

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

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A

MEMOIR

ON

M O S A S A U R U S

AND THE

THREE ALLIED NEW GENERA,

HOLCODUS, CONOSAURUS, AND AMPHOROSTEUS.

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NATURAL HISTORY, ETC.

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COMMISSION

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PROF. LOUIS AGASSIZ.

PROF. HENRY D. ROGERS.

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THE great fossil of Maestricht has been a subject of much interest as well as difference of opinion among naturalists; but, after long discussion, the researches of the younger Camper determined its saurian character, and it was by Cuvier referred to a distinct genus, called by Conybeare MOSASAURUS: *The Saurian of the Meuse*. Since its discovery, occasional announcements have appeared of other remains having been found in various localities, chiefly in the United States; — in fact, with the exception of two vertebræ reported by Dr. Mantell as found near Lewes,\* and of portions of a large jaw from the Norfolk Chalk,† they are entirely confined to our country.

The first notice of such relics in our palæontology is by Dr. Samuel L. Mitchell, ‡ who mentions, as found in the Cretaceous strata of Monmouth, New Jersey, and has figured, “a tooth and part of the jaw of a lizard monster or saurian animal, resembling the famous reptile of Maestricht.”

In the fourth volume of the *Journal of the Academy of Natural Sciences*, Dr. Harlan described a tooth as resembling, “in every respect,” those of the “Maestricht Monitor.” This was found in the Marl of New Jersey, near Woodbury.

Dr. J. E. Dekay read before the Lyceum of Natural History of New York, in 1830, an account of the remains “of Extinct Reptiles of the Genera *Mosasaurus* and *Geosaurus* found in the Secondary of New Jersey.” § He described the tooth alluded to by Mitchell, and referred it unequivocally to *Mosasaurus*.|| He also reported the fact of the existence, in the New Jersey Marl, of the subgenus *Geosaurus*, Cuv., from a specimen in the cabinet of the Lyceum, and called it *Geosaurus Mitchelli*.

\* Geology of Southeast of England.

‡ Observations on the Geology of North America.

|| *Mosasaurus Dekayi*, Bronn, *Lethæa Geogn.*, 1837.

† Wonders of Geology.

§ *Annals of the Lyceum*, Vol. III.

Dr. S. G. Morton, in his Synopsis of Organic Remains, mentioned "teeth and vertebræ found in Monmouth, Burlington, and Gloucester counties, in New Jersey, and at St. George's, in Delaware"; and in the Proceedings of the Academy of Natural Sciences, in November, 1844, described some specimens from New Jersey, and, finding some differences between them and the *Mosasaurus* of Maestricht, proposed provisionally for the former the name of *M. occidentalis*.

The next notice of Mosasaurus is the very full and valuable paper of Goldfuss, published in 1844, "On the Formation of the Cranium of Mosasaurus, with a Description of a New Species," which he calls *M. Maximiliani*.\*

Among the donations to the Academy of Natural Sciences of Philadelphia in September, 1848, was a portion of a jaw of Mosasaurus, with two nearly perfect teeth, from Freehold, New Jersey; and since this paper was read, another large fragment has been also presented from a neighbouring locality.

I have had in my cabinet for several years vertebræ from Alabama answering precisely to the description and figures of those of Mosasaurus, and agreeing, except in size, with the vertebræ from New Jersey in the museum of the Academy. I have always considered them as belonging to a small species of Mosasaurus. Lately, I received from Alabama a portion of a tooth, which must have belonged to a small species.

I have large vertebræ from the Eocene marl of Mr. J. A. Ramsays, Ashley River, near Charleston, which resembled those figured and described by Faujas St. Fond.†

In the American Journal of Science, ‡ Mr. F. S. Holmes mentions vertebræ from the marl of Ashley River which are similar. During the last year Chancellor Dargan, of Darlington, South Carolina, was kind enough to send me some fragments of bones, chiefly *cetacean*, found in the Pliocene marl of his neighbourhood, among which I found a portion of a lower jaw of Mosasaurus, with the alveolar part of a tooth.

I am indebted to Dr. Willkings, of Wilmington, North Carolina, for a vertebra, identical with those from New Jersey and Ashley River, found in the Eocene of his locality. These references comprise our present knowledge of Mosasaurus.

In the Maestricht individual (which has been called *Mosasaurus Camperi* and *M. Hoffmanni*, but is usually designated by the latter name), the teeth are described as solid and having no true roots, but supported on expanded conical bases ankylosed to the summit of the alveolar ridge of the jaws. These arise from the ossification of the pulpy matter which had secreted the teeth, and are united with and form part of the maxillary bone, the secondary teeth being formed in the substance of this body or ossified pulp. A shallow socket is left where the tooth and its supporting base are shed. They are still further attached to the jaw by the ossification of the capsule that furnished the enamel.§

"The form of the teeth is likewise different from that hitherto observed in any

\* Nov. Act. Acad., Vol XIII. "Der Schädelbau des Mosasaurus," etc.

† Hist. Nat. de la Montagne de St. Pierre, Tab. VIII. et IX.

‡ Vol. VII., 1848.

