

[A translation of Stritzke, R. (1983) "*Saniwa feisti* n. sp., ein Varanide (Lacertilia, Reptilia) aus dem Mittel-Eozän von Messel bei Darmstadt," *Senckenbergiana Lethaea* 64(5/6): 497-508. Figure captions may be found at the end. Text in italics enclosed within square brackets are my own clarifications; text in quotation marks enclosed within square brackets is the original. All footnotes are my own. Translation ©2007 by Krister T. Smith]

Fossil locality of Messel, No. 37

***Saniwa feisti* n. sp., a varanid (Lacertilia, Reptilia)  
from the middle Eocene of Messel near Darmstadt**

With 4 figures and 5 tables.

RÜDIGER STRITZKE.

Abstract.

[Translated by author into English and French.]

Introduction

Since its discovery in the last century, predominantly fishes and mammals, among vertebrates, have been described from the *Fossilagerstätte* of Messel near Darmstadt. Among reptiles, only crocodiles and turtles have been studied. The outstandingly prepared lizards were given over to me for study by Mr. O. Feist (Darmstadt) on the notice of the preparator Mr. R. Lanoo (Bochum). This man [*Feist?*] had salvaged the specimens in the early [19]70s from the Messel pit. The exact conditions of discovery with regard to stratigraphy and locality could no longer be determined because of the sudden death of Mr. Feist.

The X-radiographs were prepared by Mrs. S. Hunte and Dr. Touché in the emergency room ["Unfallkrankenhaus] of Bergmannsheil (Gelsenkirchen-Buer). Dr. M. Abs (Bochum) gave me helpful direction in our discussions. Prof. Dr. H. Mensink (Bochum) saw the manuscript through in a most friendly fashion. Dr. J. L. Franzen (Frankfurt am Main) made available some important pieces of information. For all the support accorded me I am sincerely grateful.

Systematics.

Class Reptilia Müller, 1768.  
Subclass Lepidosauria Haeckel, 1866.  
Order Squamata Opperl, 1811.  
Suborder Lacertilia Wagler, 1830.  
Infraorder Anguimorpha Fürbringer, 1900.  
Suprafamily Varanoidea Boulenger, 1831.

(=Playnota Duméril et Bibron, 1836).

Varanidae Gray, 1827.

Saniwinae Camp, 1923.

*Saniwa* Leidy, 1870.

Type species: *Saniwa ensidens* Leidy, 1870.

*Saniwa feisti* n. sp.

Fig. 1-4.

*Etymology*: In memory of Otto Feist, Darmstadt (b. 1926, d. 1982).

*Holotype*: The skeleton shown in Fig. 1 (Specimen A<sup>1</sup>), in the private collection of the family Feist, Darmstadt (cast in the Natur-Museum und Forschungs-Institut Senckenberg, Frankfurt am Main, SMF ME-A 160). *Type locality*: The “Messel pit” near Darmstadt, S-Hessen, Germany. Type level: Middle Eocene (Lutetian, “oil shale” formation)

*Paratype*: The rather disarticulated skeleton shown in Fig. 2 (Specimen B), in the private collection of the family Tandler, Bad Dürkheim, from the “oil shale” formation of the Messel pit.

*Diagnosis*: A species of the genus *Saniwa* with a long, rugose [“beknotetem”] frontal, a dentary with multiple perforations, long tail, and rudimentary zygosphene-zygantrum, as well as tall neural spines of the thoracic vertebrae and anterior caudal vertebrae.

## Description.<sup>2</sup>

### Skull.

Nearly all parts of the skull and mandible are present, but mostly torn from their original positions. The regions of the skull are strongly crushed; the skull roof is additionally shoved over the elements of the right half of the skull, so that these can not be diagnosed even in the X-radiographs. This makes the reconstruction difficult. The fact that the skull bones are separated, although the postcranial still hangs together, implies a highly kinetic skull with weak articulation of the elements with each other. The reconstructed skull is low [“niedrig”] and about 50 mm long. The orbital window was large. On the individual elements, the following:

*Premaxillae*: Only one is preserved at the anterior end of the left dentary. The other presumably lies beneath the right mandible. Even in the X-radiograph this region cannot be elucidated (Fig. 4). *Maxillae*: The left maxilla is complete. 13 teeth and 7 alveoli are visible on it. The anterior-most teeth cannot be counted. Thus, the lizard possessed at least 20 teeth in each half of the jaw. *Nasals*: They are found dislocated next to the maxillae, and only with the help of the X-radiographs can their whole length be followed. *Frontal*: Tubercles 1 mm in size densely occupy the element. *Parietal*: It is connected to the frontal, and half of it is rugose; it bears a parietal eye. *Jugal and quadratojugal*: The left jugal lies next to the left supraorbital [=palpebral]. The right one and the quadratojugals are no longer identifiable. *Squamosal*: Not determinable. *Quadrate*: Because the skull roof in the region of the quadrates is broken, these can only be made out poorly. Only a fragmentary piece of the left one is preserved by the

<sup>1</sup> This specimen is now repositied in the Hessisches Landesmuseum in Darmstadt, Germany, with the catalog number HLMD-Me 13709 (N. Micklich, pers. comm.).

