

**Article XVII.—NEW OR LITTLE KNOWN REPTILES AND
AMPHIBIANS FROM THE PERMIAN (?) OF TEXAS.¹**

BY E. C. CASE.

REPTILIA.

Order COTYLOSAURIA.

SKULL OF *Diadectes phaseolinus* COPE.

In 1905 (*Jour. of Geol.*, Vol. XII) the author gave a preliminary description of the Diadectidæ based on two specimens in the University of Chicago. The first, No. 1075, is a nearly complete skeleton, but the lower jaws are in position and the skull is preserved in such a refractory matrix that only the external features could be made out. The second, No. 1078, is an imperfect skull. The specimen here described² is nearly perfect, lacking only the premaxillaries, the articular portion of the left quadrate and the lower jaws. The preservation is especially favorable as the skull is little distorted and the details of structure can all be made out.

Upper surface. The posterior portion is marked by a very coarse sculpture but this does not extend much anterior to the orbits. Beyond this the skull is comparatively smooth except the anterior end of the nasals which are marked by a series of pits arranged in an elongate sculpture. The sutures are so indistinct that the limits of the bones can not be made out. The upper portion of the skull is much narrower than the lower so that the distance across the posterior end of the upper surface is not more than half of that across the articular surfaces of the quadrate bones. The pineal foramen is "enormous" in size. Near the posterior end of the skull there are two deep pits in the position of the superior temporal foramina in the Diapsida; in other specimens I have thought that I detected perforations of the skull at this point but there are certainly none in this skull. The character seems to have been an extremely variable one.

¹ The following descriptions were prepared in the course of work conducted under a grant from the Carnegie Institution of Washington and are published in advance of the final paper by arrangement with the Carnegie Institution and the American Museum of Natural History.

² No. 4839, American Museum of Natural History. From the upper layer of conglomerate, in Archer County, Texas, a few miles south of the town of Dundee, discovered by the author.

Posterior aspect. The occipital condyle is wider than long and is excavated on the upper border by the foramen magnum so that it presents a broad heart-shaped outline. The articular face for the atlas is concave and there is a deep pit for the continuation of the notochord. The foramina for the exit of the posterior cranial nerves are not apparent, but a deep pit on

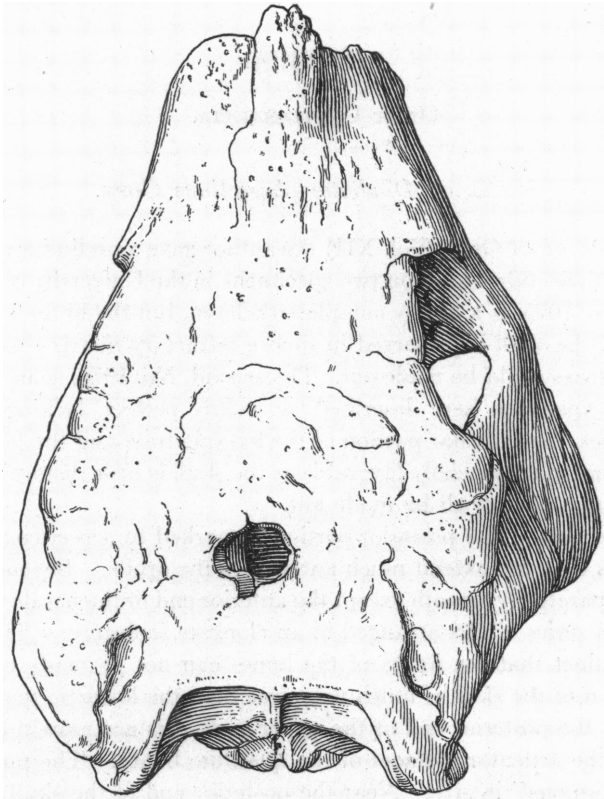


Fig. 1. *Diadectes phaseolinus*. No. 4839, A. M. N. H. Superior aspect of skull. $\times \frac{1}{2}$ nat. size.

either side of the basioccipital may have led into them. The sutures between the various bones forming the posterior plate of the skull cannot be made out, but it is apparent that the paroccipital bone was very short and joined, almost at once, the descending processes of the squamosal and the quadrate. I have described¹ two perforations in the posterior portion of

¹ *Jour. of Geol.*, vol. XIII, p. 127.

the skull in the position of the post-temporal foramina and likened the condition to that of the turtles; in this specimen I find only two deep pits in this position.

