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THE DINOSAURS
OF THE
TRANSYLVANIAN PROVINCE
IN HUNGARY.

BY

Dr. FRANZ BARON NOPCSA.

WITH PLATES I-IV AND 3 FIGURES IN THE TEXT.

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I. Introduction.

Since it appears doubtful when my monographic description of the dinosaurs of Transylvania[1] that formed my so-to-speak preparatory works to my current dinosaur studies can be completed, due on one hand to outside circumstances, but on the other hand to the new arrangement of the vertebrate material in the kgl. ungar. geologischen Reichsanstalt accomplished by Dr. KORMOS, the necessity emerged of also exhibiting some of the dinosaur material located here, so that L. v. LÓCZY left the revision to me; I view the occasion, already briefly anticipating my final work at this point, to give diagnoses of the dinosaurs from the Transylvanian Cretaceous known up to now made possible from a systematic division of the current material, as well as to discuss their biology. The reptile remains known from the Danian of Transylvania will be mentioned only incidentally. Concerning the literature, I believe in refraining from more exact citations, since this work presents only a preliminary note. This absence will be made up for in the final works.

I generally regard dinosaurs to be a superorder of reptiles and the remaining superorders (Superorder) of reptiles were accordingly: I Theromorpha (Cotylosauria + Dicynodontia + Dinocephalia + Pelycosauria + Theriodontia); II Diaptosauria (Rhynchocephalia + Parasuchia); III Lepidosauria; IV Ichthyosauria (Thalattosauria + Ichthyosauria); V Sauropterygia (placodonts + sauropterygians); VI Testudinata; VII Crocodylia; VIII Dinosauria (Saurischia + Orthopoda); IX Pterosauria. Therefore, I cannot agree with the tendency to completely abolish the idea "Dinosauria" because one of each representative of Saurischia and Orthopoda displays at least as many common features as a cotylosaur and a theriodont or *Hatteria* and *Dimetrodon*. As most essential common characteristics of "dinosaurs", I designate the peculiarity of these animals based in any case on the structure of their germ plasma, also on characteristics based deep in the organism, that the different mechanical problems that are placed before them

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[1] Parts I-III Denkschriften Akad. d. Wiss. Vienna 1899-1904.

are solved through different opportunities and completely independent of each other in a bird-like and not, as in "theromorphs", in a mammal-like way. This evidently corresponds to a "latent homoplasy" that already maintains the salvation of the concept of "dinosaur", as I have emphasized in my work on *Omosaurus* and my work "Ideas on the origin of flight".

As is obvious from my last notice treating the Transylvanian dinosaurs in Zentralbl. f. Min, Geolog. and Pal. (1914), 4 species of dinosaurs are presently known from Transylvania, which are mentioned in the literature as *Telmatosaurus*, *Mochlodon*, *Titanosaurus* and *Struthiosaurus*. A theropod, whose caudal vertebra was recently discovered in the material of the kgl. ungar. Geologischen Reichsanstalt, has recently been added [to this list].

Above all some remarks must be made about the names mentioned up to now: In the description of the *Telmatosaurus* skull as "*Limnosaurus*" it was already pointed out in 1899 that the decision of whether *Telmatosaurus* did not belong to that genus whose femur and tibia was described under the name *Orthomerus* from the Maastrichtian depended on whether the femora are referable to the *Telmatosaurus* skull. Four years later the preoccupied name *Limnosaurus* was replaced by *Telmatosaurus* and since then many years have passed; the expected femora have finally been found. The femora of "*Telmatosaurus*" recognized in the Valiora material, later also in the Szentpéterfalva material actually confirm the conjecture of 1899 that *Telmatosaurus* and *Orthomerus* are generically identical; consequently, we are forced from now on to drop the name *Telmatosaurus* (1900) to favor of *Orthomerus* (1881). The incorrect referral of the *Telmatosaurus* skull with *Titanosaurus* extremities at that time (1912) was already rejected personally by me personally in 1914.[1]

A name change is necessary also in the genus *Mochlodon*. The genus *Mochlodon* (with the only species *M. Suessi*) was erected in 1882 by SEELEY for a small dinosaur from the Gosau, which seemed to be characterized by its tooth form, and I identified the first small such jaw remains from Transylvania with this genus and species. This identification has proven correct up to the present time. When a larger *Mochlodon* individual was later discovered, I erected the new species *Mochlodon robustum* for the latter and compared it with *Rhabdodon priscum* that was also unquestionably known to SEELEY from MATHERON'S 1869 work. The teeth of the latter appeared to be distinguished from the *Mochlodon* teeth by the absence of a keel based on the

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[1] Because of his ignorance of the literature, B. BROWN proposed the very unnecessary name *Hecatasaurus* for *Limnosaurus* NOPCSA in 1910.

illustrations published by MATHERON and therefore I had no reason to doubt the validity of SEELEY'S genus *Mochlodon* in 1900.

After my description of the Transylvanian *Mochlodon* remains, a visit in Marseilles, where MATHERON'S material is preserved, satisfied me that the 10 mandibular teeth in *Rhabdodon priscum* are also keeled exactly as in *Mochlodon*, in contrast to what MATHERON'S work had supposed, and it now emerges that *Mochlodon* (1881) and *Rhabdodon* (1869) are generically identical. The name *Mochlodon* must yield to the name *Rhabdodon* because of this identity. The nomenclature of *Struthiosaurus* was already partially clear to me in 1903.

After these generic corrections it is superfluous to explore whether the individual genera of the Transylvanian dinosaurs can demonstrate differences, and whether differences, as far as available, have really specific value or were to be interpreted as sexual differences. This generally important question can only be clarified through further explicit observations.

Since the somewhat smaller *Iguanodon Mantelli was* also found in the coal mines of Bernissart in addition to *Iguanodon bernissartensis*, DOLLO already in 1882 saw reasons to explore the question of whether *I. bernissartensis* and *I. Mantelli* were not merely males and females a species of *Iguanodon*, but because of greater differences he was forced to deny this.

We have to record a second pairwise occurrence of two approximately equal-sized dinosaur species of the same genus at a locality in the Gosau, from which both *Struthiosaurus* (= *Crataeomus*) species *Str. Pawlowitschi* and *Str. Lepidophorus* were described by SEELEY; their differences are obvious, especially in the form of the scapulae figured by SEELEY.

