[A translation of Oskar Kuhn, (15 October) 1944, „Weitere Lacertilier, insbesondere Iguanidae aus dem Eozän des Geiseltales“, *Palaeontologische Zeitschrift* 23(3/4): 360-367, with 3 plates. Translation © 2004 by Krister T. Smith.]

Further lacertilians, particularly Iguanidae, from the Eocene of Geiseltal

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With Plates 19–21

Introduction.

Among lacertilians the Families Lacertidae, Placosauridae and Anguinidae have been described thus far from the middle Eocene of Geiseltal. Here, the remaining forms will now be made known.

A part of the material treated here doubtlessly belongs in the family of the Iguanidae, but other finds cannot be disposed in the system, because systematically useful and distinctive characters could not be observed as a result of the unfavorable state of preservation. These remains are nevertheless of great interest, for they rather considerably augment the picture of the European Eocene lacertilian fauna.

The treatment of the material results from the instigation of Herrn Prof. Weigelt, whom I also deeply thank for the preparation of the photographs, which was carried out in his institute.

Description of the finds.

The following forms could be described:

First I summarize the fossil Iguanidae described thus far, with which my material was compared. These are the following species:

Phrynosoma sp., Pleistocene, North America
Crotaphytus? sp., Pliocene, North America
Parasauromalus olseni Gilm[ore], ?Oligocene, North America
Exostinus serratus Cope, Oligocene, North America
“ *lancensis* Cope, Upper Cretaceous, North America
Aciprion formosum Cope, Oligocene, North America
“ *majus* Cope, Oligocene?, North America
Iguanavus exilis Marsh, Eocene, North America
“ *teres* Marsh, Eocene, North America
Chamops segnis Marsh, Upper Cretaceous, North America
“ *denticulatus* Gilm[ore], Upper Cretaceous, North America
?*Paliguana whitei* Broom, Triassic, South Africa
Agama galliae Filh[ol], upper Eocene, France
Iguana iguana L[innaeus], Pleistocene, Barbados
” *europaea* Filh[ol], Eocene, France
Leiosaurus marellii Rusc[oni], upper Pliocene, South America
Tejus teguixin, Pleistocene, South America

” *oligocenus* AMBR[?], Oligocene, South America
” *paranensis* AMBR[?], Oligocene, South America
Chlamydosaurus kingi GRAY, Pleistocene, Australia

No fossil Agaminae have been described from North America.

I. Fam. Iguanidae.

Osteological definitions and diagnoses are found in GILMORE, Mem[oirs of the] Nat[tional] Acad[emies of] Sci[ence] 1928, p.15 ff. and KUHN, Nova Acta Leopold[iana] 1940, p. 463 and in Camp, Bull[etin of the] Amer[ican] Mus[eum of] Nat[ural] Hist[ory] 48, 1923.

1. *Geiseltaliellus longicaudus* n. g. n. sp.

Pl. 19, Fig. 1*a–c*, cf. Pl. 20, Fig. 1, 3

The type is a complete skeleton, about 20 cm long, No. 4043 (Pl. 19, Fig. 1), which presents a good general picture of the construction of the skeleton of this new iguanid genus, while particulars are less recognizable.

The skull is strongly compressed. In front it is incomplete, while the nares were lost. Behind it extends to about the beginning of the temporal region; the occiput is missing. The right part of the jaws is pressed down on its side and appears again beneath the left ramus of the lower jaw. In the left upper jaw I count 23 teeth that can be attributed to the maxilla. On the ramus of the lower jaw that lies under it, in contrast, 20 teeth are ascertainable. In the right half of the jaws fewer teeth are present, on the top about 20, on the bottom only 17. All teeth are distinctly tricuspid and somewhat broadened toward the top, with the accessory cusps never reaching the level of the much larger main cusps. The teeth are never distinctly visible in cross-section, an observation that applies to the roots as well as the region of the crowns. But the cross-section appears to be somewhat compressed, and all teeth are pleurodont. This tooth form is present in diverse iguanids, and in *Parasauromalus* and *Aciprion* from the North American Tertiary.

