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LIZARDS FROM THE PLIOCENE OF POLAND

Study on the Tertiary bone-breccia Fauna from Węże
near Działoszyn in Poland

PART VI*

Abstract. — Fossil remains are here described of *Lacertilia* collected from the bone-breccia of Węże, Poland¹. They consist mostly of skull and mandible fragments, also of vertebrae and bone scales referable to genera *Lacerta*, *Ophisaurus* and others, not more closely identifiable. These reptiles come very near to representatives of the same genera described from the Pliocene of Hungary. *Ophisaurus pannonicus* Kormos occurs in both these faunal assemblages.

INTRODUCTION

Fossil remains of lizards have been yielded in fair abundance from the Pliocene bone-breccia of Węże. Unfortunately, they are mostly minute and badly damaged fragments, barely serviceable for their specific determination. Lizards, thus far identified by the author, belong to the families of Lacertidae and Anguinidae. Remains, whose systematic position is doubtful, owing to minute size of fragments and their poor state of preservation, are probably referable to the Agamidae and Gekkonidae. Some grounds also exist for suspecting the occurrence at Węże, in association with *Ophisaurus*, of the genus *Anguis*, still living in Poland.

With the exception of one mandible, all the material described in the present paper was prepared by treatment in 30% acetic acid. It is the property of the Paleozoological Laboratory of the Polish Academy of Sciences in Warsaw and of the Cracow Branch of the Academy's Zoolo-

* Parts I - V — see *Acta Geologica Polonica*, vol. II - V. Warszawa 1952-55.

¹ Reports on the here cited bone-breccia have been published in papers by J. Samsonowicz (1934), J. Stach (1952) and M. Młynarski (1955).

gical Institute. All the prepared fossil specimens, not too minute and of particular interest, have been registered under common inventory numbers, those of lizards starting with number 400.

The writer is greatly indebted to Professor Dr. Roman Kozłowski, Head of the Paleozoological Laboratory in the Polish Academy of Sciences in Warsaw, for the all round assistance extended to him while at work to prepare this paper. He also wishes to express his special thanks to Dr. Robert Hoffstetter of the Muséum National d'Histoire Naturelle de Paris, for his friendly attitude and most valuable suggestions concerning the systematic position of the fossil lizard remains from Węże. Thanks are also due to the writer's colleague Mr. J. Kulczycki for help in the preparation of specimens.

DESCRIPTION

Family **Lacertidae**

Genus *Lacerta* Linnaeus, 1758

Lacerta sp.

(fig. 1)

Material. — 1. Fragment of mandible with complete os dentale (No. 407). 2. Fragment of mandible with badly damaged surface (No. 408). 3. Fragment of mandible with os coronoideum (No. 409). 4. Fragment of mandible with goniale, angulare and spleniale (No. 410). 5. Small fragments of mandibles and isolated teeth belonging to individuals of various size (these fragments have not been given Inventory Nos.).

Dentary bone No. 407 (pl. I, fig. 2 and 4 a, b) is in a state of exceptionally good preservation; its length is 11 mm. Teeth, also well preserved, with characteristic, conical crowns, resembling those of the recent *Lacerta viridis* (Laurenti). *Foramina dento-facialia* distinctly visible on the outward side of dentary bone. Pleurodont dentition easily distinguishable on inward side of this bone (pl. I, fig. 4b).

Badly damaged fragment of mandible with almost complete coronary bone, fragment of dentary with 4 teeth and a fragment of splenial bone. The teeth preserved with the dentary have an appearance identical with those described under specimen No. 407.

Fragments of jaws, mostly with dentary bone and isolated teeth, of a type characteristic of genus *Lacerta* (material without Inventory Nos.). These fragments are very minute and are referable to individuals of various size. They may, possibly, represent jaws of several species of lizards within the genus here described.

The mandible has been very badly damaged during preparation, so that sutures joining the various bones are hardly visible. Its general

shape corresponds to that of mandibles of *Lacerta*, particularly so in the Recent *Lacerta agilis* L. The dentary bone has been broken off in the region of mandibular symphysis. Small teeth, preserved in some parts only. Total length of fragment 17 mm.

Fossil remains of mandibles, thus far collected, particularly those bearing Nos. 407 and 410, have served the present writer in his attempt

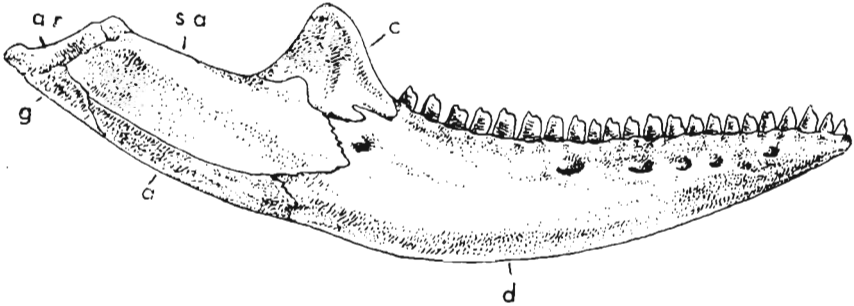


Fig. 1.—*Lacerta* sp., reconstruction of mandible; bones: a angular, ar articular, c coronary, d dentary, g gonial, sa supraangular; $\times 5$.

at a restoration of the complete mandible of the lizard here considered, assuming that all the described specimens (some unnumbered fragments excepted) are con-specific. During the restoration work the writer has followed other authors who have carried out similar restorations (fig. 1). Owing to complete lack of other bone remains and close similarities of morphology shown by the several species of *Lacerta*, the writer was not able with more precision to determine their systematic position.

Discussion. — Genus *Lacerta* Linnaeus is widely known from the Upper Tertiary of Europe. To say, H. Filhol (1878) described remains of these lizards from the Eocene phosphorites of Quercy. On fragments of the mandible he established several species, a. o. *Lacerta lamandini* Filhol and *L. mucronata* Filhol. The last form differs from those collected at Weze by its oblique dentition in relation to the dentary bone. A new genus, *Pseudolacerta*, has been established for this species by De Stefano (1903). F. Nopcsa (1909) does not regard as justifiable the erection of a new genus to include this form, since the Recent viviparous lizard, *L. vivipara* Jaquin (subgenus *Zootoca*), shows a closely similar type of dentition. A marked resemblance is also displayed by *L. mucronata* and the London Clay *L. eocena* Owen.