Lateral surface of the skull. The quadrate rises almost vertically; the

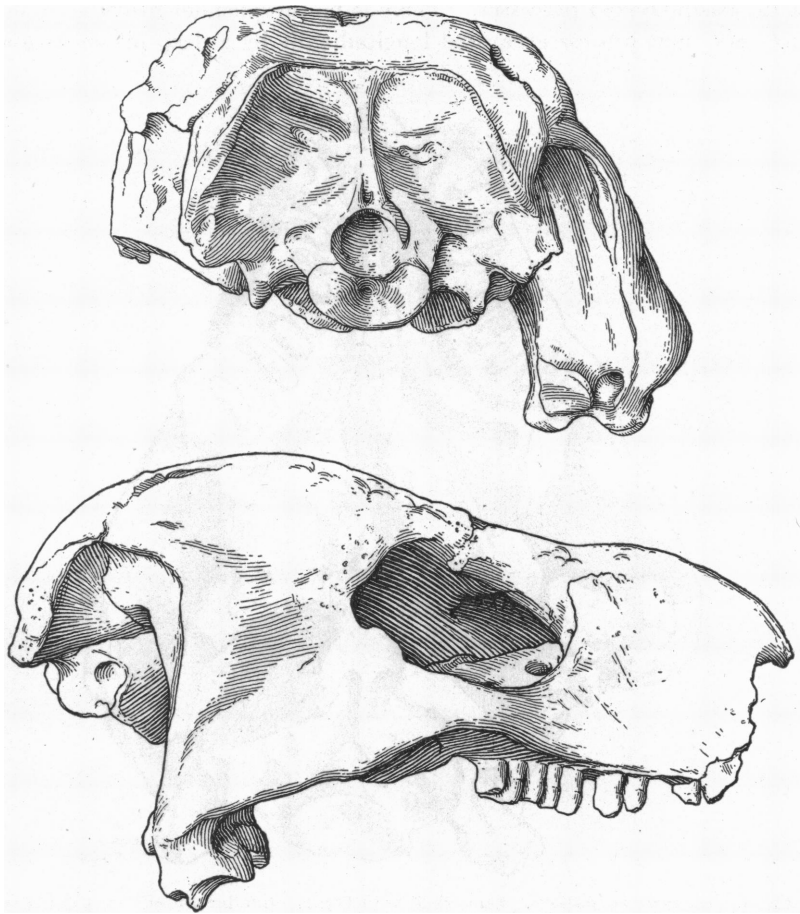


Fig. 2. *Diadectes phaseolinus*. Same skull as in Fig. 1. Posterior and lateral aspects. $\times \frac{1}{3}$ nat. size.

anterior border is attached to and somewhat overlapped by the bones of the postorbital region; near the upper end the quadrate turns at a sharp angle and joins a process of the paroccipital. The quadrate is quite similar to that of the turtles. No trace of a columella auris was found and if present

it must have been very short and stout. The opening of the auditory canal is not apparent but it must have been almost directly opposite the angle described.

Lower surface of the skull. The basioccipital joins the basisphenoid by an indistinct suture. The basisphenoid ends abruptly in front just anterior to the basipterygoid processes. There is no presphenoid rostrum: a short and very stout process excavated longitudinally by a deep pit on its lower

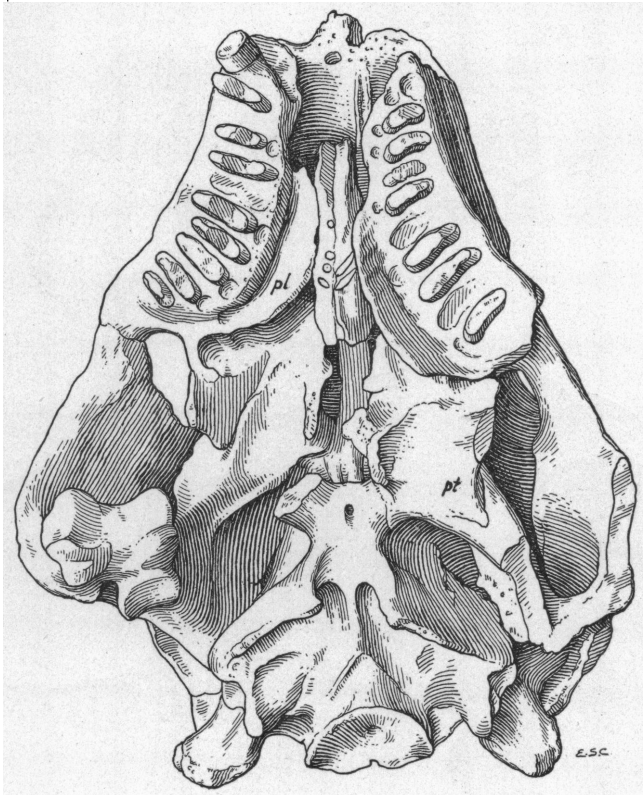


Fig. 3. *Diadectes phaseolinus*. Same skull as in Fig. 1. Inferior aspect. $\times \frac{1}{2}$ nat. size.

surface is attached to the anterior end of the basisphenoid; in other specimens this region is perfectly smooth. The lower surface of the basisphenoid is penetrated in the median line by a single foramen; in the Pelycosauria and Rhynchocephalia generally, there are two foramina in this position for the passage of the internal carotid arteries. In other specimens of *Diadectes* I noticed no foramina in this position, but one was probably present. Poste-

riorly the basisphenoid widens and the lower edge is continued backward as a sort of flange overhanging the basioccipital. This edge is excavated by a notch in the median line and the notch is divided by a narrow partition which is continued backward as a ridge on the lower surface of the basisphenoid and then divides, probably following the line of the basioccipital-basisphenoid suture. On either side of the dividing ridge there is a deep pit, probably the opening of the Eustachian canals. In the Pelycosauria this is a single pit.

Posterior to their articulation with the basipterygoid processes of the basisphenoid the pterygoids pass backward as vertical plates to join the quadrate, but the vertical plates are curved so as to approximately follow the curve of the outer wall of the skull, and this leaves no great space between them. Anteriorly the pterygoids nearly, but not quite, meet in the median line; passing forward they articulate with the inner edges of the maxillaries or with the palatines. The anterior ends of the pterygoids are covered by plates attached to the maxillaries; these occupy the position of palatines and probably are such, but their position underlying the pterygoids is very peculiar. In other specimens I have traced an incomplete ectopterygoid but none can be made out in this one. Between the maxillary plates (Cope), or palatines (Case), there is left quite a space in which lie the prevomers. These are vertical plates of considerable height but very narrow on the palatal surface. The upper edges of the posterior ends flare out to join the pterygoids or palatines, but at the anterior end the plates are strictly vertical and touch at the upper edge a single vertical plate in the median line of the skull. There are traces of a few elongate, conical teeth, irregularly arranged, on the lower surface of the prevomers.