In the maxilla of the left side there are several serially arranged foramina nutritive; behind it the suture with the arch-shaped ascending jugal is very distinct. Below [*Ventrally*] it begins behind the last tooth and extends obliquely forward so that the orbit was bounded below entirely by the jugal as in the Green Iguana. I measure lower jaw at its greatest length to be 19 mm, but a piece of bone is missing in front. The structure of the lower jaw cannot either be determined; insofar as sutures are recognizable, the picture attained follows fully the features in the Recent Green Iguana.

The length and height of the orbit are unknown; in them lie crushed masses of bone. Behind and above the hind end of the jugal lies another triradiate bone complex that is attributable to the postorbital and squamosal.

The cervical region of the vertebral column is entirely destroyed. Following the strongly compressed scapula I still recognize 14 dorsal vertebrae of procoelous form. The centrum is impressed and is crowned by a high neural arch. In front and behind the body of the vertebra is thickened into a ridge, laterally weakly recessed. Articular processes are never distinctly preserved. All ribs are slender and unicapitate.

The fore caudal vertebrae are shorter than the ones following distally, which reach very great lengths. Altogether there are still 32 caudal vertebrae present, but doubtlessly more can be assumed. They are procoelous as well, on the whole somewhat rodlike and provided with distinct zygapophyses. While the presacral section of the body is around 60 mm long, the tail section has a length of over 150 mm. That similar proportions are present even today in lacertilians is known: *Calotes versicolor* DAUDIN is one of the best-known forms. *Basiliscus plumifrons*, a tree-dwelling lizard, has a ratio in this regard of 1:3 and thereby seemingly surpasses even our form from Geiseltal. This just-named Recent comparative form lives in the vicinity of the water and can swim and jump well. One may well also confer a similar way of life on our fossil form.

Remains of the pelvis can be seen; an ilium reminiscent of *Iguana* and the acetabular region are present. The ilium is drawn out into a caudal process behind.

The limbs are rather well preserved. The forelimbs are considerably smaller than the hindlimbs, which bespeaks a jumping locomotion and a certain erection of the body and bipedality. I cannot give osteological particulars, especially of the carpus or tarsus. The state of preservation is too poor for this, and the dimensions too small. The measurements are as follows:

Ulna 6.8 mm, radius 6.7 mm, tibia 14.1 mm, fibula 14.2 mm, humerus 9 mm, femur 13.5 mm, metatarsals about 9 mm

Only three of the metatarsals are detectable.

Two further specimens, reproduced at natural size (Pl. 20, Fig. 1, 3), unfortunately suggest no more than the general habit of the skeleton. Therefore, I refer these finds for the meantime to *Geiseltaliellus* with cf.

The habit of the skull of specimen Pl. 20, Fig. 3 reminds one more of *Capitolacerta* n. g., but it is even longer. The large orbits and the s-like parietal region are conspicuous, characteristics that cannot be verified in *Geiseltaliellus*, for here the skull is only visible from the side. In specimen Pl. 20, Fig. 3, which indicates a somewhat larger animal, 18 presacral vertebrae can still be seen; in the smaller specimen Pl. 20, Fig. 1 the presacral vertebrae are missing in large part. Here more of the tail is preserved; the latter still shows 39 caudal vertebrae, in contrast to only 32 in the type specimen of *Geiseltaliellus longicaudus* n. g. n. sp. The limbs of the two pieces have the following measurements:

	(Pl. 20, Fig. 1) Smaller specimen	(Pl. 20, Fig. 3) Larger specimen
Humerus …	—	about 11 mm
Ulna …	ca. 12 mm	at least 8 mm
Radius …	ca. 12 mm	at least 8 mm
Femur …	?13.2 mm	22 mm
Tibia …	ca. 12 mm	18.2 mm
Fibula …	12 mm	18.1 mm
Metatarsals …	8 mm	at least 11 mm

Geiseltaliellus n. g., which has its closest relatives in the North American Tertiary forms *Parasauromalus* and *Aciprion*, is distinguished as follows: Teeth pleurodont, tricuspid, accessory cusps shorter than the main cusps, tail very long, about threefold the length of the presacral section of the body, at least 32 caudal vertebrae present, but over 40 assumable, as a further find shows belonging to the Subfamily Iguaninae [i.e*., Iguanidae* sensu *Kuhn (1940), Iguanidae** sensu *Estes* et al. *(1988), Pleurodonta* sensu *Frost* et al. *(2001)*].