There is also some likeness between the lizard here considered and the species described by Filhol (1878) under the name of *L. lamandini* Filhol. Fossil remains of this lizard are also cited in Lydekker's Catalogue (1888). This is a form closely allied to the Recent *L. viridis* (Laurenti).

From the Miocene of Sansan, Lartet (*vide* Nopcsa, 1909) mentions no less than three species of *Lacerta* (*L. philippiana*, *L. ponsostiana*, *L. sansanensis*). Unfortunately, however, they have no adequate foundation and Nopcsa is of the opinion that they are to be regarded as *nomina nuda*.

The same exposure has yielded *Lacerta? bifidenta*, also cited by R. Lydekker (1888). This form differs from the fossil remains here described by its bifident dentition.

By far the best knowledge of the Pliocene forms of *Lacerta* has been supplied from the Basin of Roussillon in France. A new species, under the name of *L. rusciensis* Depéret, was described from that site by Ch. Depéret (1890). This author believes it to be very closely allied to the Recent *L. ocellata* Daudin. Ch. Depéret, as the present writer too, had at his disposal fragments of mandible. It is to be regretted that he published no drawings in his paper. Judging from his description, it must have been a larger form than the lizard from Weže. Fragments of mandible, described by P. Gervais (1859) under the name of *L. crassidiens* Gervais (*vide* Nopcsa, 1908), have also been collected from the Pliocene. The present writer is unfortunately unable to ascertain to what extent these remains resembled his specimens.

Obviously, no comparison is to be made of the Weže specimens with such as for example „*Lacerta rottensis*“ or „*L. pulla*“, which have been described on evidence of skeletal fragments (H. v. Meyer, 1859—1861). There is no record of fossil remains of the mandibles of these lizards and their systematic position seems somewhat doubtful.

Of the recent species, the closest resemblance to the lizard from Weže is borne by *L. viridis*, owing to the shape of its dental crowns. In what size is concerned, the specimens here considered come close to analogous fragments of *L. agilis* L.

Family Anguinidae

Subfamily Anguininae

Genus *Ophisaurus* Daudin, 1803

Ophisaurus pannonicus Kormos

(pl. I, fig. 1; pl. II—IV)

1911. *Ophisaurus pannonicus* Kormos; T. Kormos, Der Pliozäne Knochenfund bei Polgárdi, p. 17, fig. 19.
1912. *Ophisaurus novorossicus* Aleksejew; A. Aleksejew, Opisanije meoticeskoj fauny..., p. 5—25.
1913. *Propseudopus cf. fraasi* Hilgendorf; R. N. Wegner, Tertiär und umgelagerte Kreide..., p. 212.
1921. *Ophisaurus intermedius* Bolaky; S. J. Bolaky, Additions to the fossil Herpetology..., p. 221.
1921. *Varanus deserticolus* Bolaky; S. J. Bolaky, *ibidem*, p. 222 - 223, fig. 2.

Material. — 1. Fragment of mandible, occipital part of the skull, the quadrate, imperfect vertebrae, small fragments of cranial bones, cervical and dorsal scales (No. 404). 2. Vertebrae with fragments of ribs and groups of scales (Nos. 400, 403). 3. Prepared part mandible, mainly the dentary bone (No. 402). 4. Part of skull including the parietal, part of frontal, occipital, also imperfect vertebrae and scales (No. 406). 5. The whole of the parietal bone (No. 405). 6. Fragments of epidermal scutes (the osteoderms) from cephalic and dorsal regions, fragment of frontal and parietal bones and cervical scales (No. 401).

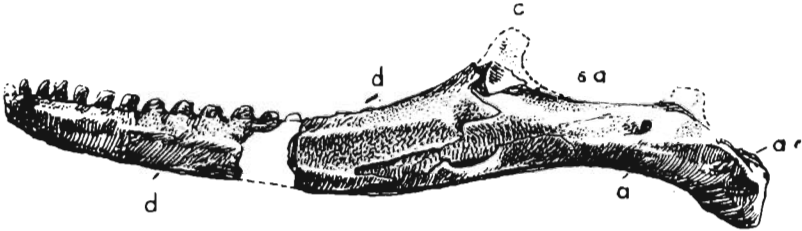


Fig. 2. — *Ophisaurus pannonicus* Kormos, reconstruction of mandible; a angular, ar articular, c coronary, d dentary, g gonial, sa supraangular; nat. size.

In addition to the here cited fossil remains, the material at the writer's disposal also contains an abundance of scales referable to the above species (bearing no Inventory Nos.). The present writer considers these remains as conspecific on the following evidence:

1. All the Glass Lizard remains from Weże exhibit similar morphological characters and belong to specimens of practically the same size.
2. The greater part of these remains were found associated with scales of characteristic ornamentation.
3. It is highly improbable for a genus containing so few species, to be recorded in several forms from the Pliocene of one locality.

Mandible (fig. 2). — On the preserved fragments it was possible to restore the whole mandible. It is considerably larger than the mandible of the Recent species *Ophisaurus apodus* (Pallas). The dentary is elongate and solid. It is in a satisfactory state of preservation in specimen No.402 (pl. I, fig. 1a, b) where the mandibular symphysis is quite distinct. Some teeth have also been well preserved (partially reconstructed in the drawing). They are low and typically ambliodont, particularly the posterior ones. *Foramina dento-facialia* are not too well preserved on the outside surface of the dentary bone. That part of the dentary bone preserved in specimen No. 404 touches the next mandibulars. The separating suture is here clearly visible.

The coronary bone has its upper part damaged. It unites with the broad supraangular bone. *Foramen nervi auriculo-temporalis* (A. M.