Longitudinal section of the skull. The brain-cavity shows the sharp downward bend posterior to the epiphysis mentioned by Cope in his description of a cast of the cranial cavity. Anterior to the otic region there is a very large foramen which probably gave exit to the seventh cranial nerve: it is likely that other nerves escaped through the same opening. Anterior to this foramen, the walls of the brain case are formed by solid descending plates, the alisphenoids, attached to the under side of the roof above and uniting with each other and the basisphenoid below; they may be traced forward as far as the anterior edge of the orbit, meeting in the mid-line below and forming a long cavity open at the anterior end, which sheltered the long anterior prolongation of the brain shown in Cope's cast.

Anterior to the basisphenoid and joining the short anterior rostrum is a single vertical plate, the parasphenoid (ethmoid). This ends somewhat abruptly behind the point where it joins the basisphenoid, but extends upward until it unites with descending plates above. It remains in contact

with these plates to their anterior end, and beyond them, it is united by cartilage to a median prominence on the lower surface of the nasals. The lower edge of its anterior half is in contact with the upper edges of the prevomers. This plate is similar in all respects to the bone figured by Broom as the ethmoid in the skull of *Lystrosaurus latirostris* and by the author in the skull of *Dimetrodon gigas*. It is a direct continuation of the parasphenoid rostrum of the basisphenoid, even if it is not a part of it. In the Pelycosauria there is a well developed presphenoid rostrum and in the

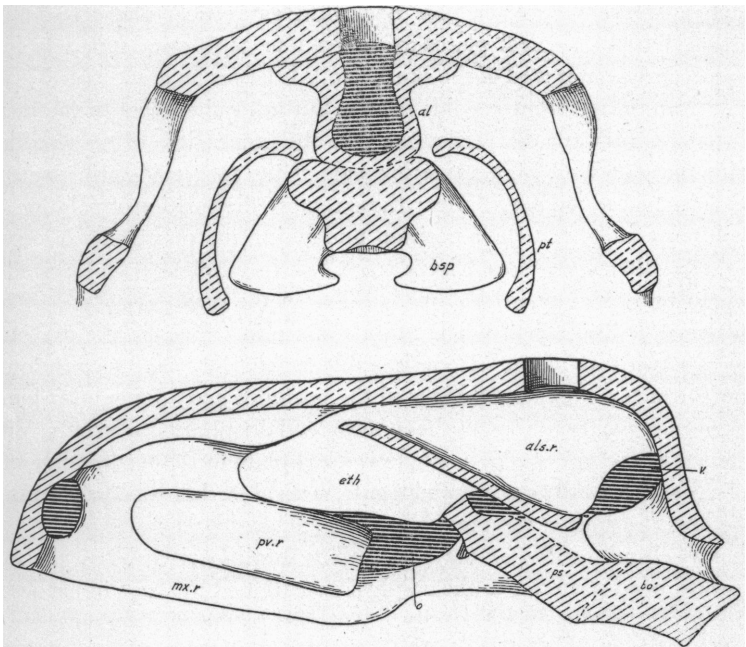


Fig. 4. *Diadectes phaseolinus*. Upper figure, a transverse section of the skull at center of orbits. *al*, alisphenoid; *pt*, section of pterygoid; *bsp*, basisphenoid. Lower figure, a longitudinal section of the skull. *als.r*, alisphenoid, right side, seen from within; *eth*, ethmoid; *pv.r*, prevomer, right side; *mx.r*, maxillary, right side; *o*, orbit; *ps*, basisphenoid; *bo*, basioccipital; *v*, opening for seventh, and perhaps other cranial nerves.

specimen described below, *Dimetrodon gigas*, the ethmoid is directly attached to its anterior end. It is my belief that this plate is in part, at least, derived from the parasphenoid and represents the beginning of the unpaired vomer as stated by Broom. The anterior, toothbearing, paired elements are true prevomers.

In the article in the 'Journal of Geology' the author suggested the possible relationship of *Diadectes* to the turtles on the following counts:

- I. The form and relations of the quadrate.
- II. The degenerate palate and the disappearing transverse bone.
- III. The absence of teeth on the palatines and pterygoids.
- IV. The absence of a parasphenoid rostrum on the basisphenoid bone.
- V. The absence of prevomers and the presence of an anteriorly placed single vomer (parasphenoid).
- VI. The method of entrance of the internal carotids into the brain cavity.
- VII. The presence of paired descending plates from the roof of the skull anterior to the brain case.

Of these numbers, IV, V, and VI must be modified.

IV. Several specimens show no trace of the parasphenoid rostrum; this one shows a short and degenerate process. Versluys has recently shown the presence of a parasphenoid in *Dermochelys*.

V. This is wrong. There is a separate parasphenoid (ethmoid, vomer) and distinct paired prevomers in the median line.

VI. In some other specimens there are no foramina perforating the lower surface of the basisphenoid, in this there is a single large foramen.

The corrections do not modify the conclusions drawn in the first paper.

RECONSTRUCTION OF *Diadectes phaseolinus* COPE.