§ Cuvier and Owen.

existing saurian; they are pyramidal, with the outer side nearly plane, or slightly convex, and separated by two sharp ridges from the remaining surface of the tooth, which forms a half-cone (Pl. I. Fig. 1); the transverse section of the tooth near its attachment to the osseous base presenting the contour given at Pl. I. Fig. 1. All the teeth are slightly recurved, and their peripheral surface is smooth. They are implanted upon the intermaxillary, maxillary, and premandibular bones. A series of similarly shaped but much smaller teeth are placed upon the pterygoid bones."\*

The successional tooth pierced through the osseous body which supported the primary tooth, and this became detached, together with its base, by a kind of necrosis, and fell off, like the horns of a deer.

There are fourteen teeth on each side of the lower jaw in the specimen in the Paris Museum. In the upper jaw there are eleven teeth, but the intermaxillary bone is wanting, on which Cuvier was induced to believe there may have been three. On each pterygoid bone there seem to have been eight teeth. A cast of the Maestricht *Mosasaurus* may be seen in the Cabinet of the American Philosophical Society.

The vertebræ of this saurian have the form of those of the living Crocodiles, Monitors, and Iguanas, namely, they are concave anteriorly and convex posteriorly: the anterior vertebræ have these characters more strongly marked.

Of the vertebræ there are five sorts, based on the number of apophyses. The first have an upper spinous apophysis, long and compressed; a lower, terminated by a concavity; four articular, the hinder ones shorter and facing outwards, and two transverse apophyses, bulky and short; these are the last vertebræ of the neck, and the first of the back: their body is longer than broad, and broader than high; the faces are of a transverse oval form. Others are without the lower apophysis, but in other respects resemble the preceding. Some follow which have articular apophyses; these are the last dorsal, the lumbar, and the first caudal: their peculiar place is recognized by their transverse apophyses, which are elongated and flattened more and more; the articular faces of their body are nearly triangular in the first caudal. Those which follow have, besides their upper spinous and the two transverse apophyses, two little facets at their lower face to support the chevron-formed bone; the articular faces of their body are pentagonal. Then come others, differing from these in having no transverse apophyses; they form a large portion of the tail, and the faces of their body are ellipses, at first transverse, and then more and more compressed at the sides; the chevron-bone is ankylosed, and forms a body with them, which is a peculiarity. The vertebræ of the tail have no apophyses: in proportion as they approach the end of the tail the bodies are shortened, and almost from its commencement they have less length than breadth or height: the length of the last is one half its height.

Next to the *Mosasaurus Hoffmanni*, the specimen described by Goldfuss is most interesting, as the head is nearly perfect. These remains were found in the Cretaceous formation near the Big Bend in the Upper Missouri, by Major O'Fallon,

\* Owen, Odontography.

and were by him presented to Prince Maximilian of Wied, who was at that time on a tour through the United States. They were carried to Europe, and placed in the Museum of Bonn.

The rock in which they were found was so hard, that the most valuable parts of the skeleton were separated with difficulty; but nearly the whole head was procured, and many vertebræ, fragments of ribs, and other bones. Excellent figures are given of the head, jaws, and teeth. A figure of a tooth is given in Pl. I. Fig. 7.

In studying the characters of the prominent bones, Goldfuss came to the conclusion that it is a different species from *Mosasaurus Hoffmanni*, and named it *M. Maximiliani*, in honor of the prince.

The state of the teeth and bones indicates that it had attained its adult growth, although it is only one half the estimated length of the former species. In the upper maxillæ of both there are eleven teeth, but in the lower jaw of the former there are fourteen, while in the latter there are only eleven; in the former the lower jaw is curved, while in the latter it is straight; and in the curve there are eight teeth, while in the corresponding portion of the latter only ten are present.

He describes the teeth of *M. Hoffmanni* as having oblong roots, rounded and touching each other, and as being inserted in a groove in the jaw to two thirds its depth; and the crowns as pyramidal, a little compressed, curved slightly backward, divided by ridges into an anterior and posterior surface having five and seven narrow pyramidal planes on them. Pl. I. Fig. 1.

It will be observed that this description differs somewhat from Cuvier's and Owen's account of the teeth, in the divisional ridges, which the sections show, and in the presence of the longitudinal narrow planes. The divisional ridges in the secondary teeth are on the anterior and posterior surfaces, and not on the lateral. This is plainly seen in the young teeth in the New Jersey specimen, (Pl. I. Fig. 2,) and does not constitute a distinction, as Professor Owen supposed when he founded a new genus *LEIODON* on this character. Mr. Charlesworth described the same fossil as a *Mosasaurus*, and called it *M. stenodon*.\* Although the longitudinal planes on the teeth are not mentioned by Cuvier, they may be seen in Faujas St. Fond's plate.

There were eighty-seven vertebræ of *M. Maximiliani* found lying in their proper apposition, measuring thirteen and a half feet long, resembling those of *M. Hoffmanni*, having one surface for the rib attachment, and becoming triangular by degrees; with eleven which are plane. The ribs are perfectly round, as if turned in a lathe, and are identical with those of *M. Hoffmanni*.

Of the small vertebræ from the Cretaceous of Alabama, figured of the natural size, Pl. I. Fig. 3, three were originally found anchylosed, though broken before I received the portion figured. They are identical in all their characters with those of Maestricht, except that they are only of about one fourth the size. I have another of similar size from another locality, and have seen several in the possession of others.

\* The Geological Journal, No. I.

The tooth figured in Pl. I. Fig. 4 has the *Mosasaurus* form, as described by Owen and figured by Faujas St. Fond, and was received from an unknown locality in Alabama. It is solid, and shows the lamellar arrangement very distinctly. A similar tooth from Georgia is figured in Pl. I. Fig. 5.

