V. A NEW RHYNCHOCEPHALIAN FROM THE JURA OF SOLENHOFEN.

By Norman MacDowell Grier.[1]

(Plate XXII.)

Homeosaurus digitatellus sp. nov.

The specimen figured is part of the Bayet Collection (No. 4026, Carnegie Museum Catalog of Vertebrate Fossils). Through the kindness of Dr. C. R. Eastman, of the Section of Paleontology, Carnegie Museum, it was placed in my hands for identification and description.

The skeleton has been injured to some extent through cracking and other damage sustained by the matrix, but is in good condition as regards many parts. It is so placed in the matrix as to reveal the dorsal aspect, and surrounding it appears the impression of the contour of the body in relief on the matrix, this impression being of a dull red color probably occasioned by the putrefaction of the body. The matrix itself is quite hard.

The Cranium.—Injuries are evident here. The cranium is slightly flattened, possibly by the imbedding of the animal. The premaxillaries as well as the greater part of the nasals, have been lost. Judging from the impression in the matrix, the premaxillaries were arched anteriorly. Nothing can be said of the superior maxillaries. The left superior maxillary is broken off, as is also the greater portion of the right; the position of the skull furthermore does not give much opportunity to observe them. The frontals (See Plate XXII, *a*) are united by a distinct suture, the adjuncts of which appear to taper both anteriorly and posteriorly. They are approximately one-eighth of the greatest width of the skull. Only the right orbital ridge is at all well-defined (*b*). Here the prefrontal, postfrontal, and the articulation of the quadrate-jugal bone with the latter may be observed (*c*). The anterior

[1] Extracted from the thesis presented by the author to the Faculty of the Graduate School of the University of Pittsburgh, June, 1912, for the degree of Master of Arts. The thesis embodies a lengthy discussion of the relationships of *Sphenodon* to the other Reptilia, which the editor of the Annals does not feel that he has the space to print, and which he therefore has omitted, although it is meritorious as a review of what is known as to the Rhyncocephalia, to which the genus *Homeosaurus* belongs.

border of the orbit and the lachrymal bone have taken part in the formation of a cup-shaped depression, (*d*), which I have not observed in any other species of this genus. Although the left orbit is for the greater part obliterated, the remains of this peculiar depression are well discernible, which would possibly indicate something more than an accidental origin for it. A small wedge-shaped projection, protruding at right angles from the posterior border of the orbit (*e*) is evidently the pterygoid bone *in situ*.

The parietals (*f*) are broad and inclose a small fontanelle. They have been slightly flattened, and compose one-fifth of the greatest breadth of the cranium. Portions of the paroccipital and basisphenoid bones have been crowded upon them. The temporal arches of the right side of the skull (*g*) are in position, the constituents showing normally, but the infra-temporal arch appears rather small. On the left side of the skull, the temporal arches are disorganized, and only vestiges of the lower arch are apparent. The quadrate bone is invisible, but portions of the mastoid may be seen. The skull has become disarticulated from the vertebral column in such a way, as to permit both the occipital condyle and the foramen to be observed (*h*).

The Vertebral Column.—Of the cervical vertebræ, the atlas (*i*) is alone well enough preserved to indicate any peculiarities of structure, appearing as a transverse, arched bar. Well defined impressions of transverse processes are present in the anterior cervical region, and there are at least two pairs of cervical ribs to be seen. The first five thoracic vertebræ are in fairly good condition, the neural spines being apparently reflexed upon the centra during fossilization, while the transverse processes are missing or indistinct. Various exposed portions of the vertebræ indicate their amphicœlous nature. The vertebræ seem to have been quite large, their width being one-tenth that of the skull, and their length one-sixth that of the femur. The sacral vertebræ are indistinguishable.

The greater part of the tail is wanting, the portion which has been preserved consisting of the impressions of seven vertebræ which are characterized by the possession of strong transverse processes, and which have the same numerical relations as the other vertebræ. Intercentra can not be seen throughout the entire length of the vertebral column. The vertebræ in the specimen are as follows: cervicals 6; presacrals 7; sacrals (?); caudals 7.

Pectoral Girdle and Ribs.—Of the pectoral girdle there are left but

a few unsatisfactory remains. To the right, a rib-like projection from the posterior cervical region is evidently the clavicle (*j*) and a doubtful impression below it is probably the shoulder-blade. There are vestiges of a coracoid and scapula on the left side of the body. The shoulder girdle was evidently ossified.

