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CHICAGO NATURAL HISTORY MUSEUM

Volume 10

JULY 29, 1954

No. 19

FAUNA OF THE VALE AND CHOZA: 9 CAPTORHINOMORPHA

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The presence of captorhinomorph reptiles in the Vale and Choza formations has been noted in my earlier papers (Olson, 1948, 1951a, and 1951b). One new genus and species, *Captorhinoides valensis*, was described previously (Olson, 1951b). Additions to the collections made during the last several years and preparation of specimens collected earlier now provide a basis for a more adequate analysis of the suborder in post-Arroyo Clear Fork beds of Texas. The specimens unfortunately are largely fragmentary, the best being only partial skeletons, but most skeletal parts now can be assigned to recognized species. The descriptions and discussion that follow touch upon all genera and species of Vale and Choza captorhinomorphs now known, including both new materials and those mentioned in earlier papers.

CLASS REPTILIA

Subclass **Eureptilia**

Infraclass **Captorhina**

Order **Captorhina**

Family **Captorhinidae**

Captorhinus aguti Cope

This species of *Captorhinus* has been known heretofore from the Admiral and Belle Plains formations of the Wichita group and the Clyde and Arroyo formations of the Clear Fork group, all of the early Permian of Texas. It is relatively abundant in the Belle Plains and Arroyo formations. In addition, a great many specimens have been obtained by various parties from fissure fills at Richard's Spur, Oklahoma. The Oklahoma deposits appear to be Arroyo in age.

Specimens that appear to be referable to this species have come from the following localities in the Vale: BX, KI, KA and KC.¹ The first listed locality contains beds of lowest Vale age. KI includes beds of the lower part of the upper Vale and KA and KC beds of the upper Vale. The best-preserved specimen is C.N.H.M. U.R. 118, from KC. It consists of lower jaws, part of the skull, 13 pre-

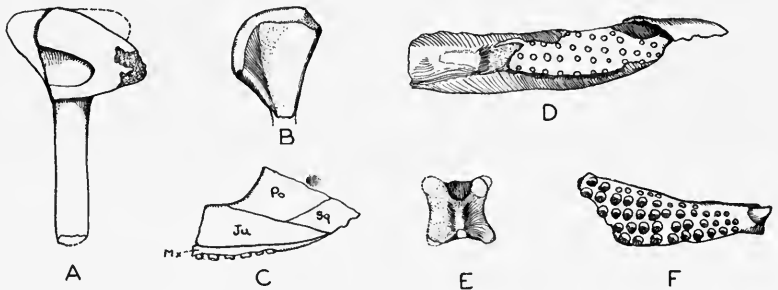


FIG. 85. *Labidosaurikos barkeri*. A, B, D, E, type, C.N.H.M. U.R. 110. A, inter-clavicle and lower end of clavicle; B, head of right femur; D, part of lower jaw showing tooth pattern as preserved in matrix with tops of crowns showing; E, dorsal vertebra in dorsal view. Lower Choza in age. C, lateral view of fragment of skull showing part of orbit; C.N.H.M. U.R. 116, lower Vale in age. F, part of maxillary in ventral view; C.N.H.M. U.R. 113, middle Vale in age. All $\times 1/2$.

sacral vertebrae, the head of a humerus, and miscellaneous fragments. Specific assignment can be made with considerable certainty. Other materials are more fragmentary and are of somewhat less certain specific affinities, but nothing known of them suggests that they are not *Captorhinus aguti*.

The discoveries in the Vale show that *Captorhinus aguti* ranged at least from the Admiral Formation through the Vale and is thus one of the longest-lived species known from the Texas Permian. A fragmentary specimen of *Captorhinus*, identifiable from poorly preserved vertebrae and skull fragments, has been found in the middle Choza. Although it is impossible to determine whether or

¹ See Olson (1948) for index system and specific locations of KC and KA and other localities cited in this paper. See Olson (1951b, p. 104) for the location of KI. BX is located on aerial photographs as follows: CUM 6B, 35, 7.1-3.0 along north and east margins of breaks to 8.6-3.9, west to 7.1-3.0. The beds of this locality appear to be of lowest Vale age and immediately overlie the even red shale beds of the upper Arroyo. *Dimetrodon gigashomogenes*, *Gnathorhiza dikeloda*, *Captorhinus aguti*, and *Xenacanthus* sp. have been identified from this locality. BX is one of the several localities in the lower Vale of western Baylor County, Texas, studied during the field seasons of 1951 and 1952.

not this is *Captorhinus aguti*, the specimen is important in extending the range of *Captorhinus* into the middle Choza.