Fejérváry-Lángh, 1923: *For supraang. pro exitu nervi Siebenrockiani mandibulae?*) has a sub-oval margin. The entire angular and gonial bones have been preserved and are clearly distinguishable. Articular bone is somewhat less distinct. Unfortunately, the inside of the mandible has only partly been cleaned of the calcite coating, from fear of damaging it. Owing to this, such bones as the gonial, inside part of the coronoid and of the angular, as well as splenial bones, are not perfectly visible. Only parts of the supraangular, coronary and dentary bones have been satisfactorily cleaned. The Meckelian groove is clearly seen, filled up by red-coloured calcite and with an elongate oval shape, so characteristic of genus *Ophisaurus*.

Other cranial bones. — Fragments of the frontal and parietal bones have been preserved. The latter is perhaps in the best state of preservation of all the specimens (registered as Nos. 403 and 405). Characteristic ornamentation is clearly visible in its anterior part. *Foramen parietale* is not visible. *Processi parotici ossis parietalis* are also in a satisfactory state of preservation and they impart a characteristic appearance to the whole bone. The shape of this bone is identical with that observed in the Recent species *Ophisaurus apodus*. To show off differences of size between the Weže specimens and the Recent Glass Lizard now found in Europe, the following table, giving measurements of the parietal bone, will be of help.

Measurements of the parietal bone (in mm):

	<i>Ophisaurus apodus</i>	<i>Ophisaurus pannonicus</i> from Weže	
	1	2	3
Complete length	19	39	25
Width	10	20	15
Length of <i>proc. parot. ossis parietalis</i>	11	22	15

Specimens Nos. 403 and 404 show the occipital part of skull, belonging to large individuals, in a satisfactory state of preservation. Supra-occipital bone is visible in specimen No. 404. A part of this bone, with calcite removed, presents an appearance which is characteristic of the genus. *Foramen magnum* is clearly visible. *Condylus occipitalis*, as compared to its size, seems somewhat wider than it is in recent forms. The exoccipital bone distinguishable in specimen No. 404 is poorly preserved. Fragments of this bone are cemented by calcite. The basioccipital bone of the same specimen is quite well preserved. The quadrate, though rather badly damaged, is clearly visible (pl. II, fig. 1). Its length is 20 mm, while that of a recent specimen is 17 mm.

Vertebrae and ribs. — The greater part of these remains are badly preserved. Their minute fragments are frequently found in association with scales. All the vertebrae are distinctly procoelic and are provided with broad spade-like spinous processes, particularly distinct in specimen No. 400. A part of the axis and minute fragments of the atlas have been preserved in two specimens, while a fragment of the proatlas is in association with specimen No. 404. The axis is also well visible in specimen No. 400 (pl. II). Specimen No. 403 shows one entire cervical vertebra in a satisfactory state of preservation. Its anterior end is coated by calcite. This vertebra shows a solid fairly long spinous process. The prezygapophyses are not large but broad. The *condylus vertebrae* is strongly developed and sharply projecting from the body of the vertebra. The shape of this part of the vertebra is similar to that in the lizard of the family Varanidae². This type of process is a feature typical of *Ophisaurus* and should be regarded as its taxonomic character (Camp, 1923, p. 326).

The costals have been preserved as a number of fragments (pl. II, fig. 2). They bear an appearance characteristic of limbless lizards. In specimen No. 400, *pseudotubercula* are easily distinguishable in the dorsal region of the costals.

Osteoderms. — Some attention should be given to the scales and scutes of the species here described, quite abundant in the writer's material. The scale bone plates of the Anguinidae are, as a rule, in a good state of preservation. Their outside surface is ornamented in the same manner as the scales of the Recent Glass Lizard and those of others fossil forms thus far recorded from Europe. In specimen No. 400 whole groups of cervical and dorsal scales have been preserved (pl. IV). The scales here are arranged in characteristic rings round the animal's body. Only exceptionally do some scales slightly overlap one another. The cervical scales are, unfortunately, badly damaged. The parietal and frontal skull bones, as well as the supraocular scutes (after the nomenclature of Schreiber, 1912) are fairly distinct in the preserved portion of head of the specimen (pl. IV, fig. 1).

Scales of fossil Glass Lizards have been rather frequently recorded from various parts of Europe. In some cases these scales as well as inner skeletal parts associated with them, were referred to remains of some representatives of the family Scincidae. Close investigation studies, however, mostly by Hoffstetter (1944), have shown that no representatives

² The resemblance of the vertebrae in *Ophisaurus* and those in *Varanus* is responsible for the error made by S. J. Bolaky (1921) in describing a vertebra belonging to *O. pannonicus* as referable to a new fossil species, *Varanus deserticolus*.

of this family have, thus far, been recorded from the Tertiary of Europe. The greater part of the would-be scincidians were assigned to *Ophisaurus*.

Discussion. — It was not until 1923 that *Ophisaurus pannonicus* was described in detail by Mrs. Fejérváry-Lángh. Kormos (1911) did but publish a good photograph of his holotype (fragment of skull). These remains were yielded by the Pannonian beds of Polgárdi in Hungary. Furthermore, the species under consideration has also been recorded from several sites in Hungary, the southern parts of the European Soviet territory, and from the Miocene in the vicinity of Opole, Poland. This lizard is closely allied to the Recent species *O. apodus* (Pallas), differing from it by a much larger size and a consequently more strongly developed skeleton.

As synonymous with *O. pannonicus* Fejérváry-Lángh (1923) considers the species *O. novorossicus* Aleksejev, whose fossil remains have been collected from Upper Miocene beds within the Russian province of Kherson. The specific characters of this lizard are not reliable. To say, the number of teeth, different than in *O. pannonicus*, is not a constant character in the Glass Lizards. Neither are differences of geological age of real significance. *O. novorossicus* is referable to the Miocene, and *O. pannonicus* to the Pliocene. Since phylogenetically these reptiles are longlived, Fejérváry-Lángh is of the opinion that to this species are referable the mandibular remains of genus *Ophisaurus*, described by Wegner (1913) under the name of *Propseudopus* cf. *fraasi* Hilgendorf from the Upper Miocene clays of Nowa Wieś Królewska in the vicinity of Opole, Poland, as well as certain remains collected from Upper Tertiary beds of Hungary (for example Bolaky, 1921).