As already mentioned, I can establish the third occurrence of two approximately the same-sized dinosaur species of the same genus at a locality, therefore a fact that stands in contradiction with the observation of vicariant forms, in the genus *Rhabdodon* of the Danian of Szentpéterfalva and accordingly I created the species *Mochlodon robustum* for the more robust *Rhabdodon* (*Mochlodon*) form in 1899. I believed some years later in 1902 that the new designation must be dropped despite the difference of the predentary of *Rh. Suessi* and *Rh. robustum*; however, today because of new finds and observations I see that *Rh. robustum* is different from *Rh. Suessi*, that furthermore *Rh. robustum* NOPCSA is completely covered by *Rh. priscum* MATHERON and that it is thus best to speak of *Rhabdodon priscus* var. *Suessi* SEELEY and *Rhabdodon priscum* MATHERON. Many years after my description of the skull remains of *Rhabdodon*, HOOLEY pointed to the size of a newly discovered specimen of *Iguanodon Mantelli*;

he compared this form later with *I. bernissartensis*, then emphasized that both of these species were identical and regarded *I. Mantelli* as the female of *I. bernissartensis*. Thus this question was posed only a short while ago and one of the most remarkable results of my newer investigations on the Transylvanian dinosaurs now is the establishment of the fact that in the Transylvanian material dimorphism occurs not only in *Rhabdodon* but also in *Orthomerus*. The figure of two very similar-sized caudal centra originating from Valiora that come from the same tail region of two similarly-sized *Orthomerus* individuals will temporarily count as evidence. One sees that the one centrum (Pl. II. Fig. 4.) is distinguished from the other (Pl. II. Fig. 3.) by the absence of the deep basal furrow. I attribute the unfurrowed vertebrae to *Orthomerus* (*Telmatosaurus*) *transylvanicus*, for the furrowed [vertebrae] I propose the designation *O. transylvanicus* var. *sulcata*, although until now it is certain only that both originate from the genus *Orthomerus* and in this case membership of the skull typical of this genus to the one or other remains can still be decided just as little as in the genus *Struthiosaurus*. At Tendaguru, the gigantic *Brachiosaurus Brancai* and *Fraasi* are preserved together in the "mittelere Saurierschichte" is likewise very striking. Notwithstanding this fact, we establish four times a pair preserved together of very similar-sized, allegedly specifically different dinosaurs of the same species of the more common European dinosaurs that themselves are not insignificantly distinguished in skeletal construction, but are almost not at all distinguishable in three cases in the structure of their teeth, and since the great difference in the construction of the caudal vertebrae of the males and females of *Heloderma* was already recognized for several years by BOULENGER, I now believe - summing everything up - that it is not daring to explain the different, approximately same-sized dinosaur species of the same genera that repeatedly occur together not through specific, but through sexual differences. In any event, the otherwise striking similarity of the teeth of these animals would naturally be explained in all these cases in that the organs serving the same jaw mechanics are evidently influenced the least by sexual differences. HOOLEY already came to the same results, but he identified the females in the smaller, more gracile forms; however, after analogy with living lacertilians, as appears to me, one would have to look for female more among the larger and more robust forms therefore *Iguanodon bernissartensis*, *Struthiosaurus Pawlowitschi*, *Rhabdodon priscum* and *Orthomerus transsylvanicus*, while *I. Mantelli*, *Str. lepidophorus*, *Rh. priscum* var. *Suessi* and *O. transsylvanicus* var. *sulcata* would represent the males. Considering the uncertainty in this point, I regard it premature to now use (male) and (female) in dinosaurs, instead temporarily for expediency to still keep writing the neutral species names instead of the sexual signs and thus *Iguanodon Mantelli* and *Iguanodon Mantelli* var. *bernissartensis*, furthermore *Struthiosaurus Pawlowitschi* and *Str. Pawlowitschi* var. *lepidophora* etc.

In any case it would be desirable, by virtue of these observations made in Europe, if now the American paleontologists went forth to revise their rich material, for nominally the relationship of some trachodontids to each other appears to be highly suspect in this regard and in addition it entices one to formally view *Ceratosaurus nasicornis* furnished simply with a "cock comb" or similar ornamentation merely as a sexually ornamented theropod and not [as one] with offensive weapons. That one of the sexual differences under consideration and also the study of the pelvic region is also possibly able to give us information on the still unresolved question of viviparity or oviparity of the dinosaurs, I only want to mention this here in passing.

After these corrections have been examined, in this way preliminary diagnoses of the five dinosaur genera *Orthomerus*, *Rhabdodon*, *Struthiosaurus*, *Titanosaurus* and *Megalosaurus* known from Transylvania can be given.

II. Descriptive Part.

A) **Orthomerus** SEELEY. (*Limnosaurus* NOPCSA; *Telmatosaurus* NOPCSA; *Hecatasaurus* BROWN). The species *O. transylvanicus* NOPCSA is closely united with the form known from the Maastrichtian of Belgium *O. Dolloi* SEELEY. *O. transsylv.* var. *sulcata* appears to represent the male of *O. transsylvanicus*. *O. Hilli* NEWTON is more distantly related. This genus belongs in the Subfamily *Protrachodontidae*[1] of the Family *Ornithopodidae*. *Protrachodontidae* differ through relatively slight development of the dental battery and high facial profile of *Trachodontidae* (*Trachodon*, *Claosaurus*). Bone structure not as dense as in *Rhabdodon*, the marrow cavity of the long bones sharply delimited. The skull of *Orthomerus* and its elements have been sufficiently described in 1899; I thus refer to this work. The cranial cervical vertebrae are very opisthocoelous and without spinous processes; the opisthocoely of these vertebrae is evidently to be interpreted as an adaptation for rapid locomotion. The dorsal vertebrae not well known up to now, the synsacrum, whose vertebrae do not display elliptical cross-section, is together formed from 8 vertebrae. The caudal vertebrae are characterized in that the arch of the proximal caudal vertebrae is tilted caudally so that the postzygapophyses tower over the edge of the vertebral centrum. The centra of the caudal vertebrae are hexagonal in the cross-section with rounded edges, nearly biplanar and almost as long as high, [and] therefore not elongate; the rear joint surfaces for the hemapophyses are separate on the midline of the body [and] the ventral surface of the caudal vertebrae is variable. (viz. page. 6.). Due to the high

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[1] The genera *Kritosaurus*, *Saurolophus*, *Orthomerus*, *Hypacrosaurus* inclusively.

neurapophyses and long hemapophyses, the tail cross-section of the living animal was laterally compressed. (Tab. II. fig. 2-4.)

At the capitulum and tuberculum, the ribs are developed into vertical plates, in which the tuberculum appears as a well-formed button placed on the upper edge of this plate. (Pl. III. fig. 1.) After their downward curvature, the ribs are somewhat broadened laterally; they are therefore quite different from the completely rod-shaped, longitudinally furrowed *Rhabdodon* ribs and reminiscent in every respect of the ribs of some Recent birds, in which the scapula is positioned on the rib thickening.

The shoulder and pelvic girdle are only incompletely known and studied. The humerus [is] short, with a weaker than thickened bulge of the crista radialis (Pl. II. fig. 5). Its difference from the *Rhabdodon* humerus can be recognized from the figure.

The femur is built [like a] trachodontid in that both lower condyles on the front side of the femur surround a hole parallel with the longitudinal axis of the femur; however, a further analogous parallel foramen is also present on the caudal side of the femur, in that both joint surfaces also become joined by a bony bridge on the caudal (curved) side. (Pl. II. Fig. 6. Pl. IV. Fig. 6.). Traces of such an indeed interrupted bony bridge between both condyles are also present in *O. Dolloi*. The joint surfaces of the lower condyles describe a distinctly large arc in profile and are well ossified. The shaft of the femur is straight; the fourth trochanter is a widely extending, wing-like crista that projects horizontally and not pendantly, [and] laterally displaying two very characteristic muscle scars. The tibia is very reminiscent of *Orthomerus*, it and the metatarsalia, like the metacarpalia, slender and definitely trachodontid. The foot had 3 metatarsalia that were all closely pressed together, indeed apparently immovable, one overlapping in a lobe-like manner as in *Iguanodon*, but occurring only individually; the metatarsalia were also much more slender than in *Iguanodon* (Pl. II. fig. 2-3.) The distal phalanges hoof-shaped.