***Captorhinoides valensis* Olson**

This species was described by me in the second article of this series (Olson, 1951b). The only known specimen consists of a skull and lower jaws. Principal differences from *Captorhinus* lie in the structure of the stapes and the nature of the cranio-palatal joint. The locality from which it came, KF, was assigned to the upper Vale in an earlier paper. More recent field work has shown that it comprises beds that must be assigned to the middle rather than the upper part of the Vale.

***Labidosaurikos barkeri* sp. nov.¹ Figure 85.**

Type.—C.N.H.M. U.R. 110. Partial skeleton including upper jaw and skull fragments, parts of lower jaws, 10 vertebrae, part of clavicle, inter-clavicle, symphyseal parts of the pubes, head of a femur, proximal and distal ends of humerus and fibula, plus miscellaneous fragments.

Horizon and locality.—Lower part of the Choza Formation, Clear Fork group, early Permian; Loc. FA, pipe site, Foard County, Texas.

Referred specimens.—C.N.H.M. U.R. 114, tooth bearing maxillary, Crooked Creek, lower part of Vale Formation, Baylor County, Texas; C.N.H.M. U.R. 116, part of side wall of skull, including partial jugal; lacrimal, and maxillary with teeth, Crooked Creek, lower part of Vale Formation, Baylor County, Texas; C.N.H.M. U.R. 115, partial maxillary tooth plate, Fish Creek, lower part of Vale Formation, Baylor County, Texas; M.C.Z. 1352, tooth plate, presumably maxillary, locality somewhat uncertain, but apparently from the lower part of the Vale on the basis of field notes of the collector, C. Sternberg; C.N.H.M. U.R. 113, maxillary with dentition, middle part of Vale Formation, Loc. KH (east end), Knox County, Texas; C.N.H.M. U.R. 109, partial large maxillary with dentition, Loc. KI, base of upper part of Vale Formation, Knox County, Texas; C.N.H.M. U.R. 120, two partial maxillary tooth plates, apparently from same individual, Loc. FA, pipe site, lower part of Choza Formation, Foard County, Texas; C.N.H.M. U.R. 111, two partial lower

¹ This species is named for Mr. Wade Barker of Knox County, Texas, in recognition of the untiring aid that he has given me and my assistants in the course of our field work in Texas.

jaws with post-canine dentition partly present, apparently from same individual, Loc. FA, pipe site, lower part of Choza Formation, Foard County, Texas; C.N.H.M. U.R. 112, lower jaw with dentition, Loc. FA, pipe site, lower part of Choza Formation, Foard County, Texas.

Diagnosis.—Lower jaw with four even rows of bulbous, semi-conical teeth. Maxillary dentition consisting of five regular rows of evenly spaced teeth and forming attenuated, roughly triangular plate with the apex anterior.

Discussion.—This species differs from *Labidosaurikos meachami* Stovall, the type of the genus (Stovall, 1950), in the number of rows of teeth, four below and five above in *Labidosaurikos barkeri* as compared with five (possibly six) below and six above in *Labidosaurikos meachami*. The available materials suggest that *Labidosaurikos barkeri* was a somewhat smaller species than *Labidosaurikos meachami*, but this must remain uncertain until larger samples become available for comparison. The stratigraphic range of *Labidosaurikos barkeri*, as known at present, is from the base of the Vale Formation to the lower part of the Choza. *Labidosaurikos meachami* is from the Hennessey of Oklahoma, probably in part a Choza equivalent. It would appear, on the basis of the number of rows of dentition and size, that *Labidosaurikos meachami* was the more advanced species of the two now known. The phylogenetic position of the genus with respect to other captorhinids is considered in the discussion at the end of the paper.

Captorhinikos gen. nov.