Ophisaurus moguntinus (Boettger) is another species of genus *Ophisaurus* recorded from Europe. It is cited by H. v. Meyer (1859/61), but it was O. Boettger (1873) who described it. Regretfully, this description is concerned with scales only. F. Kinkelin (1884) refers to *O. moguntinus*, a fossil form recorded from the vicinity of Frankfort a/M. R. Lydekker (1888) mentions the remains of this form in the Catalogue of fossil reptiles in the British Museum (Natural History). They were collected at Rott near Bonn. The same species is recorded from that region by H. v. Meyer (1859/61) and Boettger (1877). Though Nopcsa (1908) supports opinions suggesting the name established by Boettger (1877) to be *nomen nudum*, yet Fejérváry-Lángh (1923) proves that in conformity to the nomenclatory rules, this name has sufficient specific standing and is doubtlessly entitled to priority. It is this author, who has at length and with minute exactitude reported on the fossil remains of *O. moguntinus*. She based her description on material, in a satisfactory state of preservation, from the Senckenberg Museum at Frankfort a/M., yielded by the Miocene

beds of Rott near Bonn. The difference between *O. pannonicus* and *O. moguntinus* lies in the more progressive structure of the latter form. It is certainly more closely allied to the Recent *A. apodus*. Fejérváry-Lángh (1923) reports in detail on these differences. The fossil remains from Weże exhibit similar differences in relation to *O. moguntinus*.

A fossil form that has been well studied is *Propseudopus fraasi* Hilgendorf, described by F. Hilgendorf (1885) from the Miocene of Steinheim in Germany. The author believes that the index taxonomic character of this lizard is the presence of a double row of prevomerine teeth. The greater part of fossil representatives of *Ophisaurus* are assigned to this genus by both Hilgendorf (1885) and De Stefano (1905). Fejérváry-Lángh (1923) considers this form as synonymous with *O. moguntinus*. The only material difference between the Recent *Ophisaurus* and Hilgendorf's fossil genus *Propseudopus*, namely the presence of double row of prevomerine teeth, may be referable to individual variations. Fejérváry-Lángh asserts that an increase in the number of prevomerine teeth is of remarkably frequent occurrence in representatives of the Recent *O. apodus* (see F. Siebenrock, 1892, p. 186). This opinion is confirmed by the present writer's research studies on the osteology of *O. apodus*. He has actually ascertained the presence of a double row of such teeth in specimens belonging to this species. The abolishment of genus *Propseudopus* is, therefore, deemed fairly justifiable.

Another species assigned to *Propseudopus* was *P. cayluxi* De Stefano, described by De Stefano (1904) from the phosphorites of Quercy on the intermaxillary bone and fragments of mandible. Fejérváry-Lángh (1923) regards this form as one of those typically erected by amateur makers of new specific names („Speciesmacher“). She believes it to be synonymous with *O. moguntinus*. Naturally, the assignment of an exact systematic position to remains of such minute dimensions must seem very problematic.

Ophisaurus ulmensis Gerhardt, described by K. Gerhardt (1903) from the Lower Miocene in the vicinity of Ulm, is another limbless lizard which has been given a fair amount of attention. This species differs from the Weże remains by quite another appearance of the mandible, still it may be that it was figured without great accuracy in the drawing published by the author. The sculpture of tooth crowns in *O. ulmensis*, by Gerhardt judged to be so characteristic of this form, is also recorded in Glass Lizards, both fossil and Recent, thus not being a very typical feature (see pl. I, fig. 1). After Fejérváry-Lángh (1923), this species is to be regarded as another synonym of *O. moguntinus*. The specimen described by Gerhardt (1903) must certainly have belonged to a young

individual. To *Ophisaurus* may be referred the remains described by De Stefano from the phosphorites of Quercy, under the name of *Protrachysaurus gaudryi* (De Stefano), cited after R. Hoffstetter (1944). As mentioned by this author, the occipito-occipital capsels in this species do not resemble analogous parts of the skull in lizards of the family Scincidae, their structure being as in *Ophisaurus* (Anguimidae).

Teeth of lizards found in Sansan and briefly described by Lartet (1851) under the generic name of *Anguis* Linnaeus, are also referable to *Ophisaurus*. A somewhat more detailed description of these teeth has been given by Gervais (1859). Their shape is typical of *Ophisaurus*.

Further quotations of fossil remains of Glass Lizards are made in several other papers concerned with the fauna of Tertiary vertebrates from Europe (see Fejérváry-Lángh, 1923). They consist mainly of scales or fragments of mandibles, in the majority of cases referable to *O. moguntinus*. The closest comparison that the present writer was able to make of the Weże fossil remains belonging to Glass Lizards was that with skeletons of the Recent *O. apodus* (Pallas). His own specimens, as well as those at the Museum of the Wrocław University and the Zoological Institute, of the Polish Academy of Sciences, served the purpose of comparison. The remains from Weże represent the same type of structure. Differences of any significance between these forms consist foremost in the markedly larger dimensions of *O. pannonicus* from Weże (see table showing size of the parietal bone, length of reconstructed mandible in fig. 2, also dimensions as given by Fejérváry-Lángh (1923) for Hungarian specimens). If we accept that *O. pannonicus* had, roughly speaking, the same body proportions as *O. apodus*, the specimens from Weże might have attained a length of two meters. Relatively to their size, the Weże specimens may be supposed to have had scales somewhat smaller than the Recent species.

Fragments of incertae sedis

The bone material from Weże, prepared by chemical treatment, contains fairly numerous, though unfortunately most minute fragments of mandibles and isolated teeth of small lizards, with an uncertain systematic position. Owing to these circumstances the systematic assignments attempted by the present writer must be regarded as provisional only.

