

tions of animals with damaged tails. Since the ratio of regenerated tails in the island specimens as compared to those from the mainland is 1:8, it appears that predation on the mainland is about eight times as great as on the island. Presumably on the mainland where the pressure is high the aberrant individuals are weeded out and the population is relatively uniform. But on the island where predation pressure is lower the population as a whole is more variable.

It is improbable that these apparently insignificant variations in head scales should affect the lizards' ability to escape capture. Dunn has suggested that varietal characters of this type must be correlated with others that are directly concerned with survival.

That the absence of predators on islands allows forms to develop and survive that would not do so on the mainland has been postulated as an island effect. This is one of the few cases

in which evidence of predator pressure and variability can be so well correlated.

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## A Horned Toad, *Phrynosoma cornutum*, from the Upper Pliocene of Kansas

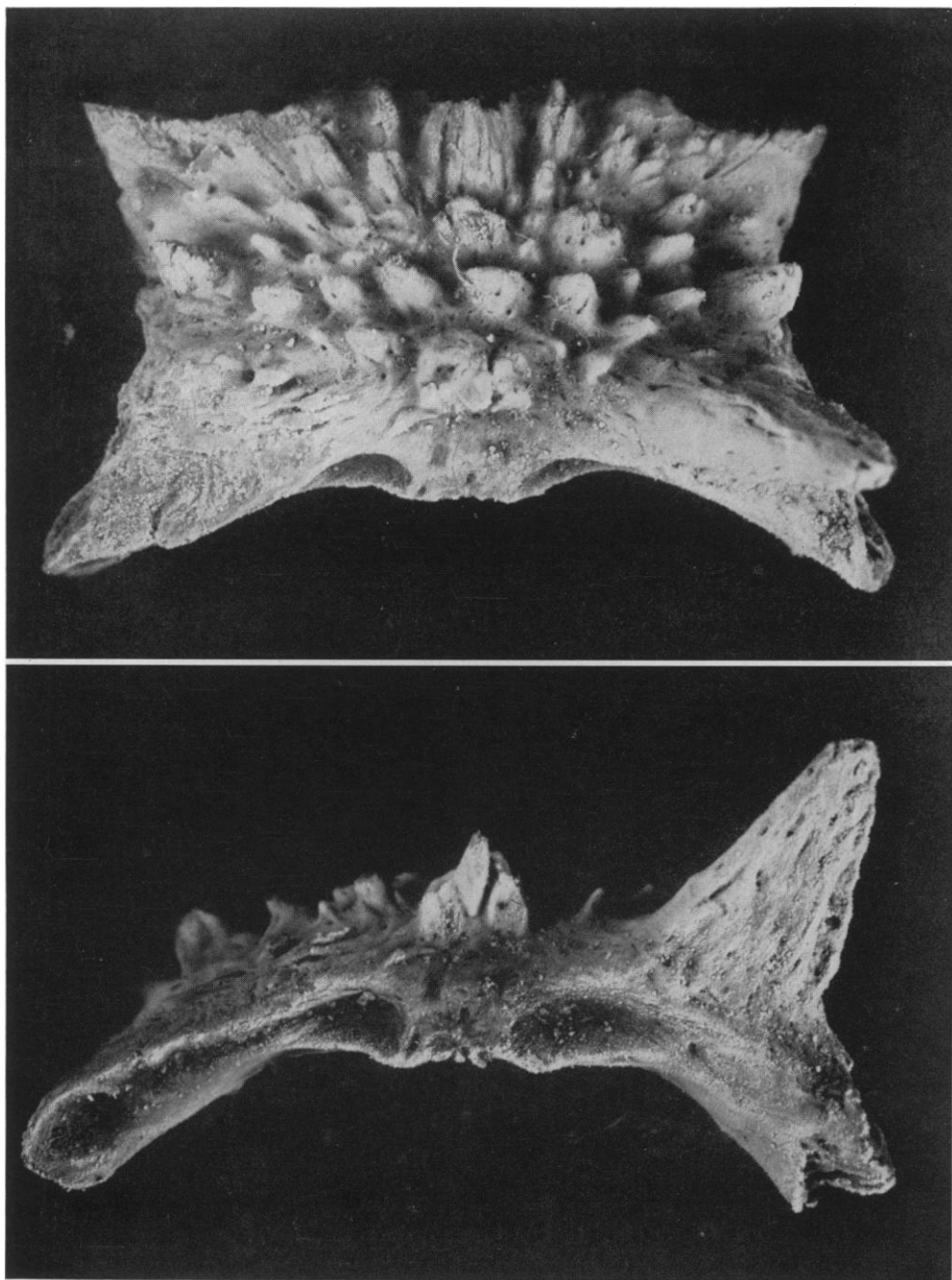
THOMAS M. OELRICH

ALTHOUGH the Rexroad fauna (Hibbard, 1950) is the best known vertebrate fauna of Pliocene age in North America, the reptiles are extremely scarce. Two species of turtles represented by *Gopherus riggsi* (Hibbard) 1944, and *Testudo rexroadensis* Oelrich (1952), one species of snake *Heterodon phonasicus* Peters (1953), and five species of lizards, *Cnemidophorus bilobatus*, *Eumeces striatulus*, *Eumecoides hibbardi* and *Eumecoides mylecoelus* all described by Taylor (1941) and *Sceloporus robustus* Twente (1953), complete the list. The occurrence of *Phrynosoma* has long been expected. Due to the disarticulated condition of the material, species identification is limited to maxillae and dentaries with the notable exception of the parietal of a horned toad.

I would like to express appreciation to Dr. Claude W. Hibbard, Museum of Paleontology, University of Michigan, for making this specimen available to me, and to Dr. E. H. Taylor, University of Kansas Museum of Natural History, for the loan of recent skeletal material.

In the summer of 1952 the field party of the University of Michigan Museum of Paleontology under the direction of Claude W. Hibbard recovered from the type locality of the Rexroad formation, and Rexroad fauna, Locality No. 3, W $\frac{1}{2}$  SW $\frac{1}{4}$  Sec. 22, T/33S, R/29W, Meade County, Kansas, a single parietal, Museum of Paleontology, University of Michigan No. 30191, of a horned toad. The specimen is very well preserved; however, it possesses only a single horn. The loss of the horn does not appear to be due to erosion or breakage. Comparison of this specimen with Recent species of North America indicates that it belongs to the *Phrynosoma cornutum* group (Plate I).

