transformed into veritable museums of teratological specimens.

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THE UNIVERSITY OF NEBRASKA,
October 10, 1913

AN ANCESTRAL LIZARD FROM THE PERMIAN OF TEXAS

THERE has been no more vexed problem in vertebrate paleontology than the origin of the scaled reptiles. The theory generally accepted has been that the lizards arose from the double-arched or rhynchocephalian type by the loss of a primitive lower arch, a theory of which I have been skeptical for many years past. I have urged in various publications for the past ten years that the lizard phylum is a very ancient one, predicting that it would eventually be discovered in the Permian, a prediction that I am now able to verify. Three years ago I described briefly a peculiar reptile from the Lower Permian of Texas under the name *Arœoscelis*. It has only been recently that the stress of other material has permitted the full preparation of the several more or less complete skeletons upon which the genus was based, a study of which has disclosed more decisively than in any other American Permian reptile the structure of both skull and skeleton. *Arœoscelis* was an extraordinarily slender, long legged, cursorial and arboreal reptile of about eighteen inches in length. The skull is remarkably lizard-like in appearance and structure, with a typical upper temporal vacuity bounded precisely as in the mosasaurs. The sides of the skull below the arch, instead of being open, as in the lizards, are covered over by a broad expansion of the squamosal bone, which is rather loosely united to the quadrate. The quadrate is supported, as in lizards, by the tabulare and opisthotic; it is rather free and is broadly visible from behind. The lacrimal bone is small, as in lizards, a character hitherto unknown among ancient reptiles; and the palate has rows of teeth on all the different bones. The neck has seven or eight more or less elongated vertebræ, the dorsal region twenty. The sacrum is almost indistinguishable from that of lizards. The pectoral and pelvic girdles differ chiefly in their old-fashioned characters. The tail was slender and long. The feet have an elongated calcaneum and a reduced astragalus, unlike those of the known contemporary reptiles. Finally the attachment of the ribs, one of the most peculiar characters of the Squamata, is by a dilated head, articulating with both arch and centrum.

To convert *Arœoscelis* into a modern lizard would require the reduction of the squamosal bone from below to a slender bone articulating with the postorbital; the closer fusion of the postorbital with the postfrontal; the greater freedom of the quadrate; the loss of the posterior coracoid bone and a modernizing of the girdles, every one of which characters we are quite sure must have been present in the ancestors of the Squamata.

Arœoscelis can not be placed in any known order of reptiles, unless it be admitted to the Squamata. But, I do not think that the differences from the Squamata will justify its ordinal separation, if we are to classify organisms phylogenetically. I would rather modify the definition of the order Squamata to include the genus as the representative, doubtless with *Kadaliosaurus* also, of a distinct suborder, the *Arœascelidia*. Several years ago I recognized in another Permian vertebrate a primitive salamander, bearing about the same relations to the modern Urodela that *Arœoscelis* does to the modern lizards. The urodelan character of *Lysorophus* has now been generally accepted, and I believe that after I have published the full details of the structure of *Arœoscelis* I shall find concurrence in its phylogenetic association with the Squamata.

I regret much to add that Dr. Broom's inexperience with the American Permian vertebrates has led him into several errors in his recent discussion of the affinities of *Arœoscelis*, based upon the meager details which have been published. Had he heeded Dr. Case's warning I do not think he would have so readily assumed that the skull and skeletal bones which he described as *Ophiodeirus* really belong together. They probably do not, for

the skeletal bones are those of *Arœoscelis,* as he himself suspected. It is unnecessary to add that his conclusions, based upon erroneous premises, are wholly incorrect. *Arœoscelis* is as widely separated from *Bolosaurus* as is any other known American Permian reptile, at least so far as can be judged from the skull as Dr. Broom has restored it.

S. W. Williston

University of Chicago,
November 8, 1913

THE CONVENTION OF GEOLOGISTS AND MINING ENGINEERS

In connection with the National Conservation Exposition conducted in Knoxville, Tennessee, during September and October, there was held a meeting of geologists and mining engineers for the purpose of discussing problems connected with the conservation of the natural resources of our country and especially of the south. Delegates were present from most of the southern states and many from the north and west.

The papers and discussions were of a high order and it is hoped that arrangements can be made to have these in print at an early date. Following are the titles of papers read:

"Economic Non-metallic Minerals of the Southern States," by Dr. J. Hyde Pratt.

"Inventory of the Mineral Resources of Georgia," by S. W. McCallie.

"Conservation as Applied to Mining Lime Phosphates," by E. H. Sellards.

"The Regulation of Oil and Gas Wells, Especially When Drilled Through Coal Seams," by Richard R. Hice.

"The Iron Resources of the World," by Dr. E. A. Schubert.

"Possible Dangers to Mines in Drilling for Oil and Gas in the Coal Measures," by Edward Barrett.

"The State Geologist and Conservation," by Dr. A. H. Purdue. (Read by title.)

"Oregon Problems of Resource Development," by H. N. Lawrie.

"Relations of the Forest Service to the Conservation of Mineral Resources of Mineral Lands," by Don Carlos Ellis.

"Soil Survey and Conservation *vs.* Soil Mining," by H. A. Hard.

"The Conservation of Natural Gas in the Mid Continent Field," by C. N. Gould.

"Gypsum and Salt Deposits of Southwest Virginia," by F. A. Wilder. (Read by title.)

"Scenic Beauty and Its Variation as Influenced by Geological Origin," by George F. Kunz. (Read by title.)

"Sane Development of the Mineral Resources of the South," by E. J. Watson. (Read by title.)

C. H. Gordon was elected chairman of the convention and F. W. DeWolf, state geologist of Illinois, secretary.

The following resolutions were adopted:

Whereas, The burden of classification of our public domain rests heavily, and perhaps unjustly, on the applicant desiring to title such lands, and

Whereas, Many conflicting interests with the consequent loss and embarrassment to the land and mineral claimant results from an absence of adequate classification of the federal domain, and

Whereas, There are not sufficient funds available for the purpose of expediting the work of classifying the federal domain, and

Whereas, It is recommended by this convention of geologists and engineers assembled at the National Conservation Exposition, at Knoxville, Tennessee, September 19, 1913, that this work be accelerated, and that the same should be comprehensive so as to include the possibilities of agriculture, timber, hydro-electric and mineral development and, if practicable, simultaneously; be it therefore

Resolved, That we, the members of the convention of geologists and engineers assembled, memorialize Congress of the United States to increase this appropriation sufficiently to enable the work as herein noted to be carried out efficiently by the Departments of the Interior and Agriculture.

Whereas, There has been an extended argument concerning the merits of state versus federal control of the national forests; and

Whereas, The Oregon Conservation Commission has made an exhaustive study of this subject, which resulted in their conclusion in favor of federal ownership; be it therefore

Resolved, That we, the members of this convention of geologists and mining engineers, assembled at this National Conservation Exposition at Knoxville, Tennessee, September 19, 1913, do hereby endorse the findings of the Oregon Conservation Commission in favor of the federal ownership of the national forests.