Probable representative of the family Agamidae. — Two small teeth in a fragment of mandible (fig. 3). Their acrodont arrangement on the dentary bone leaves little doubt as to their appurtenance to Agamidae. The writer has compared them in the first place with teeth of the Recent *Agama stelio* (Linnaeus) found in Iraq and in Palestine. From that

species the teeth here considered differ by their crowns being bent backward.

The tentatively identified representative of the Gekkonidae (pl. I, fig. 3). — This consists of a fragment of mandible belonging to a very small lizard. The dentary bone is but 4 mm long, the teeth but 1 mm

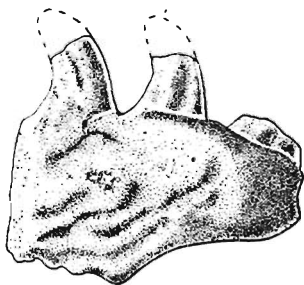


Fig. 3. — Agamidae (?), fragment of mandible; length 4 mm.

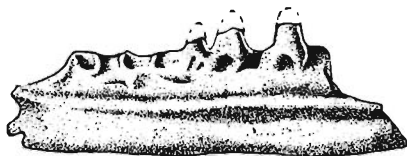


Fig. 4. — Gekkonidae (?), fragment of mandible; length 4 mm.

high. Fragment of the dentary bone and the damaged teeth are of a shape characteristic of the Gekkonidae. These remains have by the writer been compared with remains of fossil species described by Hoffstetter (1946) and with the Recent species of such palearctic forms as *Hemidactylus turcicus* (Linnaeus) and *Tarentola mauritanica* (Linnaeus).

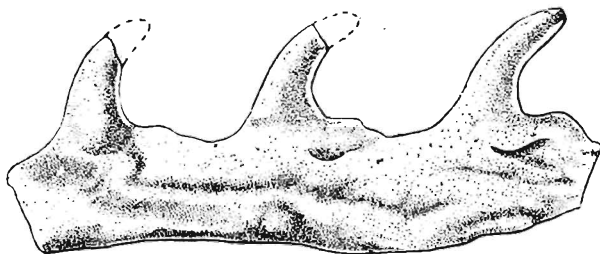


Fig 5. — *Anguis* (?), fragment of mandible; length 5 mm.

cf. *Anguis* (fig. 4). — One fragment of mandible may here, very provisionally, be referred to *Anguis* (Linnaeus). The three teeth preserved in this specimen are sharp pointed and hooked backwards as in many snakes. The occurrence in the Pliocene bone-breccia from Weże of small scales with ornamentation somewhat resembling that in the scales of *Ophisaurus*, though of a considerably smaller size, speaks in favour of the presence in the breccia of genus *Anguis*. Evidence against this identification is furnished by the rather indistinct dentition of the considered

remains. To say, the Anguinidae, like most lizards, have a pleurodont dentition, while in the writer's specimen this type of dentition cannot be ascertained beyond doubt. It is not, therefore, out of the question that the described fragment may be referable to a small snake and not to a limbless lizard.

GENERAL REMARKS

Characters of the lizard fauna from Weże

The lizard fauna from Weże is palearctic to a still greater extent than the tortoise fauna from the same breccia (Młynarski, 1955). Representatives of all the cited systematic units live at present in Europe. There is a distinct resemblance between the described fauna and the Recent fauna from the Balkan Peninsula, where the genus *Ophisaurus*, Gekkonidae and Agamidae occur in abundance. This may probably be accounted for by the similarity of climatic conditions prevailing at Weże during the Pliocene. The topography of these areas also showed some resemblance. In Pre-glacial times the Jurassic cliffs from the Cracow—Wieluń area were very much like the Karst klippen rocks now encountered, in Yugoslavia for example. Karst rocks of this type with numerous fissures, caverns and various sinks are the favourite habitat of Glass Lizards. Favourable biologic environment may be responsible for the abundance of the reptile fossil remains in the breccia under consideration. Representatives of the Agamidae, as well as Gekkonidae and Glass Lizards are all animals belonging to a warmer and continental climate. Their usual habitat is that in a xerothermic environment. Living representatives of *Lacerta* and *Anguis* are up to the present time found in Poland.

Comparison of the lizard fauna from Weże with that of other Tertiary sites from Europe

The lizards from Weże come quite near the Tertiary lizards, particularly so the Pliocene lizards from Hungary. This is very much so with *Ophisaurus pannonicus*, a species recorded from Polgárdi, Köpecz and Ajnácskő.

Special stress should be made on the occurrence of this species in the freshwater Upper Miocene clays from Nowa Wieś Królewska in Silesia. The fauna of that exposure, made widely known by R. Wegner (1913), is closely allied to the Pliocene fauna from Weże. In addition to *O. pannonicus*, the writer was also able to identify in the Weże breccia a tor-

toise referable to *Geoemyda eureia* (Wegner) thus far never recorded from any other locality besides the Nowa Wieś Królewska.

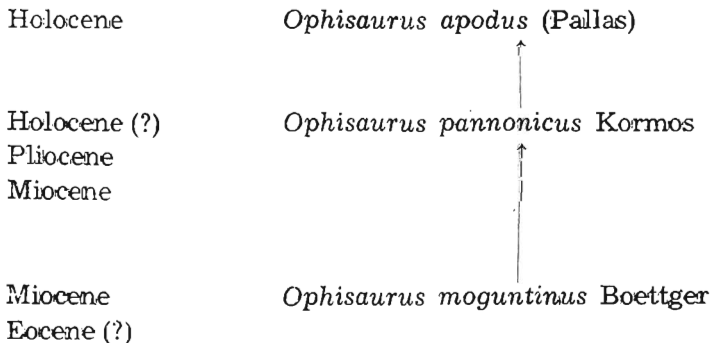
The Pliocene fauna from Roussillon differs from that here described by the absence of *Ophisaurus*. Genus *Lacerta* occurring among the Roussillon vertebrates, is represented there by a form which is larger than that in the Weże breccia. This is, however, a most „cosmopolitan“ genus and one without significant characters.