Their size, taken in connection with the existence of vertebræ which have all the characters of maturity, and evidently belonged to a small individual, disposes me to consider them as characterizing another species, which may be called *Mosasaurus minor*.

The vertebra from Wilmington, North Carolina, (Pl. I. Fig. 6,) appears identical with those found in New Jersey, now in the Academy of Natural Sciences. This seems the most common species, as I have seen similar vertebræ in the cabinets of Professor Agassiz and of Dr. J. C. Warren, from New Jersey; and I have fragments of others from Alabama.

My friend, Dr. S. G. Morton, placed in my hands two teeth of *Mosasaurus* from the Cretaceous deposits of the banks of the Chattahoochie, Georgia, discovered by J. Hamilton Couper, Esq., which differ from all the described species in their greater compression posteriorly, and in the sharpness and extent of the cutting edges, with a curve backwards giving them the form, on a lateral view, of the teeth of *Megalosaurus*. (Pl. II. Figs. 4, 5.) In honor of the discoverer, a gentleman who has made many valuable contributions to the science of our country, I propose to name this species *Mosasaurus Couperi*.

The portion of a lower maxilla sent me by Chancellor Dargan is interesting from its geological position. It is reported as found with cetacean remains among the shells of the Pliocene. In Darlington, as the beds of Pliocene rest upon the Cretaceous, it is most probable it was derived from the latter formation. Its appearance and the mineralization of its structure render it probable that it came originally from the Cretaceous. I have, from the same Pliocene beds, teeth of *Crocodylus clavirostris*, Morton, (of which Professor Agassiz proposes to form a new genus SPHENOSAURUS,) which in New Jersey is found in the Cretaceous.

The specimens found in Europe are all from the Cretaceous, as well as those from Missouri, Alabama, and New Jersey, while the vertebra from Wilmington was found in the Eocene, as well as those from the marl of Ashley River, South Carolina. From the latter locality I have many vertebræ of *Basilosaurus*; ribs and vertebræ of *Manatus*; a tooth of *Equus* resembling *E. plicidens*, Owen; teeth of *Crocodylus macrorhynchus*, Harlan; and of *Conosaurus*, about to be described.

The fragment of the jaw of *Mosasaurus* above mentioned is seven inches in length, and constituted a portion of the anterior part of the lower maxilla of the right side. The figures Pl. II. Figs. 1, 2, 3, represent it of the natural size. At the lower outer edge are two large foramina, as in *M. Hoffmanni* and in *M. Maximiliani*. Examined on the inner aspect, (Pl. II. Fig. 3,) we find it is only the portion external to the groove or alveoli for the insertion of the bony roots of the teeth. The base of a tooth, with the pulp cavity, is present, surrounded by enamel, invested by its osseous oblong support, obliquely inserted; and the alveolar surface of attachment of three others is distinctly marked. Here is also seen, on

the osseous support of the tooth, the cavity in which was contained the successional or secondary tooth.\* From the size of the tooth and estimated thickness of the maxilla, it must have characterized one of the largest species. The breadth of the bone, from the base of the root to the outer surface, is an inch and a quarter, the inner portion being estimated at the same, and the thickness of the tooth being about an inch and an eighth; where the tooth is present, the jaw is nearly three and a half inches through. The great obliquity in the insertion of the teeth distinguishes it from other species, and the base of the crown of the tooth (Fig. 1) is more circular. As I consider it differing from other American and European species, I propose to call it *Mosasaurus Caroliniensis*.

Since this paper was prepared, Professor Agassiz has kindly allowed me the privilege of examining a portion of a jaw of a specimen from New Jersey, which is figured of the natural size, in Pl. I. Fig. 2. It contains portions of two teeth, with two of the successional teeth making their appearance above the alveolar surface. The former as well as the latter are compressed laterally, a section of the base of the crown being elliptical, not angular as in *M. Couperi*.

The secondary teeth are much more compressed laterally, and the cutting edges are minutely but regularly serrated, which, therefore, is a character of young teeth. The investigations of Professor Agassiz induce him to consider all the specimens from New Jersey as belonging to the same species, including that described by Dr. Dekay, and named by Bronn *Mosasaurus Dekayi*, and which Dr. Morton had provisionally called *M. occidentalis*.

Of this species the specimen in the Academy of Natural Sciences, Philadelphia, from Burlington, New Jersey, is a fine one, containing two nearly perfect teeth.

According to our present knowledge of the genus *Mosasaurus*, we have in the United States five species:—

#### MOSASAURUS, *Conyb.*

MOSASAURUS DEKAYI, *Bronn, Lethæa Geogn.*, II. p. 760. *Dekay in Ann. Lyc. Nat. Hist. New York*, III. p. 135. (1830.)

MOSASAURUS MAXIMILIANI, *Goldfuss in Act. Nov. Acad. Leop.-Cæsar. Nat. Curios.*, XIII. (1844.)

MOSASAURUS MINOR, *Gibbes*: vide supra.

MOSASAURUS COUPERI, *Gibbes*: vide supra.

MOSASAURUS CAROLINIENSIS, *Gibbes*: vide supra.

\* Figure 3 has been inverted by the draughtsman.

