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PLIOCENE LAGOMORPHA AND RODENTIA FROM WĘŻE 1 (POLAND)

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

PART XIX*

Abstract. — Twenty three species of Lagomorpha and Rodentia from the Pliocene bone breccia from Węże 1 near Działoszyn are described and figured, among them the following are considered new: *Pliosciuropterus* n.gen., *Sciurus warthae* n.sp., *Eutamias orlovi* n.sp., *Pliosciuropterus schaubi* n.sp. and *Steneofiber wenzensis* n.sp. Moreover, *Pliosciuropterus dehneli* n.sp. from Węże 2 is described. The origin and age of the bone breccia from Węże 1 are discussed, palaeoecological and palaeoclimatic conclusions are drawn and the phylogenesis of some rodents described considered.

INTRODUCTION

Lagomorpha and Rodentia described in the present paper come from the well-known Pliocene bone breccia from Węże 1 near Działoszyn. Data on the situation and character of this locality have previously been published (Samsonowicz, 1934; Kowalski, 1951, 1960*d*; Sulimski, 1959; Młynarski, 1953, and others). On the northern edge of the Polish Jurassic this locality is not the one. Besides Rębielice Królewskie, located a dozen or so km. SSW of the Zelce Hill (Mossoczy, 1959; Kowalski, 1960*a*, 1960*c*, 1963; Młynarski, 1960, 1962), another bone breccia site (Węże 2), also of the Pliocene origin, has been found in the neighbourhood of the Węże 1 karst doline (Sulimski, 1962*a*). It is about 150—200 m north from the old — Węże 1 — locality and is situated on the northern slope of the Zelce Hill. The bone materials, excavated there, are not fully studied so far. Some results of studies on the microtheriofauna, occurring there, in particular the "flying squirrel" *Pliosciuropterus dehneli* n.sp. are given in the present paper.

* Parts I-V — see *Acta Geol. Pol.*, vol. II-V/1952-55; Parts VI-XVIII — *Acta Palaeont. Pol.*, vol. I-VII/1956-62.

Faunistic investigations at Węże 1 have been started by Stach (1951). Until now, over 20 papers, concerning the Węże 1 fauna have been published. A full list of these publications is presented in the literature cited (indicated by asterisks).

A relatively well preserved bone material, obtained by the chemical preparation, allowed for several detailed observations on the variability and morphology of the rodents described. Serial sections of teeth were often made, particularly of molars in which the crowns were prismatic in shape. They were helpful in the observations on the variability of the enamel folds, reentrant folds, position of prisms, manner of forming enamel islets and the structure of roots. Owing to these sections, in some cases, it was also possible to establish more exactly the systematic position of the Węże 1 species described previously.

In measuring large specimens, the values obtained, amounting up to 0.01, were made even to 0.1 and, in small specimens, the accuracy of measurements was left at 0.01. The values which occurred most often and the number of the specimens measured are given in measurement tables.

The Lagomorpha and Rodentia materials from Węże 1, described in the present paper, are the property of the Muzeum Ziemi (Museum of the Earth) of the Polish Academy of Sciences in Warsaw, for which the abbreviation *M. Z.* and No. VIII/Vm/... is used; those from Węże 2 — of the Institute of Palaeozoology of the Polish Academy of Sciences in Warsaw for which the abbreviation *Z. Pal.* VM/I is used.

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REMARKS ON THE ORIGIN OF THE BONE BRECCIA AT WĘŻE 1

A possibility has been advanced in the first studies of the fauna of Węże 1 that for accumulation of bones the predatory mammals were mainly responsible (Samsonowicz, 1934; Stach, 1951, 1953). Also the part of birds of prey was indicated by subsequent investigations (Sulimski, 1959, 1962*b*; Kowalski, 1960*d*, 1961, 1962*a*, 1962*b*). Besides, it was the character itself of the karst doline at Węże 1 (a vertical cave open at the top) that provided favorable conditions to the random accumulation of bones.

Dart's (1957) investigations of the accumulation of bone remains of various mammals, accompanying the remains of the *Australopithecus prometheus* Dart in Makapansgat Valley, South Africa, have shown that such carnivores as, lion, jackal, leopard and particularly hyena, did not show tendencies to accumulate bones in or near their lairs. It can be presumed, therefore, that also during the formation of the bone breccia at Węże 1 bones were not accumulated by large carnivores which occurred there.

On the basis of the fauna, thus far investigated at Węże 1, it might be concluded that the bone accumulation process should be more complicated, this being probably caused by the following three factors: 1) feeding of birds of prey (testified by a vast quantity of small bones of insectivores, rodents, small carnivores and bats); 2) accidental and unexplained deaths of most large mammals; the remains of reptiles (turtles), some insectivores (hedgehogs) and rodents (porcupines, beavers) should be reckoned in this category; 3) intensive downpours and rapid streams which washed off the bone remains from the nearest surroundings of a doline and deposited them in it.

The bone material of small mammals (Lagomorpha and Rodentia) consists of many fragments of lower jaws and, less numerous, long bones, while skulls, and particularly their brain cases, are rarely found. These remains are usually scattered, the sets of skulls with lower jaws occurring rather exceptionally. Great number of detached teeth from both jaws deserve particular attention. A thick and durable enamel allowed for their excellent preservation. The similar state of preservation of bone remains of small animals can be observed in the pellets of the Recent birds of prey.

REMARKS ON THE AGE OF THE BONE BRECCIA FROM WĘŻE 1

Several alternately distributed and variously colored beds (Samsonowicz, 1934; Sulimski, 1959) were recorded during the excavation of the bone breccia at Węże 1. The lowermost, red bed was separated from the next deposits by a thick calcite layer. It was already then that the

assumption occurred concerning the age differences of faunas represented in this cave. Samsonowicz (1934) concluded, therefore, that there is a possibility of the lowermost parts of the breccia reaching up to the highest horizons of the Miocene and the uppermost parts — down to the lowermost Pleistocene. The subsequent faunal investigations established a combined character of this fauna. A part of it contained distinctly older elements, related to the fauna of the early Pliocene and another part — younger elements with close resemblance to the faunas of the late Pliocene and early Pleistocene. The double character of the fauna was manifested not only in the assemblage of insectivores (Sulimski, 1959, 1962*b*) but also of carnivores, amphibians, reptiles (Stach, 1951, 1953; Młynarski, 1956*a,b*, 1962) and bats (Kowalski, 1962). To fortify these suppositions, the collagenic method was used for determining the relative age of the bone remains from the gray and the red breccia. A clear difference of the degree of fossilization was actually disclosed by these tests. Values, obtained by this method for two parts of the breccia expressed in age units (Wilczyński, 1961, p. 162), are related to each other as 1 : 3. Apart from the magnitude of the age unit, the results of this investigation provide additional evidence to the assumption, presented above. It might be admitted that a part of the remains described here could derive from the older and another part from the younger period of the breccia formation.

An archaic character of the Węże 1 assemblage is shown clearly enough by the recent studies on the microtheriofauna and on the lower vertebrates from Węże 1 (Kowalski, 1960*d*, 1960*c*, 1962, 1963; Sulimski, 1962*b*, 1962*c*; Młynarski, 1962), as well as from other similar faunistic assemblages in Poland (Węże 2, Podlesice near Kroczyce, Rębielice Królewskie) (Sulimski 1962*a*; Kowalski, 1962*a*, 1963, and others). Such species as, e.g., *Desmana pontica* Schreuder of Insectivora, *Rhinolophus delphinensis* Gaillard, *Rhinolophus grivensis* (Depéret) of Chiroptera, *Hystrix primigenia* (Wagner), *Parapodemus schaubi* Papp of Rodentia occur in the late Miocene or early Pliocene of various European localities (Pikermi, Polgardi, La Grive Saint-Alban, Veleš, and others). Other species, thus far known only from Węże 1 as, *Pliosciuropterus schaubi* n.gen., n.sp., *Steneofiber wenzensis* n.sp., *Plioselevinia gromovi* Sulimski, *Sminthozapus janossyi* Sulimski and probably *Glis minor* Kowalski, *Muscardinus pliocaenicus* Kowalski and others can be also related to the older faunas. In particular, this would concern the first four of them. The nearest relatives of *Pliosciuropterus* n.gen. can be found in the Miocene fauna from La Grive Saint-Alban, Biberach, Göriach, Opole, Jablanica and others where various species of the genus *Sciuropterus* F.Cuvier occur. *Steneofiber wenzensis* n.sp. is obviously related, by its structure and size of dentition, to the late Miocene representatives of the same genus. *Sminthozapus janossyi* Sulimski, a primitive zapodid, closely related to the Oligo-Miocene

Table 1
Stratigraphical and geographical distribution of the Lagomorpha and Rodentia found at Węże 1

Species	Older Pliocene	Younger Pliocene						
	W—1	W—1	P	R	I	C	G	S
Lagomorpha:								
Ochotonidae gen. et sp. non det.	+	?						
Hypolagus brachygnathus Kormos	?	+	+	+	+	+	+	+
Rodentia:								
Sciurus warthae n. sp.	?	+						
Eutamias orlovi n. sp.	+	?						
Pliosciuropterus schaubi n. gen,.n. sp.	+							
Pliopetes hungaricus Kretzoi	?	cf.				+		
Steneofiber wenzensis n. sp.	+							
Trilophomys pyrenaicus (Depéret)	?	+			+			
Baranomys longidens (Kowalski)		+		+				
? *Ungaromys* sp.	?	+						
Germanomys weileri Heller	?	+	?		+		+	
Germanomys trilobodon (Kowalski)	?	+	?		+			
? *Germanomys* sp.		+						
Dolomys hungaricus Kormos	cf.	?	+			+		
Dolomys nehringi Kretzoi	?	cf.				+		
Mimomys stehlini Kormos	cf. ?	cf.	?	cf.	?	+	?	
Mimomys gracilis (Kretzoi)		+		+	+	+		
? *Mimomys* sp.		+						
Prospalax priscus (Nehring)	?	+	?	+	+	+		
Micromys praeminutus Kretzoi		cf.				+		
Rhagapodemus frequens Kretzoi		+				+		+
Parapodemus schaubi Papp	+							
Muridae gen. et sp. non det.	+	+						
Glis minor Kowalski	?	+	+	+		+		
Muscardinus pliocaenicus Kowalski	?	+	+	+				
Plioselevinia gromovi Sulimski	+							
Sminthozapus janossyi Sulimski	+							
Hystrix primigenia (Wagner)	+	?						

+ present, *cf.* conforming, ? probable or uncertain, *W—1* Węże 1, *P* Podlesice near Kroczyce, *R* Rębielice Królewskie, *I* Ivanovce near Trenčin, *C* Csarnóta 2, *G* Gundersheim, *S* Schernfeld near Eichstätt.

species of the genus *Plesiosminthus* Viret, also confirm the archaic character of the microtheriofauna assemblage from Węże 1. Besides, it should be mentioned that the majority of forms, specified above, were found

in the lower layers of the breccia. Higher layers of the breccia, as accepted by most authors, should be attributed to the younger Pliocene and it seems that the greatest part of the fauna from this locality should derive from these layers.

At the same time, the present paper represents an attempt to divide the studied fauna into assemblages of the older and the younger Pliocene. The stratigraphical and geographical distribution of the Lagomorpha and Rodentia found at Węże 1 are presented in Table 1.

PALAEOECOLOGICAL AND PALAEOCLIMATIC REMARKS

Recent investigations of the fauna of the amphibians and reptiles (Młynarski, 1962), bats (Kowalski, 1962), rodents (Kowalski, 1960*c*, 1960*d*, 1962*b*, 1963; Sulimski, 1960, 1962*c*), insectivores (Sulimski, 1959, 1962*b*), carnivores (Stach, 1959, 1962) and ungulates (Czyżewska, 1960) have shown that the ecological conditions, which existed when bone remains were being accumulated, were fairly permanent in character with only some sporadic climatic fluctuations occurring now and then. The environment in which this fauna lived was varying, with forest-steppe conditions predominating. The presence of woods, probably of the park type, would be indicated by such rodents as *Pliosciuropterus schaubi* n.gen., n.sp., *Pliopetes* cf. *hungaricus* Kretzoi, *Eutamias orlovi* n.sp., *Sciurus warthae* n.sp., *Glis minor* Kowalski and *Muscardinus pliocaenicus* Kowalski. The forest-steppe belt with nearby regions rich in water (water basins or rivers) was, in Pliocene, certainly connected with extensive steppe areas of the Southern and Eastern Europe and Central Asia. A near neighbourhood of a water reservoir may be indicated by the presence of the Desmaninae of the insectivores, of some Testudinidae of the Reptilia and of the *Steneofiber wenzensis* n.sp. of the Rodentia. At Węże 1, the species belonging to the Microtidae, Cricetidae and Muridae are by far predominating within the assemblage of rodents. Perhaps, most of them lived in open territories. Conclusions, concerning the forest-steppe character of the environment, are fully conformable with those, based on the studies of the Pliocene flora of Poland (Szafer, 1954).

The closely related genera of *Baranomys* Kormos, *Microtodon* Miller and *Prosomys* Shotwell can also provide evidence for the approximately equal ecological conditions in the Pliocene that occurred on the territories of Eurasia and North America.

The species, belonging to them and having a primitive, microtoid structure of their molars, lived probably in an environment similar to that of the Recent Cricetidae and Microtidae. During the evolution of the dentition in the numerous group of the Microtinae, a process of the formation of rootless, high-crowned teeth can be observed along with a steady growth of crowns from primitive low-crowned and rooted teeth. This

process was connected with a change in the gramineous vegetation of the Pliocene. This adaptation allowed these rodents to secure a hard and plentiful food and, at the same time, their intensive generation caused the extinction of the subfamily Baranomyinae which occurred at the end of the Pliocene or in the early Pleistocene.

The fauna of Lagomorpha and Rodentia from Węże 1, described below, is very specific in character, different from other Pliocene faunas and does not bear full analogies with them. On the territory of Poland, some similarities are observed in such faunas as those from Rębielice Królewskie, Podlesice near Kroczyce and Węże 2 (Kowalski, 1956, 1960*a*, 1962*b*, 1963; Sulimski, 1962*a*, and others). This fauna is also similar to the faunas of small mammals from Csarnóta 2 and Polgardi in Hungary (Kretzoi, 1955*a*, *b*, 1956, 1959; Kormos, 1911*a*; Schaub, 1938; Papp, 1947), from Gundersheim, Wölfersheim-Wetterau and, partially, Schernfeld near Eichstätt in Germany (Heller, 1936; Tobien, 1952; Dehm, 1962), from Ivanovce near Trenčin in Czechoslovakia (Fejfar, 1961*a*, 1961*b*, 1961*c*), from Roussillon (Perpignan) and Sète in France (Depéret, 1890; Thaler, 1955, 1956, 1962*a*, 1962*b*), from Val d'Arno in Italy (Kormos, 1931*b*), partially from Pikermi in Greece (Gaudry, 1862—1867; Abel, 1922), from Malušteni and Berešti in Rumania (Simionescu, 1922, 1930; Kormos, 1932*b*, 1937), and others.

DESCRIPTIONS

Order **Lagomorpha** Brandt, 1855
Family **Ochotonidae** Thomas, 1897
Ochotonidae gen. et sp.non det.
(Text-fig. 1)

Material. — A fragment of a lower jaw of an adult individual with P_3—M_3 and three detached P_3 and M^3 (?), as well as two M_3.

Description. — The lower jaw is small and delicate. P_3 is bipartite with narrow anterior and wide posterior part of the crown. Both parts are divided by lingual and labial reentrant folds, converging almost exactly in the center of the tooth crown. The posterior edge of the tooth is placed at a right angle to the lingual edge. On the lingual side of the crown there are two reentrant folds, one in the anterior, another in the posterior part of the tooth. M_1 and M_2 are similar to those in *Ochotona* Link, but they are slightly larger and with more rounded outlines of the enamel prisms. M_3 is reduced to a single element in the form of a narrow tube filled out with dentine.

The detached P_3 are clearly different from the P_3, sticking in the lower jaw. They are built of three enamel prisms (Text-fig. 1 — *1 a-c*). The

first prism is small, narrow and clings to the central prism. The two remaining prisms are connected by enamel and dentine. The furrows or lingual and labial reentrant folds are filled out with cement. The crowns of the teeth have an antero-posterior elongation, their grinding surface is uneven and zigzagged in outline. Besides, these teeth have two uneven and divergent roots.

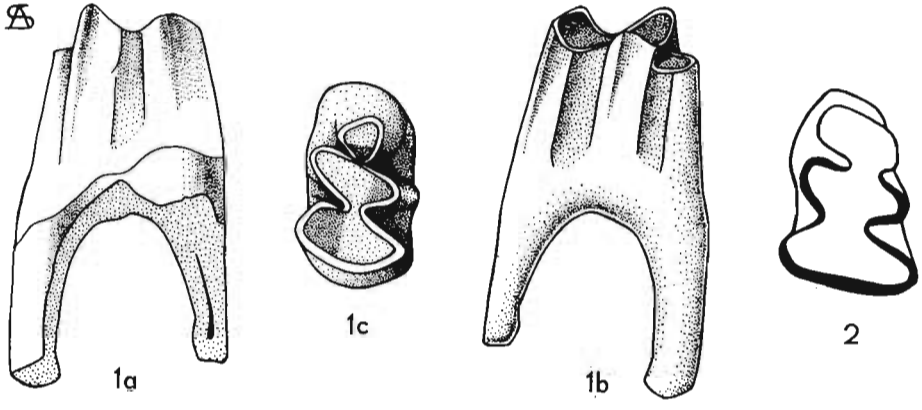

Fig. 1. — *1* Ochotonidae gen. et sp. non det.; Węże 1. Right P_3: *a* lingual view, *b* labial view, *c* occlusal view (M.Z. No. VIII/Vm-320/3); ca. × 12. *2* *Ochotona melanostoma* Pallas; Recent. Right DP_3, occlusal view; ca. × 17 (after Bohlin, 1942a, p. 91, fig. 28e).

Measurements: The length P_3—M_3 on the jaw (measured along alveoles) amounts to about 8.4 mm, the height of the jaw below M_1, 8.9 mm. The length and width of the three P_3, 2.2—2.4/1.3—1.5 mm (average 2.4/1.5 mm).

Discussion. — The preserved fragment of the lower jaw from Węże 1, compared with jaws of Recent *Ochotona pusilla* Pallas, *O. daurica* Pallas and *O. pricei* Thomas, shows distinct differences not only in the size, but also in the structure of teeth, particularly of the premolar, P_3. In the species of the *Ochotona* Link, mentioned above, this tooth, in addition to two reentrant folds on both sides, has the anterior part of the crown much wider and with more complex trace of the band of enamel. These differences do not allow, therefore, to assign the lower jaw described to *Ochotona* Link. Kretzoi (1959) mentioned the occurrence of *Ochotonoides csarnotana* Kretzoi in the locality Csarnóta 2 in Hungary. The lack of a description and illustrations of this species does not allow for any comparisons. Another species of this genus, *O. complicidens* Boule & Teilhard, described from the localities Nihowan and Yushe (Teilhard de Chardin, 1940), considerably differs from our specimen also by the complicated structure of the entire P_3. The specimens of P_3 and of the jaw described, cannot, therefore, be assigned to the genus *Ochotonoides* Teilhard de Chardin & Young.

The teeth, similar to the P_3 from Węże 1, described by Bohlin (1942*a*, p. 91, fig. 28*e*), were attributed by this author to *Ochotona* Link. These teeth, despite their similarity in structure and number of the enamel prisms (Text-fig. 1 — *2*) differ from those under study by a considerably smaller dimensions, different crown length to width ratio, absence of the cement from the reentrant external folds of the crowns and by probably poorly developed roots.

The size and the specificity of the structure of the detached P_3 teeth from Węże 1, as well as the structure of the jaw and teeth, sticking in it, allow only for their assignment to the family Ochotonidae Thomas. Representatives of the Ochotonidae Thomas occur in fairly large numbers in the early and late Pleistocene of Europe and, recently, they are numerously represented in the forest-steppe zone and on the extensive steppe and semi-desert territories of the South-Eastern Europe and Central Asia.

Family **Leporidae** Gray, 1821
Subfamily **Palaeolaginae** Dice, 1929
Genus *Hypolagus* Dice, 1917
Hypolagus brachygnathus Kormos, 1934
(Pl. I; pl. II, fig. 3-12; text-fig. 2)

The synonymy from 1930 to 1958 is given by Kowalski (1958, p. 18). Besides:

1958b. *Hypolagus brachygnathus* Kormos; K. Kowalski, Altpleistozäne..., p. 13, fig. 3 A.

?1961c. *Hypolagus* sp.; O. Fejfar, Die plio-pleistozänen..., p. 276-278, fig. 2i, 5 a-c, 6 a, c-d.

1962. *Hypolagus brachygnathus* Kormos; R. Dehm, Altpleistozäne ..., p. 52, pl. 6, fig. 23.

Material — Ten skulls, in this number 6 with a complete dentition; 12 fragments of upper jaws with a complete series of teeth; a dozen or so other fragments of the same jaws but without teeth or with single molars only; 23 left and 24 right lower jaws with a complete dentition, as well as some scores of other fragments of the same jaws with incomplete dentition. Moreover: 4 lower jaws of young animals, numerous detached molars and premolars, as well as several hundreds of incisors from both lower and upper jaws.

Description. — Skull and upper dentition. An incisor, dorso-ventrally flattened, with a longitudinal, narrow groove, containing no cement. The length of P^2 considerably smaller than its width. The frontal surface of the enamel of P^2 with a distinct, fairly deep and diagonally located central reentrant fold and with a small niche, slightly outlined on the antero-labial side (Text-fig. 2—*2*). P^3—M^2, with a central labial reentrant fold in the form of a delicately folded double lamine of the enamel, reaching, on the lingual side, up to $\frac{2}{3}$ of the width of the crown. M^3, con-

siderably inclined forward and reduced to a single tube. The anterior root of the jugal arch — within limits of P^2 and M^1. The back edge of the anterior palatine foramen — on the boundary of P^4 and M^1. Rows of teeth arched towards the labial side. Nasal bones — long and broad. Frontal bones are located between nasal bones in the form of a sharp wedge (Pl. I, fig. 6*a*). The infraorbital foramen over the posterior part of the diasteme is straight, fairly short and parallel to the palate. The internal choanae are long and broad.

