On a remarkable dinosaurian coracoid from the Wealden of Brook in the Isle of Wight, preserved in the Woodwardian Museum of the University of Cambridge, probably referable to Ornithopsis / by H.G. Seeley.

1882

(8)

[*From the* Quarterly Journal *of the* Geological Society *for August* 1882.]

On a remarkable Dinosaurian Coracoid *from the* Wealden *of* Brook *in the* Isle *of* Wight, *preserved in the* Woodwardian Museum *of the* University *of* Cambridge, *probably referable to* Ornithopsis.

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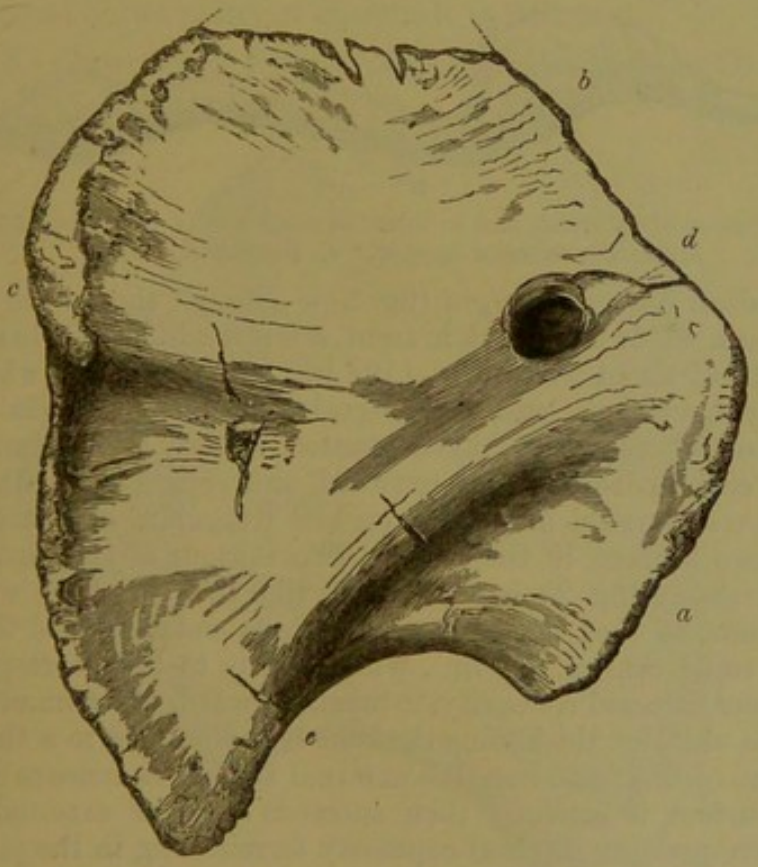
Many years ago (about 1866) Mr. Henry Keeping obtained from the cliff at Brook, midway between the fossil forest at Brook Point and Brook Chine, at about 10 feet above high-water mark, the largest Dinosaurian coracoid which it has been my fortune to examine. It differs in important generic characters from the coracoid of *Iguanodon*; and the only genus hitherto described to which it is likely to belong, is *Ornithopsis*, a Saurian to which Mr. Hulke has already referred many bones of gigantic size.

Fig. 1.—*External View of the Dinosaurian Coracoid, one sixth natural size.*



a. Humeral articulation.
b. Scapular margin.
c. Median thickening.
d. Coracoid foramen.
e. Termination of inferior ridge.

The specimen is from the right side, and perfect, except that a small portion of the thin anterior margin has been broken away. The external surface of the bone is irregular, but somewhat convex from front to back; the visceral surface is similarly concave. The

bone is of moderate thickness, but greatly expanded at the humeral articulation. Its greatest length is about 44 centim. ($17\frac{1}{3}$ in.); greatest width 36 centim. ($14\frac{1}{4}$ in.); and the greatest (external) length of the humeral articular surface is 20 centim. ($7\frac{9}{10}$ in.), while the greatest (internal) length of the suture for the scapula measures about 27 centim. ($10\frac{2}{3}$ in.) The bone gives no certain evidence of union with a sternum, though the fact that the extreme posterior end of the nternal border of the bone is thicker (fig. 2, *r*) than the part which is anterior to it is rather in favour of the possibility of the hinder part of the bone having had such an osseous relation. But the great thickening of the internal or median sutural margin in a line transversely indicating the junction of the coracoid and scapula convinces me that the coracoids there met in the median line, though their union was by no means firm. As a whole, the bone has a curious general resemblance to the anterior portion of an ilium, such as is seen in some of the large American types.

