Art. XXXIII.—*Palæohatteria* Credner, *and the Proganosauria;* by Dr. G. Baur.

One of the most important discoveries in Paleontology has just been made by Professor H. Credner of Leipzig, well known by his publications on the Stegocephalia of the Permian of Saxony.*

This discovery consists of a series of nearly complete skeletons of a reptile from the lower Permian (Rothliegendes). This reptile, with the exception of *Stereosternum* Cope, from the Carboniferous (?) of Brazil, is the oldest yet known. Professor Credner calls it *Palæohatteria* from the close resemblance to *Hatteria* from New Zealand, the only living member of the Rhynchocephalia. But since *Hatteria* is preoccupied by *Sphenodon*,† this new form really ought to be called *Palæosphenodon*. It is placed by Professor Credner among the Sphenodontidæ, but it has to be considered as the type of a distinct family, which may be called the *Palæohatteriidæ*, or *Palæosphenodontidæ*, in case the name *Palæosphenodon* shall be admitted by Credner.

Characters of the Palæohatteriidæ. — Skull resembling *Sphenodon;* lacrymal free from præfrontal; bones showing centers of ossification, like those of Stegocephalia; interclavicle

* Credner, Hermann: Die Stegocephalen und Saurier aus dem Rothliegenden des Plauenschen Grundes bei Dresden, vii Theil. *Palæohatteria longicaudata* Cred. Zeitschrift Deutsch. Geol. Gesellsch., 1888.

† *Sphenodon* Gray, 1831; *Sphenodon* Lund, 1839 (Mamm.); *Hatteria* Gray, 1841; *Sphenodon* Agass. 1843 (Fish.) Baur, G., Erwiderung an Herrn Dr. A. Günther. Zool. Anz., No. 245, 1887.

rhomboidal with long distal process, nearly of the same form as that of *Belodon*, *Aetosaurus*, and *Proterosaurus;* ilium expanded at the upper end; claws well developed.

One of the most important characters of *Palæohatteria* consists in the presence of five distinct tarsal bones in the second row, one for each metatarsal. In this it agrees with *Stereosternum* Cope, which I placed in a new order, *Proganosauria.**

The *Mesosauridæ*† are a specialized family of this order. The *Palæohatteriidæ* on the contrary are a generalized group; *they are Proganosauria, which gave origin to the Rhynchocephalia.*

I give now a new definition of the *Proganosauria.*—Humerus with entepicondylar foramen; five distinct tarsal bones in second row, one for each metatarsal; condyles of limb-bones not ossified; pubis and ischium broad plates; each set of abdominal ossicles consisting of numerous pieces.

1. *Palæohatteriidæ.*

Characters given above.

2. *Mesosauridæ.*

Skull elongate, with numerous very sharp and slender teeth; first metatarsal the shortest, fifth metatarsal the longest bone. No claws.

The *Proganosauria* are Reptiles with many characters of the Batrachians; the *Palæohatteriidæ* is the most generalized group among the *Monocondylia* (Sauropsida).

Some points in Professor Credner's paper need correction:

1. There are two not three or more sacral vertebræ.

2. The bones called "hyoids" may just as well be the epipterygoids (columellæ). If they represent hyoids, they resemble these elements in *Belodon* and *Ichthyosaurus.*

3. There is no free lacrymal in *Sphenodon* as figured by Credner.

4. The quadratojugal of *Sphenodon* is overlooked.

5. The so-called basisphenoid is probably the parasphenoid.

6. The foramen in the humerus is *entepicondylar* not ectepicondylar.

7. The carpal bones of *Proterosaurus* are wrongly determined; the bone called radial represents the first central bone.

8. The figure of the embryo of "*Monitor*" is erroneously explained, by both Hoffmann and Credner; the bone called tars. 5 is the metatarsal 5.

* Baur, G. On the Phylogenetic Arrangement of the Sauropsida. Journ. of Morphol., vol. i, No. 1, Sept, 1887.

† I use the family-name *Mesosauridæ*. It is probable that *Mesosaurus* Gervais is the same as *Stereosternum* Cope.

Some important results can be reached from the study of this ancient form:

1. The antorbital foramen or fossa is a secondary formation; all forms of Reptiles having this fossa descended from forms without it.

2. The peculiar short bone in the hind foot of the Reptilia, which some consider as a metatarsal 5, others as a tarsal 5, certainly represents the *metatarsal* 5.

3. The bones called epiplastra and endoplastron in the Testudinata are doubtless the clavicles and interclavicle. The clavicles and interclavicle of the Amniota represent the "mittleren und seitlichen Thoracalplatten" of the Stegocephalia and other Batrachia. These elements must be considered as dermal ossifications; the connection with the shoulder-girdle is secondary.

4. *The origin of the so-called "Abdominal ribs."* The *abdominal ossicles* or "ribs" are found to-day only in *Sphenodon* and the Crocodilia; the "abdominal ribs" of *Chamæleo*, *Polychus*, etc., are entirely different elements. There are no abdominal ossicles like those in *Sphenodon* found in *Palæohatteria*, *Proterosaurus*, *Hyperodapedon*. In these we have bundles of scale-like pieces. These we have to consider as the homologue of the same elements in the Stegocephalia and as the abdominal ossicles in the Rhynchocephalia, Ichthyosauria, Plesiosauria, Pterosauria, Crocodilia, Dinosauria, Saururæ. In nearly all these forms each set of abdominal ossicles consists of one or two median pieces and one lateral one on each side; but in the Ichthyosauria we find very often one median piece and *two* lateral ones on each side.

The idea, at first pronounced by Owen, that the plastron of the Testudinata has developed from abdominal bones is very probable.

5. *The foramina in the humerus of the higher Vertebrata.*—*a. No foramen:* Batrachia.

b. Foramen entepicondyloideum: Proganosauria, Theromora,† Mammalia.*

c. Foramen entepicondyloideum and foramen ectepicondyloideum: Sphenodontidæ, some humeri from the Permian of Russia.

d. Fossa entepicondyloidea and foramen ectepicondyloideum: Atoposaurus, Sapheosaurus, Nothosauridæ, part.

e. Foramen ectepicondyloideum: Testudinata, Lacertilia. Nothosauridæ part, Rhynchocephalia, part.

f. Fossa ectepicondyloidea: Belodon, Champsosaurus, Testudinata, part, etc.

g. No foramen: Crocodilia, Dinosauria, Pterosauria, Plesiosauria, Pythonomorpha, Birds, etc.

* If not lost by specialization.

† The name Theromorpha has been changed by Professor Cope to Theromora.

The oldest Reptiles, the *Proganosauria*, had only the foramen entepicondyloideum; from those the *Theromora* and *Mammalia* took their origin.* Some of the *Proganosauria*, which we do not know yet, probably developed also the foramen ectepicondyloideum; such forms connected the *Rhynchocephalia*. Then the entepicondylar foramen was lost again and later also the ectepicondylar foramen.

New Haven, Conn., March 5th, 1889.