Fossil remains collected from the phosphorites of Quercy are distinctly related to our material. Representatives of the same groups are recorded there as from Weże (Anguinidae, Lacertidae). These phosphorites have also yielded forms absent from Weże and not encountered at present within Europe (Inguanidae).

Among other Tertiary sites, with fauna approaching the Pliocene fauna from Weże, are to be mentioned: Rott near Bonn, Steinheim, Hallsach, Wisenau, Hochheim near Mainz and Ulm in Germany; Samsan, Saint-Gérard-le-Puy in France; Petroverovka, Novo-Elisavetovka (?) and Savickoe in the Soviet Union.

Ophisaurus pannonicus from Weże as compared with the Recent *Ophisaurus apodus*

As has been repeatedly ascertained in this paper, the fossil remains of *O. pannonicus* from Weże are closely allied to the Recent species *O. apodus*. Fejérváry-Lángh (1923) has observed a doubtless relationship of these lizards. Whether *O. pannonicus* is the direct ancestor of the presently living form, is difficult to establish. De Stefano (1905) believes the species *O. moguntinus* Boettger (= *Propseudopus fraasi* Hilgendorf), to be the ancestor of the recent European species. As compared with the form from Weże, this is a more primitive species. In view of the above, the writer is enabled to propose, after Fejérváry-Lángh (1923), the following phylogenetic development of *O. apodus*:



In this phylogenetic pattern *O. pannonicus* is a link between *O. mo-guntinus*, the oldest of the recorded species, and the Recent *O. apodus*. In relation to fossil forms, *O. apodus* seems as if it were a stunted form. During the Tertiary, lizards of genus *Ophisaurus* occurred throughout Central Europe. Their present geographic distribution is probably due to action of the glaciation period, when the ancestors of *O. apodus* were forced southwards. This supposition does not make it inadmissible that ancestors of genus *Ophisaurus*, not yet discovered, should not have migrated from Asia (representatives of primitive *Diploglossa*?, after McDowell and Bogert, 1954). This, however, must have been as early as at the beginning of the Tertiary, since the evolution of genus *Ophisaurus* s. str. has taken place in Europe. On this point the opinion of the writer concurs with that of Fejérváry-Lángh (1923), though he was not able to make himself familiar with her most valuable work, till after he had finished writing the present paper.

Species from Asia exhibit rather important differences as compared to forms from Europe. To say, the well known south-China species *O. harti* (Boulenger) (subgenus *Dopasia*), has the features of genera *Anguis* and *Annielia*. According to S. B. McDowell and C. M. Bogert (1954), this lizard comes much closer to the North-American species *O. gracilis* (Gray) than to European species.

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Kraków, December 1955

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MARIAN MŁYNARSKI

JASZCZURKI Z PLIOCENU POLSKI

Streszczenie

Praca zawiera opis i systematyczny przegląd szczątków jaszczurek, pochodzących z plioceńskiej brekcji kostnej z miejscowości Węże koło Działoszyna nad Wartą. Opisano przedstawicieli dwóch rodzin jaszczurek, *Anguinidae* i *Lacertidae*, należących do rodzajów *Ophisaurus* i *Lacerta*. Szczątki zaliczone do rodzaju *Lacerta* (fragmenty żuchw) wykazują cechy wspólne gatunkom współczesnym *L. agilis* L.

i *L. viridis* Laurenti. Występujący w Węzach *Ophisaurus pannonicus* Kormos jest dużą beznogą jaszczurką przeszło dwumetrowej długości. Został on opisany po raz pierwszy z pliocenu Węgier przez T. Kormosa (1921), a następnie przez A. M. Fejérváry-Lángh (1923). Jest to forma anatomicznie bardzo zbliżona do współczesnego gatunku *Ophisaurus apodus* (Pallas). Żółtopuziłka z Węzów uważam, podobnie jak Fejérváry-Lángh (l. c.) za formę przejściową między kopalnym gatunkiem *O. montinus* Boettger a *O. apodus* (Pallas).

W opracowanym materiale znajdują się poza tym szczątki, które, ze względu na ich fragmentaryczność, zaliczyłem warunkowo i nie obowiązująco do przedstawicieli rodzin Agamidae i Gekkonidae. Istnieją również przypuszczenia, że w brekceji znalazł się drugi przedstawiciel rodziny Anguinidae, należący do rodzaju *Anguis* (cf. *Anguis*). Ze względu na drobny fragment tych szczątków i zły stan zachowania, dokładne określenie ich przynależności jest trudne. Możliwe jest także, iż są to fragmenty szczęki małego węża.

W części ogólnej scharakteryzowano faunę jaszczurek jako wybitnie palearktyczną oraz porównano ją z fauną innych trzeciorzędowych znalezisk na terenie Europy. Na zakończenie omówiono pokrewieństwo gatunków *O. pannonicus* i *O. apodus*.

OBJASNIENIA DO ILUSTRACJI

Fig. 1 (p. 137)

Lacerta sp., rekonstrukcja zuchwy; *a* angulare, *ar* articulare, *c* coronoideum, *d* dentale, *g* goniale, *sa* supraangulare; × 5.

Fig. 2 (p. 139)

Ophisaurus pannonicus Kormos, rekonstrukcja zuchwy; oznaczenia — jak w fig 1; wielk. nat.

Fig. 3 (p. 145)

Agamidae (?) fragment szczęki; długość 4 mm

Fig. 4 (p. 145)

Gekkonidae (?), fragment szczęki; długość 4 mm.

Fig. 5 (p. 145)

Anguis (?), fragment szczęki; długość 5 mm.

Pl. I

Fig. 1. *Ophisaurus pannonicus* Kormos, os dentale; *a* od strony zewnętrznej, *b* od strony wewnętrznej.

Fig. 2. *Lacerta* sp., fragment os dentale.

Fig. 3. Gekkonidae (?), fragment os dentale.

Fig. 4. *Lacerta* sp., os dentale; *a* od strony zewnętrznej, *b* od strony wewnętrznej.

Kreski pod figurami odpowiadają wielkości naturalnej okazów.