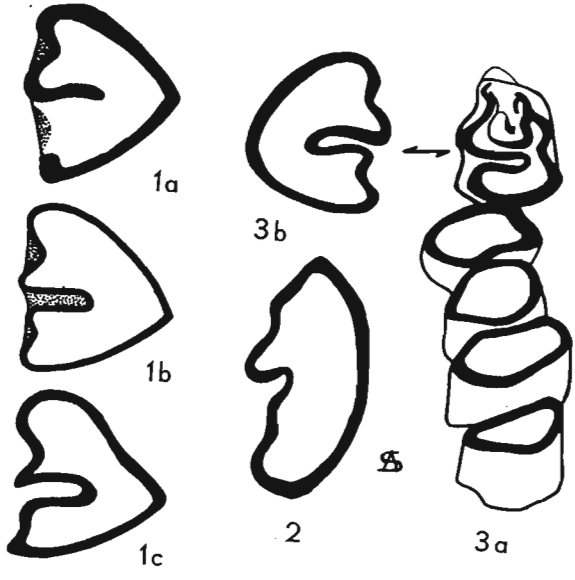

Fig. 2. — *Hypolagus brachygnathus* Kormos; Węże 1. *1* The outline of enamel loops on P_3: *a* occlusal view, *b* cross section in halfheight of the crown, *c* root view (*1c* mirror image); ca. × 7. *2* Cross section of P^2; ca. × 9. *3* Left $P_3 - M_1$ of young individual: *a* occlusal view, *b* P_3 root view (M.Z. No. VIII/Vm-321/75); ca. × 7.5.

Lower jaw and dentition. The lower incisor is broad, with a smooth and flat surface of the enamel band. The distal end of the root reaches up to the posterior edge of the P_3 (Pl. II, fig. 4). The central reentrant fold of the P_3 reaches up to the half of the width of the crown and is filled out with the cement. The anterior part of the crown is larger than the posterior one. The lingual surface of the crown — without folds and reentrant folds. At the level of the central labial reentrant fold, an angle is formed by this surface, which is acute in the root part of the tooth and almost right near the occlusal surface. A distinct but not very deep reentrant fold on the labial side of the anterior part of the crown is filled out with cement. The posterior part of the crown on the same side has a shallow and broad reentrant fold, also filled out with cement. The occlusal surface of P_3 is triangular in outline with its vertex pointing to the lingual side.

Anterior and posterior parts of the P_3 crown in young individuals are separated by a deep labial reentrant fold, reaching almost to the lingual side of the crown. The structure of these teeth on the side of the root is however typical of the *Hypolagus brachygnathus* Kormos (Text-fig. 2 — *3a, b*). M_3 in these individuals is reduced in size, but has a slight twofold crown.

In adult individuals the horizontal ramus of the jaw is fairly high under M_1 and gradually tapers off anteriorly. The diasteme is shorter than in *Lepus europaeus* Linnaeus. The articular process (preserved in two specimens only, Pl. II, fig. 5, 6) is broad, spatulous and with an elongated and broad articular surface. The coronoid process has the form of a distinctly shaped crest on the anterior edge of the ascending ramus. The mental foramen is located somewhat dorsally approximately at 1/3 of the length of the diasteme, near P_3. The end of the jaw symphysis is located below P_3.

Measurements of the lower and upper jaws and dentition in young and adult individuals are given in Tables 2 and 3.

Discussion. — The possibility of the assignment of the species described here to any other genus of the Palaeolaginae except for *Hypolagus* Dice is excluded by the characteristic structure of P_3. This genus, amply represented in the Plio-Pleistocene North American faunas, was first recorded from the Upper Pliocene of Hungary, represented there by *H.*

Table 2

Hypolagus brachygnathus Kormos

Measurements of the lower jaws and their dentition in young individuals (in mm)

M. Z. Cat. No. VIII/Vm		321/72	321/70	321/71	321/73
Height below M_1		10.0	10,0	11.0	12.0
Thickness below M_1		4.6	4.5	4.8	4.8
Diasteme		13.0	12.0	—	—
Length of $P_3 - M_3$		12.0	—	—	—
Length of $P_3 - M_2$		9.5	9.5	11.0	—
P_3	Length	2.4	2.0	2.6	2.9
	Width	1.8	1.5	2.3	2.7
P_4	Length	2.6	2.5	2.5	2.9
	Width	2.9	2.8	2.9	3.1
M_1	Length	2.6	2.6	2.7	2.7
	Width	2.8	3.0	3.0	3.2
Length of M_2		2.4	2.5	2.6	—
M_3	Length	0.8	—	—	—
	Width	1.2	—	—	—

Table 3

Hypolagus brachygnathus Kormos

A. Measurements of the lower jaws and their dentition in adult individuals (in mm)

M. Z. Cat. No. VIII/Vm-321 Jaws with teeth		Detached teeth	Modal value	Number of specimens
Height below M_1	13.5—15.0	—	14.0	69
Thickness below M_1	5.5— 6.5	—	6.1	69
Diasteme	16.0—19.0	—	17.8	52
Transverse diameter of incisors	3.2— 3.6	3.0— 3.8	3.5	132
Length of P_3—M_3 on the crowns	14.0—16.0	—	15.6	47
Length of P_3	2.8— 3.6	2.6— 3.6	3.2	279
Width of P_3	3.0— 3.6	2.8— 3.7	3.4	
Length of P_4	2.7— 3.7	2.6— 3.8	3.3	336
Width of P_4	3.4— 4.4	3.2— 4.6	4.0	
Length of M_1	2.8— 3.5	2.6— 3.7	3.3	381
Length of M_2	3.0— 3.3	2.8— 3.5	3.2	263
Length of M_3	1.6— 2.2	1.4— 2.3	1.8	103
Width of M_3	1.7— 2.4	1.5— 2.6	2.0	

B. Measurements of the upper jaws and their dentition in adult individuals (in mm)

Diasteme	22.0—26.0	—	—	6
Length of P^2—M^3	15.0—16.5	—	15.8	24
Length of P^2	1.5— 2.0	1.4— 2.1	1.8	50
Width of P^2	3.5— 4.0	3.2— 4.2	3.6	
Length of P^3	2.4— 3.1	2.4— 3.4	3.0	66
Width of P^3	4.8— 5.5	4.6— 5.6	5.2	
Length of P^4	2.8— 3.0	2.6— 3.4	3.0	169
Length of M^1	2.5— 3.2	2.4— 3.5	2.9	262
Length of M^2	2.3— 2.8	2.3— 3.0	2.7	311
Length of M^3	1.0— 1.2	0.9— 1.3	1.2	77
Width of M^3	1.7— 2.0	1.6— 2.0	1.8	

brachygnathus Kormos (Kormos, 1934*b*). The latter species, besides the localities, mentioned in Table 1 (p. 153), also occurs in younger faunas of the South-Eastern, Central and Western Europe (Hungary: Villány 3, 5, 6, 7, 8; Nagyharsány 2, 4; Beremend 1, 4, 5; Betfia near Nagyvárad; Rumania: Episcopia (Püspökfürdö); Yugoslavia: Podumci; Czechoslovakia: Stranská Skala; the Netherlands: Tegelen Beds; Poland: Kadzielnia near Kielce, Kamyk near Kłobuck).

The remains of the hare from Węże 1 are — in respect to dimensions as well as a morphology of dentition and jaws — identical with the specimens, described by Kormos (1934*b*), Kretzoi (1941*a*, 1954, 1956), Schreuder (1937), Kowalski (1958*a*, 1958*b*), Heller (1958), Dehm (1962), and others. The specimens from comparative collections, belonging to the two species, *H. brachygnathus* Kormos (from Betfia near Nagyvárad; Pl. II, fig. 1) and *H. beremendensis* (Petényi) (from Beremend — 5; Pl. II, fig. 2) do not differ by their dimensions and morphology of dentition. Insignificant deviations recorded in the structure of P_3 constitute an only difference. In the former, the lingual edge of the premolar is rounded up, while in the latter, it is sharper. The deviation of this type can be often observed in the material from Węże 1 not only in various specimens of P_3, but also separately in each premolar. A similar phenomenon occurs in the P_3 specimens, described on the basis of the material from Ivanovce near Trenčin (Fejfar, 1961 *c*, fig. 2*i*; fig. 6 *a*, *d*).

It has been shown by the observations of the structure of P_3 in the Węże 1 material (this applies to adult individuals) that both the angle, formed by the lingual walls of the crown and the trace of the band of enamel are variable, this fact resulting from both the ontogenetic development and individual variability. The angle in question is almost right, sometimes acute but never obtuse. These changes come forward more distinctly during the observation of the rooty part of P_3.

Serial sections were made from some P_3. It appeared from them that this angle, acute in the rooty part of a tooth, gradually becomes right and the lingual edge of the crown, otherwise sharp, becomes rounded. At the same time, the structure of the enamel band of the lowermost parts of a tooth is identical with that, recorded in *Pliolagus beremendensis* Kormos, while that of the upper parts is like in a typical *Hypolagus brachygnathus* Kormos.

In the description of *Pliolagus beremendensis* Kormos from Villány, Kormos maintains that two reentrant folds or depressions, filled out with cement, occur on the labial side of the P_3 crown and an additional reentrant fold situated opposite the posterior labial reentrant fold, occurs on the lingual side. The crown of P_3 is sharply outlined. These teeth were illustrated by Kretzoi together with another representative of this genus, *P. tothi* Kretzoi (Kretzoi, 1941*b*, fig. 6), coming from Betfia near Nagyvárad. Both species (described by Kormos and Kretzoi) do not prove the presence of the lingual reentrant fold in the structure of P_3. In the descriptions of the species, mentioned above, there are no measurements and in the drawings — no scale or magnification. In Kretzoi's opinion, *P. tothi* Kretzoi differs from *P. beremendensis* Kormos by somewhat smaller dimensions. A specimen related to *P. tothi* Kretzoi, from the early Pleistocene at Kadzielnia near Kielce, was also described by Kowalski (1958*a*). The measurements of these specimens are represented by some-

what higher figures than those of young individuals of *Hypolagus brachygnathus* Kormos from Węże 1.

To recapitulate, the differences in the structure of P_3, occurring between *H. brachygnathus* Kormos and both species of *Pliolagus* Kormos should be considered as connected with the individual variability and the ontogenetic development of the specimens investigated. At the same time, these characters are insufficient, at least in the case of the representatives of *Pliolagus* Kormos, discussed in the present paper, to erect a new genus. *P. beremendensis* Kormos and *P. tothi* Kretzoi are, therefore, assigned to the genus *Hypolagus* Dice. An attribution of the specimens discussed to *H. brachygnathus* Kormos is, without a revision of original materials from Betfia and Beremend — 5, impossible.

Hypolagus brachygnathus Kormos has recently been described on the basis of materials, found at Schernfeld near Eichstätt (Dehm, 1962) and at Ivanovce near Trenčin (Fejfar, 1961c) (as *Hypolagus* sp.).

In addition, two species of the same genus, *H. schreuderi* Teilhard de Chardin and *H. brachypus* Young (Young, 1927, 1935; Teilhard de Chardin & Young, 1931; Teilhard de Chardin, 1940; Bohlin, 1942*b*), were described from Eastern Asia. These species, coming from the early-Pleistocene faunas of Northern China (Huai-yü near Mentoukou 18 in the neighbourhood of Peking, Shansi), besides larger dimensions of teeth and lower jaws, differ from *H. brachygnathus* Kormos by the morphology of the P_3, since this tooth has a narrowed anterior part of the crown and a slightly marked niche, situated on the antero-lingual side of the crown.

Order **Rodentia** Bowdich, 1821
Family **Sciuridae** Gray, 1821
Subfamily **Sciurinae** Baird, 1857
Genus *Sciurus* Linnaeus, 1758
Sciurus warthae n.sp.
(Pl. III, fig. 1-4; text-fig. 3)

Type specimen: The right lower jaw with $P_4 - M_3$ (alveoles) and an incisor. M. Z. Cat. No. VIII/Vm-322/1 (Pl. III. fig. 4 a-c; text-fig. 3).

Derivation of name: warthae — for the Warta River in the neighbourhood of the locality at Węże 1.

Material. — Besides the type specimen, a dozen or so detached premolars and molars of both upper and lower jaws, a few fragments of lower jaws without teeth, as well as numerous detached incisors.

Diagnosis. — Dental formula, $\frac{1\ 0\ 2\ 3}{1\ 0\ 1\ 3} = 22$. The species is larger than *Sciurus vulgaris* Linnaeus. Lower incisor, conspicuously bent and broad. Diasteme short. Cusps of molars large, solid. P_4 two-rooted, M_3 four-rooted. The mesoconid on molars slight. The metastylid, as a rule, absent.

Description. — The lower incisor sharply bent, wide and with the antero-posterior diameter identical with that in *Sciurus vulgaris* L. and the transverse diameter — larger. P_4 two-rooted and with a small paraconid. The remaining cusps large and solid. The anterior root of P_4 large, round in cross section, the posterior root flattened along the antero- posterior axis and broad. Roots long. M_1 and M_2 identical in size, with their mesoconid slightly marked and not connected with the protoconid and hypoconid by any longitudinal crest. The metastylid as a rule lacking, or — in a few specimens — very slightly marked. Central fields of crowns, smooth. The antero-labial reentrant fold, slightly marked. Teeth have four roots. M_3 has a typically sciuroid structure of the crown and is of a four-rooted type. A tiny, considerably reduced, intermediate root is placed between the antero-lingual and posterior root. The posterior root large, sharply bent backwards. The horizontal ramus of the jaw below M_1 is high and has a well-developed, although not very high, masseteric crest. The vertex of these crests is located on the boundary with the posterior root of P_4. The large mental foramen is situated high in the middle of the length of the diasteme. The symphysis of the jaw is broad and large. The anterior edge of the ascending ramus is on the boundary between M_2 and M_3. The angular process is relatively broad and lingually notched.

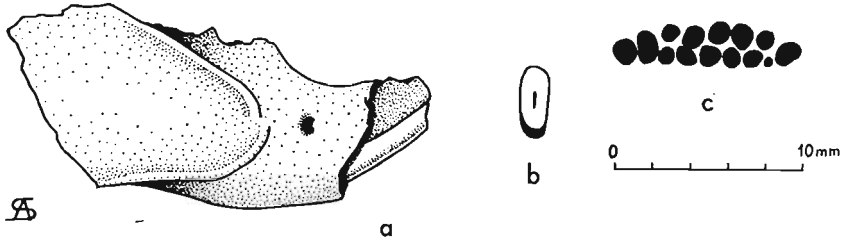

Fig. 3. — *Sciurus warthae* n.sp.; Węże 1. Right lower jaw: *a* labial view, *b* cross section of lower incisor, *c* alveoles-row; type specimen (M.Z. No. VIII/Vm-322/1).

A poor preservation of upper jaws and skulls does not allow the author to present the details of their structure. The structure of the upper dentition is of the same type as in *Sciurus vulgaris* Linnaeus, except for cusps which are large and solid. P^4 and the remaining teeth are three-rooted. A strong parastyle of P^4 is not connected with the protocone. There is no cusp between the parastyle and the paracone. The mesostyle is clearly outlined and large. The protoloph is interrupted and slightly connected with the protocone. The metaloph reaches the protocone. The posterior cingulum is well developed. M^1 and M^2 are square in shape with a strong parastyle and a well developed mesostyle. M^3 is trapezoid in outline with a well developed parastyle and marginal cin-

gulum, particularly in the posterior part of the crown. The central fields of the premolars and molars are smooth.

Measurements of the lower jaws and their dentition and of the upper dentition are given in Table 4.

Table 4

Sciurus warthae n. sp.

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-322 Jaws with teeth			Detached teeth	Average	Number of specimens
Height below M_1		8.0—8.2	—	—	2
Thickness below M_1		3,0—3.1	—	—	2
Diasteme		5.5—5.6	—	—	2
Antero-posterior diameter of incisor		4.0	3.0—4.0	4.0	12
Transverse diameter of incisor		1.8	1.8—2.0	1.8	12
Length of	P_4—M_3	9,5*	—	—	2
Length of	M_1—M_3	7.5*	—	—	2
Length	P_4	2.3—2.4*	2.2—2.4	2.2	7
Width		2.3—2.5*	2.2—2.5	2.3	
Length	M_1	2.3—2.4*	2.2—2.5	2.4	12
Width		2.6—2.7*	2.4—2.7	2.5	
Length	M_2	2.5—2.6*	2.3—2.6	2.4	15
Width		2.7*	2.6—2.8	2.6	
Length	M_3	3.0—3.1*	2.8—3.2	3.0	6
Width		2.5*	2.3—2.7	2.5	

* Measured along the alveoles.

B. Measurements of the upper dentition (in mm)

M. Z. Cat. No. VIII/Vm-322		Detached teeth	Average	Number of specimens
Length	P^4	2.6—2.8	2.6	3
Width		2.6—2.7	2.7	
Length	M^1	2.2—2.6	2.6	14
Width		2.5—2.8	2.7	
Length	M^2	2.3—3.0	2.8	9
Width		2.6—3.0	2.9	
Length	M^3	2.8—3.2	3.0	4
Width		2.8—3.2	3.0	

Discussion. — It appears from the structure of the upper and lower molars and the lower incisors that the remains from Węże 1 belong to the genus *Sciurus* Linnaeus. These specimens differ from *Sciurus vulgaris* Linnaeus by greater dimensions of their jaws and teeth, by large, solid cusps on their molars, by the presence of the fourth root in M_3 and by a pronouncedly shorter diasteme.

Several detached lower and upper molars of a comparatively large squirrel were found at Schernfeld near Eichstätt, recorded as the Sciuridae C (Dehm, 1962, Pl. 6, fig. 5,6). Of this number, only the upper teeth were similar in size and structure to the corresponding teeth of *Sciurus warthae* n.sp. The remaining were much larger and considerably differed by the structure of their crowns.

The teeth, similar by a strong development of the cusps, are also observed in *Sciurus spermophilinus* Depéret, from the Upper Miocene of La Grive Saint-Alban (Depéret, 1892, Pl. 1, fig. 26, 27-27a). This species is, however, much smaller and differs by the distribution of the cusps and by the well developed mesoconid and metastylid.

The remains of squirrels occur in the late Pliocene and the early Pleistocene of Europe. They are, however, rare and fragmentary, being recorded only as *Sciurus* sp. Thus, for instance, only a few lower jaws without teeth were found and described at Sackdillinger Höhle (Heller, 1930*a*, 1933*a*; Brunner, 1934), at Gundersheim, only the tibia was described (Heller, 1936), at Betfia near Nagyvárad — detached incisors (Kretzoi, 1941*a*) and, at Schernfeld — isolated molars, both upper and lower (Dehm, 1962).

Sciurus whitei Hinton from the early Pleistocene of England (Hinton, 1914) is the only form identified at the specific level. Its description is based on a single P^4. A much too scanty material and insufficient data on this species do not allow for any closer comparisons with the specimens from Węże 1. Only the differences in the distribution of cusps, the underdeveloped mesostyle and different trace of the metaloph can be stated.

Subfamily **Marmotinae** Pocock, 1923

Genus *Eutamias* Trouessart, 1880

Eutamias orlovi n.sp.

(Pl. III, fig. 5-8; text-fig. 4)

Type specimen: The right lower jaw with the P_4 — M_3 without an incisor and articular processes. M.Z.Cat.No.VIII/Vm-323/1 (Pl. III, fig. 5; text-fig. 4—2).

Derivation of name: orlovi — in honour of Professor J. A. Orlov, an eminent Soviet palaeontologist of Moscow.

Material. — In addition to the type specimen, several other lower jaws with various numbers of teeth, numerous detached premolars,

molars and incisors from both jaws. Besides, a few fragments of upper jaws with molars, probably belonging to this species.

Diagnosis. — Dental formula: $\frac{1\ 0\ \dot{2}\ 3}{1\ 0\ 1\ 3} = 22$. Sciuroid type of the dentition. P_4 with a well developed paraconid. The metastylid distinctly visible, isolated. The mesoconid in the form of a small spur on a longitudinal crest. Between the protoconid and the anterior cingulum — a reentrant fold, dividing the "paraconid" from the protoconid. The diasteme short. The angular process considerably depressed on the lingual side.

Description. — The lower jaw is small and delicate. The diasteme short. The well developed paraconid placed symmetrically between the protoconid and the metaconid of P_4. The mesoconid clearly visible in the form of a small spur. The metastylid is only rarely connected with the metaconid. The hypo- and entoconid are connected by a clearly visible transverse crest. The central field of the crown is smooth. P_4 two-rooted. M_1 and M_2 of identical structure, differing only in size. The mesoconid and metastylid in the latter teeth are well developed. A lophid, unconnected with the crest, running from the metaconid, stretches from the protoconid to the anterior part of the crown. In the case of a more intensive abrasion of the crowns, a labial reentrant fold, dividing the protoconid from the anterior cingulum ("paraconid"), is formed in this place. The central fields of the crowns are smooth. M_1 and M_2 with four roots each. The postero-labial edge of the M_3 crown is strongly truncated. The proto-, hypo- and mesoconid identically developed as in M_1 and M_2. The entoconid — in the form of a ridge, running towards the metastylid (in

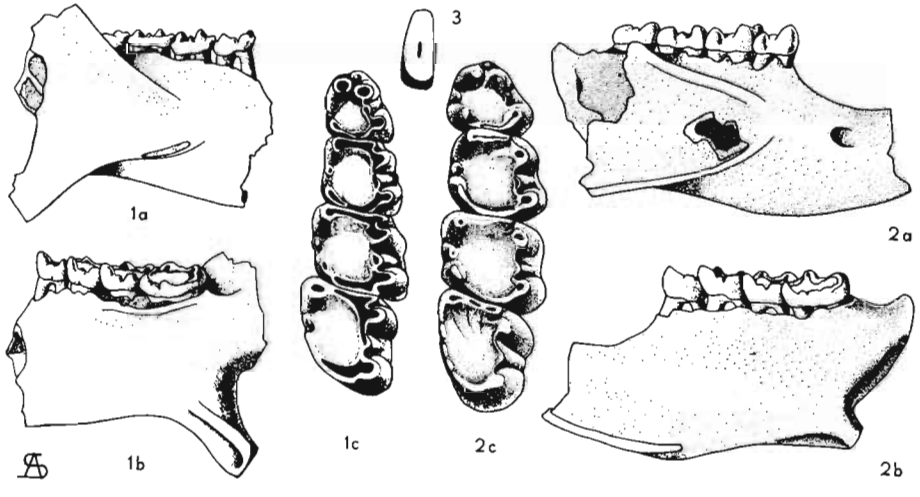

Fig. 4. — *Eutamias orlovi* n.sp.; Węże 1. *1* Right lower jaw: *a* labial view, *b* lingual view, *c* occlusal view of P_4 — M_3 (M.Z. No. VIII/Vm-323/2); fig. *1a*-*b* ca. × 4, fig. *1c* ca. × 7.5. *2* Right lower jaw: *a* labial view, *b* lingual view, *c* occlusal view of P_4 — M_3; type specimen (M.Z. No. VIII/Vm-323/1); fig. *2a*-*b* ca. × 4, fig. *2c* ca. × 7.5. *3* Cross section of lower incisor; ca. × 4.

young individuals, this ridge is formed by serially distributed small cusps). M_3 is the largest of all molars and, as a rule, has three roots. In a few specimens, there is the additional, fourth root, reduced, small and short.