As was developed in 1913, *Orthomerus*, devouring soft plant food, lived in swamps and shallow water. Apart from the Danian of Transylvania, *Orthomerus* has been found in the Belgian Maastrichtian.

B) **Rhabdodon** (*Mochlodon* SEELEY, *Iguanodon* partim.) Species of this genus are *Rhabdodon priscum* MATHERON (= *Rh. robustum* NOPCSA) and *Rhabdodon priscum* var. *Suessi* SEELEY (= *Iguanodon Suessi* BUNZEL). *Rhabdodon* is a dinosaur of the Subfamily

Camptosauridae. *Rhabdodon* remains are known from Transylvania, southern France and the Gosau.

The genus *Rhabdodon* is outlined as follows: bone structure generally very dense, skull *Camptosaurus*-like. For the sake of details, I refer to my works of 1902 and 1904. Some new tooth types of the maxilla (Pl. I. fig. 1-2) are very reminiscent of the isolated teeth figured up to now of *Craspedodon lonzeensis* from the Maastrichtian of Belgium and the evolutionary direction of our animal can be recognized. Since the present quadrate and articular are likewise more complete than the specimens known up to now, these have also been figured (Pl. I. fig. 3-4). Both belong to the more slender variety *Rhabdodon* var. *Suessi*, which in contrast to the other was figured in 1902 and 1904. Cervical vertebrae (Pl. I. fig. 6) ventrally keeled, with a large neural canal, biplanar, reminiscent of *Camptosaurus* and *Hypsilophodon.* Dorsal vertebrae weakly biconcave. Centrum with an elliptical cross-section (Pl. I. fig. 7). Number of fused sacral vertebrae increased to 6; this is different from that of *Camptosaurus* (and independent of the evolutionary direction) characteristic of the degree of evolution of *Rhabdodon* . Centrum of the true sacral vertebrae somewhat concave ventrally. Neural canal not particularly enlarged. (Compare this figure from my work on *Omosaurus lennieri*.) Caudal vertebrae biconcave, laterally compressed. The rear facets for the hemapophyses united on the midline, centra of the rear caudal vertebrae elongate. (Pl. I. fig. 8-9) The ribs as in *Hypsilophodon*, scapula in *Rh.* var. *Suessi* slender, narrow with parallel edges. The form of the scapula in *Rhabdodon priscum* is not yet recognized with certainty. A scapula displaying the ornithopod type attributable to this species is possibly known only up to now in a specimen that is distinguished from that in *Rh.* var. *Suessi*

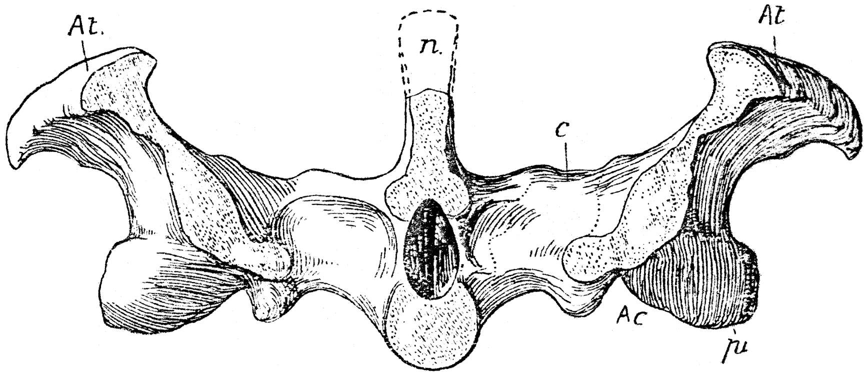

Figure 1.

through a more moderate form, broader blade and pronounced divergence of the edges dorsally. This scapula was found in a bonebed associated with the remains of *Titanosaurus*, *Struthiosaurus*, *Orthomerus* and both *Rhabdodon* species, but it is evident, because of other finds, that it can belong neither to *Titanosaurus*, nor *Struthiosaurus*, nor *Rh.* var. *Suessi*, and so *Rh. robustum* or *Orthomerus* can come into consideration. Considering the saber-shaped, parallel edges of the scapula of trachodontids and the fact that *Orthomerus* displays a *Trachodon*-like humerus, [and] thus might well also have possessed a similar scapula, this form also appears to be excluded, and so only more so does *Rh. priscum* come into consideration. The assignment is certainly nevertheless provisionally problematic.

The pelvic girdle is little known in *Rhabdodon.* The Gosau specimen, which HUENE identified as an ischial fragment of a camptosaur in 1901 and SEELEY described as a *Rhadinosaurus* femur, does not belong to *Rhabdodon*, but to *Struthiosaurus*. The front part of the ilium is weakly arch-like in *Rhabdodon*, dorsoventrally compressed, cranially ending in a flattened rounded tip. Femur with relatively poor ossification, more of a flat joint and pendant trochanter. The shaft of the femur is somewhat curved. Humerus with a more distinct knob-like projecting crista radialis (Pl. II. fig. 1).

Like *Orthomerus*, *Rhabdodon* was an inhabitant of the swamp. The abandonment of the denser bone structure of the more primitive ornithopods in favor of a less dense [structure] in trachodontids finds its analogue in the loss of the foramen pneumaticum in *Dinornis*. In Saurischia, an analogous process is present.

C) **Struthiosaurus** BUNZEL (= *Crataeomus* SEELEY, *Pleuropeltus* SEELEY, *Danubiosaurus* BUNZEL, *Rhadinosaurus* SEELEY partim.). The new species *transilvanicus* NOPCSA is closely related to *Str. austriacus* and *Str. lepidophorus*, but much more robust. What DEPERÉT mentioned from southern France as *Crataeomus*, belongs in another new, heavy armored genus possibly indeed related to *Struthiosaurus* that displays some similarity with *Hierosaurus*. *Str. transylvanicus* is only very rarely represented in Transylvania and very inadequately in the collection of the Budapest geologischen Reichsanstalt. Some remains found at Szentpéterfalva that belong together form the type of the new species and they simultaneously prove that the union of *Struthiosaurus* and *Crataeomus* was on one hand, *Acanthopholis* and *Anoplosaurus* on the other hand, by virtue of theoretical considerations undertaken by me in 1902, is correct. The new finds also provide further points of information.

