Aves, Ornithosauria, and Reptilia,' pp. 89, 90, the species being named *Pterodactylus macrurus*. I now offer some further description of the remains, and propose to place them in a new genus. The jaw cannot be located in the genus *Pterodactylus*, because no evidence exists of the occurrence in England of that genus (which, so far as I can discover, has been found only in the Solenhofen slate, and is represented by animals of small size), and because no specimen of *Pterodactylus* has the compressed, elongated, many-toothed, spear-shaped jaw on which I found the genus *Doratorhynchus*. *Pterodactylus* had the teeth in the jaw directed upward, and it is distinguished by having also a tail as short as that of a rabbit or deer; while this specimen (if the vertebra is caudal, and if the tail may be inferred from a single vertebra, five inches in length) would have had a tail unusually long and of considerable strength, and it possessed a flattened jaw, with teeth directed outward. The flattened jaw suggests *Cynorhamphus suevicus* of the Lithographic slate as an ally; but since the vertebra, as I shall presently show, may be cervical, as may all those from the Cambridge Greensand which have been regarded as caudal, no definite generic character can be drawn from the vertebra alone.

*The lower jaw.*

The rami do not extend so far back as the articulation with the quadrate bone. So much of the specimen as is preserved measures  $12\frac{1}{2}$  inches in length; and, where fractured behind, the rami measure  $2\frac{1}{2}$  inches from side to side. The symphysis, beautifully preserved, extends for 5 inches. The jaw, at its anterior termination, where it expands a little, is nearly  $\frac{3}{4}$  inch wide, while at the posterior termination of the symphysis it is an inch wide. The ankylosed portions of the rami are marked, as is usual, by a deep palatal groove. The teeth were very small and close-set, and have all fallen from their sockets.

This jaw is naturally compressed from above downward, so as to be scarcely more than an  $\frac{1}{8}$  inch thick. The specimen gives no conclusive evidence that the jaw terminated anteriorly with the fragment of bone preserved, since the upper part of the bone of the anterior three inches of the symphysis is broken away and only the thin, inferior, investing, external layer of bone remains, and of that the anterior outline is not entire. This bone has its inner surface rough, a structure which probably indicates a roughened external vascular condition. The underside of the jaw is flattened, and very slightly convex from side to side. The anterior terminal inch is bent up slightly towards the upper jaw; and this probably shows that nearly the whole symphysis is preserved. The upper and lower surfaces of the symphyseal portion of the jaw converge laterally to meet in the line of the teeth; the upper palatal surface has a flattened aspect, but is gently convex from side to side.

The sockets for the teeth appear to have been scarcely more than  $\frac{1}{8}$  of an inch deep, and to have extended along at least 8 inches of the jaw. They are so arranged that in front of the jaw they may have been directed outward horizontally, while in passing backward they become steadily less and less inclined, till the hindmost sockets appear to have been vertical. A similar arrangement is found in some species of *Plesiosaurus*, and more or less in the buccal margin of the jaws of birds and many mammals. Each socket is ovate, with the anterior end a little raised; it is margined by an elevated rim, which is more prominent on the under, or outer, than on the upper or inner margin of the socket. In the middle of the jaw there appear to be 7 teeth in the space of an inch. The teeth appear to have extended for at least  $3\frac{1}{2}$  inches behind the symphysis; but each ramus narrows rapidly from side to side to about  $\frac{3}{8}$  inch in width, becomes deeper, and the palatal surface becomes rather more convex from side to side. The rami appear to widen again behind the teeth; but this is not quite clear, since for the hinder 5 or 6 inches only the lower surface of the fractured bone is preserved.

Sometimes the teeth are so closely packed together as to be parted only by a paper thickness, while sometimes interspaces occur as wide as a tooth. The palatal surface of the jaw is striated longitudinally. The palatal groove is so deep as to extend more than halfway through the jaw; it widens where it terminates behind to  $\frac{3}{16}$  inch; and its basal surface is there elevated so as to divide the groove and prolong each half of it for some distance beyond the symphysis, down the inferior and inner side of each ramus.

There is no evidence to show what elements of the lower jaw are preserved, or to indicate the length of bone lost between the hindmost fracture and the articulation with the quadrate bone. On the right inner side a small smooth surface of bone is shown; and this is probably the suture between the dentary and the angular bones.