Pl. II

Fig. 1. *Ophisaurus pannonicus* Kormos, fragmenty czaszki, kręgow oraz łuski; *ax* axis, *c* coronoidaeum, *d* dentale, *dr* płytki kostne łusek (*dermalia*), *fm* foramen magnum, *sa* supraangulare, *sM* sulcus Meckeli, *so* supraoccipitale, *q* quadratum, *v* vertebrae; wielk. nat.

Fig. 2. *Ophisaurus pannonicus* Kormos, fragmenty kręgow, żeber oraz łuski; *ax* axis, *ct* costae, *dr* płytki kostne łusek, *v* vertebrae.

Pl. III

Fig. 1. *Ophisaurus pannonicus* Kormos, os parietale; *dr* rzeźba powierzchni kości, *al* area levis, *pp* processus paroticus; $\times 3$.

Fig. 2. *Ophisaurus pannonicus* Kormos, fragmenty kości i tarczki głowy; *f* frontale, *p* parietale, *ss* scuta supraocularia; $\times 2$.

Pl. IV

Fig. 1. *Ophisaurus pannonicus* Kormos; fragment przedniej części ciała; $\times 0,5$.

Fig. 2. *Ophisaurus pannonicus* Kormos, łuski; $\times 10$.

Fig. 3. *Ophisaurus apodus* (Pallas), łuski; $\times 10$.

МАРИАН МЛЫНАРСКИ

ЯЩЕРИЦЫ ИЗ ПЛИОЦЕНА ПОЛЬШИ

Резюме

Предлагаемая работа содержит описание и систематическое обозрение остатков ящериц плиоценовой брекчии из местности Венже близ Дзялошина у р. Варты. Описываются представители двух семейств ящериц *Anguinidae* и *Lacertidae*, принадлежащих к родам *Ophisaurus* и *Lacerta*. Остатки отнесенные к роду *Lacerta* (обломок нижних челюстей) обнаруживает общие признаки с современным видом *L. agilis* L. и *L. viridis* Laurenti. Встречаемый в Венжах *Ophisaurus pannonicus* Kormos является большой, лишенной конечностей ящерицей, длиной свыше 2 м. Впервые описал ее Кормош (Т. Kormos, 1921) из плиоцена Венгрии, а затем Феервары-Лянг (А. М. Fejérváry-Lángh, 1923). По своему анатомическому строению эта форма весьма близка современному виду *Ophisaurus apodus* (Pallas). Автор, как и Феервары-Лянг (1923) считает желтопузика из Венжев промежуточной формой между ископаемым видом *O. moguntinus* Boettger и *O. apodus* Pallas.

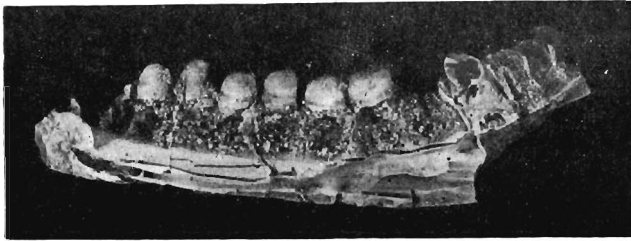
Среди исследуемого материала находятся кроме того остатки, которые ввиду находки только фрагментов условно отнесены к представителям семейства *Agamidae* и *Gekkonidae*. Предполагается тоже, что в брекчии найден другой представитель семейства *Anguinidae*, принадлежащий к роду *Anguis* (cf. *Anguis*).

Ввиду плохой сохранности небольших обломков этих остатков, точное их определение весьма затруднительно. Возможно также, что это остатки нижней челюсти небольшой змеи.

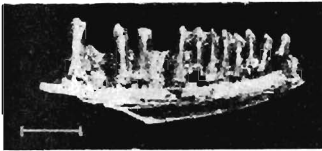
В общей части характеризуется фауна ящериц, как исключительно палеарктическая и сравнивается с фауной других третичных находок на территории Европы. В заключение рассматривается вопрос родства *O. rannonicus* и *O. apodus*.



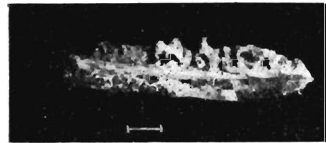
1a



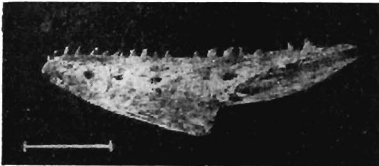
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3