The anterior cusp of P^4 (parastyle), unconnected with the protocone, is large and with an elongated crest, almost reaching the base of the protocone. The para- and protocone are connected by a strong protoloph on which a small protoconule can be seen. The meta- and protocone are also connected by the metaloph on which there is a well developed metaconule. The protocone is high, undivided and its posterior branch reaches, through the posterior cingulum, the base of the metacone. A distinct mesostyle is situated between the para- and metacone. The P^4 crown is subtriangular in shape. The M^1 and M^2 crowns are U-shaped, with well developed cusps. In these teeth, the protocone does not show any bipartition. The parastyle is less prominent than in P^4 and an additional loph sometimes branches off the protocone and extends to the central field of the crown. Besides, in many specimens the metaloph is broken. Several detached M^3, probably belonging to the species described here, also have a poorly developed parastyle and strong para- and metacone. The metacone forms a high ridge. There is no metaloph. The M^3 crown is trapezoidal in shape. All upper teeth, except for P^1, are three-rooted.

Measurements of the lower and upper jaws and their dentition are given in Table 5.

Table 5

Eutamias orlovi n. sp.

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-323 Jaws with teeth				Detached teeth	Average	Number of specimens
Height below M_1		4.6*	4.2—4.4	—	4.4	5
Thickness below M_1		2.3	2.2—2.4	—	2.3	5
Diasteme		4.8	5.0	—	—	4
Length of P_4—M_3		6.4	5.9	—	—	3
Length of M_1—M_3		5.1	4.6—4.8	—	4.8	3
Length	P_4	1.3	1.25	1.1—1.4	1.2	6
Width		1.5	1.2	1.2—1.6	1.4	
Length	M_1	1.5	1.3—1.4	1.3—1.5	1.4	13
Width		1.8	1.4—1.6	1.4—1.8	1.5	
Length	M_2	1.6	1.4—1.5	1.3—1.7	1.5	15
Width		1.9	1.7—1.8	1.6—2.0	1.8	
Length	M_3	2.1	1.8—1.9	1.8—2.2	2.0	7
Width		1.8	1.7	1.6—1.9	1.7	

B. Measurements of the upper jaws and their dentition (in mm)

Length of P^4 —M^1		2.9	—	—	1
Length of M^1 —M^2		3.2	—	—	2
Length	P^4	1.3	1.2—1.3	1.3	6
Width		1.5	1.4—1.5	1.5	
Length	M^1	1.5—1.6	1.4—1.7	1.6	8
Width		2.0—2.1	1.8—2.1	2.0	
Length	M^2	1.6	1.5—1.8	1.7	8
Width		2.0	1.8—2.1	2.0	
Length	M^3	—	1.5—1.9	1.7	3
Width		—	1.7—2.1	1.9	

* Type specimen.

Discussion. — The characteristic structure of the teeth of the small rodent from Węże 1, described above, speaks for its attribution to the Sciuridae Gray. At the same time, small dimensions of its teeth and jaws allow one to assign it to the genus *Eutamias* Trouessart, characterized by a peculiar structure of the anterior part of the molar crowns.

The Recent North Asian *Eutamias sibiricus* Laxmann seems to be closely related to the new species, described here. It differs, however, by smaller dimensions of teeth and jaws, more triangular shape of its upper molars, particularly of M^1 and M^2 (this is connected with an intensive development of the parastyle on these teeth), by a different structure of M^3, by a more rhomboidal outline of the crowns of the lower molars and by poorly developed intermediate cusps, i.e. the metastylid, mesoconid and mesostyle. In addition, the para- and metacone on P^4 and M^2, as well as the paraconid on P_4 are, in Recent species, much less developed.

Of the fossil species, a particularly noteworthy is a small sciurid, *Tamias wimani* Young[1], described from the late Pliocene or the early Pleistocene of Choukoutien (Loc. 1,2) (Young, 1927, Pl. 1, fig. 1-3; 1932, Pl. 1, fig. 1-1c; 1934, Pl. 4, fig. 3,4; Bohlin, 1946, fig. 1 B,D,E and others). *Eutamias orlovi* n.sp. differs from this species in having more delicate and not so high jaws (the height, below M_1—M_3, amounts to 5.0—5.5 mm in the former and 4.2—4.6 mm in the latter species), well developed para-, ento- and metaconid on P_4, clearly visible metastylid and mesoconid on P_4 — M_2, as well as the masseteric crests, shifted forward. The similarities are recorded in the dimensions of teeth and in the structure of the upper dentition. In both species, the parastyle is weaker than in *E. sibiricus* Laxmann. Hence, their M^1 and M^2 crowns are U-shaped.

[1] In my opinion this species should be assigned to *Eutamias* Trouessart.

The remains of another small sciurid, *Sciurotamias precox* Teilhard de Chardin (Teilhard de Chardin, 1940, Pl. 1, fig. 6, text-fig. 31) were described from the late Pliocene of Choukoutien (Locality 12) and of Huei yü near Mentoukou in the neighbourhood of Peking (Locality 18). The structure of its upper dentition is similar to that in *Eutamias orlovi* n.sp. and *E. wimani* (Young). This is expressed by the presence of the mesostyle, the well developed meta- and protoconules and relatively weak parastyle on M^1 and M^2. It differs from the new species by larger dimensions of jaws and teeth in having different structure of the lower dentition and particularly in the absence of the metastylid from all teeth, in the mesoconid connected with the hypoconid and in the absence of the paraconid from the P_4.

The genus *Eutamias* Trouessart thus far has not been recorded in a fossil state in Central Europe. Its first remains were described from Csarnóta 2 in Hungary as *Eutamias* n.sp. (Kretzoi, 1959). However, the lack of closer descriptions and illustrations of these remains does not allow one to compare them with *E. orlovi* n.sp.

Detached molars of a similar sciurid found at Schernfeld near Eichstätt, were described as the Sciuridae A (Dehm, 1962, Pl. 6, fig. 1-2). A P_4, presented there, is 1.75 mm long and 1.7 mm broad and M^3 — 2.0 mm long and 2.35 mm broad. They are, therefore, larger than the respective teeth from Węże 1. Morphologically, only P_4 could correspond with the Węże 1 specimens since its cusps are well developed. However, the metastylid is larger and mesoconid smaller.

The Recent representatives of the genus under study inhabit the regions of the northern part of Asia, ranging from the European part of the USSR to the Sea of Okhotsk in the east and to the highland Dauro-Mongolian regions in the south. They are forest forms. Some of them also live in rocky crevices and in shallow caves. *Eutamias orlovi* n.sp., *E. wimani* (Young) and *Eutamias* n.sp. (Kretzoi, 1959) from Csarnóta 2 provide evidence on considerable extent of the geographical range of this group in Pliocene and Pleistocene.

Subfamily **Petauristinae** Simpson, 1945
Genus *Pliosciuropterus* n.gen.

Type species: Pliosciuropterus dehneli n.sp.

Derivation of name: Pliosciuropterus — Gr. *pleion* = more, plus *Sciuropterus* in this case — a Pliocene large "flying squirrel".

Diagnosis. — Dental formula: $\frac{1\,0\,2\,3}{1\,0\,1\,3} = 22$. P_4 without the paraconid with 2 or 3 roots. M_3 strongly elongated antero-posteriorly, uniformly broad or tapering backwards, four-rooted. The mesoconid of P_4 — M_3 well developed in the form of a large labial spur. The metastylid on P_4 — M_2 slightly marked, often connected with the metaconid. M_3 without the

Table 6

Differences between the genera *Pliosciuropterus* n. gen., *Pteromys* G. Cuvier, *Petaurista* Link and *Petauria* Dehm

A. Lower dentition

Features	*Pliosciuropterus* n. gen.	*Pteromys* G. Cuvier (*Sciuropterus* F. Cuvier)	*Petaurista* Link	*Petauria* Dehm
Paraconid of P_4	lacking	small	small, connected with the protoconid	?
Mesoconid	on P_4—M_3 large, in the form of a labial spur	on M_1—M_3 very slightly marked	on P_4—M_3 well developed	on P_4—M_3 lacking
Metastylid	on P_4—M_2 small, connected with the metaconid; on M_3 lacking	on P_4—M_3 slightly marked	on P_4—M_3 as a "metaconid-metastylid chaos,,*	on P_4—M_3 weakly developed
Postflexid on P_4—M_3	distinct	lacking	lacking or slightly marked	slightly marked
Posterolophid and hypolophid on P_4—M_2	underdeveloped	well developed	strongly developed	weakly developed
Grinding surface of the trigonid and talonid	smooth	slightly crenulated	strongly folded (additional lophids and fossetids without the cement)	the field of trigonid consisting of additional lophids; the field of talonid less complex
Length/width ratio of M_3	1.6—1.8	1.2—1.3	1.4—1.5	1.5
Entoconid	on P_4—M_2 connected with the posterior cingulum; on M_3 connected, through the hypolophid, with the hypoconid,	same as in *Pliosciuropterus* n. gen.	on P_4—M_3 connected, through the hypolophid, with the hypoconid	same as in *Petaurista* Link
Lower incisors	broad, with oval -triangular cross section	strongly flattened laterally	broad, triangular	?

B. Upper dentition

Mesostyle	on P^4 large, on M^{1-3} lacking	on P^4—M^3 small	on P^4 small, on M^{1-3} lacking or weak	on $M^{1(2)}$ weak
Posterior cingulum=posteroloph	on P^4—M^2 lacking; on M^3 present	on P^4—M^3 present, weakly developed	on P^4—M^3 present, closes the postfossettas	on $M^{1(2)}$ present
Metaloph	on P^4—M^2 present, on M^3 lacking	on P^4—M^3 present, on M^3 well developed	on P^4—M^3 present, on M^3 well developed	on $M^{1(2)}$ present
Metaconule and metalophules	well developed	weakly developed	well developed	on $M^{1(2)}$ lacking
Postmetacone flexus	well developed, slightly open	weak, closed	well developed, closed	on $M^{1(2)}$ lacking
Postero-medial diagonal flexus	well developed, open	weak, closed	well developed, closed	on $M^{1(2)}$ lacking
Postero-lingual diagonal flexus	well developed, open	weakly developed, closed	well developed, open	on $M^{1(2)}$ lacking
Connection of paracone with protocone of P^4	lacking	present	present	?
Size ratio of P^3 to P^4	ca. 2/1	ca. 4—5/1	ca. 6—7/1	?
Size of P^4 as compared to M^{1-3}	of equal sizes	smaller	larger	?
Upper incisors	broad, with oval-triangular cross section, without longitudinal groove	fairly broad, without longitudinal groove	broad, solid, without longitudinal groove	?

* After Mc Kenna, 1962, p. 29.

metastylid, with a large, cuspy entoconid which is connected with the anterior branch of the hypoconid by a narrow and straight hypolophid, and with the posterolophid strongly developed in the form of a crested protuberance. Central fields of the crowns of P_4 — M_2 without or with poor, underdeveloped proto- and hypolophids. P_4 — M_3 with distinctly visible postflexid. Lower and upper incisors broad, with an oval-triangular cross section and without a longitudinal groove. The lower masseteric crest, high and sharp or low and poorly developed. The posterior edge of the anterior root of the jugal arch — on the boundary between P^4

and M^1. P^3 almost two times smaller than P^4. P^4 — M^2 with open posterior folds, postmetacone flexus, postero-medial diagonal flexus and postero-lingual diagonal flexus. P^4 — M^3 without the hypocone. In P^4 — M^2 the posterior cingulum lacking. The parastyle of P^4 strong, cuspy and, in M^1 — M^3, in the form of a narrow crest, connected with the anterior cingulum (by the anteroloph). M^3 with a poorly developed paracone and ridge-like metacone, without metaloph. M^1 — M^3 without the mesostyle and additional internal lophs. P^4 triangular in shape, M^{1-2} square and M^3 trapezoidal.

Discussion. — *Pliosciuropterus* n.gen. is erected to include two new species: *P. schaubi* n.sp. from Węże 1 and *P. dehneli* n.sp. from Węże 2.

The new genus can be compared with Recent and fossil genera, *Pteromys* G. Cuvier (*Sciuropterus* F. Cuvier), *Petaurista* Link and *Petauria* Dehm.

The differences between the genera, compared here, are presented in Table 6.

In addition, the species of the genus *Pliosciuropterus* n.gen. differ from those, mentioned in Table 6, by the dimensions of teeth in lower jaws and by the structure of the latter. The representatives of the genus *Petaurista* Link, as well as *Petauria helleri* Dehm are conspicuously larger than the species of *Pliosciuropterus* n.gen., while many species of the genus *Pteromys* G. Cuvier (*Sciuropterus* F. Cuvier) are approximately equal in dimensions.

Pliosciuropterus dehneli n.sp.

(Pl. IV; text-fig. 5,6,7 — *2a-d*; 8 — *2a-c*)

Type specimen. The right-side fragment of the upper jaw with P^1 — M^1 and with the alveoles of P^3 and M^2. Z.Pal.Cat. No. VM/I-1. (Pl. IV, fig. 8).

Derivation of name: dehneli — in honour of the late Professor August Dehnel, an eminent Polish zoologist.

Type horizon and locality: Węże 2 near Działoszyn. The layer E_5. Pliocene.

Material. — Besides the type specimen, two left-side fragments of upper jaws with M^1 or M^2, 17 left and right-side fragments of lower jaws with various numbers of teeth, over 250 detached premolars and molars, and numerous incisors from both lower and upper jaws.

Diagnosis. — P_4 with 3 roots. M_3 with the talonid tapering posteriorly. The lower masseteric crest high and sharp. The metastylid of P_4 — M_2, small and connected with the metaconid. Central fields of the P_4 — M_2 crowns with weak and underdeveloped proto- and hypolophids. The mental foramen large, just in front of the anterior root of P_4. P^4 — M^2 with open posterior reentrant folds: the postmetacone flexus, postero-medial diagonal flexus and postero-lingual diagonal flexus. M^3 without the metaloph.

Description. — Upper jaws and dentition. The posterior edge of the anterior root of the jugal arch in the type specimen (Pl. IV, fig. 8) is placed on the boundary between P^4 and M^1. In the remaining specimens, this character is relatively permanent. A small process occurs in front of P^3. P^3 is almost two times smaller than P^4. Premolars and molars are brachydont with low crests and cusps. P^4 is three-rooted, with strongly developed parastyle and short anterior cingulum. Between the parastyle

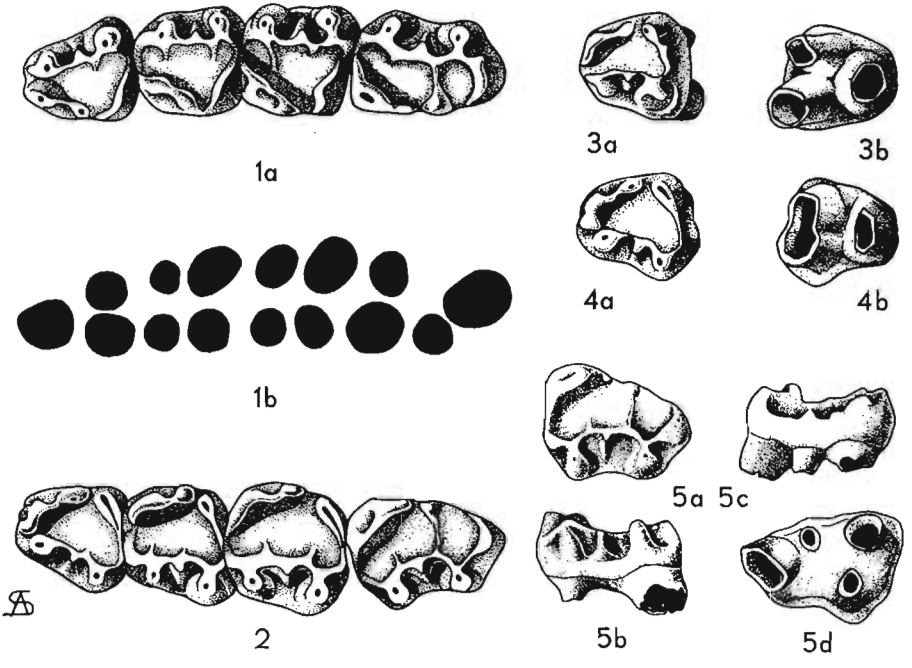

Fig. 5. — *Pliosciuropterus dehneli* n.gen., n.sp.; Węże 2. *1* Right P_4 — M_3: *a* occlusal view, *b* alveoles-row (Z.Pal.VM/I-15); *2* Left P_4 — M_3, occlusal view (Z.Pal.VM/I-16); *3* Left P_4: *a* occlusal view, *b* root view (Z.Pal.VM/I-25); *4* Left P_4: *a* occlusal view, *b* root view (Z.Pal.VM/I-25); *5* Left M_3: *a* occlusal view, *b* labial view, *c* lingual view, *d* root view (Z.Pal. VM/I-25); ca. × 6.

and the paracone, sometimes, there is a small cusp and between the para- and the metacone — a conspicuous mesostyle. The anterior branch of the protocone is not connected with the parastyle. The paracone is separated from the protocone by a deep valley. The protocone is connected with the metacone by a narrow and irregular metaloph. Between the posterior crest of the protocone and the metaconule, there is the open lingual reentrant fold (the postero-lingual diagonal flexus) and between the metaconule and metacone — the medial posterior reentrant fold (the postero-medial diagonal flexus). Behind the metacone, a small postero-labial reentrant fold (the postmetacone flexus) can also be observed. Besides, the hypocone and posterior cingulum are missing from P^4. M^1 and M^2 three-rooted with a narrow parastyle, separated from the anterior protocone crest by a depression. The paracone on these teeth is large,

cuspy and connected with the protocone by a narrow protoloph. On the protoloph, there is a well developed protoconule. The metacone is here connected with the protocone by an irregular metaloph. Between the metacone and the metaconule, there occurs the medial reentrant fold and, between the metaconule and the posterior protocone crest, the

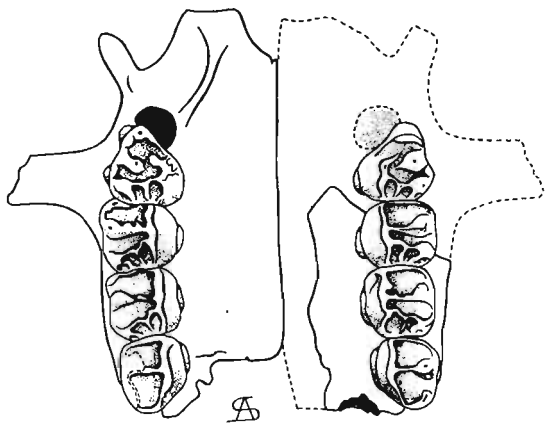

Fig. 6. — *Pliosciuropterus dehneli* n.gen., n.sp.; Węże 2. The restoration of palatal parts of the skull and the arrangement of upper teeth; ca. × 4.

postero-lingual reentrant fold. Similarly to P^4, behind the metacone, there is a small postero-labial reentrant fold. The mesostyle is as a rule absent from M^1 and M^2. M^3 three-rooted, with a distinct parastyle which is narrow and slightly connected with the anterior protocone crest. The paracone is connected with the protocone by a straight protoloph and the posterior protocone crest passes into the posterior cingulum. There is no metaloph on this tooth and the metacone occurs in the form of a swollen terminal part of the posterior cingulum. The M^3 crown is trapezoidal in outline.

Lower jaws and dentition. Premolars and molars, like those in the upper jaw, are brachydont. P_4 is three-rooted, but its two specimens have only two roots. The premolar is without the paraconid and the protoconid and hypoconid are connected by a strong and high longitudinal crest. On all teeth, the mesoconid on this crest is in the form of a labial spur. On P_4 — M_2, the metastylid is weakly developed and, as a rule, connected to the metaconid. Two short, underdeveloped lophids, that is, protolophid and hypolophid (the latter being well developed only on M_3 where it is connected to the entoconid) grow out of the longitudinal crest on all teeth and are directed towards the central fields of the crowns. M_3, strongly elongated antero-posteriorly, with the talonid tapering backwards. There is no metastylid on this tooth. In M_3 posterolophid is shaped like a strongly developed crest-like cusp. On all molars, a small postflexid can be observed behind the hypoconid.

The lower incisor is broad and oval-triangular in cross section. The enamel band is convex. The lower jaw has a short diasteme, broad symphysis and high, sharp masseteric crest. The mental foramen is near the anterior P_4 root. The distal end of the incisor reaches the dental foramen or even higher and does not form a process or a cusp on the external surface of the ascending ramus. The angular process is bent downwards and is lingually deeply concave.

Measurements of the type specimen: the length of P^3 — M^3 (measured along the alveoles), 11.3 mm, the length and width of P^4, 2.7 and 2.5 mm resp., of M^1, 2.6 and 2.5 resp. The dimensions of the remaining specimens are given in Table 7.

Discussion. — The presence of numerous bone remains of a large "flying squirrel" has been revealed in the course of studies on the fauna from Węże 2. A careful analysis of its dentition has shown a close resemblance to a squirrel, occurring at Węże 1.

Pliosciuropterus dehneli n.sp. from Węże 2 differs from the related species *P. schaubi* n.sp. from Węże 1 in the structure of M_3, that is, in having the talonid more tapering backwards, in better development of the hypolophid and poorer development of the entoconid and posterolophid; P_4 differs in having three roots. Its lower jaw has a longer diasteme,

Table 7

Pliosciuropterus dehneli n. sp.

