

The Vertebral Formula in *Diplodocus*, Marsh

Author(s): W. J. Holland

Source: *Science*, New Series, Vol. 11, No. 282 (May 25, 1900), pp. 816-818

Published by: [American Association for the Advancement of Science](#)

Stable URL: <http://www.jstor.org/stable/1626506>

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family was considered as "the forerunner of the Viverrine phylum whose members towards the close of the Eocene migrated to Asia."

The second paper by Dr. Wortman on *Oxyena lupina* Cope, contained a full description of this species, typical of one family of the *Creodonta* (flesh-eaters). Dr. Matthews's paper was a careful tabulation of the fauna of the fresh water tertiary of the west. Professor Osborn contributed his third paper on Dinosaurs making a comparison of the fore and hind limbs of these extraordinary creatures, the dimensions of whose legs, in some cases, (*Brontosaurus*) reached the extreme limit of ten feet.

This twelfth volume of the Bulletin closed with a description of the Eskimo of Smith Sound by A. L. Kroeber. These were Ross' Arctic Highlanders, and the subject of Mr. Kroeber's paper was the six natives secured by Lieut. Peary and brought to this city in 1897. The implements of these singular aborigines were described, and their sociology, religion and cosmology.

These Smith Sound Eskimo are regarded as, ethnologically, similar to the Greenland Eskimo, and claims for their distinctness and insulation are repudiated.

Their religion is vague, but practically centers around the 'medicine man,' or shaman, their morals dubious, and their government formless.

Amongst shorter papers in the tenth volume was a notice of a superb specimen of *Madrepora palmata* which Professor Whitfield obtained in the Bahamas and which now forms a conspicuous ornament of the Coral collection in the Museum halls.

These Bulletins of the Museum have now an established reputation, and form a feature as important in its scientific life, as does the beautiful or appropriate exhibition of its collections in its educational work.

L. P. GRATACAP.

THE VERTEBRAL FORMULA IN DIPLODOCUS, MARSH.

IN the Memoirs of the American Museum of Natural History, Volume I., Part V., Professor Henry F. Osborn has given a careful and exceedingly interesting account of the skeleton of a *Diplodocus* discovered in 1897 near the Como Bluffs in Wyoming by an exploring party sent out by the American Museum.

In the summer of 1899 the expedition sent out to the fossil fields of Wyoming by the Carnegie Museum at the instance and expense of the generous founder of the institution, succeeded in discovering a second skeleton of *Diplodocus*, which furnishes information as to many portions which were lacking in the specimen belonging to the American Museum. The two specimens are in many respects complementary to each other. The specimen described by Professor Osborn consisted of the left neural arches of three cervicals; eight posterior dorsals lacking the centra; the sacrum lacking the first and second centra and consisting of four vertebræ; caudal vertebræ Nos. 1-21, and 23-27, complete with chevrons; portions of caudals 32, 33, and 35 (estimated); the ribs of the three posterior dorsals; the left ilium and ischium; the upper three-fourths of the left femur, and the right scapula. The specimen belonging to the Carnegie Museum consists of eleven cervicals, ten dorsals, four sacrals lacking the left sides of the centra, the twelve anterior caudals, with chevrons; eighteen ribs, two of them imperfect; the right ilium, and the peduncle of the left ilium; the two ischia and the two pubic bones; the right femur entire; the left scapula and coracoid coössified, and the two sternal plates. The work of excavation has not yet been completed, having been interrupted in the latter part of September, 1899, by the advent of severe weather. It has been resumed at this date and it is hoped that further uncovering of

the hillside, on which the discovery was made, will result in the discovery of some additional portions of the skeleton.

It is not the intention of the writer in these lines to enter into a description or discussion of these exceedingly interesting and important remains, save for the purpose of calling attention to the fact that the specimen under consideration appears to throw light upon the hitherto unsettled number of the dorsal vertebræ in the Sauropoda. Professor Marsh has figured the number of dorsals in *Brontosaurus* as fourteen. Professor Osborn in his memoir says "We may provisionally adopt 15 as the number in *Diplodocus*." The specimen obtained by the Carnegie Museum shows but ten dorsal vertebræ. These vertebræ were found in regular order from the sacrum forward. The six posterior presacral vertebræ interlocked by their zygapophyses. The seventh and eighth presacrals articulated with each other, but were displaced vertically, having been depressed in the mud, which subsequently solidified to form the matrix. The ninth and tenth were also interlocked, and no gap existed between the eighth and ninth except that produced by the depression already noted. The first cervical lying in front of the tenth presacral was displaced at an angle from the axial line of the skeleton, but if restored to a normal position the gap between it and the most anterior of the dorsals would have been filled, and, now that these vertebræ have been freed from the matrix, they are found to closely articulate. The cervicals were for the most part interarticulated, all lying in such position as to show the serial order.*

* I am indebted to Mr. A. S. Coggeshall, the Chief Preparator in the Department of Vertebrate Paleontology in the Carnegie Museum, for the statements given above as to the exact location *in situ* of the vertebræ. Mr. Coggeshall preserved accurate memoranda of locations in the field-notes, which he made while assisting in the exhumation of the remains.