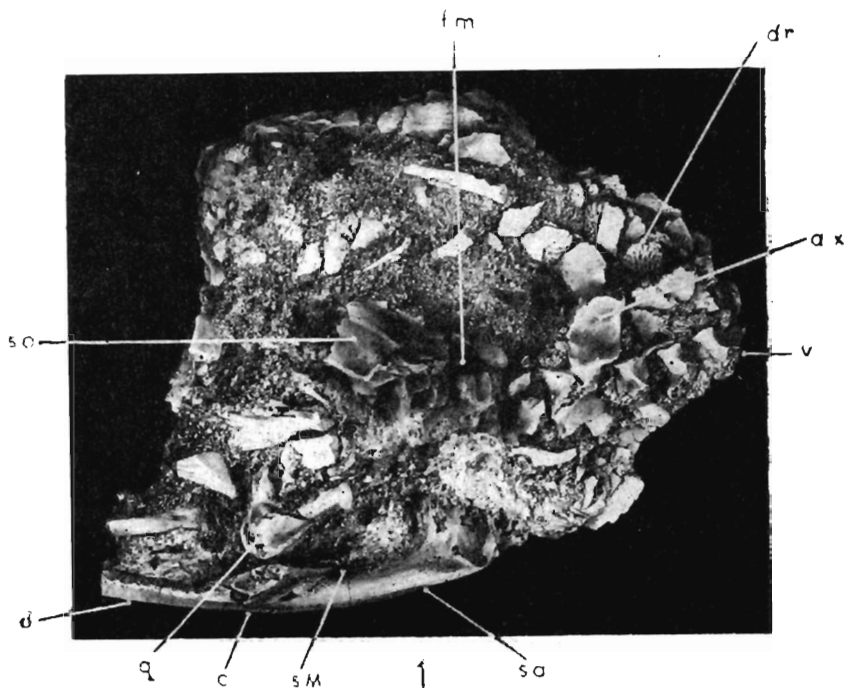


4a



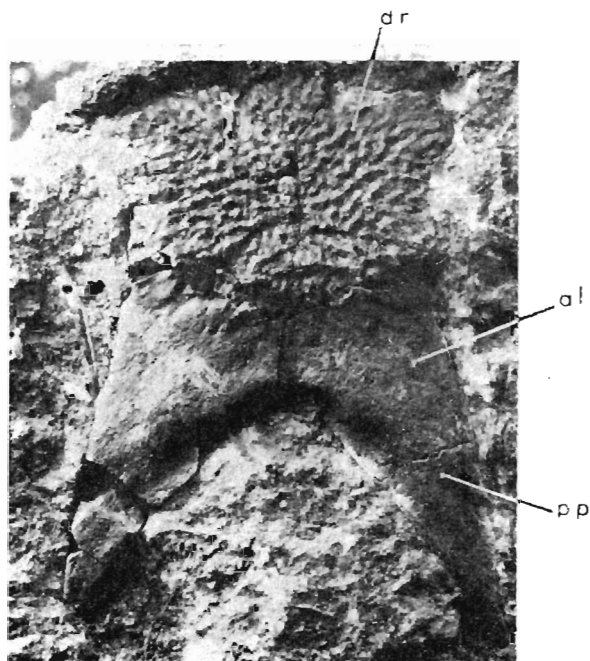
4b

Fig. 1. *Ophisaurus pannonicus* Kormos., dentary bone; a exterior view, b interior view.
 Fig. 2. *Lacerta* sp., fragment of dentary.
 Fig. 3. Gekkonidae (?), fragment of dentary.
 Fig. 4. *Lacerta* sp., dentary; a exterior view, b interior view.
 Lines under figures correspond to natural size of specimens.

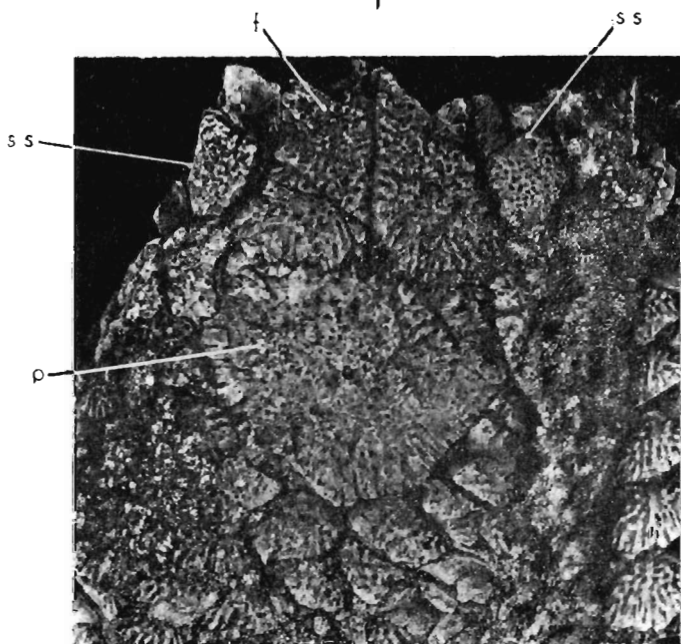


2

Fig. 1. *Ophisaurus pannonicus* Kormos, fragments of skull, vertebrae and scales; bones: *ax* axial, *c* coronary, *d* dentary, *dr* scale bone plates (*dermalia*), *fm* foramen magnum, *sa* supraangular, *sM* sulcus Meckeli, *so* supraoccipital, *q* quadrate, *v* vertebrae; nat. size.
 Fig. 2. *Ophisaurus pannonicus* Kormos, fragments of vertebrae, ribs and scales; *ax* axis, *ct* costae, *dr* scale bone plates, *v* vertebrae; nat. size.



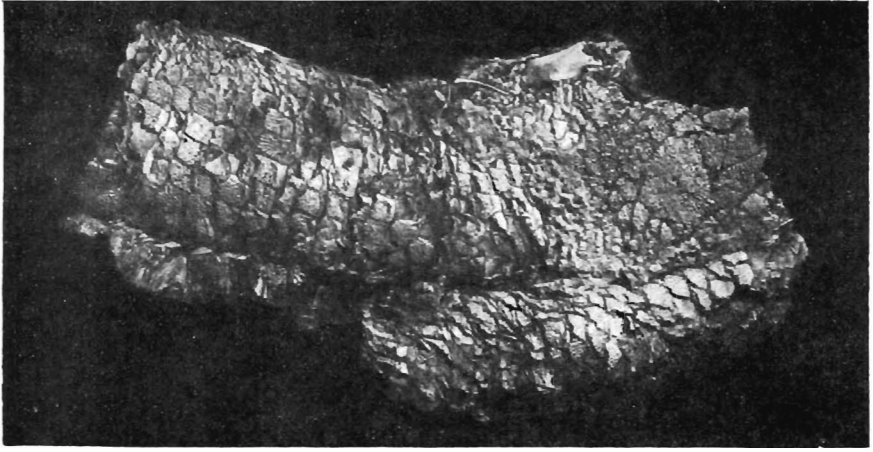
1



2

Fig. 1. *Ophisaurus pannonicus* Kormos, parietal bone; dr sculpture of bone surface, al area levis, pp processus paroticus; $\times 3$.

Fig. 2. *Ophisaurus pannonicus* Kormos, fragments of head bones and shields; f frontal, p parietal, ss scuta supraocularia; $\times 2$.



1



2



3

1. *Ophisaurus pannonicus* Kormos, fragment of anterior part of body; $\times 0,5$.
 2. *Ophisaurus pannonicus* Kormos, scales; $\times 10$.
 3. *Ophisaurus apodus* (Pallas), scales; $\times 10$.