Diagnosis.—Lower jaw with four regular rows of bulbous, sub-conical post-canine teeth. Outer and inner rows not extending full length of post-canine series and not overlapping so that there are but three effective rows at any level. Enlarged "canine" tooth above and below. Maxillary dentition with five rows of bulbous, sub-conical teeth, forming a crescentic tooth plate; teeth increasing in size from anterior and posterior ends of plate to center and rows most widely spaced at center. Skull heart-shaped in outline.

Neural spines of vertebrae tending to be better developed than those of *Captorhinus*. Neural arches broad and flat. Dimensions of various skeletal elements of adults consistently greater than comparable dimensions of large specimens of *Captorhinus*.

Type species.—*Captorhinikos valensis* sp. nov.

Captorhinikos valensis sp. nov. Figure 86, F-H.

Type.—C.N.H.M. U.R. 101. Anterior part of lower jaw and maxillary tooth plate.

Horizon and locality.—Upper part of Vale Formation, Clear Fork group, early Permian, Loc. KA, Knox County, Texas.

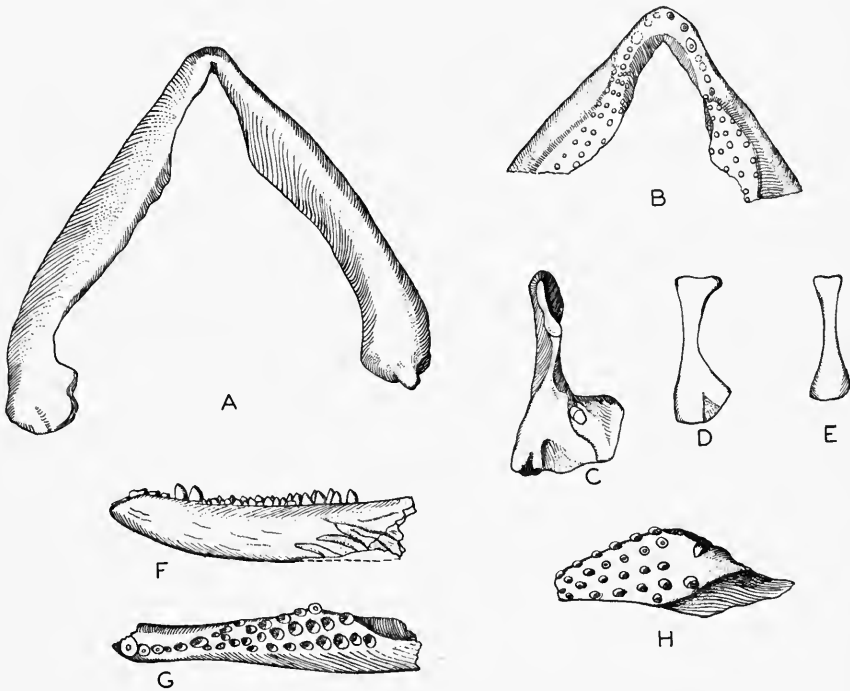


FIG. 86. *Captorhinikos*. A, B, *Captorhinikos chozaensis*; type, C.N.H.M. U.R. 97. Ventral and dorsal view of lower jaws. C-E, humerus, tibia and radius of *Captorhinikos chozaensis*; referred specimen, C.N.H.M. U.R. 100. F-H, *Captorhinikos valensis*; type, C.N.H.M. U.R. 101. F, G, lower jaw in lateral and dorsal view. H, maxillary in ventral view. A-E, $\times 1/2$; F-H, $\times 1$.

Referred specimens.—C.N.H.M. U.R. 107, 7 pre-sacral vertebrae, Loc. KF, middle part of Vale Formation; C.N.H.M. U.R. 108, 6 vertebrae associated with ribs and fragments of dental plates, Loc. KI, base of upper part of Vale Formation; C.N.H.M. U.R. 105, part of lower jaw with teeth, Loc. KH (west end), base of upper part of Vale Formation; C.N.H.M. U.R. 106, 6 vertebrae with ribs and poorly preserved impression of 5 more anterior vertebrae leading toward what appears to be fragments of posterior part of skull, Loc. KB, upper part of Vale Formation; C.N.H.M. U.R. 103, frag-

ment of upper tooth plate, Loc. KA, upper part of Vale Formation; C.N.H.M. U.R. 104, part of palate, specific assignment not entirely certain, based on morphology and proximity to jaw of this species, Loc. KA, upper part of Vale Formation; C.N.H.M. U.R. 102, partial lower jaw, Loc. KA, upper part of Vale Formation.