The skull base, apart from its much more robust arrangement essentially similar to birds, corresponds to skull base of *Struthiosaurus austriacus* figured by SEELEY. The frontal and parietal are constructed exactly as in the specimen of *Stegoceras* of LAMBE and later figured by LULL and also discussed by me. It demonstrates the accuracy of LULL'S orientation of the *Stegoceras* remains. The postfrontal is very similar to the Gosau specimen figured by SEELEY as the postfrontal of a turtle (*Pleuropeltus*), indeed it is almost identical with it, and so I do not hesitate in uniting the skull specimen of *Pleuropeltus Suessi* with *Struthiosaurus austriacus.* The upper temporal fenestra are completely closed in the new specimen. The appearance of the rear, almost smooth, hemispheric complete parts of the skull, supraoccipital, exoccipitals, squamosals, parietals, frontals, pre- and postfrontals, the brain base and the proximal ends of the quadrates, very similar to birds in profile and from behind, but with the difference that in birds the entire hemisphere of the brain is filled, while in *Struthiosaurus* the formerly armored surface of the sphere is realized by closure of the upper temporal fenestrae, therefore analogous to some lepidosaur species; the brain thus remains small. The orbit is large. The quadrate is immovably joined with the suspensorium, and handle-like and very delicately built in *Str. austriacus* in correlation with the perceptibly weak dentition. It is directed with its lower end very rostral; the distal joint surface of the quadrate is also only slightly rounded. The lower temporal fenestra [is] slit-like.

All vertebrae of *Struthiosaurus* are biplanar. The lower part of the otherwise ring-shaped atlas is strongly developed in the anteroposterior direction and thus forms a centrum-like body that has a hemispheric deepening cranially for reception of the globular occipital condyle, and caudally an impression for reception of the dens. The more caudal cervical vertebrae [are] considerably increased in size, depressed, [and] somewhat reminiscent of *Omosaurus*; the pre- and postzygapophyses [are] very large; the cross-section of the centrum [is] elliptical; the cervical ribs [are] free. Dorsal vertebrae with moderately high diapophyses and analogous to those of *Str. austriacus* and *Polacanthus*, the front caudal vertebrae with distal somewhat club-like thickened processus transversus. (Pl. III. fig. 9; Pl. IV. fig. 1) The tail in the living animal round in the cross-section.

The forward ribs, T-shaped in the cross-section as in the Gosau struthiosaur, but more moderate; the back ribs are not preserved, [but] they were probable like in the Gosau dinosaur, where they have been described under the name *Pleuropeltus*, with which they were lying in articulation with armor. The scapula of *Str. transylvanicus* is likewise built analogously like that of *Str. Pawlowitschi*, otherwise nothing is known of the Transylvanian *Struthiosaurus*, but the missing parts have been restored by virtue of the Viennese material. A study of the latter proved that by analogy with *Stegosaurus priscus,* SEELEY'S so-called *Rhadinosaurus* femora are the pubes of *Struthiosaurus*; that furthermore both of the complicated arrangements of the armor plates of "*Crataeomus*" belong to its cervical region and with aid of *Polacanthus* also otherwise provided information on the distribution of the armor elements of this animal.

A characteristic of the skeleton of *Str. transylvanicus* exists in that the upper surface of all of the bones (with the exception of the skull bones) displays sculpture that is reminiscent of crossed fibers that are frequently encountered somewhat analogously on the underside of the ossified dorsal armor elements of different animals (e.g., crocodilians and dinosaurs). The idea cannot be rejected that this sculpture of the skeletal bones is somehow correlated with the strong ossification process that produces the fusion of the armor with the ribs of Acanthopholididae. In some rhino birds, the wavy sculpture of the skull bones caused by the cranial horn masses seems to overlap on the remaining horn-free bones.

The figure of *Struthiosaurus* (text-figure 2), which was drawn by Dr. TOBORFFY from my instructions, gives us an approximate idea of general habitus of this animal, yet this figure by no means strictly raises the claim; it should serve rather only for the general orientation.

Along with *Acanthopholis* (= *Anoplosaurus*), *Polacanthus*, *Stegopeltus*, and *Stegoceras*, *Struthiosaurus* forms the Family *Acanthopholididae* NOPCSA (1902), which is separated from the other forms (e.g., *Ankylosaurus* B. BROWN) inclusive Subfamily *Nodosauridae* MARSH because of the skull construction. As is recognizable from the skull construction, the Family

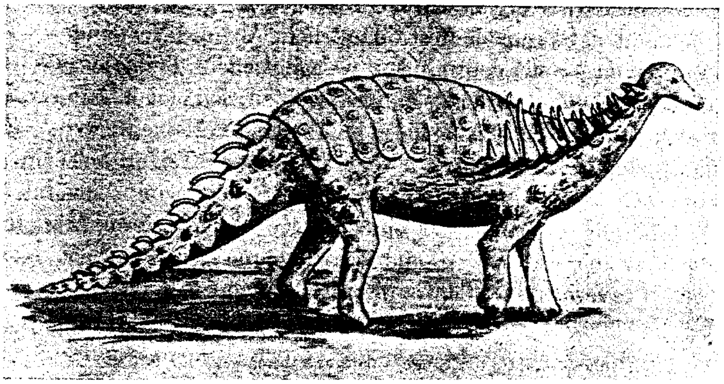

Figure 2. Reconstruction of Struthiosaurus.

Acanthopholididae is of the same systematic value as the *stegosaurs* and *ceratopsids* because of the peculiar skull of these forms.

One can join the completely armored, and thus partially herbivorous dinosaurs transforming to and adopting quadrupedal gait into a Suborder (perhaps **Thyreophora** nov. **subordo**) and contrast with the herbivorous forms that remain bipedal, unarmored, herbivorous forms opposed to become, as indeed also the quadrupedal sauropods [and] the theropods. Within Thyreophora, the Families *Acanthopholididae*, *Stegosauridae* and *Ceratopsidae* would then be distinguished in a consistent way. The uniformity of the ceratopsids (Subfamilies *Torosauridae* and *Ceratopsidae*), [and] then the stegosaurids (Subfamilies *Scelidosauridae*, *Stegosauridae*) does not speak against such a process. *Monoclonius*, *Triceratops*, *Scelidosaurus* and *Stegosaurus*[1] will then be good types for the Subfamilies in two of these groups that preserve the value of a Family.[2] *Nodosauridae* would be equivalent to *Ceratopsidae.* The comprehensive reasons for this disturbance of a part of current dinosaur systematics would overstep the limits of this notice, but it will be provided at a later date. As was explained in 1914, *Struthiosaurus* was an inhabitant of dry land.

D) **Titanosaurus**. For the Transylvanian species, I propose the name *T. dacus*. It reached a maximum of 5-6 m in length, while the smallest individuals might have hardly went beyond 1 m in length; in southern France, there are even smaller *Titanosaurus* individuals than in Transylvania, for characteristic vertebrae are found in the Museum of Lyon of approx. 2 cm length, which at the same time represent the smallest sauropod remains known up to now. The affinity of *Titanosaurus dacus* with the large Patagonian *Titanosaurus* etc. will be returned to on

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[1] Since I already mentioned the genus *Stegosaurus*, I seize the opportunity to detail the statements made in 1911 on the attachment of the dermal armor plates in the tissues of *Stegosaurus priscus*, since the position of the figures that then appeared in Geolog. Magazine may mislead to conclusions that were not intended, and of course the precision of how I thought the armor plates of *Stegosaurus* were arranged can be

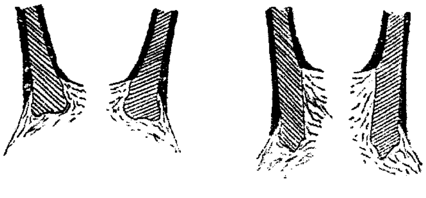

Figure 3.

better recognized from a comparison of both of the body cross-sections reproduced here with the figures 9/*a* and 9/*d* in Geol. Mag. 1911, (page 152) than from many words. Simultaneously, this kind the armor plate in the tissue appears to mechanically fix more effectively than that which LULL adopted in the Amer. Journ. of Sc., in which each armor plate displays a bulge-like base.