A. Measurements of the lower jaws and their dentition (in mm)

Z. Pal. Cat. No. VM/I Jaws with teeth			Modal value	Number of specimens
Length of P_4—M_3		10.5—11.1	11.0	12
Length of P_4—M_2		7.0— 9.0	8.0	14
Length of M_1—M_3		8.0— 9.0	8.0	12
Length	P_4	2.3— 2.7	2.4	17
Width		2.0— 2.5	2.2	
Length	M_1	2.3— 2.8	2.5	48
Width		2.3— 2.7	2.4	
Length	M_2	2.4— 2.8	2.6	54
Width		2.4— 2.8	2.7	
Length	M_3	3.0— 3.9	3.8	26
Width		2.2— 2.6	2.5	
Height below M_1		7.3— 7.8	7.5	17
Thickness below M_1		3.0— 3.5	3.3	17
Diasteme		5.0— 5.2	—	4

B. Measurements of the upper dentition (in mm)

Length of P^3—M^3		11.1*	—	1
Length of P^4—M^3		10.9*	—	1
Length of M^1—M^3		8.0*	—	1
Length	P^3	1.3—1.5	—	3
Width		1.3—1.5	—	
Length	P^4	2.5—2.8	2.6	20
Width		2.4—2.7	2.6	
Length	M^1	2.2—2.6	2.5	42
Width		2.4—2.6	2.6	
Length	M^2	2.4—2.6	2.6	48
Width		2.4—2.7	2.6	
Length	M^3	2.6—2.8	2.6	16
Width		2.3—2.5	2.4	

* Measured along the alveoles.

a large mental foramen, situated near P_4 and in front of it, a high and sharp masseteric crest and narrower lower incisors.

The specific tooth structure and the size of lower jaw show the close resemblance of *Pliosciuropterus dehneli* n.sp. to the Euroasian Recent and fossil species, of the genera *Pteromys G.* Cuvier (*Sciuropterus* F. Cuvier) and *Petaurista* Link. Of the fossil species of this group, particularly noteworthy are *Sciuropterus pliocaenicus* Depéret, described from the Pliocene Roussillon fauna (Depéret, 1890) and *Sc. jourdani* Gaillard from the Miocene La Grive Saint-Alban fauna (Gaillard, 1899), while of the Recent Euroasian ones, *Pteromys volans* Linnaeus. The former is mentioned when discussing *Pliosciuropterus schaubi* n.sp. (see page 180). *Sciuropterus jourdani* Gaillard (considered by Mein, 1958, and James, 1963, to be a synonym of *Sc. albanensis* F. Major) is characterized by its antero-posteriorly elongated M_3, by a short and laterally convex lower incisor, by a high lower masseteric crest, and by additional lophids in the central fields of molars. Its upper jaw is characterized by a more complex morphology of the lophs, particularly on M^3, the presence of a clearly visible mesostyle on M^1—M^2, the additional lophs in the anterior valley of P^4 — M^3, P^3 almost 4—5 times smaller than P^4, and the shape of P^4 and M^3. If the characters of the lower jaw and lower dentition in this species might be to a certain extent similar to those of *Pliosciuropterus dehneli* n.sp., the characters of the upper dentition allow one for a complete distinction of these two forms.

Besides the representatives of the genus *Sciuropteurs* F. Cuvier, discussed above, there are other Miocene and Pliocene species of this

genus with similar morphology. These are, European *Sciuropterus lappi* Mein (Mein, 1958), *Sc. sansaniensis* Lartet and *Sc. gaudryi* Gaillard (Gaillard, 1899), *Sc. albanensis* F. Major (F. Major, 1893; Stromer, 1928; Villalta Comela, 1950; Dehm, 1962), *Sc. gibberosus* Hofmann (Hofmann, 1893; Roger, 1898; Schlosser, 1902; Wegner, 1913; Kormos, 1913; Stehlin, 1919) and, American, *Sc. uphami* James and *Sc. matthewi* James (James, 1963). A detailed comparison of the Węże 1 and Węże 2 specimens with

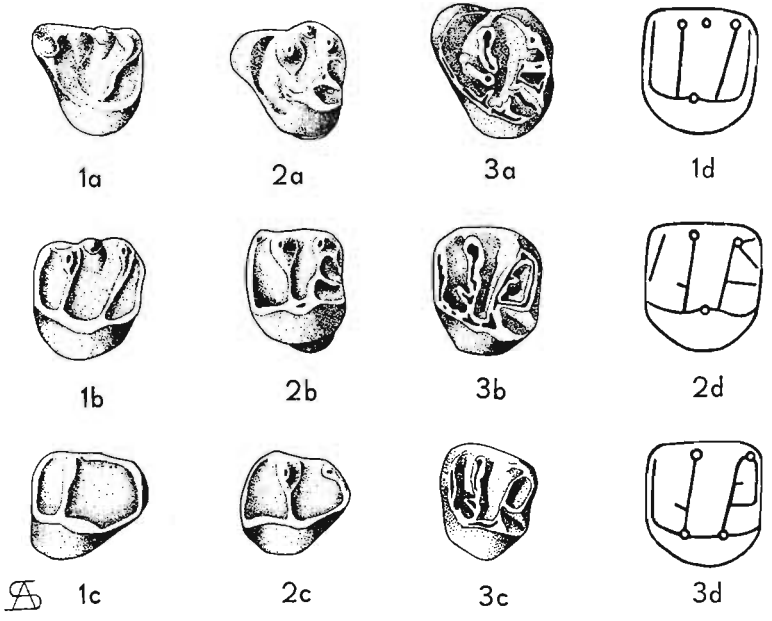

Fig. 7. — *1 Sciurus vulgaris* Linnaeus; Recent, *a* left P^4, occlusal view, *b* left $M^{1(2)}$, occlusal view, *c* left M^3, occlusal view, *d* left $M^{1(2)}$, (diagrammatic arrangement of cusps and crests); *2 Pliosciuropterus dehneli* n.gen., n.sp.; Węże 2. *a* left P^4, occlusal view, *b* left $M^{1(2)}$, occlusal view, *c* left M^3, occlusal view, *d* left $M^{1(2)}$, diagrammatic arrangement of cusps and crests (Z.Pal.VM/I-25); *3 Petaurista petaurista* (Pallas); Recent. *a* left P^4, occlusal view, *b* left $M^{1(2)}$, occlusal view, *c* left M^3, occlusal view, *d* left $M^{1(2)}$ (diagrammatic arrangement of cusps and crests); ca. × 5.5.

those, belonging to the above mentioned species described by different authors, shows that there are considerable differences either in jaw and tooth dimensions or in the morphology of particular teeth, mostly in the development of cusps and lophs on the upper and lophids on the lower molars. Besides, the American species, mentioned above, differ distinctly from *Pliosciuropterus dehneli* n.sp. in their less complex structure of upper teeth, particularly in the posterior parts of the P^4—M^2 crowns and in a more complex structure of lower teeth, marked by a distinctly granulate surface of the central fields of crowns. In addition, they differ, particularly *Sciuropterus uphami* James, in greater dimensions of teeth. The characters, presented above, relate these species rather to the representatives of the genera *Hylopetes* Thomas and *Petaurista* Link.

Besides the features, listed in Table 6, *Pliosciuropterus dehneli* n.sp. differs from Recent and fossil species of the genus *Petaurista* Link, such as, for instance, *P. petaurista* Pallas, *P. leucogenys* Milne-Edwards, *P. brachyodus* (Young), *P. sulcatus* Howell and others, in markedly greater dimensions of teeth and jaws, in the shape and length to width ratio of particular teeth of both jaws and in extremely complex structure of crowns. The similarities of these species to *Pliosciuropterus dehneli* n.sp. are expressed by the presence of posterior diagonal reentrant folds, particularly of the open lingual reentrant fold (the postero-lingual diagonal flexus).

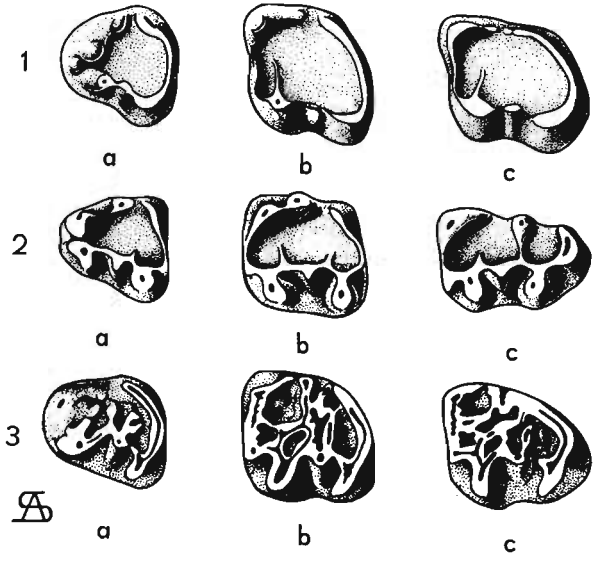

Fig. 8. — *1 Sciurus vulgaris* Linnaeus; Recent. *a* left P_4, occlusal view, *b* left $M_{1(2)}$, occlusal view, *c* left M_3, occlusal view; *2 Pliosciuropterus dehneli* n.gen., n.sp.; Węże 2. *a* left P_4, occlusal view, b left $M_{1(2)}$, occlusal view, c left M_3, occlusal view (Z.Pal.VM/I-25); *3 Petaurista petaurista* (Pallas); Recent. *a* left P_4, occlusal view, b left $M_{1(2)}$, occlusal view, *c* left M_3, occlusal view; ca. × 6.

The remains of a large „flying squirrel" *Petaurista* sp. were described from the Upper Pliocene faunas from Wölfersheim-Wetterau (Tobien, 1952) and from Ivanovce near Trenčin (Fejfar, 1961*a*). However, no closer data on these remains are available.

A large „flying squirrel" was described as *Petauria helleri* Dehm (Dehm, 1962) from the early Pleistocene and, probably, late Pliocene fauna from Schernfeld near Eichstätt. This squirrel differs from the *Pliosciuropterus dehneli* n.sp., besides characters, listed in Table 6, in much greater dimensions of the teeth and lower jaw. A full absence of the mesoconid from lower molars, a complex structure of the anterior parts of the crowns of these teeth, posterior diagonal reentrant folds

and metalophules completely missing from $M^{1(2)}$, as well as great dimensions of teeth and jaws, provide ample evidence for distinguishing this species from *Pliosciuropterus dehneli* n.sp. and, at the same time, for erecting a new genus and a new species (for the squirrel of Węże 2).

Pliosciuropterus schaubi n.sp.

(Pl. V; text-fig. 9)

Type specimen: The right lower jaw with an incisor and M_3 as well as with preserved alveoli of P_4—M_2. M. Z. Cat. No. VIII/Vm-234/1 (Pl. V, fig. 2 *a-d*; text-fig. 9 *a-c*).

Derivation of name: schaubi — in honour of the late Professor Samuel Schaub of Basel, an eminent specialist on fossil rodents.

Material. — Two fragments of lower jaws and a few detached molars and incisors, found at Węże 1.

Diagnosis. — Dental formula, the same as in *Pliosciuropterus dehneli* n.sp. P_4, two-rooted. The M_3 crown uniformly broad. Central fields of the M_3 crown without additional lophids or folds on the surface of the enamel. The lower masseteric crest low, weakly developed. The M_3 talonid broad, with a strong and high posterolophid and strong, cuspy entoconid. The diasteme short.

Description. — P_4 has two roots, molars are four-rooted. The crown of M_3 is uniformly broad over its entire length (sometimes, slightly tapering posteriorly). The proto- and hypoconid well developed, high.

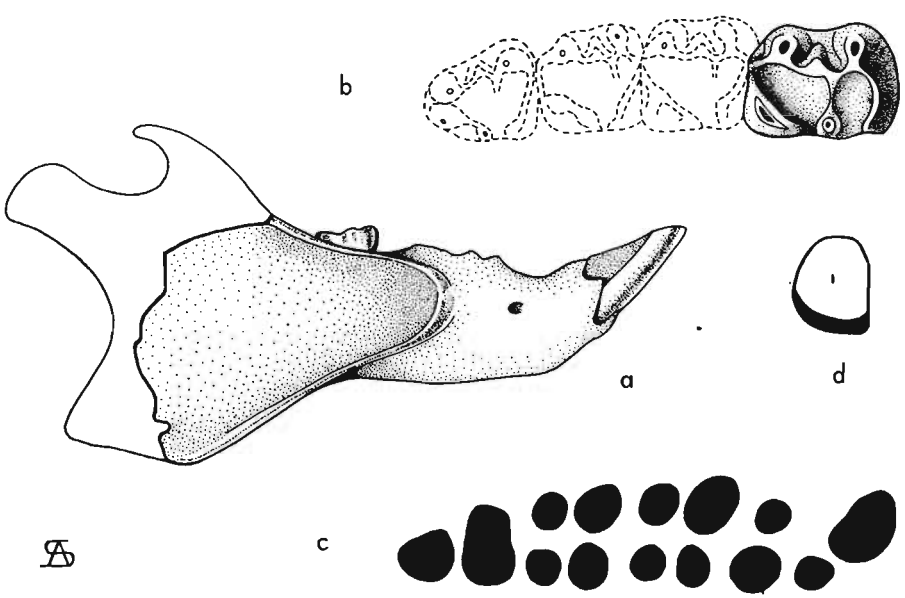

Fig. 9. — *Pliosciuropterus schaubi* n.sp.; Węże 1. Right lower jaw with I, M_3 (partially reconstructed): *a* labial view, type specimen (M.Z. No. VIII/Vm-324/1); *b* presumable lower tooth-row, *c* alveoles-row of P_4 — M_3, *d* cross section of lower incisor. Fig. 9*a* ca. × 2.5, fig. 9*b-c* ca. × 5.5, fig. 9*d* ca. × 4.

The posterior root of M_3 is the strongest one, ellipsoidal in cross section and strongly bent posteriorly. The antero-lingual root smaller than the posterior one, straight and round in cross section. The antero-labial root small, straight and also round. Between the posterior and the antero-labial root, there is the fourth root, the smallest of all and shifted lingually. A blank inter-alveolar space occurs between the antero-labial and posterior roots. The root pattern in M_1 and M_2 is identical as in M_3 but without the blank inter-alveolar space.

There are no traces of the proto- and hypolophid on detached molars, belonging to M_1 and M_2. The pattern of cusps — as in the molars of *Pliosciuropterus dehneli* n.sp.

Measurements of the lower jaws and their dentition are given in Table 8.

Table 8

Pliosciuropterus schaubi n. sp.

Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-324			Detached teeth	Average	Number of specimens
Jaws with teeth	1	2			
Height below M_1	7.3	7.4	—	—	—
Thickness below M_1	3.5	ca. 3.7*	—	—	—
Diasteme	4.8	—	—	—	—
Length of P_4—M_3	11.9*	—	—	—	—
Length of M_1—M_3	9.2*	—	—	—	—
Length P_4	2.4*	—	—	—	—
Width P_4	2.4*	—	—	—	—
Length M_1	2.7*	—	2.5—2.7	2.5	4
Width M_1	2.6*	—	2.4—2.7	2.6	
Length M_2	2.8*	—	2.6—2.9	2.7	3
Width M_2	2.7*	—	2.6—2.8	2.8	
Length M_3	3.8	3.7	3.7—4.0	3.8	3
Width M_3	2.6	2.5	2.5—2.8	2.6	

* Measured along the alveoles.

Discussion. — Depéret has described two molars: one M_3 and one M_2(?), found in the Pliocene mudstone at Serrat d'Vaquer (Perpignan, Roussillon), attributing them to the genus *Sciuroides* F. Major (a synonym of the genus *Adelomys* Gervais; Schaub, 1958*a*) (Depéret, 1890, p. 49, 121, Pl. 4, fig. 38-39*a*; Pl. 12, fig. 14?). Judging by the description and illustrations, presented in his work (M_2 is not illustrated in Pl. 12, and fig. 14 does not occur in this plate), it is only M_3 that can be discussed.

This tooth is large (4 mm long) and with a strongly developed metaconid. The proto- and hypoconid are connected by a marked, longitudinal crest, on which the mesoconid is distinctly visible. The proto- and hypolophid are well developed and stretch, the former, to the metaconid, the latter, to the large, well developed entoconid. The fifth cusp, in this case, probably the posterolophid, is formed, according to Depéret, by the talonid which characterizes the last, lower molar. A few years afterwards, three other detached molars, in this number, two lower ones and one upper, were described by Depéret from the same locality. He assigned them to *Sciuropterus pliocaenicus* Depéret (Depéret, 1897, p. 179, Pl. 18, fig. 34, 35; *fide* Dehm, 1962). The molars (M_3), mentioned above, should — according to Dehm (1962, p. 43) — be attributed to mother species, for which he suggests the name *S. depereti,* already used by Trouessart (without description) (1898, p. 400). This attribution was based on a different distribution of the enamel junctures betwen the cusps and the different structure of the entire crown than those, occurring in the representatives of the genus *Sciuropterus* F. Cuvier, known thus far. Despite scanty data on the dentition of *S. pliocaenicus* Depéret, it might be assumed that if not all the teeth, described from Roussillon, at least M_3, showing certain resemblance in the structure of the crown to the same teeth in the species of the genus *Pliosciuropterus* n.gen. might also belong to the new genus described above.

Genus *Pliopetes* Kretzoi, 1959

Pliopetes cf. *hungaricus* Kretzoi, 1959

(Text-fig. 10)

Material. — Two lower jaws with M_3, M_2 — M_3, a dozen or so detached premolars and molars, in this number three P_4 and one M_3, as well as — probably — one M^2 and one P^4.

Description. — The fragments of lower jaws do not differ much, in shape and size, from those of *Eutamias orlovi* n.sp. (see p. 165). They are small and delicate, with an elongated diasteme. P_4, two-rooted, with a small paraconid on the crown. The mesoconid of P_4—M_3 in the form of a distinct labial spur. The surface of the central fields of crowns delicately and irregularly granulated. M_1 — M_2 with romboidal crowns and twin roots, diagonally arranged. A small external reentrant fold might be observed between the para- and metaconid. The paraconid passes into the anterolophid. The latter is connected to the metaconid. A small metastylid, mostly connected to the metaconid, is placed between the metaconid and the entoconid. The entoconid, in the form of a swelling, on the terminal section of the posterior cingulum. M_3 is not elongated antero-posteriorly. The posterior part of its crown is cut lingually. This tooth has three roots.

P^4 three-rooted, with a subtriangular crown. The pattern of cusps and lophs — like in *Eutamias orlovi* n.sp., except for a broken protoloph and less developed proto- and metaconule. M^1 or M^2 with a U-shaped crown. The para- and metacone strongly developed, the protocone low.

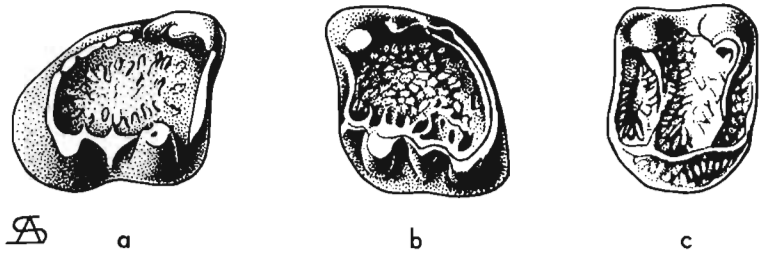

Fig. 10. — *Pliopetes* cf. *hungaricus* Kretzoi; Węże 1. *a* left M_3, occlusal view, *b* right $M_{1(2)}$, occlusal view, *c* left $M^{1(2)}$, occlusal view (M.Z. No. VIII/Vm-325/1-3). Fig. *a*–*b* ca. × 13; fig. *c* ca. × 14.

The parastyle on P^4 large and, on $M^{1(2)}$, reduced to a narrow anteroloph. The posterior cingulum, or the posteroloph, well developed. The anterior, central and posterior fields or valleys of the crowns with delicately granulated enamel surface. $M^{1(2)}$ three-rooted.

Measurements of the lower jaws and their dentition are given in Table 9.

Table 9

Pliopetes cf. *hungaricus* Kretzoi

Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-325			Detached teeth	Average	Number of specimens
Jaws with teeth	1	2			
Height below M_1	4.2	—	—	—	—
Thickness below M_1	1.8	—	—	—	—
Diasteme	4.0	—	—	—	—
Length of P_4—M_3	7.2*	—	—	—	—
Length of M_1—M_3	5.5*	5.3*	—	—	—
Length P_4	1.4*	—	1.4—1.5	1.4	3
Width P_4	1.5*	—	1.4	1.4	
Length M_1	1.5*	—	1.5—1.6	1.5	5
Width M_1	1.6*	—	1.5—1.7	1.6	
Length M_2	1.7*	1.8	1.7—1.8	1.7	2
Width M_2	1.9*	1.9	1.8—1.9	1.8	
Length M_3	2.3	2.2	2.2	2.2	1
Width M_3	1.7	1.7	1.7	1.7	

* Measured along the alveoles.

There are the following dimensions of the upper teeth, P^4 and $M^{1(2)}$: length and width of P^4, 1.7 and 1.7 mm resp., of $M^{1(2)}$, 1.4 and 1.8 mm resp.

Discussion. — The characteristic structure of molars in the small rodent, described above, indicates that it is a member of the family Sciuridae Gray. At the same time, the clearly visible granulation of the surface of the crown enamel, the diagonal arrangement of roots and the romboidal outline of crowns allow one to refer this species to the subfamily Petauristinae Simpson.

Similar remains of a small sciurid have been described from the Pliocene fauna, found at Csarnóta 2 (Kretzoi, 1959), and assigned to *Pliopetes hungaricus* Kretzoi. The drawings of detached teeth, namely, of M_2 and M^2 of this species, which I have received from Professor M. Kretzoi, show a structure of crowns, related to those of the Węże 1 specimens. *Pliopetes hungaricus* Kretzoi is, in Kretzoi's opinion, closely related to the Recent small „flying squirrels" of the genus *Hylopetes* Thomas, living in Central Asia, and can be considered an ancestor of the latter.

Family **Castoridae** Gray, 1821
Subfamily **Castoroidinae** Trouessart, 1880
Genus *Steneofiber* Geoffroy, 1833
Steneofiber wenzensis n.sp.

(Pl. VI; text-fig. 11)

Type specimen: A palatine fragment of the skull with complete rows of teeth on either side. M. Z. Cat. No. VIII/Vm-326/1 (Pl. VI, fig. 2 *a*, b).

Derivation of name: wenzensis — after the locality Węże.

Material. — Besides the type specimen, a fragment of a lower jaw with P_4 — M_2 and without articular processes.

Diagnosis. — Dental formula: $\frac{1\,0\,1\,3}{1\,0\,1\,3} = 20$. Lower and upper incisors with a convex band of enamel „convex-faced incisors" The type of dentition pentalophodont with a tendency to the reduction of the second furrow in upper molars. The premolars and molars hypsodont, with long and open hypostria and hypostriids, as well as short mesostria and mesostriids. Upper rows of teeth, strongly spaced posteriorly. Roots weakly developed. The lower and upper premolars with castorid structure pattern. The upper diasteme longer than the row of teeth. M^3 unreduced, with short lingual and longer labial mesostria and with a short postero-lingual flexus.