Diagnosis.—Lower jaw slender for full length of tooth-bearing portion. Vertebral spines short to moderate in length in pre-sacral part of column.

***Captorhinikos chozaensis* sp. nov.** Figure 86, A–E.

Type.—C.N.H.M. U.R. 97, lower jaws with fragments of skull including maxillary tooth plates.

Horizon and locality.—Middle of lower part of Choza Formation, Clear Fork group, early Permian, Loc. FA, green nodule site, Foard County, Texas.

Referred specimens.—C.N.H.M. U.R. 99, part of skeleton including 6 thoracic vertebrae, part of pelvis, femur, and indeterminate fragments, Loc. FA, pipe site, middle of lower part of Choza Formation; C.N.H.M. U.R. 100, part of skull and skeleton including portion of skull roof, impression of scapula, vertebrae (largely molds), humerus, radius, fibula, and various unprepared parts, Loc. FA, *Diplocaulus* site, top of lower part of Choza Formation.

Diagnosis.—Lower jaw expanded dorso-ventrally below region of multiple rows of dentition. Outer rows of teeth in lower jaw set in from lateral margin of lower jaw. Neural spines of thoracic vertebrae high as compared with those of *Captorhinikos valensis*.

Discussion.—The genus *Captorhinikos* is typically captorhinid in all skeletal features that are known, as shown in the illustrations (figs. 85 and 86). Its closest affinities are with *Captorhinus* on the one hand and *Labidosaurikos* on the other. Adults are consistently larger in their various osteological dimensions than the largest specimens of *Captorhinus*, but are markedly smaller than adult specimens of *Labidosaurikos*. The principal known differences from *Captorhinus* have been noted in the generic and specific diagnoses. The regular rows of teeth contrast with the irregular rows in *Captorhinus* as do the number of rows of teeth above and below, five and four respectively in *Captorhinikos*, and, roughly, three above and below in *Captorhinus*. The presence of a single “canine” tooth contrasts with the condition in *Captorhinus* in which only the first tooth in the pre-maxillary series tends to be markedly larger than adjacent teeth.

Post-cranial differences, excepting those of size, are less pronounced. The most striking is the difference in degree of development of the neural spines, a feature probably associated with the differences in size.

Resemblances to *Labidosaurikos* are evident in the jaws and dentition. Notable are the regularity of the tooth rows, the presence of more than three rows above and below, and the existence of a single, large "canine" tooth, in both *Captorhinikos* and *Labidosaurikos*. The bulbous character of the cheek teeth of *Captorhinikos* is repeated in *Labidosaurikos* and contrasts with the somewhat flattened crowns of the teeth of *Captorhinus*. Post-cranial elements in the three genera are similar in most respects so far as is known. Until more adequate materials of *Captorhinikos* and *Labidosaurikos* are obtained, detailed comparisons cannot be made.

Morphologically, *Captorhinikos* is nearly intermediate between *Captorhinus* and *Labidosaurikos*. *Labidosaurikos*, however, is known from somewhat earlier deposits than *Captorhinikos*, for it occurs in the lowest Vale whereas *Captorhinikos* has not yet been found below the middle Vale. This may be due merely to accidents of preservation and collection. It would seem that *Labidosaurikos* might have arisen from *Captorhinus* through *Captorhinikos* as an intermediate stage, or, perhaps, that the two genera arose independently from *Captorhinus* and followed somewhat similar evolutionary courses. The first alternative seems somewhat more plausible, inasmuch as the two genera occur in the same geographic area and *Labidosaurikos* must have passed through a *Captorhinikos*-like stage. It is interesting to note, in this regard, that the Choza species of *Captorhinikos* resembles *Labidosaurikos* more closely in some features, particularly those of the lower jaw and upper and lower dentition, than does the Vale species. After the origin of the two genera, regardless of the precise derivation of each, parallelism seems to have been important in their continued evolution. The greatest contrasts between the evolutionary development of the two lies in the retention of a *Captorhinus*-like skull shape by *Captorhinikos*, the tendency for elongation in the skull of *Labidosaurikos*, and the tendency toward attainment of greater size exhibited by *Labidosaurikos*.