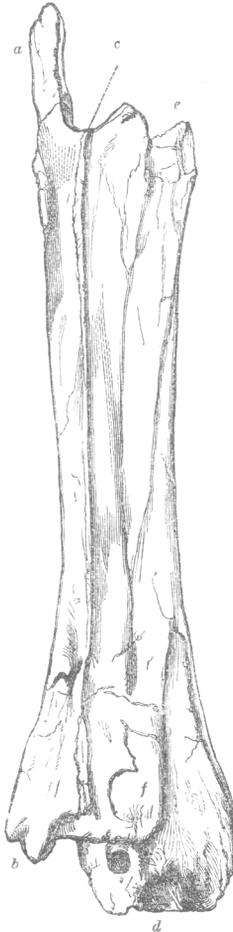
#### *The vertebra.*

This specimen demonstrates the external layer of bone to have been more than usually thin, with extremely delicate cancellous

tissue forming large meshes when the investing film of bone is removed. The fossil is somewhat obliquely crushed, the neural arch being pressed down on the centrum so as to extend beyond it on one side.

Along the length of the neural arch in the middle line, is a very narrow sharp ridge (*c*), slightly elevated at the anterior and posterior

*Vertebra of Doratorhynchus validus, Owen, from above.*  
(Natural size.)



- a.* Anterior zygapophysis. *b.* Posterior end of the neural arch. *c.* Ridge in the median line of the neural arch. *d.* Posterior articular end of the centrum. *e.* Anterior articular end of centrum. *f.* Cancellous tissue of bone from which the dense thin investing layer is broken away.

ends so as to be concave in length. The upper surface of the neural arch is limited anteriorly by a slight angle, which is prolonged backward; for the two sides slightly converge in passing backward from the outer margin of the præzygapophyses.

The præzygapophysis (*a*) is preserved on the left side only; the process is about  $\frac{3}{4}$  inch long, it is narrow and carries a narrow zygapophysial facet, which looks inward and upward and very slightly forward. The anterior part of the neural arch between the zygapophyses is not developed so far forward as to quite cover the centrum. The transverse width across the zygapophyses was rather more than  $\frac{5}{8}$  inch. In the median line the neural arch is  $3\frac{3}{4}$  inches long; it is constricted, and in the middle the width is reduced to  $\frac{5}{8}$  of an inch. The posterior end of the neural arch widens to fully  $\frac{7}{8}$  of an inch, and is flatter and more expanded horizontally than the anterior end. It terminates  $\frac{3}{8}$  inch from the end of the centrum. The posterior zygapophysial facets are not preserved. The lateral outline of the bone above and behind the zygapophysis terminates in a prominent tubercle.

The centrum appears to be about  $\frac{3}{4}$  inch wide in front, and to be a little wider behind. In front the articular surface (*e*) seems to be concave from side to side, and was evidently shallow, as in the vertebræ from the Cambridge Upper Greensand. The posterior articulation (*d*) is not convex as in *Ornithocheirus*, but appears to be nearly flat, though the crushed condition renders its exact structure uncertain. As in vertebræ of *Ornithocheirus* from the Cambridge Upper Greensand, hitherto regarded as caudal, the pneumatic foramen is reduced to a small puncture, longitudinally ovate in form, less than  $\frac{1}{4}$  inch long; it enters the bone from the front about the middle of the side, and looks more like the nutritive canal of the bone than a pneumatic foramen.

The largest reputed caudal vertebra hitherto found in the Cambridge Upper Greensand is  $1\frac{1}{2}$  inch long, and relatively larger at the ends than this, which measures 5 inches in length.

When the cervical vertebræ of *Pterodactylus longirostris* are enlarged 6 diameters, they so closely resemble this type that I greatly doubt the propriety of continuing to regard this vertebra as caudal.

A detailed comparison with other genera and species may be reserved till other materials occur. I propose to change the specific name, because I have ceased to feel sure that the species had a tail; and until the species proves distinct, it may be incorporated with Prof. Owen's *Pterodactylus validus*, which is founded upon an isolated phalange of the wing-finger.

I offer my thanks to Prof. Hughes for his kindness in lending me these specimens and permitting them to be figured.