<sup>2</sup> Needless to say, this description is very perfunctory, yet even so there are many mistakes (as with the assumption, here, of paired premaxillae, or of a quadratojugal) and self-contradictions (see also below), and roughly half the bones of the skull are misidentified in Fig. 3. No attempt is made to correct most of these mistakes here, but a redescription of this species—which is not referable to *Saniwa*—is in preparation (Smith, Rieppel and Habersetzer, unpubl.). Translation of this description is done for the sake of completeness.

quadrate process of the surangular. *Pterygoids*: They possess a wing-like shape. Of the right pterygoid only the quadrate process can be seen, beneath the displaced right coronoid. *Ectopterygoid*: Not preserved. *Epipterygoid*: According to shape and position, the left epipterygoid is the small bone above the left pterygoid beneath the frontal. *Palatine*: Not recognizable. *Vomer*: In the expected place there is found a flat, broad bone. *Basicranium*: It was crushed into a nearly undifferentiated mass of bone. Next to the anterior end of the parietal, the basisphenoid and left basisphenoid [=basipterygoid] process are still recognizable. *Mandible*: Both lower jaws are slightly displaced. The right ramus is broken and cannot be fully traced. *Dentary*: The dentary is narrower anteriorly than posteriorly. The tooth row is covered by the maxilla. 5 foramina dentifacialia. *Surangular*: The left one lies next to the dentary; of the right one, the posterior section is vaguely visible. *Angular*: It is completely preserved beneath the surangular. *Articular*: Only the posterior part of the left articular is recognizable at the end of the left lower jaw. *Hyoid apparatus*: The thin hyoid bones cannot be made out because of the strongly compressed occipital region of the skull.

### Axial skeleton.

*Vertebral column*: It is nearly complete in Specimen A, but only the thoracic region of preserved in Specimen B. The holotype has 24 articulated presacral vertebrae, of which 23 bear ribs. A 25th lies on the other side of a fracture that separates from skull from the trunk. The vertebrae have a flat centrum and a posteriorly directed procoelous condyle. The rudimentary zygophene and zygantrum are conspicuous. The neural spines, like those of the proximal caudal vertebrae, are conspicuously tall. The atlas and axis, like a few cervical vertebrae, are hidden beneath the parietal. The sacrum is constructed from two strongly crushed vertebrae. There follows a series of 42 elongate [“gestreckten”], articulated caudal vertebrae. Their length varies little. The condyles [sic] of the 38th vertebra are [sic] no longer present (Fig. 1b). Between it and the next vertebra there is a gap of 6 mm. The latter [vertebra] does not fit on the 38th, for it is too small (length about 4 mm, width 1.5 mm, in contrast to 6 mm and 2 mm for the 38th). Accordingly, a few caudal vertebrae are missing.

*Ribs*: Cervical and thoracic ribs are not distinguishable. Rib length varies between 7 mm (proximally [anteriorly]) and 27 mm (distally [posteriorly]). They are bicapitate.

### Shoulder girdle and forelimb.

Of the shoulder girdle only the dorsal, isolated interclavicles and coracoid are visible, because the specimen lies on its ventral side. The bones of both arms are preserved; the right one is partly covered by the vertebral column. The humerus, with a wide condyle, is 3 cm long; the intertubercular sulcus is wide and flat. The radius is longer than the ulna; forearm length comes to 2.3 cm. 5 distal carpals. Phalangeal formula 2-3-4-5-3. On the terminal phalanges are claws.

### Pelvic girdle and hind-limb.

The left pubis is somewhat broadened anteriorly and 1.7 cm long; the rodlike ilium is about 1.7 cm long. The right half of the pelvis is slightly damaged. The acetabula are hidden beneath the ilia. The posterior face of the complete right femur is broad. The left femur is only partly preserved. Its posterior end [“hinteres Ende”] is broken off. The right tibia is complete, but the right fibula is preserved in two fragments; they lie obliquely over the tibia. The lower leg clearly suffered postmortem torsion. Of the left tibia and fibula only the lateral-most (“äußersten”) parts remain. The connection with the foot is preserved, whereas on the right side

it was lost. Each foot has 5 tarsals and claws on the terminal phalanges. The phalangeal formula is 2-3-4-5-3.

### Squamation.

Thin, 2-mm-long scales cover neck, chest and tail. The head and back are without scales [“schuppenlos”]. The scales are oval and have a tall keel.