[2] Fragmentary remains like *Regnosaurus* etc. still need further investigation.

another occasion. Skulls unknown, likewise cervical vertebrae, dorsal vertebrae spongy with rather small, widely open pleurocentral cavities that communicate with the spongy part through a foramen. Vertebral centra strongly opisthocoelous; the spine, ✚-shaped in cross-section, simple, somewhat club-shaped, is reminiscent of *Haplocanthosaurus*. The pre- and postzygapophyses hollow (pneumatically?), sacral vertebrae cavernous, their centra flattened, of an almost square cross-section. The most typical body part are the caudal vertebrae. Front caudal vertebrae with small pleurocentral cavities, which the following are missing. Processus transversus of the front caudal vertebra not plate-shaped as in *Diplodocus*, but developed into a rod shape. The vertebrae in the front half of the tail very greatly procoelous and deeply furrowed ventrally. (Pl. III. fig. 4). The rear, partially already planoconvex, caudal vertebrae (Pl. III. fig. 5) elongate, the arch limited to the rear part of the centrum, the articulation with the preceding vertebra produced by rod-shaped, long prezygapophyses, the last caudal vertebrae biconcave. Dorsal ribs hollow in their upper part, with a large foramen leading to this cavity. Scapula *Apatosaurus*-like in outline, but without true crista or spina. Humerus heavy, robust, proximal and distal strongly widened, the humerus not much shorter than the femur, crista radialis well developed. Femur slender, with a not very sharply delimited medullary cavity and the joint surfaces poorly developed, evidently covered with thick cartilage. The shaft of the femur is straight, somewhat flattened from front to back. The fourth trochanter a very outwardly-projecting sharp edge. Tibia, fibula, ulna, radius and pelvic elements of *Titanosaurus* more or less well-known, but not yet sufficiently studied. Claws as in all sauropods asymmetrical, but develops strikingly slender claws (Pl. III. fig. 8). The forelimb was, as is recognizable from the size of the humerus, relatively long. *Titanosaurus* was, as the form of the femur shows, a tall-legged swamp animal like *Diplodocus* .

The femur of both of these sauropods is, as it is in all sauropods, constructed exactly after the ground-plan of the stegosaur femur. In *Stegosaurus* and its relatives, it can be recognized that it descended from semi-bipedal forms (e.g., *Scelidosaurus*) from the construction of the pelvis, the size of the fourth trochanter in some forms, and the shortness of the humerus, and I thus agree very much with TORNIER as concerns the ostrich-like normal carriage of the neck in *Diplodocus* and its relatives, likewise I find myself thus compelled to fight his view that *Diplodocus* had a lizard-like foot posture and refer to my works on *Omosaurus* and *Stegosaurus priscus*. The argument that *Diplodocus* was therefore positioned like a reptile because it is a reptile is naturally nonsense.

E) **Megalosaurus**. Much like before HUENE'S revision of the Triassic dinosaurs, the generic name *Zanclodon* is used for all kinds of large theropods from the Triassic, so the name *Megalosaurus* is still used today for the younger *theropods*, a receptacle into which one puts all the not more exactly definable European theropod remains of the Jurassic and Cretaceous. We temporarily must have no concern in the world to do with this drawback and for this reason it thus appears most advisable to also provide new Transylvanian theropod remains with the embarrassing name *Megalosaurus* spec. As [shown in] figure 6, 7 on Plate III, it is a biplanar, smooth, ventrally rounded vertebral centrum whose construction deviates from all of the remains known otherwise from Transylvania and is reminiscent of a theropod caudal vertebra. Its only interest lies in that a year ago I first gave an expression of hope that theropod remains would also be discovered in the coal-bearing Transylvanian Cretaceous deposits and such a vertebra was actually found in the many strata at Valiora that contain plant remains. Considering the rarity of the find, I believe it suffices if I simply refer to the figure in lieu of a description. The identity of this animal with *M. pannoniensis* SEELEY, furthermore *M. hungaricus* NOPCSA, from which only teeth are known, finally *Megalosaurus? Bredai* SEELEY is a loud undetermined question.

III. General Section.

In summary, we can distinguish five kinds of dinosaurs in the Transylvanian Danian in which sexual differences could at least be partially ascertained and if the more exact scientific value of the material recovered up to now will also naturally emerge after a detailed study of the individual specimens, we are nevertheless also already in the position to survey some today.

First of all, we emphasize the monotony of the dinosaur fauna of the entire Late Cretaceous of all of Europe, which is composed with inclusion of the remains only from the genera *Orthomerus*, *Rhabdodon*, *Craspedodon*?, *Struthiosaurus*, *Titanosaurus*, *Megalosaurus* and still another heavily armored of southern France, Belgian and Austrian and of course one knows *Rhabdodon*, an armored orthopod and *Titanosaurus* from the Danian of southern France, *Orthomerus*, *Craspedodon*, and *Megalosaurus* from the Maastrichtian of Belgium, *Orthomerus*, *Rhabdodon*, *Struthiosaurus*, *Titanosaurus* and *Megalosaurus* from the Danian of Transylvania. The Turonian of the Gosau shows exactly the same genera as the Transylvanian Danian, that is *Rhabdodon*, *Megalosaurus* and *Struthiosaurus* and new forms confronted first in the Cambridge Greensand, where *Acanthopholis* is implied to occur instead of *Struthiosaurus*, furthermore a species of *Titanosaurus* sauropod and, through a caudal vertebra, a *Rhabdodon*-like form have left their traces behind. After this general observation we pass on to the individual forms.

Rhabdodon belongs, as a near relative of *Camptosaurus*, to the most primitive kalodontids, that is to say to the most primitive forms of those ornithopod dinosaurs whose dentitions become specialized in the course of time by enrichment of the sculpture; *Orthomerus* belongs to the most primitive representatives of the family Trachodontidae, therefore a group in which the specialization of the dentition results not through increasing sculpture of the single tooth as in kalodontids, but through increase in the number of teeth.[1] Primitive kalodontids in North America characterize the Jurassic, primitive trachodontids the middle Cretaceous; both kinds of form are missing in the North American Laramie. In Europe *Camptosaurus*-like forms are known from the Wealden to the Danian, especially *Rhabdodon* from the Turonian, protrachodontids are found in the Maastrichtian and Danian, while genuine trachodontids (foreseen by a tooth *Trachodon cantabrigiensis* found in a marine formation) are missing in Europe. The occurrence of numerous *Titanosaurus* remains in the Danian of Europe likewise stands in contrast to what is known in North America, for there the maximum of the development of sauropods falls in the Jurassic and extends into the Early Cretaceous as in Europe. In Africa, the large sauropods (*Tornieria* etc.) are Early Cretaceous, so that *Titanosaurus* in the Danian of Europe, known through forms already from the Wealden of Europe but also of South America and India, gives the impression of a latecomer. (viz. LULL'S related grouping in the Amer. Journal of Science.)