In close association with the remains of the right shoulder-blade, are the two short and blunt cervical ribs. There are some seventeen pairs of sternal and abdominal ribs. Anteriorly they are smooth, much the same as in *Sphenodon*. Posteriorly they are considerably shorter than those in the middle of the body, are not so broad, and are nearly equal in extent to five dorsal vertebræ. As far as could be determined, all the ribs have solitary, broad, compressed, and acuminate extremities.

Pelvic Girdle.—The pelvic girdle (*k*) is only to be distinguished by the impression it has produced on the surrounding matrix. It is approximately four-fifths of the width of the cranium. The obturator foramen (*l*) was quite small, having a width one-fourth of that of the pelvis.

Fore-Limbs.—The fore-limbs are quite weak in proportion to the rest of the body, and are shorter and not nearly so strong as the hind-limbs. The humerus is very broad in its distal portion, but an ectepicondylar foramen is not visible. The radius and ulna are proportionally large, curved slightly inward, and are approximately the same length. On both members of the fore-limbs, the carpals, metacarpals, and digits are so obscure, that description is impossible beyond stating that they are unusually fragile for a reptile of the size they support.

Hind-Limbs.—The proximal portion of the femur is long and curved as judging from the impression. It is connected with the distal portion by a large shaft increasing in size toward that end. The tibia and fibula are both strong bones, the former being somewhat stouter than the latter. Both tarsals and metatarsals in either foot are too obscure for further remark. Five toes are present, the number of the phalanges of which are 2, 3, 4, 5, and 4, respectively. The digits are of delicate construction and the claws of the hind-feet are longer than those of the fore-feet.

MEASUREMENTS.

	Cm.
Width of cranium	1.6
Length of cranium	2.
Length of mandible	1.8
Length of humerus	.7
Length of ulna	.7
Length of radius	.65
Length of 4th metacarpal	.2
Length of finger	.8
Length of femur	1.15
Length of tibia	.95
Length of fibula	.9
Length of 4th metatarsal	.45
Length of toe	1.1
Distance cranium to pelvis	7.3
Length of whole skeleton	9.5

Six species of the genus *Homeosaurus* have been described, viz: *macrodactylus*, *maximiliani*, *pulchellus*, *neptunia*, *jourdani* and *rhodani*, the last having been unfortunately described from only the pelvic and caudal portions of the skeleton. In the form *digitatellus*, however, the position of the skeleton within the matrix, as well as injuries received during imbedding, preclude the use of many osteological characters, which were of advantage in the identification and description of the other species which have been cited. Still, as the accompanying plate shows, the outlines or impressions of the more important bones are clearly defined for accurate measurement and comparison.

Upon consultation of the appended table of measurements prepared from the species already described, the relative resemblances and differences will become apparent.

This species has a length of cranium which is proportionately less in comparison with that of the body than in any other species of *Homeosaurus*, except *H. maximiliani*, which it but slightly exceeds in this respect. On the other hand, however, the length of the cranium compared with the width is shorter than in the latter form.

The relative length of the cranium to the femur greatly exceeds that of any of the described species, while that of the humerus bears a similar relation, which is closely approximated by *H. neptunia*, a species, however, which is excluded from comparison by its diminutive size. The ulna and tibia likewise differ, the former most resembling in size that of *H. pulchellus*, the latter being less than that of any other

species. The relative length of the tibia to the femur is less than in any other species excepting *H. neptunia*, which it exceeds.[2]

While the above are the principal points of difference leading to the distinction of the form in question from other species of *Homeosaurus*, similar discrepancies will be found to exist in the relations of all other accessible portions of the skeleton. Collectively these indicate that we are dealing with a new species, which on account of the somewhat fragile digits, I have named *Homeosaurus digitatellus*. For the more accurate distinction of these forms the following key to the species has been prepared.

Genus HOMEOSAURUS.

SPECIES.

Length of cranium approximately equalling the combined length of the humerus and ulna, or twice the length of the humerus. Femur the length of the fibula or .8[3] the length of the cranium. Length of the fourth metatarsal and toe twice that of the fourth metacarpal and finger..... *macrodactylus.*

Length of cranium approximately 1.375 of width, twice the length of the fourth toe. Radius approximately the length of the fourth metatarsal and toe. Combined length of humerus and ulna approximately the length of the tibia or fibula. *maximiliani.*

Length of cranium approximately 1.55 of the width. Width of cranium the length of the fibula, or twice the length of the fourth finger..... *pulchellus.*

Length of cranium approximately 1.50 of the width, 1.65 the length of the femur, 2.5 length of the fibula. Combined 1.50 the length of the fibula..... *neptunia.*