Fig. 2.—*Contour of Median Sutural Margin of Dinosaurian Coracoid.*

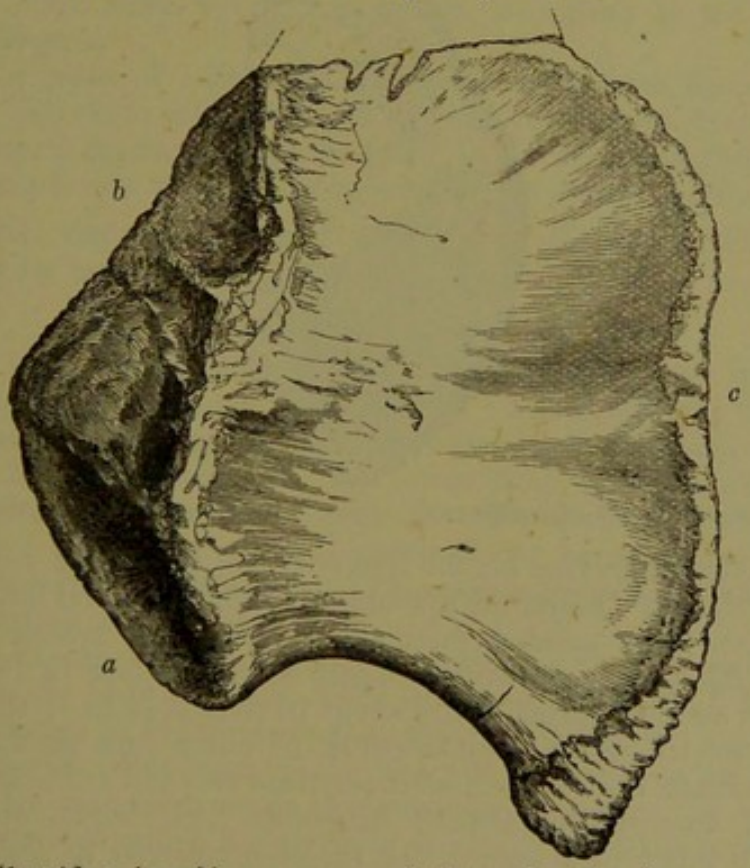
m, contour of external, and *n*, internal surfaces. *p* is placed at the imperfect anterior border. *r*. Posterior border.

The Median Sutural Margin (fig. 2).—Though the lateral outline is convex as a whole from back to front, it is straight or a little concave for a length of about 27 centim. ($10\frac{2}{3}$ in.) in the middle, where the bones may have met; and the diverging posterior margin is also straightened where it may have abutted against a sternum. This surface is convex from within outward, and roughened with transverse grooves, parallel and more or less irregular, indicative of a cartilaginous surface to the bone. The contour of this surface, as seen transversely (fig. 2), is remarkably like that of a ladle with the bowl in front, so that its convexity projects outward and thickens the bone to $5\frac{1}{2}$ centim. ($2\frac{1}{6}$ in.), while, owing to the corresponding though lesser internal concavity, it tapers forward. But immediately behind this anterior thickening the bone is compressed to a thickness of 2 centim. ($\frac{4}{5}$ in.); and here the external surface is concave and the internal surface is convex; then succeeds a longer external curve with a corresponding internal concavity terminating in the posterior expansion of $5\frac{1}{2}$ centim. width already mentioned.

The External Surface (fig. 1).—This is necessarily irregular towards the median line (*c*), with the folds and thickenings of the bone already described, which somewhat resemble those of *Colymbosaurus* and certain Plesiosaurs where these bones meet in the median line. The bone is 18 centim. ($7\frac{1}{10}$ in.) wide proximally, 26 centim. ($10\frac{1}{4}$ in.) wide in the middle where thickest, and from

20 to 21 centim. ($7\frac{9}{10}$ to $8\frac{3}{10}$ in.) wide at the concave posterior border. The extreme length of the external margin is 33 centim. (13 in.), while the internal margin is about 41 centim. ($16\frac{1}{7}$ in.) long. The suture for the scapula, *b*, converges anteriorly somewhat toward the internal sutural margin. The foramen which perforates the coracoid towards its suture with the scapula, *d*, is oval, about 4 centim. ($1\frac{3}{5}$ in.) long by 3 centim. ($1\frac{1}{5}$ in.) wide, situate $3\frac{1}{2}$ centim. ($1\frac{2}{5}$ in.) from the scapular suture, and about 16 centim. ($6\frac{3}{10}$ in.) from the nearest part of the curve of the concave posterior border. The external margin of the foramen is rounded. The perforation pierces into the middle of the scapular suture; anterior to it the bone is undulated; and posteriorly the bone is convex from before backward, and concave towards the elevated margin of the glenoid cavity. At about $7\frac{1}{2}$ centim. (3 in.) behind the coracoid foramen is an oblique deep furrow about 8 centim. ($3\frac{3}{20}$ in.) long, directed backward and inward, but so that if prolonged it would nearly reach the posterior angle of the inner margin, *e*. This groove has in its posterior part the appearance of being muscular, and in its anterior part a vascular aspect; on its inner margin the bone is rounded, and on its posterior margin it is flattened.