This reconstruction is based on specimen No. 4684, Am. Mus. Nat. Hist. It consists of a nearly anatomically perfect skeleton, lacking only the skull, the atlas and axis, a few caudal vertebræ and many of the bones of the feet. The lower jaw is in good preservation and shows that the animal belongs to the same species as the skull, No. 4839, described above, so the only points left in doubt are the structure of the carpus and tarsus, the number and arrangement of the phalanges and the exact number of caudal vertebræ. The specimen was found in the upper conglomerate layer on the south side of Godlin Creek, in Archer Co., Texas, by the author in 1908. The skeleton was worked out and reconstructed by Charles Falkenbach of the American Museum.

In 1907 the author published a reconstruction of *Diadectes* based on the very perfect skeleton in the University of Chicago but the present specimen indicates several errors, notably in regard to the plates overlying the anterior ribs and in the length of the tail. The form and proportions of the present reconstruction are subject to little doubt. The position of all the presacral vertebræ has been determined by fits between the fragments with the exception of a single place; this renders the position and number pretty certain,

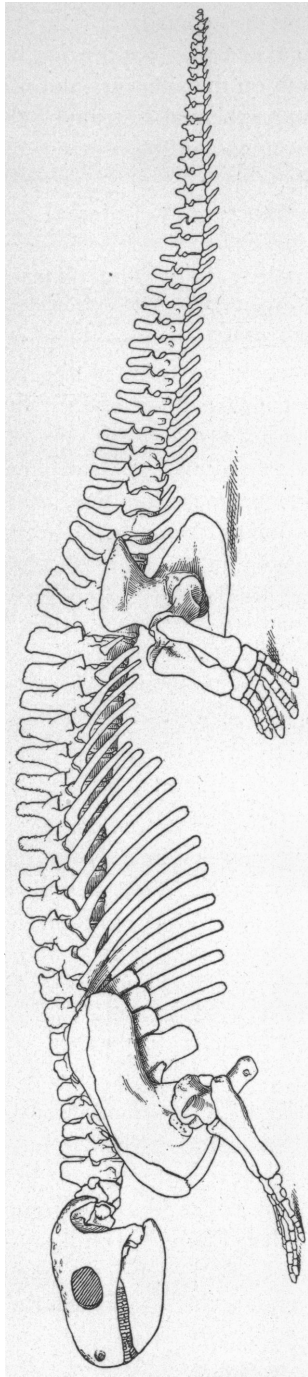


Fig. 5. Reconstruction of the skeleton of *Diadectes phaeocephalus*. $\times \frac{1}{1}$ nat. size.

but if we add the axis and atlas there is one more vertebra than in the Chicago specimen.

The *atlas* as shown by the Chicago University specimen number 1075, has a simple disk-like centrum with the neural arch composed of two separate halves. These latter strongly resemble the same elements in *Dimetrodon*. The articular face of the occipital condyle is placed at a strong angle to the main axis of the skull, so that if it articulated directly with the face of the atlas the skull would have been held at an angle to the vertebral column; to avoid this there must have been a large preatlantal intercentrum.

The *axis* resembles the succeeding vertebrae in general form but the spine is thinner and expanded somewhat antero-posteriorly. It is not greatly higher than the spines of the other vertebrae.

The remaining cervicals and the dorsals are similar in form. The neural arches are broad and strong, the zygapophyses are flat and there is a well developed hyosphene-hypantrum articulation throughout the presacral series. The spines are all stout and low with slightly expanded, very rugose upper ends which are strongly suggestive of the presence of a row of dermal plates overlying the neural spines as in *Pareiasaurus*. No trace of such plates has been observed in any specimen, however. There are no true lumbar in the sense of any vertebrae being without ribs, for the first presacral has a short rib coössified with the transverse process. There are two sacral vertebrae, not united into a sacrum, but with reduced zygapophyses and evidences of a very close union between them. The anterior caudals, up to the fourth or fifth, have free ribs, beyond this the ribs are ankylosed to the transverse processes and are rapidly reduced to a rudimentary condition. The tail is as long as the presacral portion of the column, but the vertebrae do not assume the elongate form which indicates the presence of a very slender tail. Between the fifth and the sixth vertebrae the first chevron appears and these continue to the extremity of the tail. The chevrons and the spines of the caudal vertebrae indicate that the tail was somewhat flattened vertically as in the alligators.

Intercentra of small size occur in the specimen in Chicago but are not preserved in this specimen.

The ribs. The atlas probably bore a pair of slender ribs of considerable length, but this is indicated very imperfectly in the specimen. The ribs of the axis are short but broader, showing an approach to the triangular form of the three following ribs. The ribs of the third, fourth and fifth vertebrae show a well defined articular end with a distinct neck, but in common with all the rest of the ribs there is no division into capitulum and tuberculum. The bodies of these ribs are expanded into thin triangular plates, with the front edge straight and the posterior edge drawn out into a point which

overlaps the succeeding rib; this forms a strong protection for the anterior thoracic region. The following ribs are of normal form, gradually increasing in size to the eighth or ninth and then decreasing. The sixth, seventh and eighth are overlain by thin, narrow, plates which continue backward the protection of the thoracic region to a point opposite the posterior end of the scapula. In the first restoration of *Diadectes* it was thought that the expanded anterior ribs were also plates overlying the ribs, but this is shown to be an error.

The bones of the *shoulder girdle* are separated but show the same character as previously described; the animal was distinctly narrow chested, with the bones of the girdle strongly interlocked. The anterior edge of the clavicle was so far forward that it was very close to the angle of the lower jaw. In common with many of the Permian and Triassic reptiles, *Diadectes* had practically no neck.