Description. — *Skull and upper dentition.* An arched diasteme is visible in the anterior part of the palatine fragment of the skull. This diasteme is longer than the row of teeth. The upper molar with a „convex-faced" and slightly granulated surface of the enamel band (Text-fig. 11*a*). The incisor oval and subtriangular in cross section. An oval, open canal runs inside the tooth. The sagittal suture of the palate —

coalescent. The rows of teeth are antero-convergent and postero-divergent. Posterior palatine foramens narrow and long and the anterior narrow and short. The posterior edge of the palate situated halfway the length of last molars.

P^4 with long, deep and open hypostria; short mesostria and a very deep, posteriorly bent mesoflexus. The metaflexus in the form of a metafossette. The parastria short. The metacone bent to a considerable extent towards the labial side of the tooth. The para-, meso- and metafossettes which in the course of further grinding remain open, close in very worn crowns. The para- and metastria are always shorter than the mesostria while the hypostria remain open up to the crown base. The mesofossette on P^4 is the longest one and bent in the form of an arch. M^1 and M^2, with long, open and deep hypostria, with short mesostria and with a very deep and posteriorly bent mesoflexus. The para- and metaflexi are, on these teeth, closed in the para- and metafossettes. The crowns are square in outline. In the course of a further crown grinding, the para- and metastria are always shorter than the mesostria, while the hypostria remain deep and open. In young individuals the M^1 and M^2 para- and metaflexi are open. The M^3 crown is square and its posterior part is rounded. The hypostria are long and open. The posterior part of the crown has the mesoflexus open on both sides. The lingual mesostria are shorter, the labial — longer. The metaflexus is short and the metastria much shorter than the mesostria. A small and short posteroflexus can be observed on the lingual side. In the course of a further crown grinding, the para-, meso- and metaflexi pass into the para-, meso- and metafossettes, while the hypostria remain deep, long and open.

Lower jaw and dentition. The jaw fragment, preserved without the anterior and posterior parts of its body, contains only P_4—M_2. The lower fragment of the ascending ramus is situated more or less on the boundary between M_2 and M_3 and is diagonally directed. The jaw is solid, thick and high. The lower incisor oval and subtriangular in cross

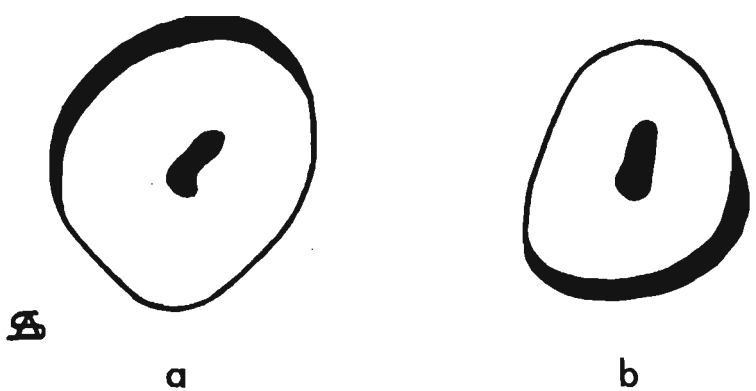

Fig. 11. —*Steneofiber wenzensis* n.sp.; Węże 1. The cross section: *a* upper incisor, *b* lower incisor (M.Z. No. VIII/Vm-326/1-2); ca. × 10.

section, has a convex band of enamel, „convex-faced incisor". An oval, open canal runs inside the tooth. The small mental foramen is placed below the anterior edge of P_4. P_4 has a long hypostriid open over its entire length. The meso- and hypoflexid do not touch each other. In the anterior part of the crown, the paraflexid is closed. The meso- and metaflexid are open. The mesostriid is very short. The tooth crown is oval in shape. The paraconid is strongly reduced in width. The parastriid is shorter than the metastriid, both being much shorter than the mesostriid. The hypostriid is deep, long and open. In teeth which are more worn away the para- and metaflexids pass into the para- and metafossettids and the mesoflexids remain open. By advanced wear of crown, the lingual flexids close and pass into the fossettids and the hypoflexid and the hypostriid remain open up to the crown base. M_1 and M_2 have long hypostriids and deep hypoflexids. The para-and metaflexid form the para- and metafossettids. The mesoflexid is open and the mesostriid short. The crowns are square in outline with labial edges rounded. In young individuals the paraflexid is probably open and the paraconid reduced in width. Besides, the meso- and metaflexids, as well as hypostriids are also open and the meso- and metastriids short. In specimens with crowns worn away to a considerable extent, all lingual flexids are closed and the hypoflexid remains deep and open up to the crown base.

Measurements of the lower and upper jaws and their dentition are given in Table 10.

Table 10

Steneofiber wenzensis n. sp.

A. Measurements of the lower jaw and dentition (in mm)

M. Z. Cat. No. VIII/Vm-325/2		
Length of the jaw fragment preserved		ca. 20.5
Height below P_4		9,5
Thickness below P_4		6.5
Length of P_4—M_2		11.0
Length of M_1—M_2		6.6
Length	P_4	4.4
Width		3.2
Length	M_1	3.2
Width		3.3
Length	M_2	3.2
Width		3.3
Sagittal diameter of incisor		3.2
Transverse diameter of incisor		3.2

B. Measurements of the upper jaw and dentition (in mm)

M. Z. Cat. No. VIII/Vm-325/1	
Length of the palate	33.2
Width of the rostral part of the palate	9.5
Width of the palate between P^{4-4}	3.0
Width of the palate between M^{3-3}	10.0
Length of the diasteme	18.0
Length of P^4—M^3	14.0
Length of M^1—M^3	9.8
Length P^4	4.0
Width P^4	3.5
Length M^1	3.2
Width M^1	3.1
Length M^2	3.3
Width M^2	3.0
Length M^3	3.6
Width M^3	3.0
Sagittal diameter of incisor	3.4
Transverse diameter of incisor	3.3

Note: The measurements of the lengths of tooth-rows and of particular teeth were taken on the grinding surfaces.

Discussion. — The characteristic, lophoidal structure of the dentition of the remains preserved speaks for their assignment to the subfamily Castoroidinae Trouessart. The specific structure of premolars and molars. small dimensions of jaws and teeth allow one to assign the beaver described to the small Neogene beaver-like animals of the genus *Steneofiber (Monosaulax)* Geoffroy.

Of the relatively numerous Mio-Pliocene group of small beaver-like rodents *Steneofiber minutus* H. v. Meyer, described from the Upper Vindobone of Central Europe (Meyer, 1848, 1856-1858; Gervais, 1848-1852; Schlosser, 1884, 1902; Roger, 1898; Stirton, 1935; Schaub, 1958*a*, and others), seems to be most closely related to the form from Węże 1. It has approximately the same dimensions of teeth and some similarities in the structure of molars. The palatine part of the skull with P^4—M^1 from Leibiberg near Günzburg (Schlosser, 1884, Pl. 10, fig. 26, 28) has a similar structure of the anterior part of the palate, antero-convergent tooth rows and, generally speaking, a similar distribution of the enamel folds on molars. The differences between the Węże 1 specimen and that, found in Germany, concern the distribution of particular folds and flexi

and especially the length and trace of the hypostria, the position of the labial fossettes, the structure of P^4 itself and the dimensions of teeth. In the specimen of the lower jaw of *Steneofiber minutus* H. v. Meyer from Schwenditobel (*l.c.*, Pl. 10, fig. 16, 16a), a marked difference can be observed in the dimensions of the jaw itself (its height below P_4 amounts to 15 mm and more, while a corresponding figure for the specimen from Węże 1 equals only 9.5 mm) and in the structure of teeth, particularly of P_4. In the Węże 1 specimen, this tooth has a clearly visible islet of enamel, i. e. the parafossettid, in the anterior while, in the German specimen, in the posterior part of the crown. The trace of the meso- and hypoflexids is also different in this species. M_1 and M_2 in both forms discussed here are similar, but the differences in the situation of the fossettids and in the depth and trace of the flexids allow one to consider them as belonging to different species. Similarities are more clearly manifested in the structure of lower and upper incisors. In both forms, the band of enamel is convex („convex-faced incisors").

In the locality Kosjakinskij Karier, in the neighbourhood of Stavropol, on the northern border of the Caucasus, a fragment of the upper jaw with a complete row of teeth was found by Vereščagin (1959) who assigned it to *Steneofiber* sp. The remaining fauna of that locality was regarded as being of the Lower or Middle Pliocene age. The structure of teeth in this form is in principle similar to the teeth of the Węże 1 specimen. The difference between them lies in a slightly different distribution of the flexids of M^3 and in the dimensions of the jaw and teeth.

A similar type of remains were also described as *Steneofiber* sp. (Borisjak & Beljaeva, 1948; Alekseeva. 1961; Topačevskij, 1962, and others) from other regions of the U. S. S. R.'s European part. Any closer descriptions of these remains being unavailable, there is no possibility of comparing them with the specimens from Węże 1.

A new species of the genus *Monosaulax* Stirton (perhaps it is the case of the genus *Steneofiber* Geoffroy), found in the locality Wafangyingtze near Changpeihsien (the northern Hopei Province, China) and named *M. changpeiensis,* was described by Li Chuan-Kuei (1962). This specimen is a lower jaw with a complete dentition. Its dimensions are approximating those of the Węże 1 specimen (the height of the jaw below P_4—M_3 amounts, in this form, to 9.0—11.0 mm). Besides the molars, fairly low and cylindrical in shape, the teeth of the Chinese form are of a different structure of the flexids, fossettids and enamel folds. The only similarity lies in principle in a convex enamel band on the incisor.

The more diagonal position of the enamel folds, flexi and flexids, the differences in the premolar structure of both jaws and of M^3, considerable spacing of the tooth rows of the upper jaw, the situation of the parafossettid in the anterior part of P_4, the presence of an additional

flexus on M^3, as well as smaller dimensions of the lower jaw, all these characters considered — a new species of a small beaver of the genus *Steneofiber* Geoffroy, i.e. *St. wenzensis* n.sp. can be erected at Węże 1.

The rodent from Węże 1 can be considered a relic of the Miocene fauna. Its remains come from the lower layers of the breccia, attributed to the older Pliocene. Its affinity with the Mio-Pliocene species of the genus *Steneofiber* Geoffroy is unquestionable. Certain characters, which can be observed in the morphology of the premolars of this beaver, might also relate it to a more progressive group of beavers of the genus *Castor* Linnaeus. The rodent from Węże 1 was probably, similarly to all recent beavers, adapted to an aquatic mode of life.

Order **Myomorpha** Brandt, 1855
Cricetidae incertae sedis
Genus *Trilophomys* (Depéret, 1890)
Trilophomys pyrenaicus (Depéret, 1890)
(Pl. VII; text-fig. 12-14)

The synonymy from 1890 to 1960 is presented in Kowalski's work (1960*d*, p. 452, 453). Besides:

1961b. *Trilophomys pyrenaicus* (Depéret); O. Fejfar, Die plio-pleistozänen..., p. 71-72, 74-75; text-fig. 10d.
1961b. *Trilophomys depereti* n.sp.; O. Fejfar, *Ibid.*, p. 71-73, 74-77, 80; text-fig. 10 b, e, 11 a, b.
1961b. *Trilophomys schaubi* n.sp.; O. Fejfar, *Ibid.*, p. 71-76, 80, pl. 18, fig. 7; text-fig. 10 a, c, 12 a, b, 13 a, b.
1961b. *Trilophomys* sp.; O. Fejfar, *Ibid.*, p. 75-78, pl. 18, fig. 7; text-fig. 14 a-f, 15 a-c.

Material. — The left-side lower jaw with M_1 — M_3 (Pl. VIII, fig. 1 *a-b*). Besides, there are two lower jaws with M_1 — M_2, three with M_1 and three with I — M_2 (articular processes in all these jaws are damaged). Of detached teeth, 19 molars have been found, in this number, 4 M_1, 3 M_2, 2 M_3, 3 M^1, 6 M^2 and 4 M^3, as well as fragments of skulls in the form of a premaxillar bone with an incisor and a fragment of a maxillar bone with M^1.

Description. — The structure of the first two molars of both jaws, the number and position of roots in specimens from Węże 1 are identical with those in a type specimen from Roussillon (Depéret 1890; Schaub, 1940). This also applies to the morphology of the lower jaw. A lower jaw with M_1 — M_3, a detached M_3 (Pl. VII, fig. 2) and four detached M^3 (Pl. VII, fig. 3, 4) make up a new material in the collections. These teeth are two-prismatic in shape. The anterior loop of enamel is larger than the posterior one. On M^3, the size ratios of both loops are not as clearly marked as on M_3. Both M_3 and M^3 have one reentrant fold each on either side and, of them, the lingual one on M_3, similarly to M_1 — M_2,

reaches deeper towards the center of the crown than the labial one. On M^3, the labial reentrant fold is deeper than the lingual one. In the lower molar, the number of roots is reduced to two broad and antero-posteriorly flattened roots. M^3 is three-rooted, the two anterior roots supporting the anterior loop and the posterior, small one — the posterior loop. The labial and lingual reentrant folds do not contain the cement.

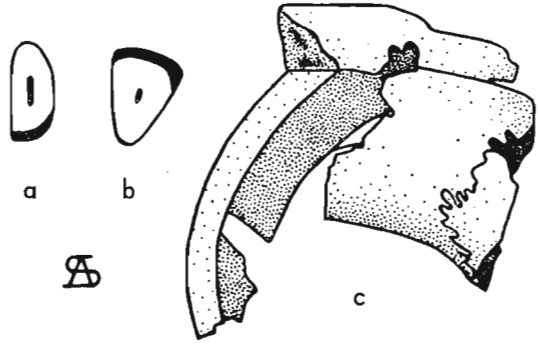

Fig. 12. — *Trilophomys pyrenaicus* (Depéret); Węże 1. The cross sections: *a* lower incisor (M.Z. No. VIII/Vm-327/15), *b* upper incisor, *c* premaxillar fragment with incisor, side view (M.Z. No. VIII/Vm-327/10); ca. × 5.

The skull fragments preserved (the premaxilla with the incisor and the maxilla with M^1) show that there is no longitudinal groove on the incisor and that the molar is identically built as the isolated teeth. These fragments come from a skull which has been destroyed during the preparation. A detailed diagram (Text-fig. 13) has, however, been drawn prior to the preparation. Besides, long and narrow nasal bones, sharply wedging anteriorly, were observed in this skull. The jugal arch, slightly angular in shape, was strongly bent laterally. Similarly to detached teeth, there were three alveoles in each molar.

It has been shown by serial sections, made on two M_1 specimens, belonging to young individuals (with an antero-lingual fold well marked) that the anterior reentrant loop in the form of an enamel fold, strongly bent lingually, becomes — in teeth more worn away — broad and romboidal in shape (the crown height 1.7—1.8 mm) and — in teeth extremely worn away — it takes the form of an oval and wide dentine field, surrounded by a thick band of enamel (Text-fig. 14 *a-c*). During the steady wear of the crown, the labial and lingual reentrant folds do not show any deviation from an original pattern observable in young individuals.

No distinct deviations have been recorded during the observation of the structure of the M_1 roots. In some specimens, the roots are more

widely spaced and the crown base more strongly bent upwards. In other specimens, the presence has been recorded of a small, vestigial process — a pseudo-root, located between proper roots.

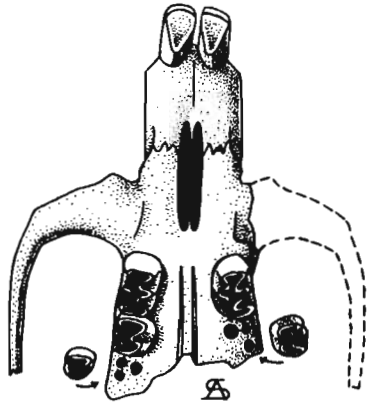

Fig. 13. — *Trilophomys pyrenaicus* (Depéret); Węże 1. Rostral fragment of skull, palatal view (M.Z. No. VIII/Vm-327/11); ca. × 3.

On one of the lower jaws with the incisor preserved, the distal end of the latter reaches the labial side of the ascending ramus, forming a clean-cut protuberance on its surface.

Measurements of the lower jaws and their dentition are given in Table 11.

Table 11

Trilophomys pyrenaicus (Depéret)

Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-326					Detached teeth	Average	Number of specimens
Jaws with teeth	1	2	3	4			
Height below M_1	4.5	4.6	4.6	4.0	—	—	—
Thickness below M_1	2.0	2.0	2.0	2.3	—	—	—
Diasteme	3.4	3.5	3.3	3.4	—	—	—
Sagittal width of incisor	2.6	2.4	2.4	2.6	2.4—2.6	2.5	16
Transverse width of incisor	1.1	1.1	1.0	1.1	1.0—1.2	1.1	16
Length of M_1—M_3	4.6	5.4*	5.6*	5.5*	—	—	
Width M_1	1.8	2.0	1.75	1.8	1.7—2.4	1.8	13
Length M_1	1.2	1.2	1.3	1.2	1.1—1.4	1.3	
Length M_2	1.7	1.6	1.5	1.6	1.6—2.0	1.6	9
Width M_2	1.1	1.2	1.2	1.3	1.2—1.3	1.3	
Length M_3	1.2	1.4*	1.5*	1.6*	1.2 ; 1.3	1.2	3
Width M_3	0.8	0.9*	0.9*	0.9*	0.7 ; 0.8	0.8	

* Measured along the alveoles. Teeth measured at the crown bases.

There are the following dimensions of upper molars (in mm): the length of $M^1 - M^2$ on the grinding surface: about 3.3, the length and width of M^1 (3 specimens), 2.0 and 1.2 resp., of M^2 (6 specimens), 1.3—1.4 and 1.0—1.2 resp. (mostly, 1.4 and 1.2 resp.), of M^3 (2 specimens), 0.7 and 0.8 resp., as well as 0.65 and 0.8 resp.

Discussion. — The first remains of *Trilophomys pyrenaicus* (Depéret) were described from the Pliocene fauna from Roussillon, France (Depéret, 1890). They comprised a few fragments of lower and upper jaws with only the first two molars (M_1^1 and M_2^2) preserved; their detailed description was given by Schaub (1940). The remains presumably of the same rodent have also been found in the fauna from Wölfersheim-Wetterau and determined as *Trilophomys* sp. (Tobien, 1952). A few fragments of lower and upper jaws and detached molars of *T. pyrenaicus* (Depéret) were also described from Węże 1 fauna by Schaub and Kowalski (1958*b*) and by Kowalski (1960*d*). Materials, described there, cover — besides a few lower jaws — the first two molars (M_1^1 and M_2^2). The specimens from Węże 1, studied here, are in conformity with those, described in the publications, mentioned above, as regards both the morphology of the dentition and jaws, and the dimensions. The differences in the structure of molars, especially of the anterior loop of M_1, in the number of roots of the teeth of both jaws and in the structure of lower jaws — result from a considerable individual variability.

Fairly numerous remains of lower jaws and detached molars, in this number also M_3^3, assigned to two new species, *T. depereti* Fejfar and *T. schaubi* Fejfar (Fejfar, 1961*b*), have recently been described from the Plio-Pleistocene fauna found at Ivanovce near Trenčin. The detached M_3^3 were attributed to *Trilophomys* sp. The description of new species has mostly been based on the structure of M_1. According to Fejfar, the first of these species, would differ from *T. pyrenaicus* (Depéret) in its anterior loop of M_1 rounded up even with a tooth little worn away, in the absence of the antero-lingual reentrant fold from the anterior loop, in the base of the crown which is not tapering, in the widely spaced roots, and enamel prism alternate one to another. On the other hand, *T. schaubi* Fejfar would differ in the tapering anterior loop with a clean- cut antero-lingual reentrant fold of M_1, wedging towards the crown base, in the rounded paraconid prism, weaker roots and the length of the crown itself.

Specimens which served as a basis for the description of these two species have the dentition with different degrees of the crown wear. The structure of M_1, examined in these specimens, indicates that, in the second specimen of *T. schaubi* Fejfar (*l. c.*, fig. 12a-b), at a more intensive abrasion of the crown, the anterior loop becomes broad and rhomboidal in shape, like in worn crowns of M_1 in *T. depereti* Fejfar (*l. c.*, fig. 11 a-b).

Similar shape of the loop is observed in the specimens with strongly worn crowns, belonging to *T. pyrenaicus* (Depéret) from Węże 1 and Roussillon (Depéret, 1890, Pl. 12, fig. 2-2*).

It has been shown by a series of sections (Text-fig. 14 *a*-c), made on two M_1 with the antero-lingual reentrant fold preserved, that this reentrant fold disappears on one of these teeth fairly quickly even with an insignificant wear of the crown, while on the other tooth it persists to the half of the crown height, disappearing completely only with further abrasion. On both specimens, the anterior loop, at first tapering,

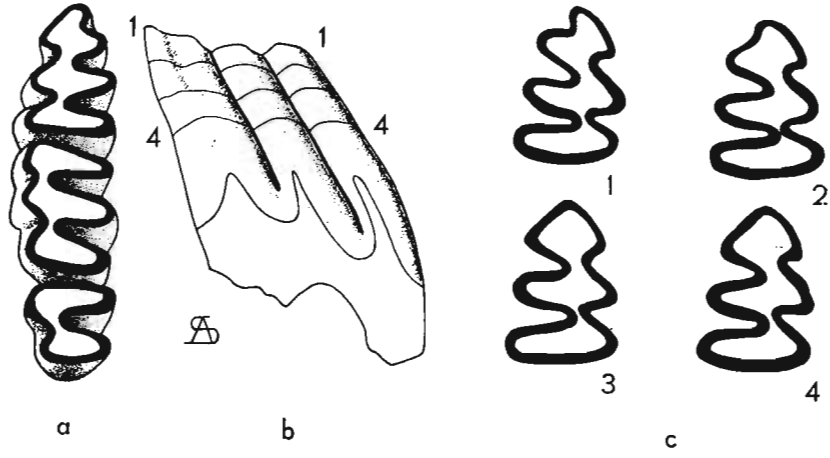

Fig. 14. — *Trilophomys pyrenaicus* (Depéret); Węże 1. *a* left M_1 — M_3, occlusal view, b right M_1, lingual view, *c* a series of cross sections (1-4); fig. 14*a* ca. × 10, fig. 14*b*-*c* ca. × 12.

broadens and forms a rhomboidal loop with the enamel band gradually becoming thicker. Concluding from successive grinding stages of the M_1 crown, this tooth, in young individuals of *T. pyrenaicus* (Depéret) from Węże 1 with 2.2 mm high crowns, shows the same structure as in *T. schaubi* Fejfar and, in adult individuals with 1.7-1.2 mm high crowns, the same structure as in *T. depereti* Fejfar and *T. schaubi* Fejfar. In specimens with crowns below 1.0 mm in height the structure of the anterior loop is the same in all the species discussed here, i.e. broadly rhomboidal and with thick enamel. In accordance with these facts, I assign the species, described from Ivanovce near Trenčin, to *T. pyrenaicus* (Depéret). Moreover, the detached M_3^3, described by Fejfar, with their crown structure identical with the teeth of *T. pyrenaicus* (Depéret) from Węże 1, should also belong to this species. This is proven by the lower jaw with M_1 — M_3 *in situ* (Pl. VII, fig. 1 *a*-*b*; text-fig. 14*a*).

