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## The First Find of a Dolichosaur (Squamata, Dolichosauridae) in Central Asia

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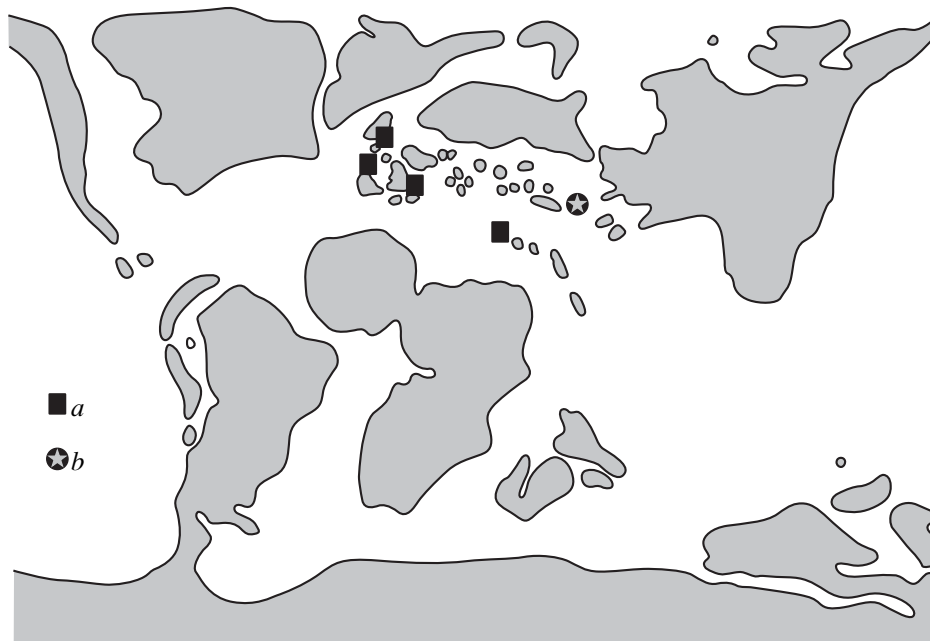
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**Abstract**—A thoracic vertebra attributed to Dolichosauridae indet. from the Late Cenomanian?–Turonian of Kazakhstan (Besokty II locality) is described. This is the first record of the group in Kazakhstan and Central Asia.

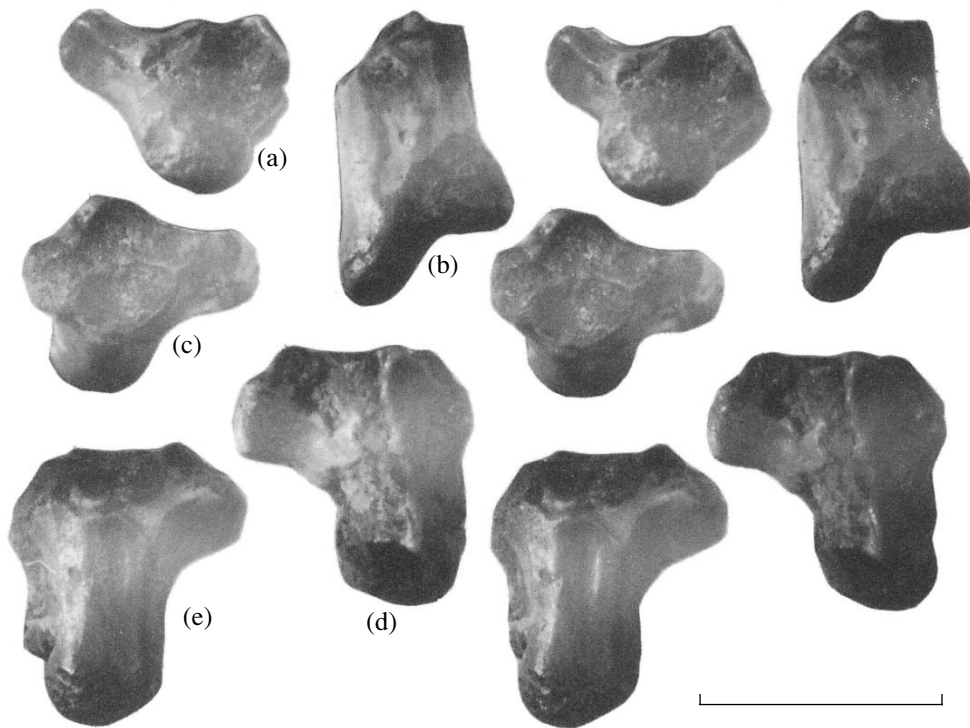
Dolichosaurs are a small group of medium-sized marine varanoid lizards, which are represented by scarce finds from the mid-Cretaceous (Cenomanian–Turonian) of Europe and the Near East (Fig. 1). The family includes four monotypic genera: *Dolichosaurus* Owen, 1850; *Acteosaurus* Meyer, 1860; *Pontosaurus* Kramberger, 1892; and *Aphanizocnemus* Dal Sasso et Pinna, 1997 (Owen, 1851; Meyer, 1860; Seeley, 1880; Calligaris, 1988, 1993; Dal Sasso and Pinna, 1997).