The *limbs* were exceptionally stout and short and the feet very wide and stumpy. There are only a few of the carpal and tarsal bones preserved. In the reconstruction they have been placed as nearly in the correct position as possible, but the result is very doubtful. The metapodial bones are all very broad and short and the terminal phalanges are spatulate and rugose, showing the presence of a broad, blunt nail.

The *pelvis* is complete but has been badly crushed in fossilization so that it is much too narrow and the ischium and pubes are not horizontal as they were in life. The ilium rose almost vertically and at right angles to the other two bones.

No trace of *abdominal ribs* have been found in any specimen of *Diadectes* but it seems probable that such elements were present. They occur in most of the reptiles of the Permian which are related in form or habit to the Diadectids.

The appearance of this creature, with its large head, short neck, narrow chest and round body; with its short stumpy legs and feet resembling those of a land turtle, and its alligator-like tail, must have been sufficiently bizarre, but not more so than that of many living reptiles. Perhaps *Heloderma* would be the most similar among living forms in attitude and proportions, if the cylindrical tail were compressed into that of an alligator, the feet shortened and the claws blunted. It is difficult to form any idea of the habits except that the animal was herbivorous, of low brain power and sluggish movement, and it can only have offered a passive defense to such animals as the carnivorous Pelycosaur. The strong girdles, the powerful limbs with well formed articulations and especially strong rugosities for muscular attachment, the closely knit and well formed carpus and tarsus all indicate a terrestrial habit. The broad, short feet with powerful spade-

like terminal phalanges which were covered by powerful nail-like claws have strong resemblances to those of certain fossorial forms such as the gopher turtle of Florida, *Gopherus polyphemus*. It seems probable that the foot rested fairly flat on the ground with a pad raising the carpus and tarsus slightly. A small fragment of shale from the same region in which this specimen was found carries two footprints of a smaller animal, probably a Diadectid; in this only the impression of the claws and of a flat pad are shown.

I believe these animals to have been harmless, sluggish, terrestrial herbivores; possibly fossorial in habit, at least to the extent of excavating burrows

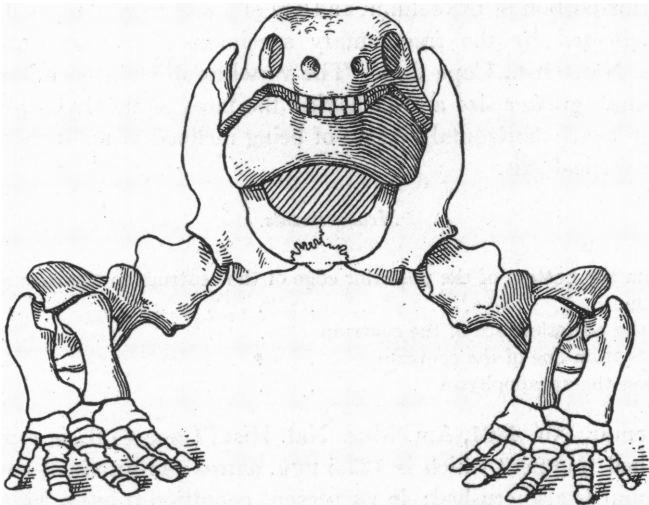


Fig. 6. Reconstruction of the skeleton of *Diadectes phaseolinus*. $\times \frac{1}{4}$ nat. size.

for their protection. The attitude was habitually prone and they could not elevate the body on the limbs even as much as an alligator can, nor could they develop any speed even for short intervals. Finally: These Diadectids, the type forms of the Cotylosauria, can not be retained in the ancestral position in which Cope placed them, the Rhynchocephalian double arch can not be derived from the skull and the animal is otherwise too highly specialized. The mounted skeleton bears out in form, proportions, attitude and probable habit, the suggestions previously made by the author that these animals are the nearest discovered forms to the ancestors of the turtles.

NEW REPTILES.

Diadectes maximus sp. nov.

Type: Three large lumbar vertebræ. No. 4392, Am. Mus. Nat. Hist., Cope Coll.

This species is indicated by the not uncommon occurrence of especially large bones of this genus. Size, however, is not sufficient alone to indicate distinction among the reptiles. Three large vertebræ give certain characters sufficiently distinct to warrant the separation of the species. These are from the posterior portion of the column and are of a size to go with such femora as are indicated by the fragmentary specimens Nos. 4361 and 4379, Am. Mus. Nat. Hist., Cope Coll. The vertebræ differ from other known forms in their greater size and in having the faces of the hyposphene and hypantrum nearly horizontal instead of being inclined at an angle of nearly 45° to the vertical axis.

Measurements.

	mm.
Height from the bottom of the posterior edge of the centrum to the base of the spine	146.5
Height of the posterior face of the centrum	58.5
Length of bottom line of the centrum	48.
Width across the zygapophyses	140.

The femur, No. 4361, Am. Mus. Nat. Hist., Cope Coll., is represented by a crushed fragment which is 122.5 mm. across the proximal end. The second femur is also crushed; in its present condition it has a width across the distal end of 138.5 mm. and a length of 261 mm. An anterior caudal vertebra, No. 4838, Am. Mus. Nat. Hist., has a total height from the base of the centrum to the top of the spine of 182 mm. and a width across the transverse processes to the beginning of the ribs of 83 mm. These bones indicate an animal at least one third larger than the reconstructed specimen No. 4684.