## MOSASAUROID GENERA.

HOLCODUS, *Nov. Gen.*

AMONG my specimens I have a tooth from Alabama given me by Mr. Joseph Jones, of Columbia, South Carolina, and from the latter State another, differing from any which have been described. They are solid, and resemble in their pyramidal form those of *Mosasaurus Hoffmani*, but are compressed antero-posteriorly, the dividing ridges making the anterior and posterior surfaces equal, and they are both convex. They are also acutely pointed. In *Mosasaurus* the outer surface is a plane, or nearly so, and both have longitudinal narrow planes near the base. In the position of the cutting edges they resemble *Geosaurus* as described by Professor Owen, but the distinction of this genus, besides the position of the ridges and greater breadth, consists in the edges being serrated. In Professor Agassiz's specimen of *Mosasaurus* the edges are equally serrated, settling the point that serratures are characters of young teeth of *Mosasaurus*. Soemmering conjectured that *Geosaurus* was the young of *Mosasaurus*. This is only the case with what was considered an American species of *Geosaurus* by Dr. Dekay.\* The genus *Geosaurus* belongs to formations of an older date than the Cretaceous.

In the teeth under notice, on the outer half, are many planes almost grooves, and also on the inner face, which is peculiarly striated towards the base. It is evidently nearly allied to *Mosasaurus*, and I consider it as forming one of the Mosasauroid family.

As the striated character is a structural distinction, the name of *HOLCODUS* † is given to the genus, and that of *acutidens* to the species.

On a recent visit to Professor S. S. Haldeman, of Pennsylvania, I found in his cabinet a well-marked specimen of this new genus from the Cretaceous of New Jersey, which he has kindly allowed me to figure, Pl. III. Fig. 13. The specimen from the Cretaceous of Alabama is represented in Pl. III. Figs. 6, 7, 8, and 9. The other, from the Eocene of Orangeburg, South Carolina, was only a fragment, and has not been drawn.

CONOSAURUS, *Nov. Gen.*

I am indebted to Captain A. H. Bowman, of the United States Topographical Engineers, for several teeth of an acrodont saurian found in the Eocene of Ashley River, South Carolina. At first view I supposed them to be pterygoid teeth of *Mosasaurus*, but they are without divisional ridges or cutting edges, and the section is circular and not elliptical. They are conical, solid, sharp-pointed, slightly

\* Annals of the Lyceum of Natural History, New York, Vol. III.

† From *ὄκός*, striatus.

curved backward, fluted near the base on the inner face with smooth and fine enamel, and have an expanded osseous support resembling that of *Mosasaurus*. Several are figured in Pl. III. Figs. 1, 2, 3, 4, 5. I propose for this genus the designation of CONOSAURUS,\* and for the species the name of the discoverer, a gentleman diligently engaged in developing the palæontology of South Carolina, — *Conosaurus Bowmani*.

In the London Geological Journal, (No. I.) Mr. Toulmin Smith has figured teeth very similar to these from the Chalk of Lewes. He says, — “The teeth are conical and much curved, perfectly smooth, uncompressed, and with no trenchant edge. They are attached to conical and prominent osseous bases, which are shed with the teeth, leaving very deep circular alveolar cavities, but no trace of a tooth rising from below to replace the one which has fallen out.”

#### AMPHOROSTEUS, *Nov. Gen.*

Professor R. T. Brumby, of the South Carolina College, lately submitted to me two large vertebræ of a Mosasauroid animal, from the Cretaceous deposits of Alabama. They exceed in size any of those figured or described by Faujas, in the Natural History of St. Peter's Mountain.

The size of one (Pl. III. Fig. 11) is, —

Length,	. . . . .	4 $\frac{1}{4}$ inches.
Breadth at the middle of the centrum,	. . . . .	4 $\frac{1}{2}$ “
Vertical thickness,	. . . . .	2 $\frac{1}{4}$ “
Longitudinal diameter of post. articular face,	. . . . .	5 $\frac{1}{4}$ “
Short diameter,	. . . . .	3 $\frac{1}{4}$ “

It is much compressed, (Fig. 12,) and the ellipse of the convex surface (Fig. 10) is much longer than in *Mosasaurus*; the centrum is more flattened, and the surface of attachment of the lateral apophyses is much thinner (Fig. 12); the concave articular face is much deeper, and the convexity of the opposite end greater, than in any of the vertebræ of *Mosasaurus* which I have examined, and it projects more over the body. Below the edge of the convex articulating face is a contraction, almost amounting to a groove, which is not present in the vertebræ of *Mosasaurus*. The other specimen is represented by Figs. 14, 15, 16, of Pl. III. It seems, therefore, probable that these vertebræ belonged to a huge animal of the Mosasauroid group.

In the measurement of the vertebræ of *Mosasaurus Hoffmani*, no one is represented as larger than two inches in length, and two and a half inches across the articular face. This is about the size of the vertebræ from New Jersey, and of those from Ashley River, South Carolina.

For this remarkable saurian the generic name of AMPHOROSTEUS † is appro-

\* From κώνος, conus.

† From the resemblance of the vertebræ, in outline, to an ancient ἀμφόρα.

priated, and the species is dedicated to Professor Brumby, — *Amphorosteus Brumbyi*.

It may not be out of place to mention, in this connection, that I have in my cabinet, from the Eocene of South Carolina, teeth of *Crocodylus macrorhynchus*, Harlan, and of two nondescript saurians; also from the Pliocene of Darlington, South Carolina, (lying on the Cretaceous,) teeth of *Crocodylus clavirostris*, Morton, and from the Pliocene of Edisto, South Carolina, a new species of *Crocodylus*. I have also vertebræ of true crocodylians from Illinois, Alabama, and South Carolina, which will be made the subject of a future communication.

