TRIASSIC DINOSAURIA OF EUROPE*

Von HUENE spoke on the Triassic Dinosauria of Europe.

For c. 4 years I have studied the Triassic Dinosauria of Europe. Since publication will be further in the future than I thought, I think it is in order to report here on several of the results.

Dinosauria in the younger Triassic must have been widely distributed in numbers and variety of forms (Europe, S. Africa, India, Australia, E. and W. North America). Where one finds them there are usually several individuals together. I could investigate complete skeletal parts and teeth of over 60 specimens. Much as I wanted to split up genera and species as little as possible, I finished up with 24 species, of which 3 are indeed only isolated teeth. The 24 or 21 species divide up into 8 genera. The fact that among the comparatively few individuals so many genera and species are represented shows that the number of forms must have been extraordinarily large and we have yet to expect many new ones in future finds.

All belong to the group of Theropoda and are thus built according to a common basic plan. I will only point out a few things.

Unfortunately the skull could not be used for systematics since parts of it were so seldom found. *Plateosaurus erlenbergiensis* and *Thecodontosaurus antiquus* have supplied the best skull pieces.

The lower jaw agrees largely with that of *Dryptosaurus* recently described by LAMBE. A small coronoid is present; the alveolar fossa is very broad; a perforation is absent.

The pterygoid is perforated by an oval fenestra and extended wing-like backwards. The small transversal lies in the suborbital palatal fossa. The palatines are large and broad. In the middle is found an upward deepened groove formed from the paired prevomer. The anterior half of the palate is not present.

The occiput has much similarity with Crocodilia. The quadrate is broad and flat above. Its position was probably as OSBORN figures it in *Creosaurus*, not as MARSH figures it for *Anchisaurus*.

Above the foramen magnum is found a steep roof formed by parietals and supraoccipital (well preserved in *Thecodontosaurus*, also in *Megalosaurus* from the Dogger of Stonesfield).

On the side in front and towards the exoccipital process a narrow squamosal arches free in *Thecodontosaurus antiquus* and *Plateosaurus Erlenbergiensis* (also *Megalosaurus* and *Creosaurus*).

Under its place of branching lies the outer ear opening. In front the frontals meet the parietals, large, broad and flat (*Plateosaurus engelhardti*); in this lies the pineal foramen; this is the case in all Dinosauria, e.g. *Anchisaurus*, *Triceratops*, *Stegosaurus*, *Diplodocus* (also in

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Hatteria and Ichthyosauria). The jugal extends to in front of the orbit. Thus the maxilla is moved far forwards.

Of skull perforations there are the temporal fossae, the orbits and always a large antorbital vacuity (e.g. *Teratosaurus*, also *Anchisaurus*, *Megalosaurus*, but also in *Thecodontosaurus* and *Creosaurus*).

In the European material postfrontal, postorbital, lachrymal, nasal and premaxilla are not preserved. But to conclude from the frontals and maxillae, the nasals must have been very large, like MARSH figured for *Anchisaurus*.

It would go too far into anatomical details if I were to describe nerve and vessel openings of the brain case and the inner ear which are still preserved in perfect completeness in *Plateosaurus erlenbergiensis* and *Thecodontosaurus antiquus*.

In the skeleton I will only comment on the particularly important points for distinguishing the forms.

Among the vertebrae the sacral are most important. There are 3, not 2 as MARSH states. Also *Megalosaurus* of the Dogger still has 3 sacral vertebrae. The fusion with the ilia is brought about by strong sacral ribs that expand mushroom-like distally. The 2 anterior sacral vertebrae are longer than the dorsal vertebrae; in *Gresslyosaurus* the first is the longest, in the other genera the second; the third is always short. In *Plateosaurus*, *Pachysaurus*, *Thecodontosaurus* the third is sharpened below, in *Gresslyosaurus* and *Sellosaurus* round.

In the shoulder girdle the scapula in particular is important. The genus *Plateosaurus* has at the anterior end a wing process upwards. This is absent in *Pachysaurus*, *Gresslyosaurus* and *Thecodontosaurus* (but is present in several South African forms).

Scapula and coracoid are always clearly separate, never fused. The scapula engages in the coracoid with a large notch. No precoracoid is present.

In the genera *Pachysaurus* and *Plateosaurus* I have been able to show a supracoracoid foramen; in other genera this is not visible, although MARSH and FÜRBRINGER figure it for *Thecodontosaurus*. On the outer medial lower edge of the coracoid there is in several species a strong attachment for the coracobrachialis muscle.

The clavicle is absent as in most Dinosauria.

The limbs also offer noteworthy features. The forelimb is strong but short; hand and forearm are in general adapted, more for seizing and holding prey than for locomotion. While sitting the forelimbs were probably used for support.