Diasparactus zenos gen. et. sp. nov.

Type: A short series of vertebræ, including the sacral and a few pre-sacral vertebræ. No. 4797, Am. Mus. Nat. Hist., Cope Coll. From New Mexico. (Fig. 7, upper row.)

This new genus and species of the family Diadectidæ is characterized by the small size of the centra compared to the height and spread of the neural

arches and by the short transverse processes. The whole vertebra is relatively very thin antero-posteriorly so that while it has the general form of all members of the family, it looks much higher and wider and the small centrum gives it something of a high-shouldered kite shape, when viewed from the front or rear. The transverse processes are exceedingly short, never extending out beyond the edges of the zygapophyses and in most cases not reaching so far.

The last perfect vertebra in the series presents an abnormal condition.

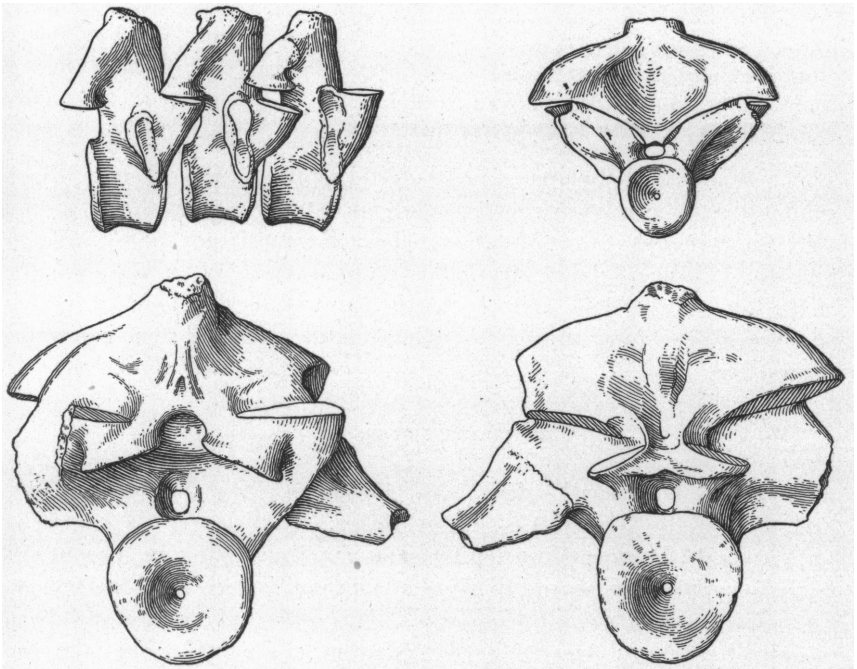


Fig. 7. Upper row: *Diasparactus zenos*, type vertebræ, No. 4794, A. M. N. H., lateral and posterior aspects. $\times \frac{1}{2}$ nat. size. Lower row: *Diadectes maximus*, type vertebræ, No. 4392, A. M. N. H., anterior and posterior aspects. $\times \frac{1}{8}$ nat. size.

On the right side the transverse process is reduced to a mere rudiment. On the left side, there is a short, strong process with a large face for the sacral rib. A fragment of the vertebra succeeding has the appearance of carrying a large face on the right side. It is evidently a case of an abnormal support of the pelvis.

The first presacral has only small transverse processes without articular facets for ribs. The second presacral has a very short transverse process which is inclined very slightly forward at the lower end; the upper end hardly

overhangs the lower. In these respects it differs from *Diadectes* in which the articular face is inclined sharply downward and forward. In the anterior vertebræ the faces of the transverse processes become longer but remain nearly vertical. In all, the transverse process is so short as to be practically absent and the upper end of the articular face is on the posterior surface of the anterior zygapophysis.

Measurements.

	mm.
Transverse diameter of a centrum	23.
“ “ “ same centrum, bottom line	12.
Antero-posterior diameter of same centrum	20.
Height of vertebra to base of spine	63.
Width across posterior zygapophyses	66.
Anterior-posterior width across zygapophyses	37.

There are isolated vertebræ of Diadectid reptiles in the collection which exhibit the same relative shortness antero-posteriorly as is shown in No. 4797, but do not have the proportionately small centrum nor short transverse processes. It may be that they indicate a new genus but we know so little of the osteology of these animals that it may well be that they are lumbar vertebræ of some form already described from the teeth and so no new name is proposed.

***Ctenosaurus rugosus* sp. nov.**

Type: A few neural spines. No. 4785, Am. Mus. Nat. Hist., Cope Coll. From Rio Arribas Co., New Mexico.

Among the fragments bearing the same number as the type specimen of *Zatrachys apicalis* are several spines of a Pelycosaurian reptile which indicate a new species of the genus *Ctenosaurus*. This genus has not previously been recorded from North America but Dr. Matthew has located in the collection of the American Museum certain spines from Texas which are very similar to *Ctenosaurus koeneni* of von Huehne. It is probable that this genus or something very similar to it existed in North America. The spines here described are not very long, the base is narrowed with almost equal antero-posterior and transverse diameters. The upper portion becomes more thin and is elongated in the antero-posterior direction. The sides of the spine from the base to the top are covered with small irregular bosses similar to that on the skull of many amphibians. Some of the spines are more slender and less expanded antero-posteriorly at the top than others but all bear the characteristic sculpture. Fragments of scapulæ and limb bones associated with the spines are typically Pelycosaurian in form.

	mm.
Height of a nearly complete spine	113.
Antero-posterior diameter at top	30.
Same at bottom	15.