COLUMBIA, SOUTH CAROLINA, August, 1849.

## REFERENCE TO THE PLATES.

## Plate I.

*The figures are all of the natural size.*

- Fig. 1. *Mosasaurus Hoffmani*.  
 Figs. 2, 6. *Mosasaurus Dekayi*, Bronn.  
 Figs. 3, 4, 5. *Mosasaurus minor*, Gibbes.  
 Fig. 7. *Mosasaurus Maximiliani*, Goldfuss.

## Plate II.

*The figures are all of the natural size.*

- Fig. 1. Upper surface of a fragment of the jaw of *Mos. Caroliniensis*.  
 Fig. 2. External lateral view of the same.  
 Fig. 3. Inner view of the same, inverted.  
 Figs. 4, 5. *Mosasaurus Couperi*, Gibbes.

## Plate III.

*Figures of the natural size.*

- Figs. 1, 2, 3, 4, 5. *Conosaurus Bowmani*, Gibbes.  
 Figs. 6, 7, 8, 9, 13. *Holcodus acutidens*, Gibbes; — striated and smooth surfaces.

*Figures one fourth of the natural size.*

- Figs. 10, 14. Convex articular surface of vertebræ of *Amphoroosteus*.  
 Figs. 11, 15. Abdominal surface of vertebræ of the same.  
 Figs. 12, 16. Lateral views of the same.

## NOTE.

Since the preceding paper was placed in the hands of the commission, I find in the February number for 1850 of the Quarterly Journal of the Geological Society of London some interesting notes of Prof. Owen "*On remains of Fossil Reptiles discovered by Prof. H. D. Rogers in Greensand formations of New Jersey.*" He mentions the loss of a paper which he had read before the Geological Society giving a more particular account of these fossils, but gives the general results of his investigations.

The examination of Prof. Rogers's specimens of vertebræ led Prof. Owen to notice a division of those which were Crocodilian into two series, based upon a character of the *hypapophysis*. In the one it is single, and in the other cleft. Other characters induce him to consider the vertebræ in question as belonging to the "oldest of the modern Crocodilian family."

For that distinguished by the single hypapophysis, he proposes the specific name of *C. basitruncatus*; while for the cleft apophysis he adopts that of *C. basifissus*. These vertebræ are identical with several in the cabinet of the Academy of Natural Sciences of Philadelphia, which have been described by Prof. Agassiz in the proceedings of the Academy of National Sciences, on which he founds two new genera, *Sphenosaurus* and *Bottosaurus*. Of Mosasauroid vertebræ, Prof. Owen describes and figures some of the same type as those of *Mosasaurus*, but "longer and more slender"—thinks they may belong to *Leiodon*, but in the absence of confirmatory evidence prefers to refer them to a new genus, "*Macrosaurus.*" The figures resemble precisely the vertebræ of those of a fine specimen discovered by Prof. Tuomey in Alabama, now in the care of Prof. Agassiz for description. As the maxillary bones and teeth are in good preservation, we may anticipate much valuable addition to our stock of knowledge of this family of Saurians.

Prof. Owen also gives figures of other vertebræ characterized by the large size, and especially the great antero-posterior extent of the hypapophysis, and the concavity of the articulating faces resembling those of the *Teleosauroids*. These he considers as constituting a new genus, which he calls *Hyposaurus*, and dedicates it to our eminent Geologist, Prof. H. D. Rogers.

I had hopes, before the addition of this note, to have had the opportunity of examining the collection of Prof. Rogers, but the box containing the specimens was accidentally mislaid, and has not yet reached me.

Nov. 1, 1850.