Acanthopholididae, which is known in Europe from the Wealden with *Polacanthus* and has its representative in the European Turonian in *Acanthopholis*; missing in the Laramie of North America, they however are represented in the American middle Cretaceous even though rarely (*Stegopelta*, *Stegoceras*); in contrast, Trachodontidae and Ceratopsidae characteristic of the Laramie of America are missing for the in the Danian of Europe. This shows already that the

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[1] I give the term Kalodontidae coined in 1900 the value of a Family, from which the following systematic arrangement emerges for the ornithopod dinosaurs: Superorder *Dinosauria*, Order *Orthopoda*, Suborder *Ornithopodidae*: 1. Family Kalodontidae, Subfamily: *a) Hypsilophodontidae, b) Camptosauridae c) Iguanodontidae*; 2. Family *Trachodontidae*, Subfamily: *a) Protrachodontidae, b) Trachodontidae*. The difference of the tendency of development between kalodontids and trachodontids lies in that the former, on the basis of the nearly vertical orientation of the chewing surfaces of their teeth, obviously cut up so to speak the harder plant food with their back teeth, but the latter also crushed softer food. Due to this difference it was better for the former to always strengthen the blade of the teeth , which resulted on one side through a construction of ornamentation caused by secondary enamel ribs, while in the latter a grinding surface must be produced and this resulted in the enamel layer and the chewing surfaces of different teeth being used simultaneously, whereby a tooth pavement emerged. Both types were uneconomical in that the tooth (or the dental complex) remained usable through continual wear, whereas the mammalian principle of the thickening of enamel amounts to the tooth remaining usable not only despite wear, but being preserved despite extremely rapid wear. Since Ornithopodidae did not adapt in this way to plant food as did the mammals, in which the single tooth was strengthened through the thickening of enamel, but in such a way that the enamel of the teeth is unilaterally reduced for the production of a chewing surface and the consequent loss of tooth resistance was replaced by rapid tooth replacement, which could only result at the expense of alveolar attachment due to greater material turnover, as was already established in this way in the later inevitable reference to Ornithopodidae on soft plant food. We can point to the dental specialization of Ornithopodidae as an abortive adaptation sensu ABEL and we explain the same potentially plasmatic construction of these animals (viz. the introduction of this work) as a conflict of tooth reduction, therefore possibly also bird-like, and hardly advanced tooth-strengthening by the demands of a mechanically very productive, plant-consuming dentition.

composition the dinosaur fauna of the European Danian is not so very reminiscent of the contemporary dinosaur fauna of the Laramie Formation, but is rather reminiscent of the older faunas of Europe and North America and other form elements that fall outside the scope of our notice confirm this observation. Despite active search, not the slightest traces of the mammals from the American Laramie have been found in the European Danian, but at Szentpéterfalva forms reminiscent of the English Turonian pterosaur *Ornithodesmus* (therefore the youngest pterosaur remains of the whole world!) have been found. The lizard and bird remains of the Transylvanian Danian are still too inadequate [known] for one to arrive at conclusions from them, and unfortunately because of outstanding revision of the turtles (*Pleurosternum*?) and crocodilians (*Crocodilus affulevensis*?) the same also applies, for the only thing that one can presently say about the crocodilians of Transylvania is that they are identical with the crocodilians occurring in the Danian of southern France identical. The figures of some crocodilian remains originating from Valiora (Pl. IV, fig. 2-5) can count as proof of the occurrence of true crocodilians. The original of *Pleurosternum* comes from the Wealden. A point that we can ascertain by virtue of all of these observations is therefore that the fauna of the European Danian as compares with the fauna of the same age from the North American Laramie calls forth an ancient impression due to both the occurrence as well as the absence of certain forms.

Another interesting point of the dinosaur fauna of Transylvania and the dinosaur fauna of the European Late Cretaceous concerns the size, that is the smallness, of the individual forms. While the turtles, crocodilian and similar animals of the Late Cretaceous reach their normal size, the dinosaurs almost always remain below their normal size. Considering the different-sized *sauropods*, *orthopods* and *theropods* of a length of 10-20 m, even our largest dinosaur (*Titanosaurus* maximum 6 m) is decidedly marked as small, indeed most of the Transylvanian dinosaurs hardly reached a length of 4 m and many remained under this size.

Exactly the same smallness of the dinosaurs can be established in the Cambridge Greensand, in the Gosau, at Maastrich, in southern France and at Nagybároth, certainly only two teeth of very small *Megalosaurus hungaricus* NOPCSA are known up to now from the last place much like *Megalos. pannoniensis* of the Gosau.

This smallness of the Upper Cretaceous dinosaurs of Europe has significance for that reason, because we have to discern in it either an original character corresponding to the primitive stage of development of our dinosaurs or a symptom of degeneration. Considering that Europe was broken up into islands to the Cenomanian and considering the obvious individual wealth of the Transylvanian dinosaurs at Szentpéterfalva, Valiora, and other places, despite all of the generic monotony, I am more inclined to a symptom of degeneration called forth by insular isolation and simultaneous mass increase, as in a game park, than to think about a primitive trend. By the way, some light will be shed later on this view once the study of the dinosaur bones not rarely met in Transylvania that have been altered pathologically, for it can already be ascertained today that the not far too rare changes visible in the bones from Szentpéterfalva and Valiora were caused not through mechanical injuries, but through (caused perhaps by food disturbances?) illnesses of the bone. Under the impression of a former debate in the Wiener Zoolog.-Botan. Gesellschaft, I certainly do not lock myself out of the insight that dwarf insular forms could only appear if one species is negatively influenced by the cut-off of their habitats in disturbances in food, sexual processes or lack of space; while in this case isolation only removes predators so that tendencies of growth are boundless, which eventually might culminate in gigantic insular forms, e.g., moas. That I specifically point out moas is due to the fact that we know that these stupid and lazy, fern-eating animals did not feel the limitations of space on New Zealand since they, from their own drive, only inhabited one side of the island. As one sees, a question of most general interest subsequently emerges from the smallness of our dinosaurs.

After discussion of this further point [and] having arrived at the conclusion of our work, we must still dedicate a word on the extinction of our Transylvanian dinosaurs. Concerning the extinction, as I believe, one cannot go wrong if one first of all connects the disappearance of the Cretaceous swamp dinosaurs with the drying up of Transylvania, which culminated in the Early Eocene, and what caused the extinction of the terrestrial armored forms, so perhaps in addition to climatic factors influencing vegetation, the active, offensive interference of the small mammals can possibly also be called upon for its explanation. For example, it is known that in menageries mice even gnaw at the feet of living elephants. That after the disappearance of the large herbivorous dinosaurs disappeared the theropods that fed on them also vanished is easily explicable. The paucity of species of Cretaceous dinosaurs in all of Europe diminished to apparently only 3 (4 with *Craspedodon*) swamp forms, furthermore shrunk to 3 terrestrial forms; in addition, the apparent degeneration of these animals verifiable by bone illnesses will have influenced their extinction considerably. In any case, the change of the climate and the flora of Transylvania joined with tectonic uplift (therefore a geological factor) on the extinction of the dinosaurs located there was of the greatest significance and therefore we want to treat this process in somewhat more detail.