GYMNARTHRIA subord. nov.

Gymnarthridæ fam. nov.

Skull without temporal openings. Lower edge of postorbital portion cut away by the development of a notch until the quadratojugal is lost and the prosquamosal greatly reduced. Quadrate freely exposed and perhaps movable. Parasphenoid rostrum large. Distinguished from *Lysorophus* by the single occipital condyle, loss (?) of prosquamosal and quadratojugal, and character of the teeth.

Gymnarthrus willoughbyi gen. et sp. nov.

Type: A skull. No. 4892, Am. Mus. Nat. Hist. From Baylor Co. near the head of Coffee Creek, in a red clay above the Wichita Conglomerate.

Paratype: A skull. No. 4763 Am. Mus. Nat. Hist. Cope Coll. Locality unknown.

The description given is taken from the type largely, but additional facts have been determined from the paratype.

Teeth blunt cones with no indication of anterior and posterior cutting edges. Teeth regularly decreasing in size anteriorly. No enlarged teeth in premaxillaries. Nine teeth in maxillary and three or four in the premaxillary.

The type skull is small, total length slightly over 16 mm. The premaxillaries are imperfect, so it is impossible to give the exact length. At first sight the skull resembles that described by Cope as *Pariotichus* but it is radically different in the posterior portion. The lower edge of the postorbital region has been cut away in the manner of some turtles, until the quadratojugal is lost, the prosquamosal doubtfully present, and the quadrate fully exposed and perhaps movable. The upper portion of the skull is roofed over and there is no suggestion of temporal openings. The quadrate is elongate and of peculiar shape; it articulates with the squamosal above and seemingly with the occipital plate (paroccipital + exoccipital + supraoccipital) behind. The posterior surface is somewhat injured and it is impossible to make out the form and relations of the various bones. The relations of the bones of the upper surface is shown in Fig. 8D. There is a small but distinct parietal foramen. The premaxillaries were apparently large and

sent back a process between the nares to meet the nasals. The anterior nares were of good size and terminal in position. The last maxillary tooth is small, the next to the last is the largest and the others diminish regularly toward the anterior end. There are no tusks or enlarged teeth on the premaxillaries, the teeth on this bone sharing in the regular diminution in size toward the anterior end of the skull. There are no cutting edges on the antero-posterior faces.

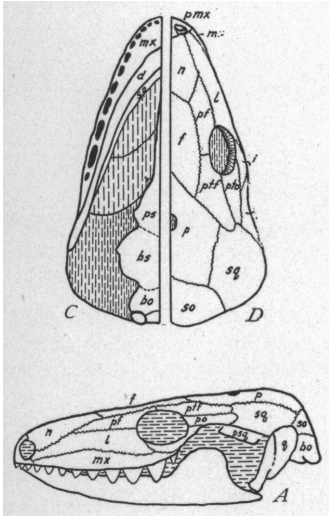


Fig. 8. *Gymnarthrus willoughbi*, type skull, No. 4892, A. M. N. H. A lateral, and D superior aspects. $\times \frac{1}{2}$ nat. size.

On the lower surface the basioccipital occupies a small space at the rear, the basisphenoid is a large flat plate, and unites without suture with a strong parasphenoid process. It was thought at first that both the basisphenoid and the parasphenoid process constituted the parasphenoid bone and that the animal was an amphibian, but this is impossible. The parasphenoid process is relatively the largest in any of the Permian reptiles recovered from Texas and in this respect, the animal approaches the intermediate form between the amphibians and reptiles. At the anterior end, the parasphenoid meets two diverging plates which are apparently the palatines but they are in large part covered by the lower jaws. The lower edge of the pterygoids can be made out as a thin line in the matrix which fills the back part of the skull; its relations to the basisphenoid and quadrate are normal.

The lower jaws lie in position between the upper jaws and the teeth cannot be seen. The articular region is low and just anterior to this the upper edge rises in a prominent coronoid process. The different bones of the jaw cannot be made out, but it is apparent that the dentary takes part in the symphysis.

The paratype shows that the pterygoids are large flat plates reaching the middle line, not widely separated as in amphibians. The type skull shows two small openings between the orbits and nares which were supposed to be preorbital openings but as nothing of this kind appears in the paratype, they are probably accidental.

The nearest approach to this form is the small amphibian skull described by Broili as *Cardiocephalus sternbergii*,¹ but this is described as having the

¹ 'Permische Stegocephalen und Reptilien aus Texas.' *Paleontographica*, Bd. LI, s. 45, Taf. vi, fig. 5.

skull complete, no **parietal** foramen, teeth regularly diminishing in size anteriorly but with cutting edges, **and** lyra present.

AMPHIBIA.

Order TEMNOSPONDYLI.

ASPIDOSAURIDÆ fam. nov.

Aspidosaurus glascocki sp. nov.

Type: A fragmentary skull and portions of the vertebral column. No. 4864, Am. Mus. Nat. Hist. Collection of 1908. From the upper conglomerate layer a few miles south of Dundee, Archer Co., Texas.