The comparison of skull fragments from Węże 1 (Text-fig. 13) and from Roussillon (Schaub, 1940, fig. 4) shows in the former a longer rostral section and narrow nasal bones. This part of the palate has not

been preserved in the Roussillon skull and, therefore, it is quite possible that, in this specimen, the rostral section was longer than shown in the illustration.

Trilophomys pyrenaicus (Depéret) from Węże 1 is one of the oldest elements of the steppe-forest rodent fauna. It is probably related with the Asian steppe representatives of the Gerbillidae Tullberg. At present, it continues to be assigned to the group Cricetidae incertae sedis.

Family **Microtidae** Cope, 1891
Subfamily **Baranomyinae** Kretzoi, 1955
Genus *Baranomys* Kormos, 1933
Baranomys longidens (Kowalski, 1960)
(Pl. VIII; text-fig. 15-17)

1960a. *Baranomys* sp.; K. Kowalski, Pliocene Insectivores..., p. 187—188.
1960d. *Microtodon longidens* n.sp.; K. Kowalski, Cricetidae and Microtidae..., p. 453—457, pl. 58, fig. 1-3; pl. 59, fig. 1; text-fig. 1 A-K.
1962a. *Microtodonomys longidens* (Kowalski); A. Sulimski, O nowym..., p. 221 (nomen nudum).

Material. — Hundred thirty seven left and right lower jaws, in this number 36 with $M_1 — M_3$ or $I — M_3$, 22 upper jaws, in this number one skull with $M^1 — M^3$ and $M^1 — M^2$ of the right side without the brain case (M.Z. VIII/Vm-330/1). Besides, about 2,500 detached lower and upper molars, as well as many incisors of both jaws.

Description. — The description of the upper dentition was given by Kowalski (1960*d*, p. 453-457). It should be, however, mentioned that upper molars show considerable variability in the crown structure, due to the individual variability and ontogenetic development. This applies not only to the structure of crowns, but also to the structure and number of roots. Various types of anomalies are also often observed on the molar crowns. They are manifested, for instance, by a 180° reversal of the posterior part of the crown in M^3 (more frequent) and M^2 (less frequent). At the same time, a weaker or stronger development of the anterior loop with, sometimes, a small islet of enamel takes place on the M^1 crown. Besides, changes are observed in the trace of the enamel loops, particularly on the M^2 and M^3 crowns. In young individuals the anterior and posterior parts of the crowns are separated by a fairly deep recess. In adult individuals the postero-labial end of the loop of the anterior part of the crown is connected with the antero-labial end of the posterior part of the crown, producing a crown outline, resembling letter E or figure 3 (Pl. VIII, fig. 1; text-fig. 17 — 2*a*). On teeth with strongly worn crowns, the posterior part of the crown closes and an islet of enamel is formed inside. With further grinding of crowns, this islet also appears in their anterior parts.

The upper molars are mostly three-rooted. The coalescence of anterior roots is, howewer, observed on M^2 and M^3 and a small fourth root, situated on the labial side of M^1, occurs on a few specimens.

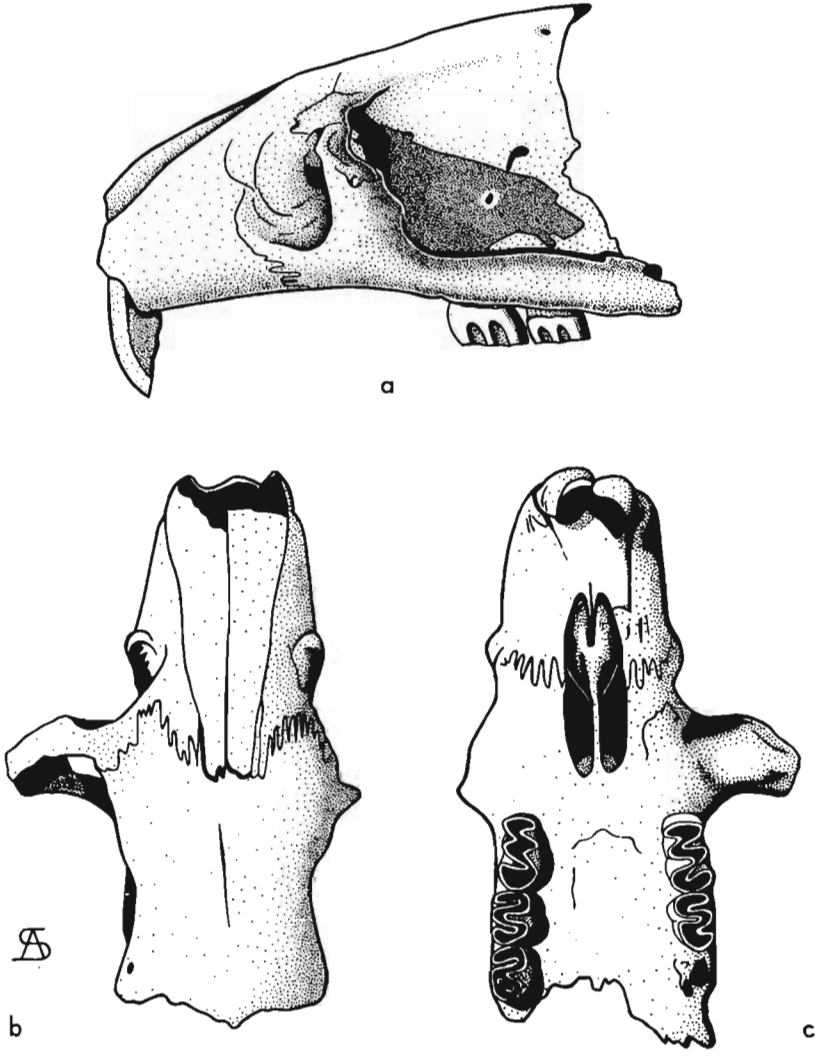

Fig. 15. — *Baranomys longidens* (Kowalski); Węże 1. Rostral fragment of skull: *a* side view, *b* top view, *c* palatal view (M.Z. No. VIII/Vm-330/5); ca. × 6.

The rostral fragment of the skull preserved (Pl. VIII, fig. 3 *a-b*; text-fig. 15 *a-c*) with incisors, M^1 — M^3 on its right and M^1 — M^2 on its left side has a relatively short and broad rostrum, narrow and long, anteriorly extending nasal bones, a diasteme longer than the length of the rooth row, a large infraorbital foramen with a fairly broad bridge above it, long and fairly broad anterior palatine foramens, parallel rows of molars, and upper incisors, placed at a right angle to the palate.

Considerable variability in the structure of jaws and in their dentition was also observed during the studies of numerous lower jaws. Apart from dimensions, the differences are recorded in the position of the anterior edge of the ascending ramus in relation to M_2 and M_3, in the situation of the mental foramen and of the tips of the masseteric crests in relation to M_1, in the size and shape of articular processes and in the length of the diasteme. A description of the lower dentition based on materials, coming from the same locality as the collections, discussed here, was given by Kowalski (1960*d*). Moreover, the analysis of many series of detached teeth, particularly M_1 and M_3, allowed one to find distinct differences in the structure of the crowns of these teeth. They are particularly remarkable in the structure of the anterior loop of M_1. In a series, containing many such teeth, a sort of two "populations" A and B can be distinguished, marked either by the presence, or by the absence of the enamel islet (Text-fig. 16 — *1 a-b, 2 a-b*). Besides, changes are observed in the configuration of the anterior loop of M_1 itself. This loop can be either large and broad with a long labial end or reduced, narrower than the tooth width and with a short labial end. In a „population" having the enamel islet, a divided islet occurs sometimes on the dentine field.

Finally, the posterior loop of M_3 is well developed in all the specimens investigated. Lower molars have two roots each, but an additional thin medial root can be observed on a few specimens of M_1. Moreover, on one of the specimens this root is bifurcate.

Measurements of the lower jaws and their dentition are given in Table 12.

Table 12

Baranomys longidens (Kowalski)

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-330		Detached teeth	Modal value	Number of specimens
Jaws with teeth				
Length of jaw with an incisor	12.8—15.2	—	14.5	36
Length of jaw without incisor	10.5—12.5	—	12.0	88
Height below M_1	2.2— 2.8	—	2.6	97
Thickness below M_1	1.5— 2.0	—	1.8	110
Length of M_1–M_3	3.6— 4.5	—	4.0	36
Length M_1	1.4— 1.8	1.3—1.8	1.5—1.6	556
Width M_1	0.8—1.2	0.8—1.2	1.0	
Length M_2	1.1— 1.3	1.0—1.4	1.2	450
Width M_2	0.7—0.9	0.7—1.0	0.9	
Length M_3	0.9— 1.2	0.8—1.3	1.1	244
Width M_3	0.6— 0.8	0.6—0.9	0.8	

B. Measurements of the upper jaws and their dentition (in mm)

Length of M^1–M^3		3.6—4.2	—	4.0	16
Length	M^1	1.4—1.6	1.4—1.8	1.6	629
Width		0.8—1.1	0.8—1.2	1.0	
Length	M^2	1.1—1.2	1.0—1.4	1.3	370
Width		0.8—0.9	0.7—1.0	0.9	
Length	M^3	1.0—1.2	1.0—1.3	1.1	187
Width		0.7—0.8	0.7—0.9	0.8	

Discussion. — The specimens of the rodent, described here, were identified by Kowalski (1960*d*) as *Microtodon longidens* Kowalski. The analysis of the lower dentition, particularly of M_3 and the comparison of the latter with M_3 of a typical representative of the genus *Microtodon* Miller, *M. atavus* (Schlosser) (Schlosser, 1924; Miller, 1927; Schaub, 1934), shows a distinctly different structure of the crown. In *M. atavus* (Schlosser), this tooth has no posterior loop (posterior cingulum), while in the specimens from Węże 1 this loop is well developed. Besides, the crowns of lower molars in *M. atavus* (Schlosser)[2] are not rectiprismatic, the anterior loop on M_1 is, in relation to the tooth width, small, rounded, without an elongated labial fold and enamel islet, enamel loops are rounded and both labial and lingual reentrant folds are broad. In *Microtodon longidens* Kowalski, similarly to *Baranomys loczyi* Kormos, molars are rectiprismatic with a flat grinding surface, M_1 has a well-developed anterior loop with an elongated labial fold, tooth crowns in general have sharply pointed enamel folds and narrow labial, as well as lingual reentrant folds. In conformity with these facts, the remains from Węże 1 can be hardly assigned to the genus *Microtodon* Miller and, until the dentition of *Baranomys loczyi* Kormos from Csarnóta 2, is fully elaborated, these specimens should be attributed to the genus *Baranomys* Kormos.

On the other hand, the rodent remains from the fauna of Podlesice near Kroczyce, described as *B. loczyi* Kormos (Kowalski, 1956, p. 381), can be referred to the genus *Microtodon* Miller. This can be based on the structure of M_3 (absence of the posterior loop!), typical of *Microtodon* Miller. Since the presence of detached M_3 with identical structure with those in *B. longidens* (Kowalski) was recorded in new materials from Csarnóta 2, belonging to *B. loczyi* Kormos (M. Kretzoi's oral report), the Podlesice specimens should, in addition, be referred to another, perhaps new, species of the genus *Microtodon* Miller.

The remains of a lower jaw with M_1 and a single, detached M_1 from Rębielice Królewskie, were described as *Baranomys* sp. (Kowalski, 1960*a*,

[2] The upper dentition of this rodent is so far unknown.

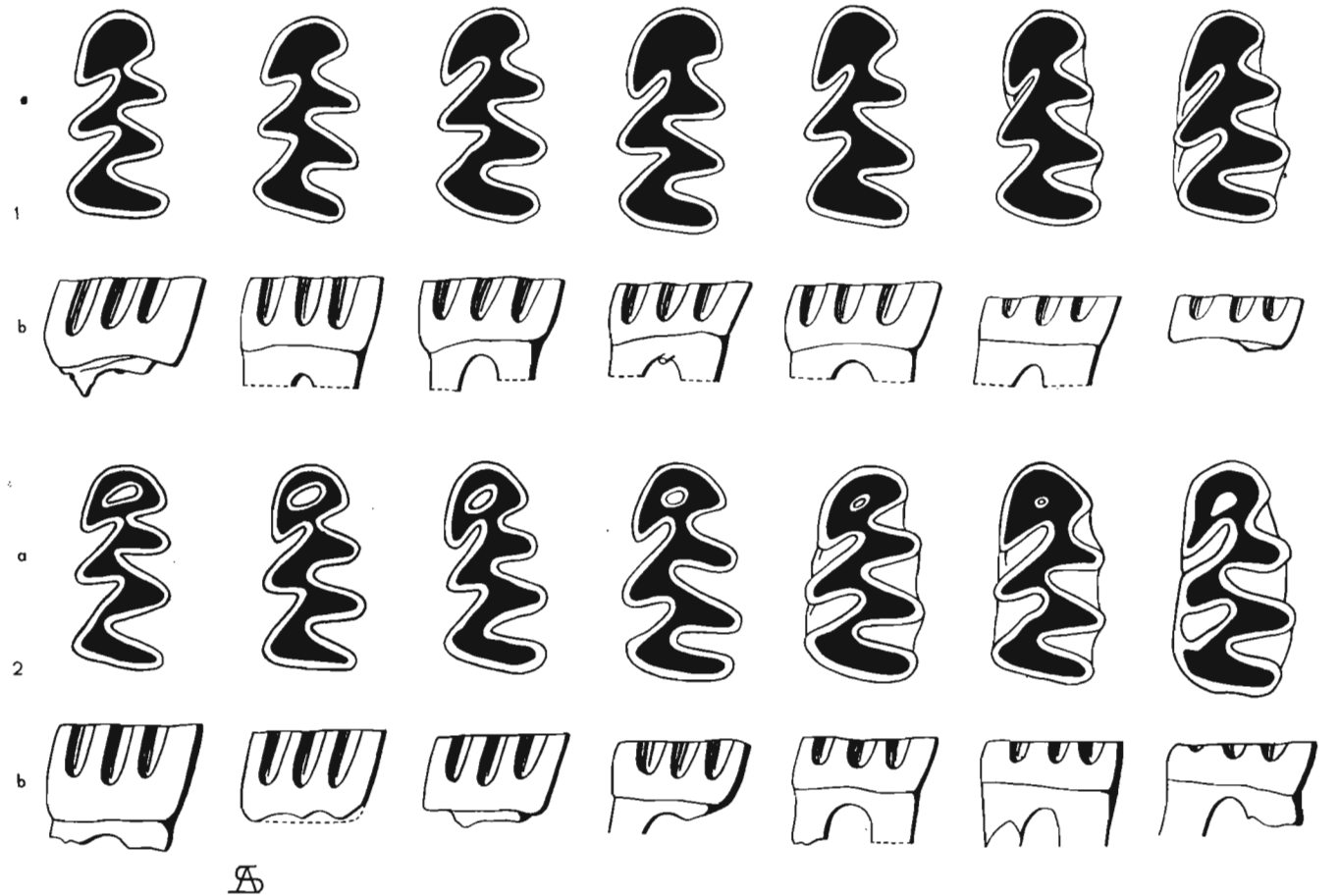

Fig. 16. — *Baranomys longidens* (Kowalski); Węże 1. *1* The population A: *a* M_1 series from young to old individuals, *b* the same, lingual view (M.Z. No. VIII/Vm-330/100); *2* The population B: *a* M_1 series from young to old individuals, *b* the same, lingual view (M. Z. No. VIII/Vm-330/100); fig. *1a*, *2a* ca. × 18, fig. *1b*, *2b* ca. × 13.

p. 187-188, text-fig. 8). The dimensions of teeth and structure of crowns, particularly of an anterior loop, speak in favour of their assignment to *B. longidens* (Kowalski).

Prosomys mimus Shotwell, described from the Pliocene fauna from Oregon (Hemphillian) (Shotwell, 1956, p. 732-733, text-fig. 5 F — 1-2) is considered by Kowalski (1960 *d*, p. 453, 456-457) as being a form „negligible and fit into ordinary infrageneric variations" (*l.c.*, p. 457) and it is assigned to the genus *Microtodon* Miller. This conclusion is based only on the similarity of the structure of M_1. This species, lacking M_2 and particularly M_3 which is of a great diagnostic importance, cannot be assigned to *Microtodon* Miller. Moreover, the rodent from Oregon differs from

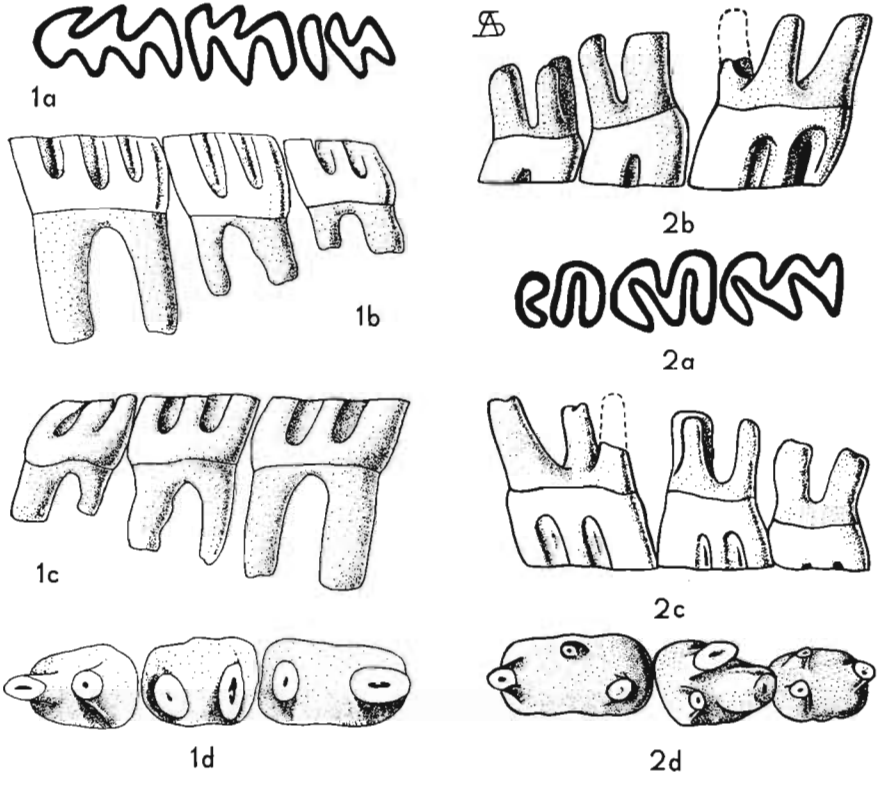

Fig. 17. — *Baranomys longidens* (Kowalski); Węże 1. *1* The tooth-row of M_1 — M_3: *a* occlusal view, *b* lingual view, *c* labial view, *d* root view (M.Z. No. VIII/Vm-330/15). *2* The tooth-row of M^1 — M^3: *a* occlusal view, *b* lingual view, *c* labial view, *d* root view (M.Z. No. VIII/Vm-330/13). ca. × 12.

B. longidens (Kowalski) in greater dimensions of teeth, in broad anterior loop of M_1 without an enamel islet, in the distribution of reentrant folds and enamel folds, particularly a deeply notched reentrant fold on M_1 and in the structure of the anterior and posterior loops on M_2. According

to Shotwell (*l.c.*, p. 733), *P. mimus* Shotwell is one of the primitive forms of the subfamily Microtinae Miller.

The studies on *Baranomys loczyi* Kormos, *B. longidens* (Kowalski) and on related forms, made thus far, spoke in favour of their being members of Cricetidae incertae sedis (Stehlin & Schaub, 1951; Schaub, 1958*a*; Kowalski, 1956, 1960*a*, 1960*d*). A three-looped structure of crowns in lower (in M_2 and also in M_3) and upper molars (M^1), high, rectiprismatic, microtoidal crowns with flat grinding surfaces and without cement, the structure of lower jaws and skulls and well developed roots indicate that they belong to a primitive group within Microtidae Cope. This conclusion coincides with the following opinion of Kretzoi: „*Microtodon* Miller, eine so mit Arvicoliden, wie mit der *Baranomys* Gruppe verbundene, aber auch an Hesperomyiden von Anatolomys-Gestalt erinnernde Primitiv-form der Arvicoliden darstellt" (Kretzoi, 1955*b*, p. 93).

The ecological character of the rodent, described from Węże 1 and *B. loczyi* Kormos, closely related with it, is unknown. It is presumed that, similarly to many Recent forms of Cricetidae, in the Pliocene, they inhabitated extensive steppe areas.

Subfamily **Microtinae** Miller, 1896
Genus *Ungaromys* Kormos, 1932
?Ungaromys sp.

Material. — Sixteen detached M_1 with various degrees of wear, 5 fragments of lower jaws with M_1 or M_2, as well as one jaw of old specimen with $M_1 — M_2$.

Description. — M_1 with a crown, consisting of an anterior and a posterior loop, two lingual and one labial triangles. The anterior loop in adult and old individuals without additional folds and reentrant folds on the frontal surface. Enamel fairly thick. In young individuals this loop has additional folds which, with an insignificant grinding of the crown, rapidly disappear. Besides anterior and posterior loops M_2 have two triangles of dentine on the lingual and labial sides, situated opposite one to another. All teeth with well developed roots. External reentrant folds of crowns without the cement.

Measurements of the lower jaw and dentition are given in Table 13.

Discussion. — The dimensions and structure of teeth, particularly of M_1, speak for the remains from Węże 1 belonging to one of the forms of the tribe Ellobini Simpson (Microtinae Miller). Scarce and incomplete materials, the lack of M_3 and the structure of the anterior loop of M_1, nontypical of the genus *Ungaromys* Kormos, do not allow for assigning it with certainty to this genus. Teeth with the same structure from Węże 1 were also described by Kowalski (1960*d*, p. 459, text-fig. 2 A,D,E).

A lower jaw with $M_1 — M_2$ from Gundersheim, Germany, was described as *Ungaromys nanus* Kormos (Heller, 1936, Pl. 10, fig. 5). In this specimen,

Table 13

? *Ungaromys* sp.