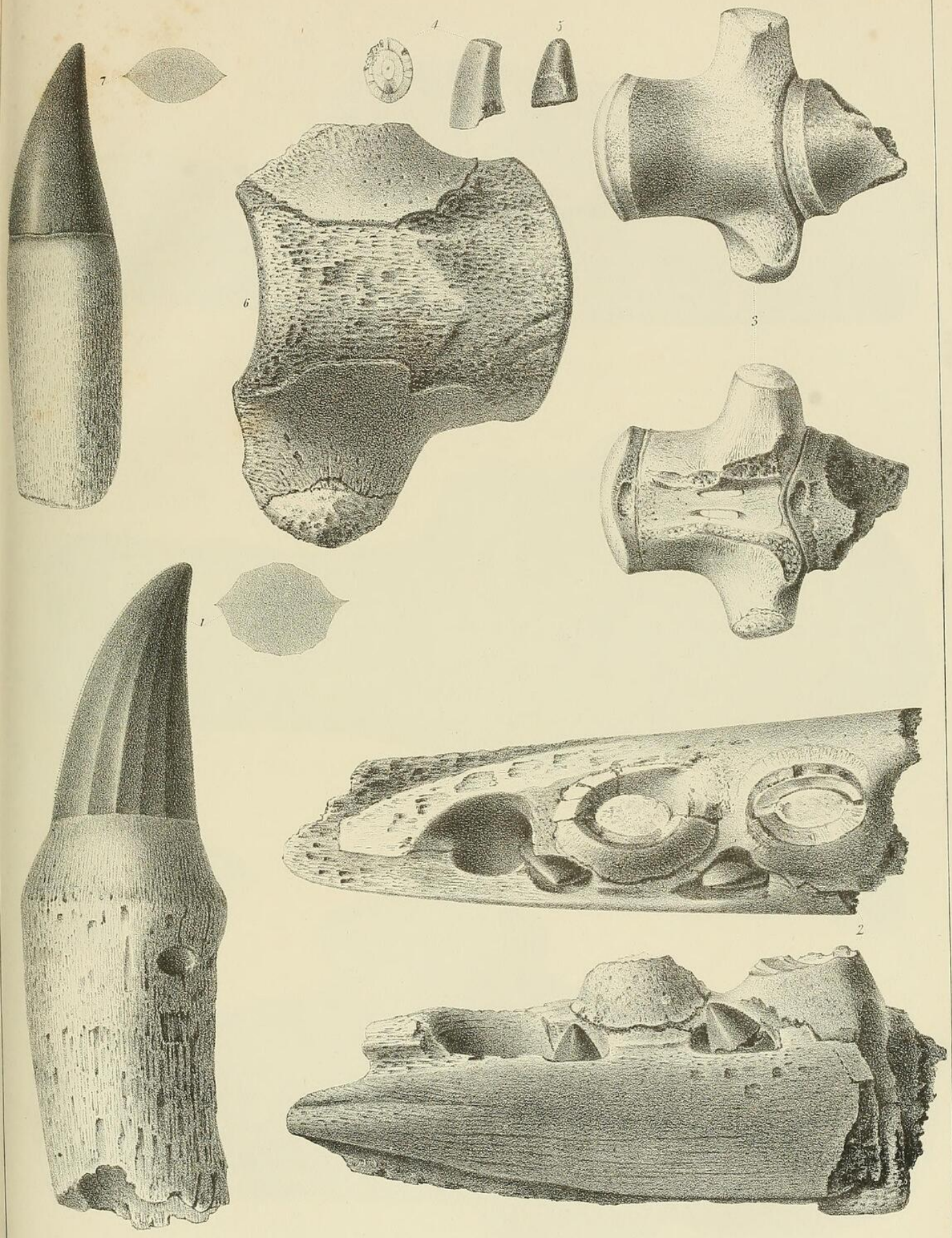
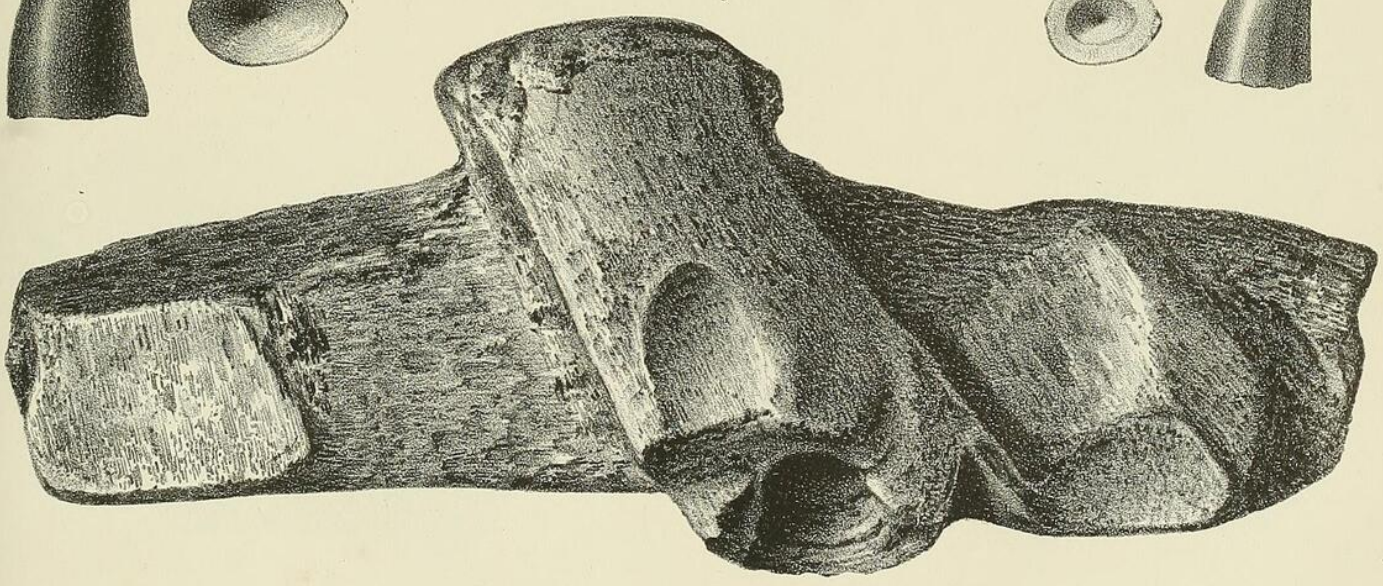
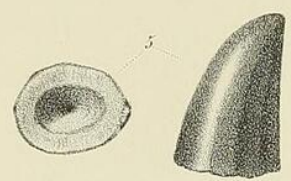