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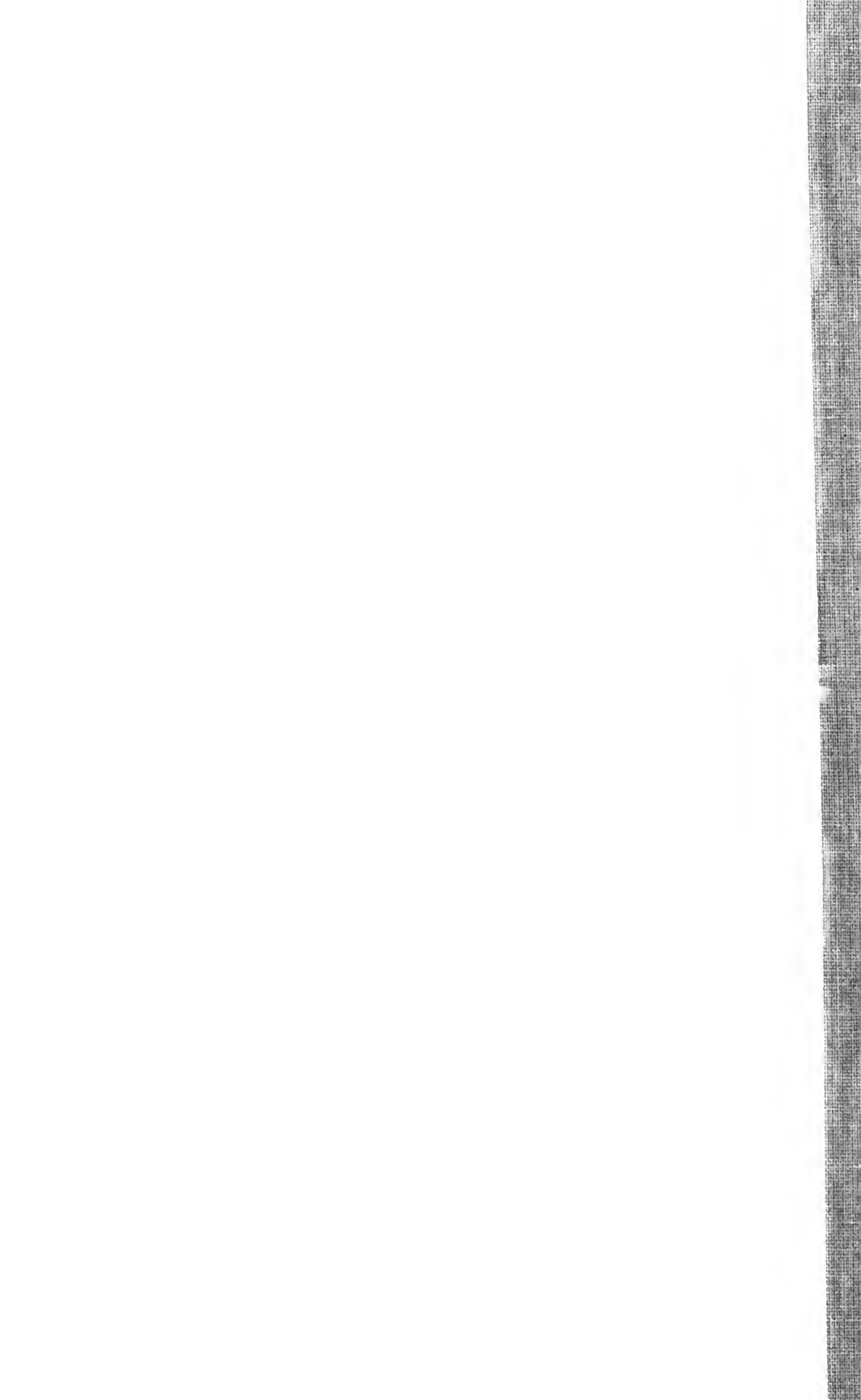
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