As far as I could compare with Recent genera, of which 93 are known (of these, 59 Iguaninae and 34 Agaminae), there exists no generic identity with one of these; it is also from the great geological age of the Geiseltal form very improbable. Therefore, I introduce the find into science as

Geiseltaliellus longicaudus n. g. n. sp.

2. *Iguanosaurus haupti* n. g. n. sp.

Pl. 19, Fig. 3, Pl. 21, Fig. 1

The new genus and species, named after the eminent Halle paleoentomologist H. HAUPT, is founded on a single skull that shows typically bicuspid dentition. It is illustrated with X-ray photography in Pl. 21, Fig. 1 at about fourfold.

The length of the skull amounts to 34 mm. Its form, which could be somewhat distorted by compression, extends out of the picture; apparently it had already suffered from maceration before it was imbedded, for the postorbital section is lacking and the zygomatic bone is separated from the line of the jaw.

The lower jaw carried about 25 teeth, which display a very characteristic form (Pl. 19, Fig. 3). In front of the main cusp a small accessory cusp is present, as in the Paleocene lizard form from Walbeck (Pl. 20, Fig. 7), whose generic assignment I could not at the time make with certainty and which I would now like to compare with *Iguanosaurus*.

No identical forms are known to me from the European Tertiary; even GILMORE's excellent monograph on the American Tertiary lacertilians fails. I therefore propose a new genus for the Geiseltal find: *Iguanosaurus haupti* n. g. n. sp.

In the name I have expressed that the new genus may be an iguanid. The meager material, however, provides for great caution, and for the meantime I leave the familial affiliation open, as for the next find.

II. Fam. Scincidae (?)

3. *Capitolacerta dubia* n. g. n. sp.

Pl. 19, Fig. 4, 5, cf. Pl. 20, Fig. 5

The type is a small skull, Pl. 20, Fig. 5. It is about 12 mm long; the breadth amounts to a maximum of 8.5 mm. The find (No. 4005) is viewed at about fivefold enlargement.

The skull, whose upper side is visible, is conspicuous in its compact form. The snout is very short and somewhat tapered. At the edge of the jaw several teeth can still be seen, but their form is not particularly certain. No accessory cusps were apparently developed; rather, only simple conical teeth were present. The nasal openings are not distinct; the orbits are very large, roundish, and located in the middle of the skull. On the type skull the temporal fossae are not detectable; the hind part of the head is crushed and also unamenable to description.

The somewhat larger skull, Pl. 19, Fig. 4, illustrated at about fourfold enlargement, likewise permits no certain statements on the tooth form. The skull agrees in principle with the type; it only comes across as longer because the postorbital section is preserved in a much more extended state. The supratemporal fossa can only be traced in part. This find is in any case important in that it shows that the orbits lie close to the middle of the skull.

The systematic position cannot be stated with certainty. In respect of the outline of the skull there exists great similarity to the scincoid *Eumeces* and to *Ardeosaurus* from the upper Jurassic, which BROILI has made known (?*Ardeosaurus schröderi* BROILI); but with the unsatisfactory state of preservation no certain conclusion may be drawn.

III. Familia indet.

4. div. gen. indet.

Here I place specimens Pl. 19, Fig. 2, Pl. 20, Fig. 2, 6, Pl. 21, Fig. 2–4.

a) Seen from a biological point of view the “glove” (Pl. 21, Fig. 3) is interesting, a product of shedding of a right hindlimb. The fifth finger is not preserved. Skin remains of this sort have also been proven multiple times in connection with skeletal remains. The systematic affiliation can never be determined on the basis of this find alone.

b) The 24-mm long, right lower-jaw ramus with pleurodont teeth (Pl. 21, Fig. 2), whose points certainly remain simple but in front are somewhat tapered, and turn somewhat backward. It shows otherwise too few characteristics to support certain conclusions. One is reminded in any case of *Iguana europaea* FILH[OL] from the Eocene of Quercy; but otherwise no generic agreement between these nearly coeval forms can be made.