Measurements of t2e lower jaw and dentition (in mm)

M. Z. Cat. No. VIII/Vm-331 Jaw with teth		Detached teeth	Average	Number of specimens
Height below M^1	2.1	—	—	5
Thickness below M_1	1.2	—	—	5
Length of M_1—M_3	3.2	—	—	1
Length M_1	1.7	1.7—1.8	1.7	20
Wtdth M_1	0.9	0.8—1.0	1.0	20
Lenght M_3	1.4	1.3—1.4	1.4	3
Width M_3	0.9	0.9	0.9	3

the anterior loop of M_1 has, on its frontal surface, one labial fold and two reentrant folds. In addition to these characters, this tooth differs from *Germanomys weileri* Heller, also described in Heller's work, in smaller dimensions and in the structure of the anterior loop (*l.c.*, Pl. 10, fig. 6). The typical representative of *Ungaromys nanus* Kormos, described from Episkopia (Püspökfürdö), differs from the specimens, mentioned above, by its strongly developed anterior loop with a few tiny folds and furrows on its frontal surface and by a small, narrow M_3 with a strongly reduced posterior loop.

Genus *Germanomys* Heller, 1936
Germanomys weileri Heller, 1936

1936. *Germanomys weileri* n.g., n.sp.; F. Heller, Eine oberpliozäne..., p. 130—131, pl. 10, fig. 6.

1960d. *Ungaromys weileri* (Heller); K. Kowalski, Cricetidae and Microtidae..., p. 458-461, text-fig. 2C. Partim.

1961b. *Germanomys weileri* Heller; O. Fejfar, Die plio-pleistozänen..., p. 63-64, pl. 5, figs. 1-2; text-fig. 9 a, d.

1961b. *Germanomys helleri* n.sp.; O. Fejfar, *Ibid.*, p. 64-66, pl. 16, fig. 3-4; text-fig. 7 a-c, 8 a-b.

Material. — Six fragments of lower jaws with $M_1 — M_3$ or $M_1 — M_2$ 12 other jaws with single teeth, about 100 detached molars, in this number 22 M_1, 10 M_3, as well as fairly numerous incisors. The fact of several fragments of upper jaws and detached upper molars belonging to this species is not certain.

Description. — The lower incisor passes between the roots of M_2 and M_3. The lower jaw small with a shortened incisor and short diasteme. The mental foramen in front of the anterior root of M_1. Molars have no cement in their reentrant folds. The thickness of enamel in molars —

moderate. Roots early developing. Molar crowns with fairly broad reentrant folds and enamel folds. M_1 with two labial folds and two labial reentrant folds, as well as with three lingual folds and three lingual reentrant folds. Fields of dentine in triangles slightly closed. In adult individuals the anterior loop of M_1 has, on its labial side, a larger posterior and smaller anterior fold, as well as a not too deep reentrant fold, situated between them. This loop has also, on its lingual side, a larger posterior and smaller anterior fold, as well as a slightly deeper reentrant fold, situated between them. Behind the anterior loop, the connection with further fields of dentine is narrow. Labial and lingual reentrant folds are fairly broad, deep and proximally notched. M_2 with three folds and two reentrant folds on the labial and lingual sides respectively. Dentine fields and enamel prisms opposite one to another. M_3 is similar to M_2 in the structure of the crown but narrower and its posterior loop is not reduced and laterally bent.

The fact of these fragments of upper jaws and detached teeth belonging to *Germanomys weileri* Heller is, despite their approximately the same dimensions, uncertain. This uncertainty is caused primarily by the dispersion of the remains of the lower and upper jaws and by the lack of a complete upper dentition. M^1, similarly to the majority of forms of the Microtinae Miller, has three folds and three reentrant folds on each side, as well as three roots and a relatively thick enamel. Three detached M^3 have not enamel islets and their posterior loops are strongly reduced. Perhaps, these teeth belong to detached jaws. There are no teeth with cement in their reentrant folds.

Measurements of the lower jaws and their dentition are given in Table 14.

Table 14

Germanomys weileri Heller

Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-332			Detached teeth	Modal value	Number of specimens
Jaws with teeth					
Height below M_1		2.4—2.6	—	2.4	18
Thickness below M_1		1.4—1.6	—	1.5	18
Length of M_1—M_3		4.9—5.4	—	—	2
Length	M_1	1.8—2.1	1.8—2.4	2.0	67
Width		1.0—1.1	1.0—1.2	1.1	
Length	M_2	1.5—1.7	1.5—1.7	1.7	47
Width		1.0—1.1	1.0—1.2	1.1	
Legth	M_3	1.2—1.4	1.2—1.4	1.3	12
Width		0.8—1.0	0.8—1.0	0.9	

Discussion. — The structure of the anterior loop of M_1 in most specimens (adult individuals), the dimensions of lower jaws and teeth allow one to assign the Węże 1 remains to *Germanomys weileri* Heller, described from Gundersheim (Heller, 1936, p. 130-131, Pl. 10, fig. 6). Some specimens, determined by Kowalski as *Ungaromys weileri* (Heller) (Kowalski, 1960*d*, text-fig. 2C), belong to the species, described above since the structure of the anterior loop of M_1, typical of *G. weileri* Heller, is one of their characters. In addition, the same species should also comprise the specimens from Ivanovce near Trenčin, described as *G. helleri* Fejfar (Fejfar, 1961*b*, Pl. 16, fig. 3-4; text-fig. 7 a-c, 8 a-b). The specimens of M_1 in this species have not any more important characters in which they would differ from M_1 in *G. weileri* Heller. Besides, in their structure and dimensions they are fully conformable with specimens from Węże 1, described here. Insignificant differences between them are only a result of an individual and, probably, ontogenetic variability. The additional folds on the mesio-labial side of M_1 are transitory in character and, on more intensively worn teeth, the outline of the enamel loops is, in these specimens, identical with that in the Gundersheim type and in the Węże 1 specimens. The specimens, described here, differ from *G. trilobodon* (Kowalski) primarily by the structure of the anterior loop of M_1, by more extended reentrant folds of molars and by the structure of M_3. In the structure of M_1 and M_3, *Germanomys weileri* Heller, similarly to *G. trilobodon* (Kowalski), is closely related with the Recent *Prometheomys schaposchnikovi* Satunin. According to Heller (1936, p. 131), the genus *Germanomys* Heller is a side branch of the main development line of the *Mimomys* group.

Germanomys trilobodon (Kowalski, 1960)
(Text-fig. 18)

1960d. *Stachomys trilobodon* n.gen., n.sp.; K. Kowalski, Cricetidae and Microtidae..., p. 461-465, pl. 60; text-fig. 3 A-B, D-G; 4 A-J.
1960d. *Ungaromys weileri* (Heller); K. Kowalski, *Ibid.*, p. 458-461, text-fig. 2B. Partim.
1961b. *Leucaristomys vagui* n.gen., n.sp.; O. Fejfar, Die plio-pleistozänen..., p. 60-62, pl. 16, fig. 5; text-fig. 5 b, d, 6 c.

Material. — Five left and right lower jaws with I — M_3, 26 other fragments of jaws with M_1, M_2 — M_3 or M_1 — M_2, 3 fragments of upper jaws with incomplete dentition, numerous detached molars and incisors of both upper and lower jaws.

Description. — The description of lower and upper jaws and their dentition was given by Kowalski (1960*d*, p. 461-465). Besides, the analysis of the structure of a numerous series of detached M_1, found in the material, described here, shows considerable changes in the configuration of the anterior loop, related with the individual and ontogenetic variability. In

young individuals this loop is as a rule "three-lobed" in shape, the medial lobe being longer than the lateral ones and lingually deflected. Moreover, this loop is often more complex in structure. In addition to principal lobes, small enamel folds occur which disappear during the gradual abrasion. After grinding of the crown to the half of its height, the "three-lobed" system of the loop appears once more (Text-fig. 18c; cross sections 5-7). In nontypical specimens, the medial lobe is shortened and,

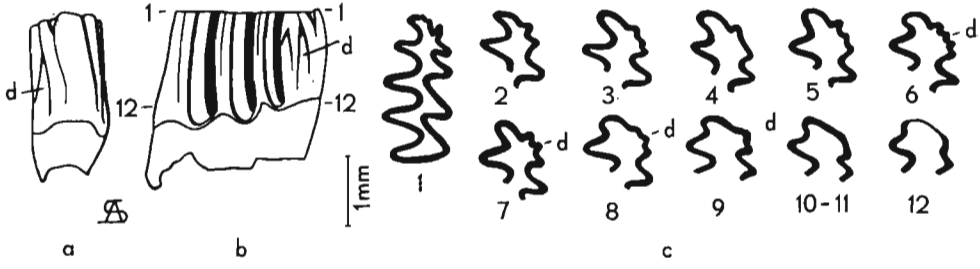

Fig. 18. — *Germanomys trilobodon* (Kowalski); Węże 1. Right M_1: *a* frontal view, *b* labial view, *c* a series of cross sections (1-12). Designation: *d* repeated fold.

together with side folds, forms a flattened and diagonal cap. In specimens with strongly ground teeth, the anterior loop of M_1 extends, forming broad and fairly high loops, resembling by their shapes the anterior loop in corresponding specimens of *G. weileri* Heller. In such cases, the adult individuals of *G. weileri* Heller and *G. trilobodon* (Kowalski) differ one from the other by a mean length of M_1. M_3 in the species discussed has a less reduced posterior loop, the posterior end of which is not pointed backwards.

Measurements of the lower and upper jaws and their dentition are given in Table 15.

Table 15

Germanomys trilobodon (Kowalski)

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-333 Jaws with teeth		Detached teeth	Modal value	Number of specimens
Height below M_1	2.4—2.7	—	2.6	30
Thickness below M_1	1.4—1.8	—	1.7	30
Length of M_1—M_3	5.6—6.6	—	—	5
Length M_1	2.2—2.5	2.1—2.6	2.4	119
Width M_1	1.0—1.1	0.9—1.3	1.2	
Length of M_2	1.5—1.8	1.4—1.9	1.8	92
Length M_3	1.2—1.4	1.2—1.4	1.4	31
Width M_3	0.8—1.0	0.8—1.0	1.0	

B. Measurements of the upper jaws and their dentition (in mm)

Length of M^1—M^3		5.2—5.8	—	—	2
Length of M^1—M^2		4.1	—	—	1
Length	M^1	2.0—2.5	2.0—2.6	2.5	86
Width		1.0—1.2	1.0—1.3	1.2	
Length of M^2		1.5—1.9	1.4—1.9	1.8	68
Length	M^3	1.5—1.7	1.4—1.8	1.6	16
Width		0.8—1.0	0.8—1.1	1.0	

Discussion. — The rodent, described here, was determined by Kowalski (1960*d*) as *Stachomys trilobodon.* The diagnosis given by him was based on the structure of the anterior loop and the structure of M_1 and M^3. A series of sections, made on a few specimens of M_1, coming from young individuals (Text-fig. 18 *a-c*) shows that in more intensively ground crowns, the anterior loop acquires the same or very similar shape as in adult individuals of *Germanomys weileri* Heller. Some similarities are also observed in the structure of M_3 and M^3. Accordingly, the specimens, described by Kowalski as *Stachomys trilobodon* should be considered congeneric with the *Germanomys* Heller.

A new genus and species, *Leucaristomys vagui* Fejfar (Fejfar, 1961*b*, p. 60-62, Pl. 16, fig. 5, text-fig. 5 b, d, 6 c) has also been described from Ivanovce near Trenčin. Detached M_1 and M^3, are, in their dimensions and morphology, in full conformity with corresponding teeth of *G. trilobodon* (Kowalski). This is marked primarily in the structure of the anterior loop of M_1 and, therefore, specimens described as *Leucaristomys vagui* Fejfar should be assigned to *Germanomys trilobodon* (Kowalski). The latter, together with *G. weileri* Heller, can be considered ancestors of the Recent Caucasian *Prometheomys schaposchnikovi* Satunin.

?*Germanomys* sp.
(Text-fig. 19)

Material. — Thirty six detached molars, in this number 24 M_1 and 12 M_2.

Description. — M_1 with a structure of its anterior loop nontypical of the *Germanomys* Heller. A series of sections, made on a few specimens, shows that this loop, in specimens with little ground crowns (a crown about 2.0 mm high), has an anterior lobe strongly elongated and antero-lingually deflected. On the labial side, this lobe is uneven and provided with additional small enamel folds. Moreover, in some specimens, two mesio-labial, fairly large folds occur, resembling labial folds, recorded in the genus *Mimomys* F. Major („Mimomys- und Prismenkante"). In adult individuals (crowns about 1.5 mm high), these folds are completely

reduced, while the anterior lobe remains unchanged. Its shape and position does not change even on strongly ground crowns. In old individuals (crowns about 0.5—0.7 mm high), the anterior loop changes as a whole but the anterior lobe and the reentrant fold, situated behind it, are still distinctly visible and the antero-labial reentrant fold becomes level. The remaining reentrant folds and enamel folds do not change their

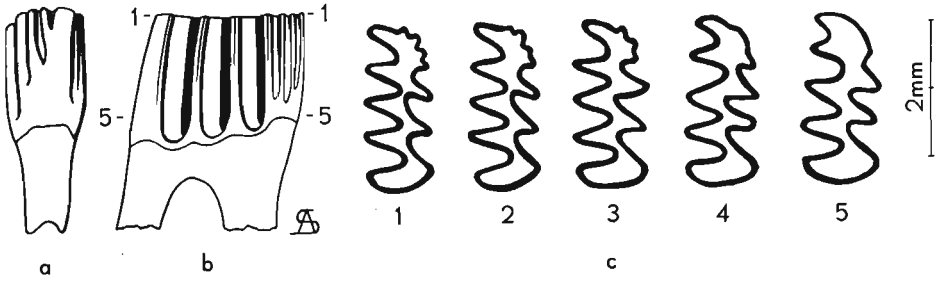

Fig. 19. — *?Germanomys* sp.; Węże 1. Right M_1: *a* frontal view, *b* labial view, *c* a series of cross sections (1-5).

position and shape during the abrasion of the crowns. In strongly ground crowns, the external reentrant folds become shallow and the enamel, surrounding the triangles, grows bigger.

Measurements of the detached lower teeth are given in Table 16.

Table 16

?Germanomys sp.

Measurements of the lower detached teeth (in mm)

M. Z. Cat. No. VIII/Vm-334			Average	Number of specimens
Length	M_1	2.3—2.7	2.5	24
Width		0.9—1.3	1.2	
Length of M_2		1.5—1.8	1.7	12

Discussion. — Fairly numerous M_1, described here, resemble, by the structure of their anterior loop, M_1 in *Pliomys proavius* Heller, described from Erpfingen (Heller, 1958, p. 53, fig. 27), or some of M_1 in *Pliomys lenki* (Heller) (*l.c.*, p. 48, fig. 20). However, they differ from them by the lack of two triangles, 6 and 7. The distribution of the remaining enamel loops is related in all the forms mentioned above. The reentrant folds are fairly broad, rounded and without any deep notches.

An M_1 with the structure of the anterior loop and the structure of the entire crown identical with those in specimens, described here, was mentioned by Kowalski in his description of *Stachomys trilobodon* Kowalski (Kowalski, 1960d, text-fig. 3C). The specimens, described here,

differ from the remaining specimens of *G. trilobodon* (Kowalski) in having a permanent, strongly bent antero-lingual lobe, a deep antero-labial reentrant fold and additional labial folds. And finally, the dimensions of teeth are more or less in accordance with the dimensions of M_1 and M_2 in *G. trilobodon* (Kowalski) and *G. weileri* Heller. The absence of the remaining dentition (especially upper one) from the material available does not allow one to determine a proper genus to which these teeth should be attributed.

Genus *Dolomys* Nehring, 1898
Dolomys cf. *hungaricus* Kormos, 1934
(Pl. IX, fig. 1-7; text-fig. 20)

Material. — Sixty five fragments of lower jaws with various numbers of teeth, including 15 with M_1 — M_3, 5 fragments of upper jaws with incomplete dentition and about 750 detached molars of both jaws, in this number 180 M_1.

Description. — The structure of lower jaws and molars, the position of the lower incisor in relation to M_2, the number and arrangement of the enamel loop (absence of cement from reentrant folds, early developing roots, etc.) are in conformity with Kowalski's (1960 *a, d*) description. Besides, in the series of M_1, investigated here, it has been found that the anterior loop is short, diagonally situated and — only in single specimens,

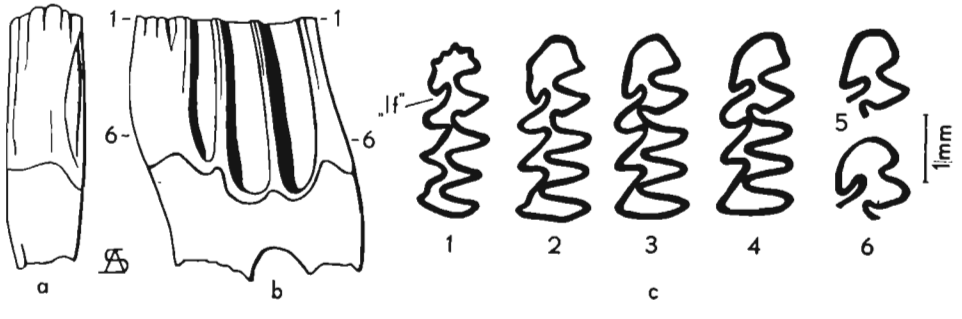

Fig. 20. — *Dolomys* cf. *hungaricus* Kormos; Węże 1. Left M_1: *a* frontal view, *b* labial view, *c* a series of cross sections (1-6). Designation: *„If"* „islet fold".

coming from very young individuals — with a slightly marked lingual reentrant fold. With an insignificant abrasion of the crown, this reentrant fold completely disappears and, in almost all specimens of M_1, the anterior loop is semicircular in shape. And finally, the fields of triangles 1 and 2 on M_1 are mostly connected one to the other by a broad isthmus.

Numerous detached upper molars and a few fragments of jaws without teeth, occurring in this material, can be hardly assigned for a certainty to the species described. This also applies to the materials, presented by Kowalski (1960*d*).

Measurements of the lower jaws and their dentition are given in Table 17.

Table 17

Dolomys cf. *hungaricus* Kormos
Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-335 Jaws with teeth		Detached teeth	Modal value	Number of specimens
Height below M_1	2.9—3.5	—	3.3	65
Thickness below M_1	2.5—3.1	—	2.7	65
Length of M_1—M_3	5.8—6.8	—	6.5	15
Length M_1	2.8—3.0	2.7—3.3	3.0	225
Width M_1	1.3—1.4	1.2—1.4	1.4	
Length of M_2	1.7—2.0	1.6—2.1	2.0	190
Length of M_3	1.5—1.7	1.3—1.8	1.6	110

Discussion. — *Dolomys hungaricus* Kormos was first described from Csarnóta 2, Hungary (Kormos, 1934*a*, fig. 46). A lower jaw of a young individual with M_1 — M_3, described by Méhely (1914, Pl. 2, fig. 9), was also attributed to this species. An antero-posterior elongation of the anterior loop can be observed in the structure of M_1 in these specimens. This loop is bilaterally notched by shallow side reentrant folds and the antero-lingual and antero-labial reentrant folds, dividing this loop, are alternate one to the other. In addition, the dentine fields of the last but one loop are, like the first and second pair of triangles of M_2 and M_3, connected one to the other and the internal angle of the reentrant folds is not extended anteriorly.

The specimens of *Dolomys* cf. *hungaricus* Kormos from Węże 1 and *D. hungaricus* Kormos from Csarnóta 2 distinctly differ from *Dolomys dalmatinus* Kormos (Kormos, 1931a; Kowalski, 1958*b*), described from the Pleistocene fauna, found at Podumci, in smaller dimensions of their teeth, narrower reentrant folds and enamel folds, as well as in simpler structure of the anterior loop of M_1.

The anterior loop of *Pliomys lenki* (Heller), described from the Pleistocene fauna from Erpfingen (Heller, 1958, fig. 13), is bilaterally notched and antero-posteriorly elongated; the antero-lingual and antero-labial reentrant folds, separating the anterior loop, are alternate one to the other. The identical situation of the loops is also observed in *Dolomys hungaricus* Kormos from Csarnóta 2. Attention was also drawn by Kormos to the above similarities between the genera *Dolomys* Nehring and *Pliomys* Méhely.

The systematic position of *Dolomys hungaricus* Kormos was questioned several times, the similarities to the genus *Pliomys* Méhely, mentio-

ned above, being precisely the cause of these doubts. Different versions of the name of this species were given by Kretzoi (1955*a*, 1955*b*, 1956) such as, for instance, *Pliomys(?) hungaricus* (Kormos), *Dolomys(?) hungaricus* Kormos, *Dolomys hungaricus* Kormos, etc. Finally, in his description of the Pliocene fauna from Csarnóta 2 (Kretzoi, 1959, p. 243), he defined it as *Propliomys hungaricus* (Kormos). The specimens of M_1, described by him, morphologically do not differ from the structure of this tooth in *Dolomys nehringi* Kretzoi and *D. milleri* (Nehring). This is confirmed by the comparison of the M_1 specimens of *Propliomys hungaricus* (Kormos) from Csarnóta 2 (received by the author of the present work on an exchange basis) with illustrations, depicting *D. milleri* (Nehring) (Méhely, 1914, Pl. 2, fig. 8). Numerous detached M_1 from Węże 1 differ distinctly from the teeth of *Propliomys hungaricus* (Kormos) in the lack of a distinct and deep antero-lingual reentrant fold on the anterior loop. In a series of sections (Text-fig. 20 *a-c*) made on a few M_1, coming from very young individuals in which the enamel traces are still preserved on the grinding surface, the trace of the antero-lingual reentrant fold is observed only on three teeth. On many other teeth, the crowns of which are still high, this reentrant fold does not occur at all. In another section (Text-fig. 20*c*) made very near the grinding surface, the reentrant fold, mentioned above, cannot be observed.

The antero-lingual reentrant fold in *Propliomys hungaricus* (Kormos) is much deeper and reaches half-way the crown height. This is characteristic also of *Dolomys milleri* (Nehring) and *D. nehringi* Kretzoi.

A complete row of the M_1 — M_3 teeth, belonging to a young individual of *D.* cf. *hungaricus* Kormos, was presented by Kowalski (1960, fig. 5C). M_1 of this individual has an anterior loop short and much narrower than the remaining triangles of enamel, considered as a total. The slightly marked antero-lingual reentrant fold is probably shallow in this tooth and rapidly disappears after a slight abrasion of the crown.