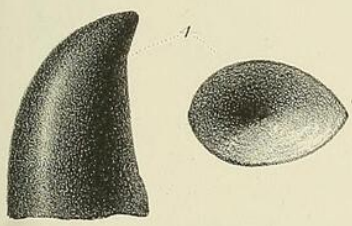
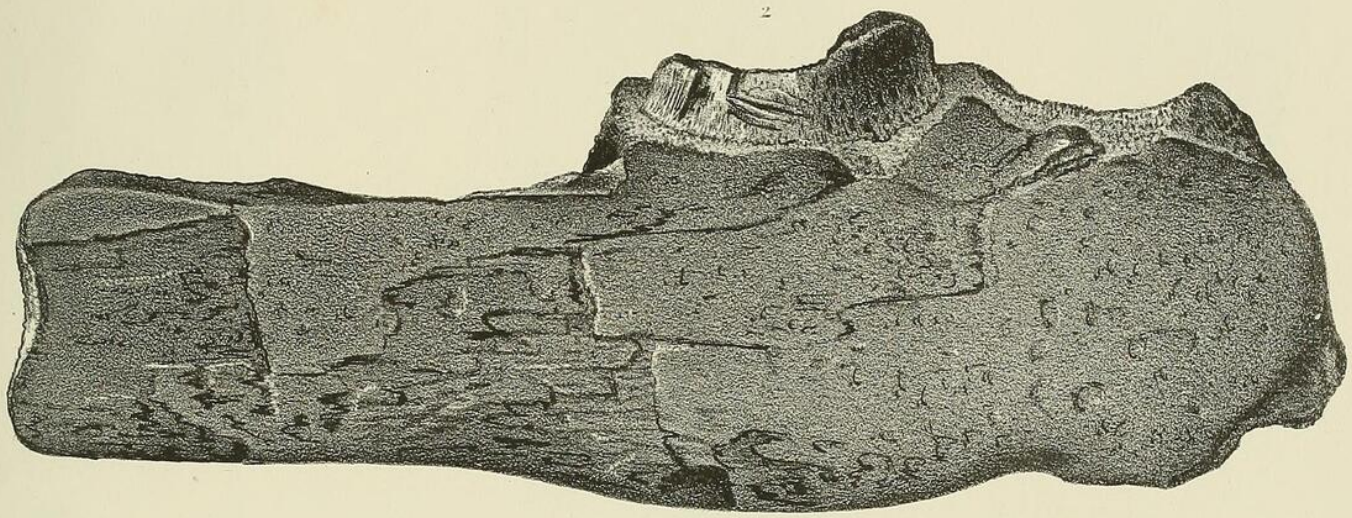
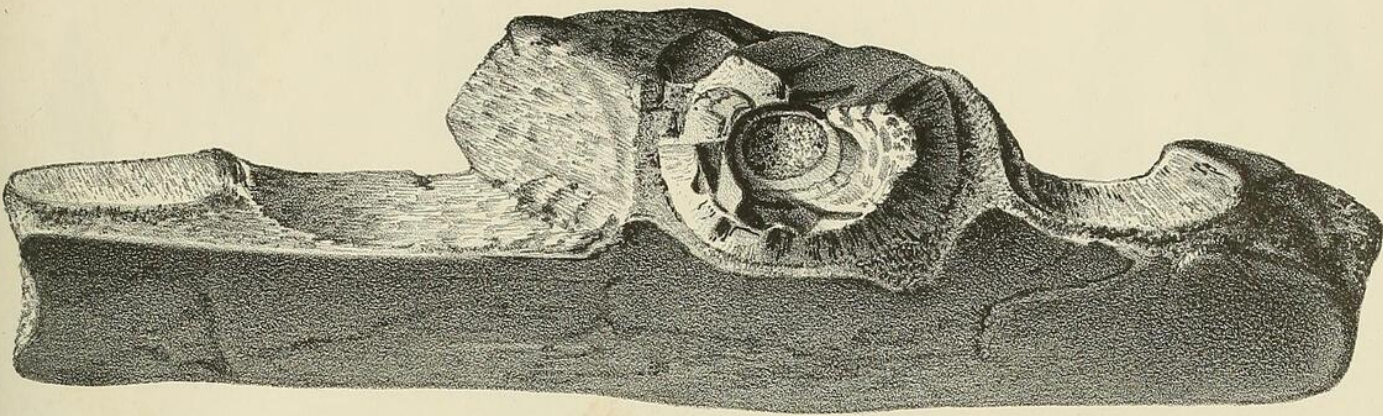