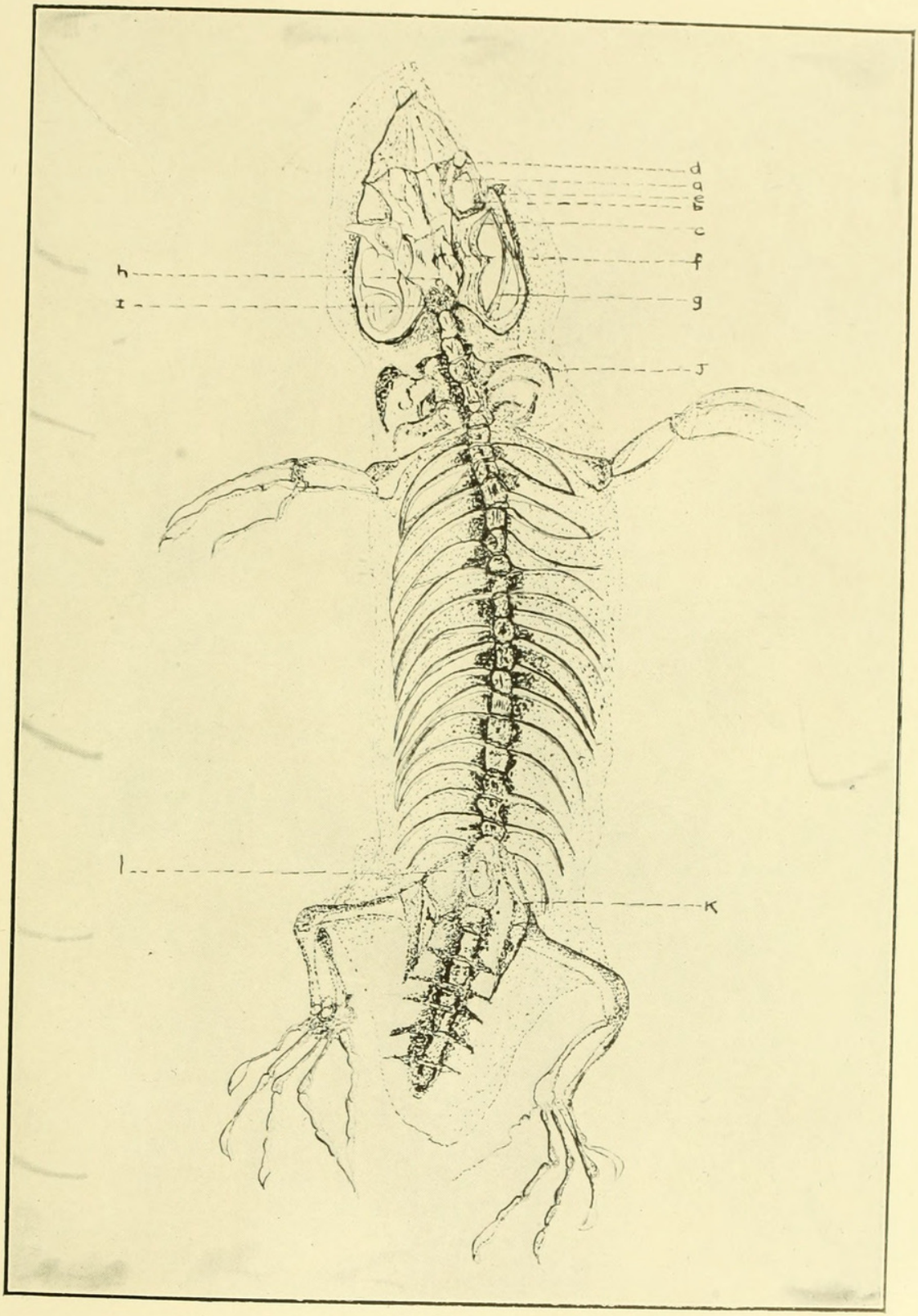
Length of cranium 1.33 the width. Fibula and fourth metatarsal length of fourth toe. Fourth metatarsal and toe twice the length of the femur..... *jourdani.*

Fibula and fourth metatarsal the length of the fourth toe; fourth metatarsal and toe twice the length of the femur..... *rhodani.*

Length of cranium 1.25 of the width, twice the length of the fourth metacarpal and finger. Length of fourth metatarsal and toe approximately width of cranium. *digitatellus.*

[2] This proportion is stated for the elimination of *H. rhodani*, with special reference to its imperfect state of preservation.

[3] Within 1 mm.



Homeosaurus digitetallus Crier. Sp. nov.