This specimen is similar to those described by Cope as *Zatrachys apicalis*, by Case as *Z. crucifer*, and by Broili as *Aspidosaurus chiton*. Cope mentioned that he considered as belonging to the genus *Zatrachys* all forms of amphibians with serrate edges of the skull and with expanded rugose terminations of the neural spine. There is no evidence in the Cope Collection or elsewhere for the union of such forms in a single genus. The genus *Zatrachys* was originally described from skulls alone and the species *apicalis* and *crucifer* were described from fragmentary dorsal spines. The present specimen shows that the expanded neural spines are not connected with a skull of the type of *Zatrachys* but with one more like that of *Trimerorhachis*. As there seem to be several distinct genera with the expanded neural spines, and as there is no place for them, I propose a new family **Aspidosauridæ** for *Aspidosaurus chiton* Broili, *A. (Zatrachys) apicalis* Cope, and *A. (Zatrachys) crucifer* Case. This family is characterized by the rhacitomous vertebræ, by the expanded tops of the neural spines which are marked on the upper surface by a rugose pitted area; by the intercentra with more or less prominent processes for the heads of the ribs; and by having the ribs flattened and expanded distally and overlapping to form a protection for the thoracic cavity.

This family approaches the Otocœlidæ (now known to be a family of amphibians containing the genera *Dissorophus*, *Otocœlus* and others), but differs in the fact that in the latter family the expanded spines are not rugose above and are overlain by a set of rugose plates, corresponding to the neural spines in number but distinct from them.

The new species, *A. glascocki*, differs from *A. chiton* Broili in having the expanded apices of the neural spines much larger and marked with a coarser sculpture. The apices of the spines touch but do not overlap. The intercentra have prominent processes on the sides for the heads of the ribs.

In *A. chiton* there are facets a little more prominent than in *Eryops* and *Trimerorhachis*, while in *A. glascocki* they extend out from the sides of

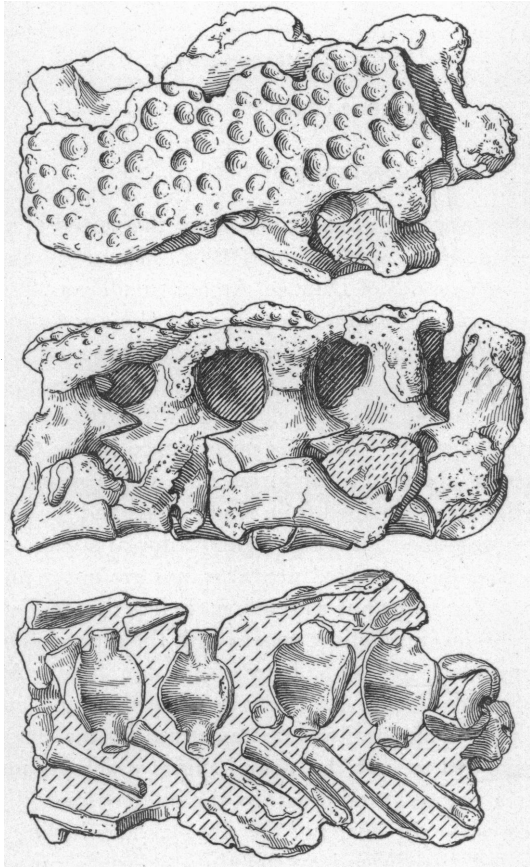


Fig. 9. *Aspidosaurus glascocki*, type vertebræ, No. 4864, A. M. N. H., superior, lateral and inferior aspects. $\times \frac{1}{3}$ nat. size.

the intercentrum for two or three millimeters. The skull resembles that of *Trimerorhachis* as far as it is preserved. The animal was about 300 centimeters long.

***Tersomius texensis* gen. et sp. nov.**

Type: A small skull. No. 4719, Am. Mus. Nat. Hist. From a yellow clay near the upper layer of conglomerate, on the south side of the Little Wichita River, in Archer Co., Texas. Collection of 1906.

The skull is flattened, having nowhere near so much of an arch as in the specimen described by Cope as *Trimerorhachis conangulus*. The orbits are large, extending so close to the edge that there is a very thin maxillary border. The nares are small and look almost directly upward. The teeth are small and sharply conical with no enlarged ones visible in the maxillary or the mandible. The position and relations of the various bones is shown in the figures. There is no tabulare visible and it is probable that it was not present. Compared with *Trimerorhachis conangulus*, which it most closely resembles, there is no second prosquamosal (intertemporale) and the orbits are much larger and placed farther to the rear.

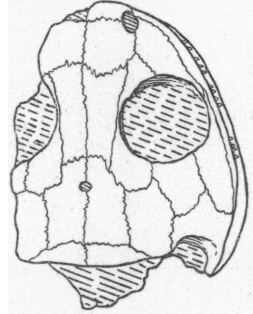


Fig. 10. *Tersomius texensis*, type skull, No. 4719, A. M. N. H. $\times \frac{1}{2}$ nat. size.

Measurements.

	mm.
Length on the median line	32.
Length of the lower jaw	34.5.
Width at the back of the skull	25.
Interorbital width	7.

***Trimerorhachis alleni* sp. nov.**

Type. Four dorsal vertebræ, No. 4577 Am. Mus. Nat. Hist., Cope Coll. From Texas.

This specimen differs from the type specimen in such important respects that it is necessary to regard it as a new species. The vertebræ are larger than any of the typical specimens, four intercentra occupying 166 mm. The neural spines show no indication of being divided, but the tops of the spines are still concave and show the former presence of a considerable mass of cartilage. The pleurocentra are proportionately very small. The spines are more erect and there are well formed posterior zygapophyses. The intercentra are marked on the lower face by deep pits lying on either side of a median keel. The posterior edges of the upper ends of the intercentra are reflected forward and form a concave facet.