Discussing the tectonic processes only briefly, the deeper parts of Transylvania were covered by a sea in the Late Senonian and a brackish water region was set up for the first time due to vertical uplift in the latest Senonian; this then gradually became fresh and finally made a freshwater lake and wetlands place in the Danian. The Danian salt-water sea was already completely drained through erosion in the Early Eocene; a mainland took its place and in the Middle Eocene the whole area then rapidly sank vertically in depth to such an extent that the entire region was later flooded by the sea. Of the flora of this area, we report the following: the entire flora of the Transylvanian Danian known up to now consists of two ecological units and of course according to the outlined geographical circumstances of a hydrophilic unit and one loving a drier area. Representatives of hydrophilic plants have been found in the volcanic tuff especially suitable for their preservation at Ruszkabánya and Nadrág. They have been studied by STAUB and Prof. TUZSON and include *Pandanites* and *Arundo* and the plants of this flora might have formed the food of the herbivorous Transylvanian swamp dinosaurs (nominally *Rhabdodon* and *Orthomerus*); *Sabal* and *Jurania* have been recognized up to the present as representatives of the flora inhabiting the drier areas of the Danian of Transylvania (at Borberek and Ruszkabánya); in addition, however, it has also yielded paleotropical trees foreign to the present-day European foliage forests: *Crednaria, Sassafras*, *Ficus* and tree ferns. The Danian flora of Bulgaria known through DE LAUNAY and ZEILLER includes the following forms: in the first place ferns such as *Asplenium*, *Gleichenia*, *Pecopteris*, then conifers like *Cunninghamites* and *Damarites*, finally dicotyledonous forest plants and trees, namely *Aralia* and *Ternstroemia*.

DE LAUNAY regards this flora as Senonian, but in my opinion not the least doubt exists that it is Danian because of the stratigraphic relationships the least doubt, for the stratigraphic sequence is exactly the same as in Transylvania. On the whole, we have increased the swamps that harbored *Pandanites* and *Arundo* in the Danian of eastern Europe, then the forests before us in which fern like *Asplenium*, *Gleichenia* and *Pecopteris* grew in the shadows and which even consisted of *Cunninghamites*, *Damarites*, *Ternstroemia*, *Crednaria*, *Sassafras*, *Ficus*, tree ferns and aralians, finally glades, in which one met palm trees like *Sabal* and *Jurania*. All of this points to a damp, warm climate.

All floristic units of Transylvania disappear more or less at the beginning the Eocene, for in the Buda Eocene, as TUZSON advised me, the representatives of the European continental foliage forests, (e.g., in large quantity of *Juglans*) are already represented, instead of the paleotropical trees.

After this botanical excursion, we now consider the flat beak and the weak attachment of the teeth of *Orthomerus* that are subject to extensive wear, such that we immediately recognize that this animal could crush only soft hydrophilic plants, while we can still indeed suppose from the primitive *Rhabdodon* that it perhaps was in the position, due to its sharp beak, to direct somewhat resistant food into its mouth, where it indeed was not chewed and ground up by the teeth as in *Orthomerus* , but became cut into pieces. We are thus free to accept that the few-meters-high rhabdodonts were of the right height to nip off bunches of leaves of the *Pandanus* shrubs or the young shoots of tree ferns. In any case, what *Rhabdodon* and *Orthomerus* had in common is that both the one because of the edges of its teeth, the other because of the loose attachment of the grinding teeth, would never have been in the position to crush the leaf-bearing, small, woody branches of the continental deciduous trees of the later Eocene without damage to their dentitions. This is already extremely important and since as reptiles both of our animal also had no fleshy lips, mastication of the hidden small branches of the foliage of Eocene trees und shrubs can certainly not have been undertaken; on the other hand, however, they were yet again hindered by their body size, to be satisfied with the individual leaves of dicotyledonous plants in a turtle- or lizard-like manner; one can thus easily imagine which food breakdown followed a rapid floristic change for these animals. The absence of rapid adaptability in Ornithopodidae to another soft plant food was absolutely one of those essential moments that caused the extinction of the Cretaceous swamp dinosaurs.

It is more difficult to get to the bottom of the extinction of the Transylvanian armored dinosaurs of the terrestrial realm than in ornithopodids, or of the floristic transformations; the representatives of the Cretaceous terrestrial flora had not yet disappeared in the Eocene to the degree that the representatives of the hydrophilic flora did and therefore it gives the impression that the assumption that some of the terrestrial dinosaurs would have persisted into the Eocene cannot be ruled a prior out of hand.

The establishment of this fact compels us to investigate the habits of Acanthopholididae in general and those of *Struthiosaurus* specifically. Unfortunately some parts of the *Struthiosaurus* skeleton (e.g., end of the muzzle, palate and claws) that are important in this regard are still a Desideratum, but several things can still be achieved. The small, uniformly-shaped teeth of the lower jaw of *Struthiosaurus* are inserted into separate alveoli; they are not especially numerous for a dinosaur; they apparently fell out easily because they are missing in all of the acanthopholidid jaws known up to now, tooth generation happened slowly for visible tooth combs are rare; particular chewing surfaces are not preserved in teeth found in isolation; the teeth operated more often without being polished knife-like against one another; in size and as a whole the teeth of *Struthiosaurus* therefore served for cutting up slightly resistant food. Since a coronoid process is apparently missing in the lower jaw, the supratemporal openings furthermore are closed in *Struthiosaurus*, finally a relatively large pterygoid is present, this also shows that the development of the musculature of the lower jaw took another direction in this animal than in the typical herbivorous ornithopods und ceratopsids and this difference is still more greatly marked in the construction of the quadrate. The weak dentition that corresponds to the conspicuously weak previously described element, merely a few millimeters thick, in which the very weak rounding of the distal joint surface was directly explained, suggests that *Struthiosaurus* opened its mouth only a little. In the construction of its jaw, *Struthiosaurus* furthermore shows itself to be an animal that took not only soft but small food that demanded unspecialized chewing action, and since the heavy armor of *Struthiosaurus* again suggests slow movement, the food of this animal can be exactly fixed by consideration of the inferior jaw action, for the combination of both observations automatically leads to the assumption that the soft, small food in the first place was concentrated as concerns its nutritive value, and in the second place its nature was such that it was not able to escape the approach of *Struthiosaurus*. All of this again compels us to conclude in favor of larger insects or their larvae, worms, night slugs or soft fruit. Since the time at which the first Acantholididae existed (*Polacanthus* in the Wealden), no fruit plants are yet known; soft fruit can be eliminated from contention as the food of Acanthopholididae; thus only soft lower animals of the soil can be considered and the small, cutting teeth furnished with piercing edges of *Struthiosaurus* are in fact very suitable to cut to pieces such half tough, half slippery, almost not at all restrained food when introduced somewhat slowly into the mouth . All in all, we therefore are compelled to regard *Struthiosaurus* as being malacophagous-insectivorous and even though this assumption must count as a hypothesis, as we are not informed about the missing body parts, it appears to correspond best to the body form of *Struthiosaurus* on the basis of the current status of our knowledge.