c) The skull remnant visible on the palatal side is entirely uncertain (Pl. 21, Fig. 4); it may well be an iguanid, for the teeth appear to be tricuspid like in *Geiseltaliellus*. Find Pl. 20, Fig. 2 is similar.

d) The skull (Pl. 19, Fig. 2), at most 25 mm long and with a triangular preorbital section, large orbits, a broad flat parietal region and a roundish supratemporal fossa, reminds one strongly of *Crocodilia*; but it has a parietal foramen, wherefore it may be placed in the *Lacertilia*. The nostrils are separated by an ascending process of the premaxillaries; I cannot observe teeth. A determination for the meanwhile is impossible.

e) The skull Pl. 20, Fig. 6, about 13 mm long, possesses ossifications in the orbits and the supratemporal region, which indicate the Lacertidae (cf. *Eolacerta robusta* NÖTH from Geiseltal). The teeth are likewise unicuspid, and in front of and behind the cusp somewhat slanted. This is possibly *Eolacerta* itself, but the find is not well preserved enough.

Summary.

Following the placosaurids, anguinids and lacertids, which were earlier described from the middle Eocene of Geiseltal, the iguanids are described here, of which *Geiseltaliellus longicaudus* n. g. n. sp. possesses a very long tail that nearly surpasses the presacral part of the body by threefold in length. The teeth are tricuspid.

Iguanosaurus haupti n. g. n. sp. possess in the mouth only one main tooth cusp, in front of which a smaller accessory cusp lies. The genus also appears to be an iguanid.

Capitolacerta dubia n. g. n. sp., in the outline of its skull with the large orbits located near the middle, reminds one of the *Scincoidea*.

Furthermore one form belongs in the vicinity of *Eolacerta robusta*; other remains are for the time being indeterminable. Altogether the forms described here could be divided into six genera; but the number of species probably is probably one to two greater.

Literature.

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(Original document received on 13 November 1942.)

Explanation of plates.

Pl. 19.

Fig. 1. *Geiseltaliellus longicaudus* n. g., n. sp., No. 4043, 1a, type skeleton, 1*b* ditto, jaw enlarged, 1c caudal vertebrae.

Fig. 2. gen. indet., skull ca. 4/1.

Fig. 3. *Iguanosaurus haupti* n. g., n. sp., teeth of the type skull (Pl. 21 Fig. 1) enlarged.

Fig. 4. *Capitolacerta dubia* n. g., n. sp., ca. 4/1.

Fig. 5. cf. *Capitolacerta* n. g., two small skeletons, 1/1.

Pl. 20.

Fig. 1. cf. *Geiseltaliellus* n. g., ca. 1/1.

Fig. 2. gen. indet. underside of skull and vertebral column, 1/1.

Fig. 3. cf. *Geiseltaliellus*, No. 4042, ca. 1/1.

Fig. 4. ?*Ardeosaurus schröderi* BROILI, skull from the upper *Malm* [i.e., upper Upper Jurassic] from Solnhofen. After BROILI, for comparison with Fig. 5.

Fig. 5. *Capitolacerta dubia* n. g., n. sp., type, 5/1. No. 4005.

Fig. 6. gen. indet. cf. *Eolacerta*, skull, 4/1.

Fig. 7. aff. *Iguanosaurus paleocenicus* KUHN sp., Paleocene of Walbeck, original to KUHN Z[eitschrift für] Min[eralogie] 1940, 5/1.

Pl. 21.

Fig. 1. *Iguanosaurus haupti* n. g., n. sp., type, skull from the right, No. 4007, 34 mm length, ca. 4/1, teeth enlarged and illustrated in Pl. 19, Fig. 3.

Fig. 2. gen. indet., right ramus of lower jaw, *a* from inside, *b* from outside, length 24 mm.

Fig. 3. gen. indet. so-called “glove”, ca. 7/1.

Fig. 4. gen. indet., skull from below with vertebral column, 1/1.