

TWO AMPHIBIANS, ONE OF THEM NEW, FROM THE CARBONIFEROUS OF ILLINOIS.

By ROY L. MOODIE,
Of the University of Kansas, Lawrence

The Lacoë collection in the United States National Museum contains examples of two interesting amphibians, one of them a new species, from the Mazon Creek shales. A new labyrinthodont from Kansas has recently been described by the writer from the same collection.¹ The two forms discussed in the present paper are representatives of the salamander-like Branchiosauria and the reptile-like Microsauria. They are members of the families Branchiosauridæ and Amphibamidæ.

Some years ago Mr. David White told the writer of an interesting salamander in the collection of Mr. Lacoë and it was with very great interest that the writer received the specimen which, with the others, was sent through the courtesy of Mr. C. W. Gilmore, to whom I express my hearty thanks.

The little salamander-like fossil is a member of the species *Eumicrerpeton parvum* Moodie, which had been founded, before the specimen was received, on material from Yale University. The name and a discussion of the alimentary canal were published last spring.² The additional specimen from the National Museum serves to substantiate the genus and species, *Eumicrerpeton parvum*, and shows more clearly characters which are distinct from *Micrerpeton*, the genus to which the present form is most nearly related. The National Museum specimen (No. 4400, U.S.N.M.), like those from Yale, shows almost perfectly the entire length of the alimentary canal (fig. 1). The specimen is almost as perfectly preserved as was that of *Micrerpeton caudatum* Moodie.

When the nodule containing the fossil was received the tail was embedded in matrix, but by careful use of the hammer and chisel it was possible to lay bare the whole tail, the tip of which ends on the

¹ Proc. U. S. Nat. Mus., vol. 39, 1911, p. 489.

² Amer. Nat., vol. 44, June, 1910, pp. 367-375.

very edge of the nodule. This was at once perceived to be precisely similar to that of the previously studied examples from Yale. The skull structure, the intermediate position of the pineal foramen, the epiotic notch, and the shape of the skull are so exactly similar to those of the Yale specimens that the form is unhesitatingly referred to the same species.

Most interestingly, too, the present specimen has the alimentary canal almost as perfectly preserved as in the other two specimens, so that the three specimens of this species now known all show the alimentary canals. The present specimen is, however, much more developed than the other two if we may judge from the relative sizes and the proportions of the various parts of the body. There is not the slightest trace of branchiæ in any of the specimens. The matrix does not preserve the skeletal elements as well as does the hard rock from Saxony in which Doctor Credner found such excellently preserved branchiæ.

The National Museum specimen is nearly half as long again as the smallest of the Yale specimens, and the skull is proportionately longer and wider. There is preserved an impression of the anterior edge of both clavicles as has been described for the Yale specimens. No other portion of the pectoral girdle is preserved. The right humerus is imperfectly preserved, as is also the right femur and tibia; other than these the fossil is merely an impression.

The skull is so nearly like what has been described for the Yale specimens that additional description is unnecessary.¹ The pineal foramen is quite large and lies on a line which cuts the orbits into equal longitudinal parts. The inter-orbital space is about equal to the long diameter of the orbit, as in the Yale specimens. Traces of sclerotic plates are observed in the left orbit, but they are quite imperfect.

The alimentary canal is unlike that described for the Yale specimens² in that the intestine is longer and much more convoluted. It lies in five longitudinal folds and ends in an enlarged cloaca near which are the impressions of two glands which may be the posterior ends of the oviducts, as has been suggested for the Yale specimens, but it is rather peculiar that all three specimens should

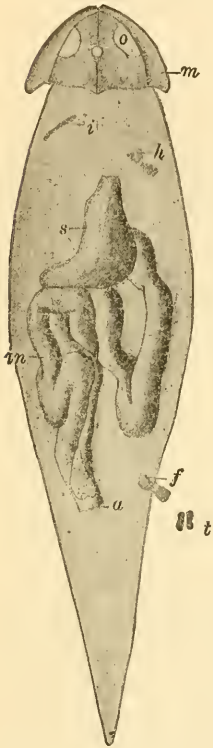


FIG. 1.—A DRAWING OF THE SPECIMEN OF EUMICRERPETON PARVUM MOODIE (CAT. NO. 400, U. S. N. M.). *a* = ANUS; *f* = FEMUR; *h* = HUMERUS; *i* = INTERCLAVICLE; *in* = INTESTINE; *m* = MANDIBLE; *o* = ORBIT; *s* = STOMACH; *t* = TIBIA AND FIBULA. $\times 2$.

¹ Kans. Univ. Science Bulletin, vol. 5, 1911.

² Amer. Nat., vol. 44, June, 1910, p. 368.

be females. Like the Yale specimens the œsophagus is displaced and partially obscured. The creatures undoubtedly fed on small plants and animals much as do our recent salamanders. The alimentary tract is preserved fully extended.