Fig. 3.—*Internal or Visceral Aspect of Dinosaurian Coracoid.*



a. Glenoid cavity of humerus. *b*. Sutural surface for scapular.
c. Median margin for union of coracoids.

The internal surface (fig. 3) is moderately concave from within outward; and slightly concave in length, or, rather, is divided into two concavities, of which the larger and deeper is anterior. But

the external articular margin of the bone is straight; the concave posterior margin is rounded from below upward, and maintains a uniform thickness of about $2\frac{1}{2}$ centim. (1 in.).

The external margin (fig. 4) consists of two parts:—a posterior semiovate articulation, *a*; and an anterior subtriangular sutural surface for the scapula, *b*. The latter is about 15 centim. (6 in.) thick, and measures about 17 centim. ($6\frac{3}{4}$ in.) on the line where it meets the glenoid cavity. The external margin is about 17 centim. ($6\frac{3}{4}$ in.) long, and the internal margin is about 27 centim. ($10\frac{2}{3}$ in.) long. Where it terminates anteriorly the bone is about 4 centim. ($1\frac{3}{5}$ in.) thick. The sutural surface is irregular and undulating, but lies essentially in one plane; it is rough with cartilaginous attachment. It is at a right angle with the interior margin of the bone, but makes a sharp angle with the external surface.

Fig. 4.—*Scapulo-glenoid Surface of Dinosaurian Coracoid.*

a. Glenoid cavity of humerus. *b*. Sutural surface for scapula.

The articular surface for the humerus has its outline convex externally (fig. 4); behind the convexity it is sharper; and internally it is straight. The greatest thickness of the bone is a little over 17 centim. ($6\frac{3}{4}$ in.), the greatest length of the surface is 18 centim. ($7\frac{1}{10}$ in.), and its greatest width about 10 centim. (4 in.); the glenoid cavity is gently concave, but towards the outer part shows grooves which indicate that the articular cartilage was not entirely ossified.

Of all coracoids of British Dinosaurs, that which approaches nearest to this type is seen in the skeleton referred to *Hylæosaurus* from the Wealden of Tilgate. But in *Hylæosaurus* the distal portion of the bone is more prolonged, the median portion is less thickened, and the foramen is placed behind the middle of the humeral border far away from the scapular margin. The bone is

distinguished from the coracoid of *Iguanodon* by wanting the notch between the humeral and scapular surfaces, which in that genus represents the foramen in this.

In many characters our Wealden coracoid approaches nearer to American types, such as *Morosaurus*, and especially *Camptonotus*, than to any English form. The resemblance is seen in form of the bone, angle of the scapular margin, and especially in a ridge which diverges from the humeral articulation downward over the outer surface of the bone. This ridge is well seen in *Stegosaurus*, and is less developed and nearer the margin in *Camptonotus*. But in no American genus are the characters identical with those here seen; for in this coracoid the lateral ridge rises opposite the middle of the humeral articular surface.

The large size of the bone makes it probable that the bone, if pertaining to a described genus, must be referred to either *Pelorosaurus* or *Ornithopsis*. The resemblances of the bone to coracoids of American Stegosauria may make the affinity of the bone with *Ornithopsis* sufficiently probable to be adopted. *Pelorosaurus* has never been critically described; but many of the bones referred to it seem to me unquestionably Iguanodont, probably belonging to a large species of *Iguanodon*; while other bones like the great humerus (Owen, Palæont. Soc. 1859, Suppl. 2, p. 39, pl. xii.) seem to me to belong to *Ornithopsis*.

So few types of Dinosaurian coracoid have been figured, that I believe this form will possess a certain interest in demonstrating that generic characters may be found in the shoulder-girdle; and it may furnish new evidence in support of the genus *Ornithopsis*.

I would express my thanks to Professor Hughes for his kindness in allowing me to study this specimen.

Discussion.

The President considered the specimen the most magnificent Dinosaurian coracoid he had ever seen. There was one thing to be said against regarding this bone as belonging to *Ornithopsis*, namely that it had been found in beds lower than those in which *Ornithopsis* had hitherto been obtained. He doubted whether there had been any mesial sutural union of the coracoids, a feature as yet unobserved in Dinosaurs. *Iguanodon Seelyi* was found at the same horizon as this bone.

Prof. Seeley did not see any difficulty in *Ornithopsis* occurring lower in the beds at Brook, since it ranged to Tilgate. He was at first disposed to examine whether this coracoid might not belong to *Pelorosaurus*. But most of the bones of that genus so resembled *Iguanodon* that there are no characters in the coracoid or other parts of the skeleton which differentiate it clearly. If the bone is attributed to *Iguanodon Seelyi*, it proves that that species must be referred to some other genus; for the characters of this coracoid are distinct from those of *Iguanodon*. The reference of an isolated bone to its species when the region to which it belongs is previously unknown is necessarily a matter of probabilities.