The present paper considers a dolichosaurian vertebra discovered in the upper phosphoritic horizon of the Upper Cenomanian?–Turonian in the Besokty II locality (the southern part of the Mangyshlak Plateau, Kaza-

khstan; collected by Yu.I. Kats). This vertebra, previously referred to as *Lacertilia* indet. (Nesov, 1997, p. 105), was probably mistaken for that of a terrestrial lizard. The vertebra was found together with teeth of sharks, such as *Ptychodus*, *Protolamna*, *Cretolamna*, *Cretoxyrhina*, and *Hispidaspis*. These are mainly pelagic forms, the presence of which suggests a deep-sea depositional environment. The thoracic vertebra (Fig. 2) should be assigned, in my opinion, to the Dolichosauridae based on the following combination of characters: (1) the vertebra is procelous; (2) the spinous process is reduced to a median crest on the neural arch (in the specimen considered, the crest is broken off; it is apparent, however, that the spinous process could not be well



**Fig. 1.** Diagram showing the main localities containing members of the family Dolichosauridae: (a) points of previous finds (after Owen, 1851; Meyer, 1860; Seeley, 1880; Calligaris, 1988, 1993; Rage, 1989; Dal Sasso and Pinna, 1997) and (b) locality Besokty II (specimen from Kazakhstan). Paleogeographic map of the Cenomanian after Zharkov *et al.* (1995).



**Fig. 2.** Thoracic vertebra of Dolichosauridae indet. (ZIN, no. PH 1/8, collection of the Herpetological Division of the Zoological Institute, Russian Academy of Sciences, St. Petersburg); Besokty II, Kazakhstan. Late Cenomanian?–Turonian: (a) rear, (b) lateral, (c) frontal, (d) dorsal, and (e) ventral views (stereopairs). Scale bar, 1 cm.

developed); (3) the prezygapophyses are connected to the synapophyses; (4) the synapophyses substantially project laterally; (5) an additional intervertebral articulation (zygosphene–zygantrum) is present; (6) the articular surfaces of the zygosphene face ventrolaterally; (7) the ventral surface of the vertebral center is flattened; (8) the vertebral center has no constrictions ahead of the articular condyle; (9) the surface of the articular condyle faces dorsoposteriorly: only a small part is visible on the ventral side; and (10) the articular depression and the condyle on the vertebral center are oval and transversely expanded. Characters 1, 8, 9, and 10 are the symplesiomorphies of the Varanoidea *sensu* Lee, 1997; characters 5 and 6 are the synapomorphies of the Pytonomorpha *sensu* Lee, 1997; and characters 2, 3, 4, and 7 may be the synapomorphies of the Dolichosauridae.

Dolichosaurs were probably ignored in most of the recent phylogenetic analyses of varanoid lizards (Carroll and Debraga, 1992; Bell, 1994; Caldwell *et al.*, 1995; Lee, 1997; Caldwell, 1999a, 1999b) because of the lack of material on this group. The only exception is the preliminary analysis performed by Dal Sasso and Pinna (1997), who believe that dolichosaurs form a polytomy with the “Aigialosauridae” and Mosasauridae. The Dolichosauridae share at least one synapomorphy in the axial skeleton structure with the Mosasauroidae

(“Aigialosauridae” + Mosasauridae); i.e., the distal caudal vertebrae lack transverse processes. In *Aphanizocnemus*, the zygapophyses on the distal caudal vertebrae markedly diminished, but persisted (Dal Sasso and Pinna, 1997); in Mosasauroidae, they disappeared (Lee, 1997). The thoracic vertebrae of dolichosaurs possess an oval articular depression and oval condyle (specimen ZIN, no. PH 1/8, described in this paper; Rage, 1989, text-figs. A and B), whereas the circular outlines of the articular condyle and depression of the Pytonomorpha *sensu* Lee, 1997 are considered to be synapomorphic characters of this group (Lee, 1997). Thus, dolichosaurs are undoubtedly phylogenetically close to mosasauroids; however, the plesiomorphic conditions of the above structural characters of the axial skeleton indicate that the Dolichosauridae are probably a mixotaxon with reference to the Mosasauroidae or even to the Pytonomorpha.

Judging from the presence of relatively long spinous processes on the thoracic vertebrae and circular outlines of the articular condyles and depressions, the genus *Coniasaurus* Owen, 1850, (Owen, 1851, pl. 9, fig. 13; Bell *et al.*, 1982, fig. 1; Caldwell, 1999b, fig. 15) should be either assigned to the “Aigialosauridae” or raised to the rank of monotypic family Coniasauridae (Caldwell, 1999b) rather than placed in the Dolichosauridae.

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