To now return to the starting point of the considerations concerning our *Struthiosaurus*, namely its extinction, this can also be easily explained by the known dependence of each insect fauna on the flora of an area with the acceptance that it [*Struthiosaurus*] was insectivorous, for one needs to assume merely that certainly older, plants that definitely harbored insects or their waste materials declined at the drying out of the climate and at the introduction of the Eocene age continental flora .

Since the extinction of the herbivorous dinosaurs and of a part of the omnivorous dinosaurs in any case had as a consequence the extinction of the theropods that fed on them and since the basis for the extinction of *Orthomerus*, *Rhabdodon*, *Struthiosaurus* and *Megalosaurus* was therefore at least partially recognized in this way, *Titanosaurus* remains to be discussed. Unfortunately, we are not yet in the position to provide only the slightest indications about this, for if it also undoubtedly appears that the living conditions of this animal, like that of the Danian crocodilians, were unfavorably influenced by the drying out of the Danian swamps, it cannot yet be sufficient for extinction to be explained, and these principally very agile swamp animals, because of their upright stance in relation to their vertebral column, had expanded over India and South America at the end of the Cretaceous, which points to rapid migration ability and not to unfavorable, but on the contrary to the most highly favorable living conditions; it was then that these migrations were forcibly caused through difficult outside circumstances und this agile animal was able so to speak to rush around the globe before its extinction, which however contradicts the vigor indicated by the body size of the Patagonian *Titanosaurus*. Except for all that still rendered the problem of the extinction of *Titanosaurus* more difficult, at the same time we know nearly nothing about the food that sauropods as well, since indeed only so much can be certain that the *Diplodocus*-like and *Ornithopsis*-like sauropods fed on quite different material.

A solution to all of these questions is first to be expected when we once know how much nutrients a Recent reptile needs, then the nutrients have to be converted into calories and then the quantity of food necessary for *Diplodocus* compared with the presumable throat width of *Diplodocus* and *Morosaurus* based on the rhea-like construction of the caudal vertebrae; for then will we be able to get an idea for the first time about the volume of food and its necessary concentration. So far, all conjectures that *Diplodocus* fed on nitrogen-rich or nitrogen-poor food, as BRANCA mentions correctly in the Archiv für Biontologie, are unfounded speculations and therefore nothing can also be said provisionally about the extinction of sauropods .

PALEONTOLOGICAL GROUPING OF THE FIGURED MATERIAL.

A) **Orthomerus**.

1. *O. Transylvanicus*.	Humerus. Pl. II, fig. 5.
	Middle caudal vertebra Pl. II, fig. 2.
	Distal caudal vertebra. Pl. II. fig. 4.
	Rib. Pl. II, fig. 6.
	Femur. { Pl. II, fig. 6. Pl. IV, fig. 6.
2. *O. transylv*. var. *sulcata.*	Distal caudal vertebra. Pl. II, fig. 3.

B) **Rhabdodon**.

1. *Rh. robustum* var. *Suessi*.	Articular. Pl. I, fig. 3.
	Dentary. Pl. I. fig. 5.
	Quadrate. Pl. I, fig. 4.
	Maxillary tooth. Pl. I, fig. 1, 2.
2. *Rhabdodon indet.*	Cervical vertebra. Pl. I, fig. 6
	Dorsal vertebra. Pl. I, fig. 7.
	Middle caudal vertebra. Pl. I, fig. 8.
	Lower caudal vertebra. Pl. I, fig. 9.
	Humerus. Pl. II, fig. 1.

C) **Struthiosaurus transylvanicus**.

Proximal caudal vertebra. { Pl. III, fig. 9.
Pl. IV, fig. 1.

D) **Titanosaurus dacus**.

Middle caudal vertebra. Pl. III, fig. 4.
Lower caudal vertebra. Pl. III, fig. 5.

E) **Crocodilus affulevensis**.

Skull. Pl. IV, fig. 2.
Dorsal vertebra. Pl. IV, fig. 3.
Sacral vertebra with ilium. Pl. IV, fig. 4.
Femora. Pl. IV, fig. 5.

PLATE I.

Figure 1. Maxillary tooth of *Rhabdodon* (2/1) *a* buccal view.
b lingual view.
c mesial.
Figure 2. Another maxillary tooth (2/1) *a* mesial.
b lingual view.
c buccal view.
Figure 3. Articular of *Rhabdodon robustum* var. *Suessi* lateral view.
Figure 4. Quadrate " " " " " " "
Figure 5. Dentary " " " " " medial "
Figure 6. Cervical centrum of *Rhabdodon* (1/1) *a* ventral view.
b right lateral view.
c cranial view.
Figure 7. Dorsal vertebra of *Rhabdodon* cranial view.
Figure 8. Middle caudal vertebra of *Rhabdodon* *a* right lateral view.
b cranial view.
Figure 9. Distal caudal vertebra of *Rhabdodon* *a* left lateral view.
b caudal view.

(All figures unless especially indicated 1/2 natural size.)

PLATE II.

Fig. 1. Humerus of *Rhabdodon*.

Fig. 2. Middle caudal vertebra of *Orthomerus* *a* left lateral view.

b cranial view.

Fig. 3. Distal caudal vertebra of *Orthomerus transylvanicus* var. sulcata

a ventral view.

b caudal view.

c right lateral view.

Fig. 4. Distal caudal vertebra of *Orthomerus transylvanicus* *a* ventral view.

Fig. 5. Humerus of *Orthomerus.*

Fig. 6. Femur of *Orthomerus.*

(All figures 1/2 natural size.)

PLATE III.

Figure I. Rib of *Orthomerus.*

Figure 2. Metatarsal of *Orthomerus* cranial view.

Figure 3. Another metatarsal of *Orthomerus* from the inside.

Figure 4. Middle caudal vertebra of *Titanosaurus* *a* ventral view.
b right lateral view (!)
c caudal view.

Figure 5. Distal caudal vertebra of *Titanosaurus dacus* left lateral view (!)

Fig. 6. Lower caudal vertebra of *Megalosaurus* ventral view.

Fig. 7. Another caudal vertebra of *Megalosaurus* right lateral view.

Fig. 8. Claw of *Titanosaurus* (1/1) *a* lateral.
b dorsal view.

Fig. 9. Middle caudal vertebra of *Struthiosaurus transylvanica* *a* ventral view.

(All figures unless especially indicated 1/2 natural size.)

PLATE IV.

Figure 1. Middle caudal vertebra of *Struthiosaurus transylvanicus* caudal view.

Figure 2. Skull roof of *Crocodilus affulevensis* dorsal view (the left postfrontal and squamosal reconstructed).

Figure 3. Dorsal vertebra of the same animal *a* dorsal view.
b left lateral view.
c caudal view.

Figure 4. First sacral vertebra and ilium of the same animal dorsal view (lateral part of the right reconstructed).

Figure 5. Both femora of the same animal.

Figure 6. Ventral joint surface of a femur of *Orthomerus* ventral view both foramina shown (1/2).

(All figures unless specially indicated 1/2 natural size.)