### Systematic assignment and comparison.

The present specimens belong to the family Varanidae Gray, 1827: the supratemporal fenestra is open, only one premaxilla<sup>3</sup> and parietal each were developed, and the dentition is subpleurodont<sup>4</sup>; the palatines are separated<sup>5</sup>, the neural spines of the dorsal and anterior caudal vertebrae tall; the total habit as well as the trunk/tail ratio of  $<1$ <sup>6</sup> further speak for it. One can distinguish *Varanus* Merrem, 1820 (upper Miocene – Recent) and *Saniwa* Leidy, 1870 (lower Eocene – middle Oligocene). Both genera display only trifling departures in individual elements. The present specimens belong to the genus *Saniwa* because the first rib clearly lies far anteriorly (probably on the 5th cervical vertebra), the tooth count—approximately 11 teeth in 35 mm—is distinctly higher than in *Varanus*, the jugal is very robust, and the ulnar condyle of the humerus begins rather more deeply than in *Varanus*. On the vertebrae between the anterior zygapophyses two small (rudimentary?) articular bumps (zygosphenes) are developed. Correspondingly, zyganchra are present at the posterior end.

*Saniwa*, which arose in North America, has been demonstrated up to the middle Oligocene. In the Eocene it reached western Europe. The finds in Dormaal (=“Orsmael”), Erquelinas, Cuis, Monthelon (*Saniwa orsmaelensis* Dollo, 1923) are from the lower Eocene (Landenian). Hoffstetter (1942: 137) mentions middle Eocene remains of 5–6 specimens from Geiseltal.

*Saniwa feisti* n. sp. is distinguished from the North American species [*plural*] by a different tooth count, smaller presacral vertebrae, and a smaller, narrow pterygoid. *Saniwa orsmaelensis* Dollo was diagnosed on the basis of a maxilla fragment, a few dorsal vertebrae, and a femur. Figures are lacking. *Saniwa feisti* n. sp. possesses more teeth as well as taller neural spines on the thoracic vertebrae and proximal caudal vertebrae.

Meanwhile, a specimen from Geiseltal was published (Haubold, 1977). This turns out to be the species *Eosaniwa koehni* n. g., n. sp., which is distinguished from the genus *Saniwa* by a longer preorbital segment and a greater tooth count. The body scales, in contrast to those of *Saniwa*, are strongly sculptured to either side of the keel.

### Phylogenetic position.

*Saniwa feisti* n. sp. from the middle Eocene of the Messel pit presents a complete skeleton of the European Saniwinae. These may be viewed as ancestors of *Varanus* Merrem, 1820 (Hoffstetter, 1942), which arose in western Europe (Hoffstetter, 1968) and is first proved

<sup>3</sup> Earlier, of course, he writes that the premaxillae were paired.

<sup>4</sup> I do not know how he determines the teeth to be “subpleurodont” (or what, indeed, *he* means by this); in any case, he does not mention this earlier.

<sup>5</sup> A remarkable statement, since he earlier writes they could not be identified. In any case, the palatines are unfused in all squamates.

<sup>6</sup> Nearly all lizards have a trunk/tail ratio of  $<1$ .

with *Varanus hofmanni* Roger, 1898 from the lower Vindobonian [“unteren Vindobonium”]. No European Varanidae have thus far been made known from the intervening period of 30 million years. *Saniwa feisti* n. sp. obviously leads over to the Varaninae. Beside typically saniwine characters (rudimentary zygantrium, zygosphene, tooth count) are features reminiscent of Varaninae: a narrow pterygoid and tall neural spines of the vertebrae.

#### Literature cited. ...

#### [Figure captions.]

Fig. 1. *Saniwa feisti* n. sp. Holotype (Specimen A); x0.4. Middle Eocene (Lutetian), “oil shale” formation; “Messel pit” near Darmstadt, south Hessen, Germany. (a) Picture of entire skeleton. (b) Outline drawing of same with identification of the skeletal elements.

Abbreviations: [Most of these are Latinate and so will not be repeated here. Note only that “-wirbel” means *vertebra(e)*.]

Fig. 2. *Saniwa feisti* n. sp. Paratype (Specimen B); x1. Middle Eocene (Lutetian), “oil shale” formation; “Messel pit” near Darmstadt, south Hessen, Germany.

Fig. 3. *Saniwa feisti* n. sp. Skull of the holotype (Specimen A); x1.6. Middle Eocene (Lutetian), “oil-shale” formation; “Messel pit” near Darmstadt, south Hessen, Germany. (a) Picture of the entire skull. (b) Outline drawing of same with identification of the skeletal elements; abbreviations as in Fig. 1.

Fig. 4. *Saniwa feisti* n. sp. X-radiograph of the holotype (Specimen A); x1. The vertebral column is not completely shown. Middle Eocene (Lutetian), “oil-shale” formation; “Messel pit” near Darmstadt, south Hessen, Germany.