The humerus is 2/3 as long as the femur, the forearm ½ - 4/5 the length of the humerus.

The hand has 5 fingers. Indeed in this reptilian grasping hand no true opposition of the thumb is possible, but metacarpal I and the phalanges are medially twisted in such a way that the huge end claw is moved against the other fingers and the other metacarpals form a crescent so that IV lies half behind III and V completely behind IV! I and II are very strong, IV very

weak, V short and thick without claw. The thumb is provided with a large claw; in II and III it is always smaller. In each genus the hand has a characteristic form.

Also in the hindlimb each bone has its distinctive form for species and genus. The femur is generally crocodile-like, but with larger trochanter IV, which sometimes has a different form, but particularly a different position; in *Gresslyosaurus* less than halfway along the femur, in *Plateosaurus* halfway along, in *Teratosaurus*, *Sellosarus* and *Thecodontosaurus* over halfway along.

Also much is to be said of the lower leg but which must be passed over. The lower leg is always shorter than the femur.

The foot is well developed. It has 5 toes, the middle 3 are the longest and strongest; III the most; II and IV again correspond. I and V are short, I with a strong claw, V probably without. These stand steeper, III the least. The claws stand obliquely lateral, and are asymmetrically built. This strongly armed foot probably served as an offensive weapon in jumping like the spur of the cock. The form of the foot is essentially the same in all Triassic Theropoda (in Europe, S. Africa, N. America), only sometimes slimmer, sometimes more compact.

In both the reduced toes there shows the tendency for reduction of the toes. They must be derived from symmetrically 5-toed forms. Later (e.g. *Allosaurus* of the Como beds) V is missing and I is rudimentary. In Cretaceous Theropoda (e. g. *Ornithomimus*), I is also missing. It is the same case as in the horse series.

The distribution of species follows:

<u>Rhaetic</u>:

Gresslyosaurus cf. *ingens* RÜTIM. Part of skeleton, Wedmore Hill (*Avalonia* and *Picrodon* SEELEY).

Plateosaurus cf. *Poligniensis* PID. and CHOP. Part of skeleton, Göttingen.

"*Plateosaurus*" *cloacinus* QUENST. sp. Teeth in the Swabian bone bed (incl. "*Zanclodon cambrensis*" E. T. NEWTON, lower jaw).

"*Plateosaurus*" *ornatus* n. sp. 1 tooth. Bebenhausen.

<u>Knollenmergel</u>:

Plateosaurus *Reinigeri* n. sp. Skeleton, Stuttgart.
" *Quenstedti* n. sp. Skeleton, Pfrondorf near Tübingen.
" *Erlenbergiensis* n. sp. Skeleton with skull, Erlenberg near Stuttgart.
" *Engelhardti* H. v. MEYER. Heroldsberg near Nürnberg.
" *Poligniensis* PID. and CHOP. Several skeletons, Poligny.

Gresslyosaurus ingens RÜTIM. Schönthal near Basel.
" *Plieningeri* n. sp. Skeleton, Stuttgart.
" *robustus* n. sp. Skeleton, Bebenhausen near Tübingen.

Pachysaurus magnus n. gen. n. sp. Schönthal near Basel.
" *ajax* n. sp. Skeleton, Wüstenrot near Löwenstein.

<u>Stubensandstein</u>:

Teratosaurus suevicus H. v. MEYER. Upper jaw, Stuttgart.
Identical (?) Skeleton, Aixheim.

Sellosaurus gracilis n. gen. n. sp. Skeleton, Stuttgart.

"*Thecodontosaurus*" *Hermannianus* n. sp. Upper jaw, Stuttgart.

Schilf sandstone:

"*Zanclodon*" *subcylindricodon* n. sp. 1 tooth, Feuerbacher Haide.

Lettenkohle:

Zanclodon laevis T. H. PLIENINGER. Teeth, Gaildorf.

"*Zanclodon*" *crenatus* T. H. PLIEN. Teeth.

Lower "Keuper" of England:

Thecodontosaurus antiquus MORRIS. Bristol.

" *cylindrodon* R. OWEN n. sp. Bristol.

Upper Muschelkalk:

Thecodontosaurus latespinatus n. sp. Dorsal and caudal vertebrae. Bayreuth, Crailsheim, Lunéville, Thuringia.

Tanystrophaeus conspicuus H. v. MEYER. Vertebrae with foramen in centrum below. Bayreuth etc. (? Incl. *Zanclodon Schützii* E. FRAAS, tooth).

Lower Muschelkalk:

Thecodontosaurus primus n. sp. Dorsal vertebrae, Upper Silesia.

Tanystrophaeus antiquus n. sp. Upper Silesia.

With this I have briefly covered the hitherto so little known dinosaur fauna of the European Triassic and perhaps indicated several interesting points.