The impression of the tail is, unfortunately, too imperfect to show traces of the lateral lines.

Measurements of the specimen of Eumicrerpeton parvum Moodie (Cat. No. 4400, U.S.N.M.).

	mm.
Length of entire animal.....	45
Length of skull.....	6
Width of skull.....	9
Transverse diameter of the orbit.....	1.50
Long diameter of the orbit.....	2.25
Interorbital space.....	2.50
Diameter of pineal foramen.....	.50
Length of body from back of skull to pelvis.....	22
Greatest width of body.....	9
Length of tail.....	16
Width of tail at base.....	5
Length of humerus.....	3
Length of femur.....	2.50
Length of tibia (fibula?).....	1.75
Length of stomach.....	7
Width of stomach.....	3
Length of intestine (estimated).....	56
Width of intestine.....	1

AMPHIBAMUS THORACATUS, new species.

The genus *Amphibamus* was the first known of the Mazon Creek Amphibia to which Cope, in 1865, ascribed the species *grandiceps*. It is interesting that the latest discovery of forms from Mazon Creek should be an additional species of this genus. The specimen referred to is No. 4306 of the U. S. National Museum. It formed a part of the Lacoë collection. The fossil is rather poorly preserved, but the remains are present on both halves of the nodule, so that considerable has been made out as to its structure.

The chief diagnostic characters which will at once distinguish the species are, the elongate arm, the large interclavicle, the shape of the vertebra, and the triangular skull.

The portions of the animal which are preserved are: the impression of the skull with one orbit; the right humerus and radius (ulna?); the interclavicle; the left clavicle; a single vertebral centrum, with portions of others; and traces of the ventral scutellæ. These remains are so intermingled with fragments of plants that it has been quite difficult to distinguish bone impressions from plants. This has, however, been successfully accomplished by whitening the fossil with ammonium chloride when the texture of the fossils serve

to distinguish the one from the other. Parts of the plants have been converted into or destroyed by galena and kaolin, as have also parts of the bones, so that the task has been doubly difficult. There can be no doubt, however, that the observations recorded below are correct. The position of the arm in relation to the pectoral girdle and the position of the girdle in relation to the skull impression first called attention to the possible presence of a fossil amphibian.

There is little to be said about the skull. It is merely an impression in the nodule. It is triangular in form, with the snout an acute angle. The angle is, however, exaggerated by the compression to which the fossil has been subjected. The right side of the skull lies over a portion of some plant. The animal is preserved on its back, so that this gives a good opportunity for a study of the pectoral girdle, which is partially preserved. The interclavicle is very large, and from this the species has been given its name (*thoracatus*=armed with a breastplate). The interclavicle is an exaggerated "T," with the stem very short. The anterior margin is curved and ends in a rather sharp, elongate point. The posterior spine is quite short and sharp pointed, having a length of only four millimeters. The element recalls, in a measure, the same element of *Branchiosaurus*, although it is much more expanded anteriorly and has a shorter spine. In these respects it resembles more nearly a reptilian interclavicle. The element is quite smooth.



FIG. 2.—DRAWING OF THE SPECIMEN OF AMPHIBAMUS THORACATUS MOODIE (CAT. NO. 4306, U. S. N. M.). *c* = CLAVICLE; *h* = HUMERUS; *i* = INTERCLAVICLE; *o* = ORBIT; *r* = RADIUS (ULNA?); *v* = VERTEBRA. $\times 1$.

The clavicle is of the simple triangular form so characteristic of the Microsauria. It is somewhat displaced backward, and its inner margin is slightly obscured.

The humerus is elongate, apparently cylindrical, and with expanded ends. It resembles very closely the humerus of *Amphibamus grandiceps*, although its proportions are much greater than in that species. Its length is almost equal to the length of the skull, while in *A. grandiceps* the length of the humerus is only one-half that of the skull.

The radius (ulna?) resembles in its general proportions those of the humerus. It is a more slender, lighter bone. The impression of the other bone of the forearm is obscured.

A portion of a single vertebral centrum is preserved. It is from the posterior end of the dorsal series. It is, apparently, amphicoelous. Its height is about one-half greater than its length. The neural spine is obscured.

Measurements of the type of Amphibamus thoracatus Moodie (Cat. No. 4306, U.S.N.M.).

	<i>mm.</i>
Length of entire specimen as preserved.....	60
Length of skull impression.....	18
Greatest width of same.....	15.5
Long diameter of right orbit.....	4
Transverse diameter of same.....	3
Transverse width of the interclavicle.....	14
Long diameter of same.....	7
Long diameter of clavicle.....	9
Greatest transverse diameter of same.....	3
Length of humerus.....	10
Greatest diameter of same.....	4
Least diameter of same.....	1.5
Length of radius (ulna?).....	11
Length of vertebral centrum.....	2
Width of same.....	3