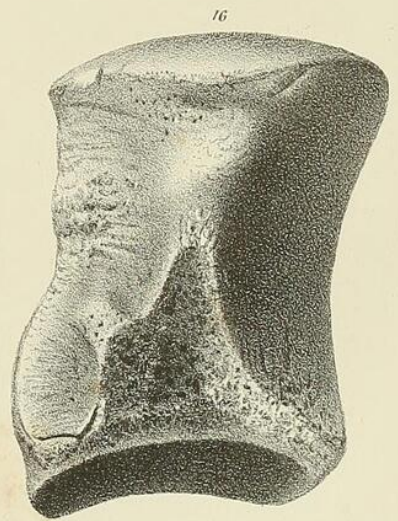
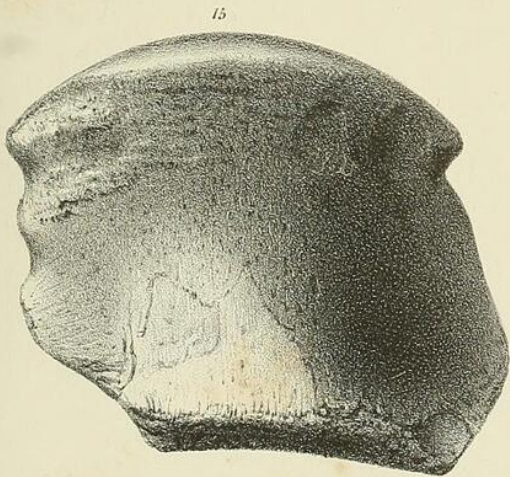
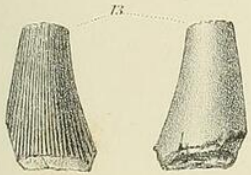
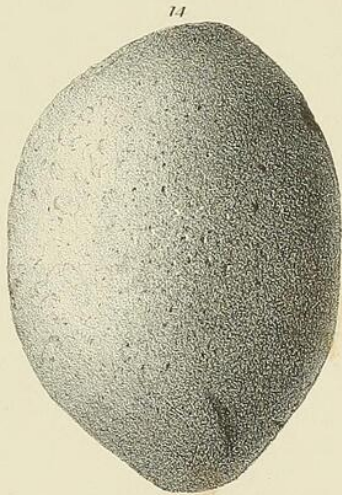
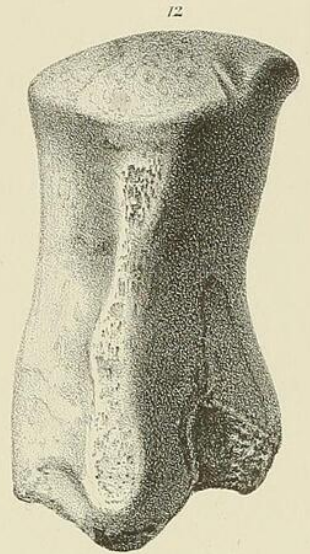
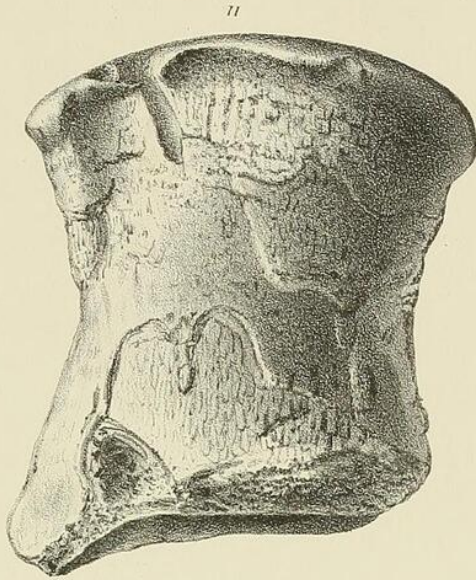
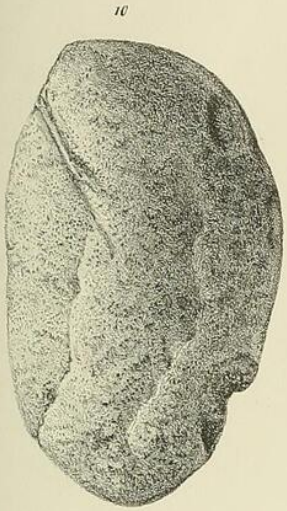
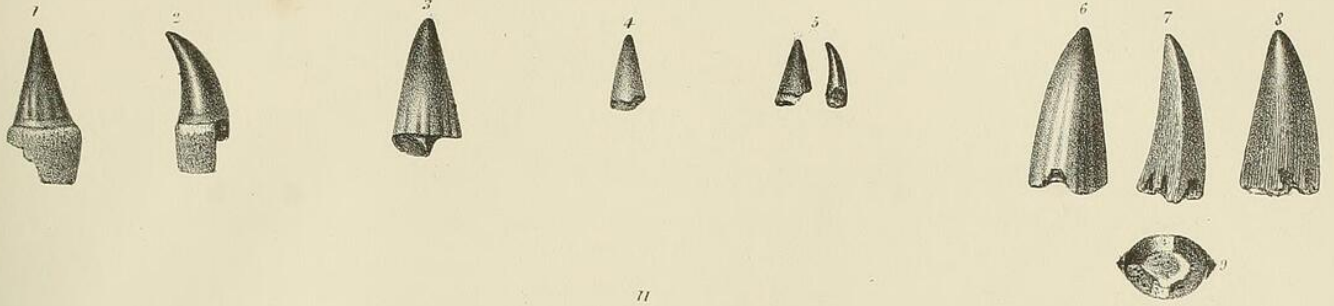
Fig 1 *Mosasaurus Hoffmani*  
 Figs 2 6 „ „ *Dekayi*. Bronn.  
 Figs 3 4 5 „ „ *Minor*. Gibbes.  
 Fig 7 „ „ *Maximiliani*. Goldfuss





Figs 1. 2. 3. *Mosasaurus Caroliniensis*. Gibbs.  
 Figs. 4. 5. ,, *Couperi*. Gibbs.





Figs 1 to 5 *Canosaurus Bowmani*. Gibbes  
 Figs 6 7 8 13 *Holoedus acutidens*. Gibbes  
 Figs 10 to 16 *Amphorosteus Brambyi*. Gibbes.



Gibbes, Robert W. 1850. "A memoir on Mosasaurus and the three allied new genera, Holcodus, Conosaurus, and Amphorosteus." *Smithsonian contributions to knowledge* 2(5), 1–13.

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