From the foregoing facts it appears that the number of dorsal vertebræ in *Diplodocus* is only ten.

A further confirmation of this view is derived from the number of ribs which were discovered. Beginning with the dorsal vertebræ immediately before the sacrum we find the short posterior ribs as delineated by Professor Osborn, followed, as we advance, by ribs rapidly increasing in length, until we find attached to the seventh presacral a rib five feet eight and a half inches in length. This represents the maximum development in the length of the ribs. Both ribs of the seventh presacral have been recovered. We have not found time as yet to carefully adjust the ribs to the vertebræ, but we have every reason to think that we have recovered all of them except two. Twenty is then the number of the dorsal ribs in *Diplodocus* and the inference is plain that there must have been but ten dorsal vertebræ.

The correspondence between the structures of the sacral region in *Diplodocus* and those found in the struthionid birds has already been pointed out by Professor Osborn. I may say that this likeness is further shown in the number of the dorsal vertebræ, and the conformation of the scapular girdle, as well as in certain features of the cervical vertebræ. These colossal reptilia reveal in portions of their osseous framework marked tendencies in the direction of a development along avian lines.

Cervicals.....at least 13	}	Eleven are found in the specimen at the Carnegie Museum, atlas and axis being as yet undiscovered. There may have been more than thirteen cervicals, though their great length, averaging two feet, seems to militate against the existence of many more than the number given.
Dorsals	10	
Sacrals.....	4	{ Both specimens agree in showing only four sacrals.
Caudals.....	32-35	(Osborn).

Collating the facts ascertained from the two skeletons of *Diplodocus*, the one in the American Museum, and the other in the Carnegie Museum, we ascertain that the vertebral formula of *Diplodocus* was as given on page 817.

A paper giving a full account of the specimen belonging to the Carnegie Museum will appear in the Memoirs of this Institution.

W. J. HOLLAND.

CARNEGIE MUSEUM,
May 10, 1900.

UNVEILING OF THE HUXLEY MEMORIAL.*

A LARGE assembly, representative of many interests and many nationalities, the Prince of Wales at their head, met in the great hall of the Natural History Museum, South Kensington, on Saturday, to do honor to one who, in a degree rarely paralleled, was at once a great man of science and a great man of literature. The occasion was the acceptance by the Prince of Wales, on behalf of the trustees of the British Museum, of a statute of Mr. Huxley, presented in the name of the subscribers by the veteran Sir Joseph Hooker, and may be regarded in some sense as an *eirenicon*, for among the official persons present was the Bishop of Winchester, the successor of a doughty opponent of the late Professor; and the statue faces the stately and simple figure of a former scientific antagonist—Owen. The Prince of Wales was president, Lord Avebury, honorary treasurer, and Professor G. B. Howes, honorary secretary of the memorial committee. Huxley had a rare power of winning the regard and affection of his pupils, and many of them, unknown to fame, came to do him reverence.

Professor Ray Lankester, Director of the Museum, made the following statement: The duty of briefly explaining the nature of the present proceedings has devolved upon

* From the London *Times*.

me. I feel it to be a great privilege to discharge this duty on the occasion designed to do honor to my venerated master, Professor Huxley. This celebration would have been no less dear to Huxley's fellow-worker and friend, the late Director of this Museum, Sir William Flower, who, unhappily, is no longer with us to witness the completion of the memorial statue which he especially desired to see placed in this hall. A few months after Professor Huxley's death in 1895 a committee was formed for the purpose of establishing a memorial of the great naturalist and teacher. At a meeting of that committee, held on November 27, 1895, at which 250 members were present and at which his Grace the Duke of Devonshire presided, the following resolution was carried: "That the memorial do take the form of a statue, to be placed in the Museum of Natural History, and a medal in connection with the Royal College of Science, and that the surplus be devoted to the furtherance of biological science in some manner to be hereafter determined by the committee, dependent upon the amount collected." From all parts of the world, besides our own country, from every State of Europe, from India and the remotest colonies, and from the United States of America subscriptions have been received for the Huxley Memorial, amounting in all to £3380. (Cheers.) Three years ago the committee commissioned and obtained the execution of a medal bearing the portrait of Huxley, and has established its presentation as a distinguished reward in the Royal College of Science. The republication of the complete series of Huxley's scientific memoirs, which was proposed as one of the memorials to be carried out by the committee, has been undertaken by Messrs. Macmillan without assistance from the committee. I am glad to be able to state that two large volumes of these richly-illustrated contributions to science have