The parietal is 10 mm. wide and 5 mm. long (greatest length). Comparison with parietals of medium sized *P. cornutum* shows only one distinguishing character: along the posterior border of the parietal are two well developed recesses which receive the insertion of the spinalis dorsi muscle. In Recent forms of



Dorsal and posterior views of parietal bone of *Phrynosoma cornutum* from the Rexroad Formation of Kansas

*P. cornutum* excavation of this extent was not seen; however, in *Phrynosoma modestum* a similar excavation is present. This is probably an individual character.

Only one other fossil record of *Phrynosoma* is known. This is from Conard fissure, Arkansas, and is of late Pleistocene age (Gilmore, 1928). The Conard fissure specimens are maxilla and dentaries which are referred to *Phrynosoma* sp. The middle Oligocene lizard *Exostinus serratus* (Cope) has been suggested as a possible ancestral *Phrynosoma* (Gilmore, 1941; Reeve, 1952).

The present distribution of *P. cornutum* (Smith, 1946, Map 20) is distinctly southwestern. If the Pliocene forms had similar climatic demands as do the Recent related ones, then the presence of *P. cornutum* along with the other reptiles in this fauna indicates a warm temperate climate. The extremely large mammalian, avian, amphibian and invertebrate fauna indicates a mild temperate climate with demands for numerous aquatic habitats (Hibbard, 1950). The assignment of the Rexroad deposits containing the Rexroad fauna and the older Saw Rock Canyon fauna (Hibbard, 1953) to post-Nebraskan till, Pleistocene age, by Frye and Leonard (1952), would therefore seem untenable according to the vertebrate faunas.

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## Crocodilian Remains from the Pleistocene of Celebes

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THE two fragments of crocodilian dentaries described below form part of a collection of fossils made at Sompoh, near Tjabengè (Sopeng district), about 100 km. NE of Macassar in southwestern Celebes. Earlier finds have been mentioned elsewhere (Hooijer, 1948 a-c, 1949, 1950). No specific determination is here attempted, yet it seems worth while to draw attention to these remains because they are the first evidence ever obtained of crocodiles occurring in the Pleistocene of Celebes. It is a great pleasure to acknowledge my indebted-

ness to the Head of the Dinas Purbakala R. I. at Jakarta, Java, Indonesia, who entrusted these fossils to me for study, and to Mr. H. R. van Heekeren who was responsible for collecting. The figures illustrating this paper are by Mr. H. Heyn of the Museum of Natural History at Leiden.

Recent material used for comparison consists of a good series of *Crocodylus porosus* as well as a few skulls of *C. palustris* and *C. siamensis*, all in the Leiden Museum of Natural History. The literature was consulted for the