It is only on a few specimens of M_1 in the material from Węże 1 that a slightly marked labial folds are observed resembling corresponding ones in species of the genus *Mimomys* F. Major ("Mimomyskante und Prismenfalte"). These folds are, however, not lasting and disappear after a slight abrasion of the crowns. According to Kowalski (1960*d*) and Thaler (1962*b*), these folds related the species described with primitive forms of the genus *Mimomys* F. Major (for instance, with *M.* cf. *stehlini* Kormos).

Dolomys cf. *nehringi* Kretzoi, 1959
(Pl. IX, fig. 8)

Material. — Four M_1 and a fragment of a lower jaw with M_1 — M_2.

Description. — The crowns of M_1 are slightly worn. A lingual notch is marked on the anterior loop of one specimen (Pl. IX, fig. 8). The labial

and lingual folds, separating the anterior loop from the rest of the crown, are alternate one to the other. In specimens with strongly ground crowns, these reentrant folds contact each other. On the remaining part of the crown the lingual reentrant folds are deeper than the labial ones and almost perpendicular to the longitudinal axis of the tooth, while the labial reentrant folds are pointed anteriorly. The posterior walls of the lingual reentrant folds are almost straight and antero-convex. The crown enamel is fairly broad. The dentine fields of the last but one loop (triangles 1 and 2) are connected by a broad isthmus. The remaining fields of triangles are usually closed. M_2 has three folds and two reentrant folds on each side. The reentrant folds of M_1 and M_2 are without cement. The roots are of an early developing type.

Measurements of the lower jaws and their dentition are given in Table 18.

Table 18

Dolomys cf. *nehringi* Kretzoi
Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-336 Jaws with teeth		Detached teeth	Number of specimens
Height below M_1	4.5	—	1
Thickness below M_1	2.8	—	1
Length of M_1—M_2	6.2	—	1
Length M_1	3.4	3.4—3.5	5
Width M_1	1.6	1.5—1.6	5
Length of M_2	2.4	—	1

Discussion. — *Dolomys nehringi* Kretzoi was described from the Upper Pliocene fauna from Csarnóta 2, Hungary (Kretzoi, 1959, p. 242-243). The M_1 specimens from Węże 1 are, in their dimensions, identical with M_1 of this species. For lack of a distinct lingual reentrant fold on the anterior loop of M_1 and a broad connection between triangles 3 and 4 on these specimens, they cannot be for certain assigned to *D. nehringi* Kretzoi. Besides, on M_1 of a young individual, the anterior loop is shortened and anteriorly flattened. Such a loop also occurs in *D.* cf. *hungaricus* Kormos and, therefore, the antero-lingual reentrant fold is in this species slightly marked and, in addition, it occurs in young individuals. The specimens from Węże 1 are related to *D. nehringi* Kretzoi also in such characters as, the reentrant folds alternately arranged behind the anterior loop, broad connection of triangles 1 and 2, as well as in dimensions.

Genus *Mimomys* F. Major, 1902
Mimomys cf. *stehlini* Kormos, 1931
(Pl. IX, fig. 12-14; text-fig. 21)

Material. — Forty two left and right lower jaws, in this number 8 with M_1 — M_3, numerous (about 800) detached molars and incisors of both jaws. Upper jaws with various numbers of teeth *in situ* (a few fragments) probably belong to this species.

Description. — The position of the lower incisor in relation to M_2, the structure of M_1, M^3 and other teeth of an upper and lower jaw are the same as in the specimens, described by Kowalski (1960*d*) from this same locality and conform with specimens, coming from Rębielice Królewskie (Kowalski, 1960*a*). Differences, occurring in the structure of the anterior loop of M_1, in enamel loops of remaining teeth and in the structure of lower jaws are related with a considerable individual variability and ontogenetic development. Besides folds typical of *Mimomys* F. Major, occurring on the labial side, M_1 has additional anterior enamel folds

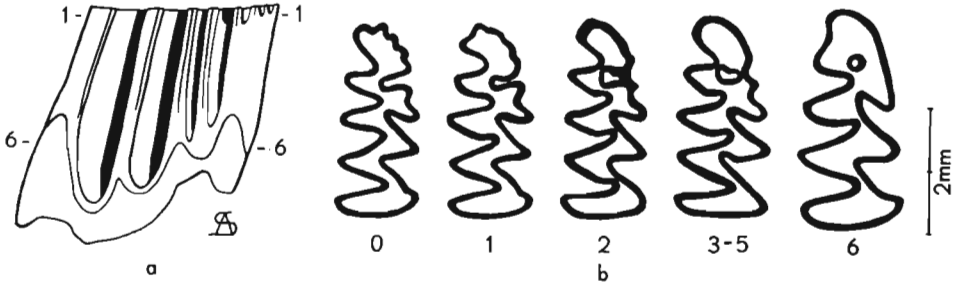

Fig. 21. — *Mimomys* cf. *stehlini* Kormos; Węże 1. Left M_1: *a* frontal view, b a series of cross sections (0-6).

recorded only in young and absent from adult individuals. The surface of this part of the loops is smooth. In very young individuals, the anterior lobe of M_1 has, on the anterior loop, an lingual, small and shallow reentrant fold. This reentrant fold, similarly to the additional labial fold, disappears rapidly. The enamel islet takes various positions on the anterior loop of M_1, depending on the degree of the crown wear (from the sagittal-vertical to the horizontal and lateral positions) and may have various shapes (from round to ellipsoidal and even crescent). M^3 is, in this species, as a rule three-rooted, although, sometimes, the coalescence of the two posterior roots is also recorded. The arrangement of enamel islets and enamel loops on this tooth is variable and depends on both the individual variability and ontogenetic development. Two islets of enamel, on the anterior and posterior parts of the crown, occur as a rule in adult individuals. In young individuals, a deeply notched labial reentrant fold is observed instead of the anterior islet. No traces

of cement were recorded in the lingual and labial reentrant folds both in lower and upper molars.

Measurements of the lower and upper jaws and their dentition are given in Table 19.

Table 19

Mimomys cf. *stehlini* Kormos

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-337 Jaws with teeth		Detached teeth	Modal value	Number of specimens
Height below M_1	3.1—4.0	—	3.6	42
Thickness below M_1	2.6—3.3	—	2.8	42
Length of M_1—M_3	5.8—6.7	—	—	8
Length M_1	2.7—3.3	2.6—3.5	3.0	248
Width M_1	1.2—1.5	1.2—1.7	1.5	
Length of M_2	1.8—2.5	1.7—2.6	2.4	184
Length of M_3	1.5—1.8	1.4—2.0	1.7	87

B. Measurements of upper jaws and their dentition (in mm)

Length of M^1—M^3	6.3—6.7	—	—	3
Length M^1	3.0—3.2	2.8—3.4	3.0	192
Width M^1	1.3—1.5	1.2—1.7	1.6	
Length of M^2	1.7—2.2	1.6—2.5	2.2	137
Length of M^3	1.4—1.7	1.4—1.9	1.6	61

Discussion. — The description of the type *Mimomys stehlini* Kormos was based on two lower jaws, one with $I — M_3$, the other with $M_1 — M_3$ (Kormos, 1931*b*, Pl. 13, fig. 12), coming from the Middle Pliocene fauna of the lower Val d'Arno (San Giusto) (Stehlin, 1923*b*; Schaub, 1944). The uncertainty of the systematic position of the Węże 1 rodent results from differences in the structure of the anterior loop of M_1. In specimens from San Giusto, the lingual side of this loop has a distinct, deep and broad reentrant fold and the anterior lobe itself is narrow and antero-posteriorly extended. This reentrant fold and the narrowed anterior lobe on M_1 from Węże 1 occur only in very young individuals, while in most specimens, undoubtedly adult ones, such reentrant fold is missing and the anterior lobe is broad, rounded and lingually deflected. Besides, in specimens from San Giusto, the triangle dentine fields are, between the anterior and posterior loop, connected to each other by broad isthmi, while in the Węże 1 specimens, only triangles 1 and 2 have broad connections and triangle 3 is almost completely closed.

According to Kowalski (1960*d*, p. 179), *M. stehlini* Kormos should comprise specimens from Arcille and Sète, described as *M. pliocaenicus* (Major) (Friant, 1953, 1954; Hinton, 1954) and, until recently, considered by Thaler (1955, 1956) to be a new species *M. occitanus* Thaler. At present, the latter author agrees with Kowalski's opinion and attributes the specimens from Sète to *M.* cf. *stehlini* Kormos (Thaler, 1962*a, b*).

Mimomys hassiacus Heller, described from the Upper Pliocene fauna from Gundersheim (Heller, 1936, Pl. 10, fig. 11), is also considered by Kowalski conspecific with *M. stehlini* Kormos since, in his opinion, there is a conformity of the tooth dimensions and of the morphology with those of the specimens from San Giusto. Judging from illustrations, the specimen from Gundersheim belongs to an adult individual. There is no antero-labial reentrant fold on the anterior loop of M_1 and the configuration of the loop is identical with that of the Węże 1 specimens. This also applies to the structure of M_2 and particularly M^3, the latter having three roots.

A series of sections (Text-fig. 21 *a-b*) based on a few M_1, belonging to very young individuals (traces of enamel on the grinding surface!), shows that the antero-lingual reentrant fold on the anterior loop of M_1 is very shallow and rapidly disappears even after a slight crown abrasion. This reentrant fold in the specimens from San Giusto is deep and, in adult individuals, probably occurs for a long time (Kormos, 1931*b*, fig. 12).

The enamel islet in the Węże 1 specimens forms about 0.2—0.4 mm from the grinding surface and the folds, characteristic of *Mimomys* F. Major, occur even in specimens with strongly worn crowns.

Mimomys hassiacus var. *atavus* Fejfar, described from the Plio-pleistocene fauna from Ivanovce near Trenčin (Fejfar, 1961*b*, p. 58, fig. 5a) is known by one M_1 and one M^3. These specimens, in respect both to the dimensions and morphology, are in conformity with respective teeth in *M.* cf. *stehlini* Kormos from Węże 1 and, therefore, *M. hassiacus* var. *atavus* Fejfar is considered conspecific with *M.* cf. *stehlini* Kormos.

Mimomys gracilis (Kretzoi, 1959)

(Pl. IX, fig. 9-11; text-fig. 22)

1959. *Cseria gracilis* n.g., n.sp.; M. Kretzoi, Insektivoren..., p. 242.

1960*d*. *Mimomys gracilis* (Kretzoi), K. Kowalski, Cricetidae and Microtidae..., p. 476-479; pl. 63, fig. 1, pl. 64; text-fig. 9, 10.

1961*d*. *Mimomys prošeki* n.sp.; O. Fejfar, Die plio-pleistozänen..., p. 55-57. pl. 17, fig. 3-4, pl. 18, fig. 1-2; text-fig. 3 c, e; 6 a, e.

Material. — Twenty six left and right lower jaws with $M_1 — M_3$ or $I — M_3$, 50 fragments of jaws with various numbers of teeth *in situ*, very numerous detached molars and incisors of both jaws (about 900),

in this number 215 M_1 and 62 M^3, as well as several fragments of upper jaws, among them two rostral parts of skulls with full dentition.

Description. — The position of the lower incisor in the relation to M_2, the structure of M_1 and of the remaining teeth of both jaws are in conformity with Kretzoi's (1959, p. 242) and Kowalski's (1960*d*, p. 476-479) descriptions and with comparative specimens, from Csarnóta 2. A series of sections (Text-fig. 22 *a*-*c*) made on a few M_1, shows that the enamel islet forms relatively early since it is situated about 0.3—0.4 mm from the grinding surface and, in adult individuals, takes as a rule a sagittal position. The remaining elements of M_1 are identical with those in the Hungarian specimens and in the specimens, described by Kowalski. In

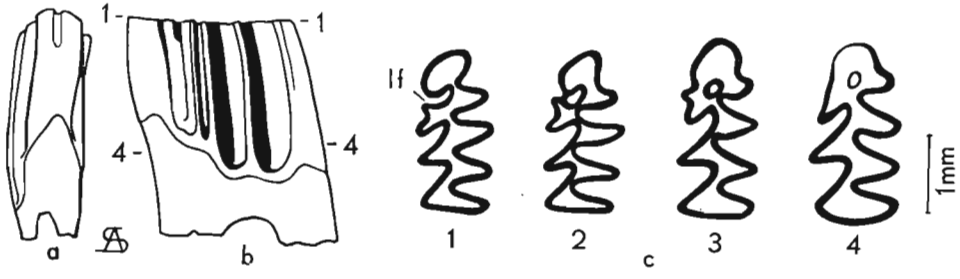

Fig. 22. — *Mimomys gracilis* (Kretzoi); Węże 1. Left M_1: *a* frontal view, *b* labial view, *c* a series of cross sections (1-4).

addition to folds, characteristic of *Mimomys* F. Major, a small, additional fold occurs on the same side of the crown, disappearing with the gradual abrasion of the latter. M_3 in the Węże 1 specimens shows a more distinct contraction of the lingual and labial folds. The structure of the enamel loops and upper dentition dentine fields is in the collection, described here, identical with the specimens, discussed by Kowalski (1960*d*, text-fig. 10). In a large series of detached M^3, a more distinct variability can be observed in the structure of crowns. This applies to the shape, size and situation of enamel islets of both parts of the crown. These islets are, as a rule, formed late since, in considerably worn teeth, belonging to adult animals, open and deep reentrant folds can still be observed in places where islets are situated.

Measurements of the lower and upper jaws and their dentition are given in Table 20.

Discussion. — The species, described here, was mentioned for the first time from the Pliocene fauna from Csarnóta 2, Hungary, as *Cseria gracilis* Kretzoi (Kretzoi, 1959, p. 242). On the basis of a typical structure of its M_1, it was assigned by Kowalski, (1960*d*, p. 476-479) to the genus *Mimomys* F. Major. *Mimomys gracilis* (Kretzoi) differs from forms related with it and belonging to this genus (e.g., *M.* cf. *stehlini* Kormos) in distinctly smaller dimensions of its teeth and jaws. Besides, the struc-

Table 20

Mimomys gracilis Kretzoi

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-338 Jaws with teeth		Detached teeth	Modal value	Number of specimens
Height below M_1	2.2—3.2	—	2.9	70
Thickness below M_1	2.2—2.7	—	2.5	76
Length of M_1—M_3	4.7—5.7	—	5.2	26
Length M_1	2.1—2.7	2.0—2.8	2.4	282
Width M_1	1.0—1.3	0.9—1.4	1.1	
Length of M_2	1.5—1.8	1.4—2.0	1.6	235
Length of M_3	1.1—1.6	1.1—1.8	1.4	129

B. Measurements of the upper jaws and their dentition (in mm)

Length of M^1—M^3	5.0—5.6	—	—	4
Length M^1	2.0—2.4	2.0—2.5	2.4	209
Width M^1	0.9—1.3	0.9—1.4	1.2	
Length of M^2	1.6—1.8	1.5—1.9	1.7	157
Length of M^3	1.4—1.5	1.3—1.7	1.5	68

ture of M^3 and an additional fold on the mesio-labial side of the anterior loop of M_1 are characteristic of this species.

Mimomys orientalis Young, described from the early Pleistocene fauna of Northern China (Shansi and Honan) (Young, 1935), differs from the species *M.* cf. *stehlini* Kormos and *M. gracilis* (Kretzoi), besides its dimensions, in a characteristic, very complex structure of the anterior loop of M_1.

Mimomys prošeki Fejfar, described from the Plio-Pleistocene fauna of Ivanovce near Trenčin (Fejfar, 1961b, p. 53, fig. 3 *b, c*), is known only by one M_1 and one M^3. Both in their dimensions and structure, these specimens are in conformity with corresponding teeth of *M. gracilis* (Kretzoi) from Węże 1 and Csarnóta 2. Accordingly, this species should be considered a synonym of *M. gracilis* (Kretzoi).

? *Mimomys* sp.

(Pl. IX, fig. 15, 16; text-fig. 23)

Material. — Five fragments of lower jaws with M_1 — M_3 and M_2 — M_3, 75 detached lower molars, including 34 M_1, 26 M_2 and 15 M_3.

Description. — Among numerous lower jaws and detached molars, some number of remains were found with the following characters: M_1 having a strong anterior loop with two alternate reentrant folds. In

young individuals, the labial reentrant fold is deep and distinctly pointed anteriorly. In adult individuals, this reentrant fold is closed about 0.4 mm from the grinding surface, forming a dentine islet inside the dentine field. In young individuals, the antero-mesial surface of the anterior loop is folded and, with the abrasion of the crown, becomes ever smoother. On the remaining part of the M_1 crown, the labial and lingual reentrant folds are alternate to each other, the latter being deeper than the former. Posterior walls of the lingual reentrant folds are straight or slightly

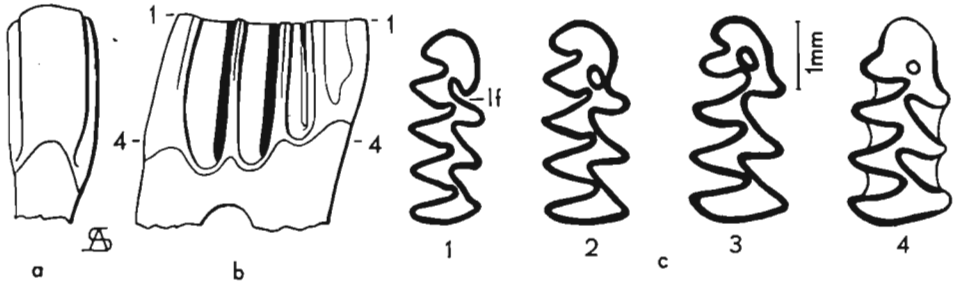

Fig. 23. — *?Mimomys* sp.; Węże 1. Right M_1: *a* frontal view, *b* labial view, *c* a series of cross sections (1-4). Designation: *If* islet fold.

concave and anterior — convex. The second reentrant fold of this side of the crown is deeply notched. No cement is recorded in the reentrant folds on both sides and the enamel in the loops is moderate in thickness. The enamel islet disappears as a rule from teeth with strongly ground crowns and, if still present, it is situated on the medial axis of the tooth. No presence of folds typical of *Mimomys* F. Major was recorded on the labial side of the M_1 crown in all the specimens studied. Only one fold occurs in this place like in the species *Dolomys* cf. *hungaricus* Kormos. M_2 does not in principle differ in the structure of its crown from the corresponding tooth of *D.* cf. *hungaricus* Kormos. M_3 is narrow and its external reentrant folds are equal in depth. All teeth are two-rooted.

Measurements of the lower jaws and their dentition are given in Table 21.

Discussion. — The simple structure of the anterior loop of M_1, the presence of the enamel islet, the absence of folds typical of *Mimomys* F. Major and the dimensions of teeth, classify these remains between the species of *Dolomys* cf. *hungaricus* Kormos, on the one hand, and *Mimomys* cf. *stehlini* Kormos, on the other. These specimens differ from the former species in having an enamel islet on the anterior loop of their M_1, in narrower M_3 and broad reentrant folds, occurring on this tooth and, from the latter, in the absence of labial folds typical of *Mimomys* F. Major from M_1, as well as in the structure of M_3.

Table 21

? *Mimomys* sp.

Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-339 Jaws with teeth		Detached teeth	Modal value	Number of specimens
Height below M_1	3.3—3.5	—	—	5
Thickness below M_1	2.7—3.0	—	—	5
Length of M_1—M_3	6.4—7.2	—	—	3
Length M_1	2.9—3.3	2.8—3.5	3.1	37
Width M_1	1.3—1.5	1.3—1.8	1.6	
Length of M_2	1.8—2.1	1.8—2.4	2.0	28
Length M_3	1.5—1.7	1.5—1.9	1.7	20
Width M_3	0.9—1.0	0.9—1.2	1.0	

An M_1 with a similar structure was described by Fejfar as *Laugaritiomys ivanovcensis* Fejfar from Ivanovce near Trenčin (Fejfar, 1961*b*, p. 68, fig. 9a). That M_1 has not labial folds characteristic of *Mimomys* F. Major and an enamel islet occurs on its anterior loop similar to the Węże 1 specimens. This species differ from the specimens, described here, in its smaller dimensions.

An M_1 of the same type was also presented by Kowalski (1960*d*, p. 469, text-fig. 6 G, H), who considers these teeth conspecific with intermediary forms between *Dolomys* cf. *hungaricus* Kormos and *M.* cf. *stehlini* Kormos or, an example of a considerable individual variability of the latter species.

A relatively ample material of M_1 allows one, however, to establish that this type of structure can be met with in species neither of the genus *Dolomys* Nehring nor of the genus *Mimomys* F. Major. All the same, the presence of an enamel islet and absence of folds, typical of *Mimomys* F. Major, allow one to assign the Węże 1 specimens to forms which are nearer the genus *Mimomys* F. Major. This can also be indicated by the structure of the enamel islet. And, finally, some teeth, described here, coming from young animals, show a similar or even identical structure of their anterior loops with young individuals of *Dolomys* cf. *hungaricus* Kormos. This is, however, a short-lived phenomenon and it is already in adult individuals that, in both forms, the crowns of these teeth distinctly differ from each other. This is confirmed by serial sections (Text-fig. 20, 23).

The possibility of assigning the specimens discussed to *M.* cf. *stehlini* Kormos is, however, hardly likely. This applies also to specimens, described from Ivanovce near Trenčin. It may well be that at Węże 1 we have to do with one more a new representative of the genus *Mimomys* F. Major with its characteristic structure of M_1.

Family **Spalacidae** Gray, 1821
Subfamily **Spalacinae** Thomas, 1896
Genus *Prospalax* Méhely, 1908
Prospalax priscus (Nehring, 1897)
(Pl. X, XI)

The synonymy from 1897 to 1958 is given in Kowalski's work, 1960*c*, p. 109. Besides:

1960*a*. *Prospalax priscus* (Nehring); K. Kowalski, Pliocene..., p. 188.
1961*a*. *Prospalax priscus* (Nehring); O. Fejfar, Die plio-pleistozänen..., p. 261.
?1961*a*. *Prospalax* sp.; O. Fejfar, *Ibid.*, p. 263.

Material. — Fifteen fragments of skulls, including one with a complete bilateral dentition, 42 left and right lower jaws, in this number 6 with a complete dentition, as well as about 400 detached molars of both jaws and numerous incisors.

Description. — The structure of lower jaws, of a lower and upper dentition, as well as dimensions are in conformity with those of the specimens, described by Nehring (1897), Méhely (1908, 1913), Kormos (1937*b*), Stehlin and Schaub (1951), and Kowalski (1960*c*). An ample material of the dentition facilitated the investigation of changes, occurring in it and resulting from a considerable individual variability and ontogenetic development of this species. These changes are particularly manifested in the first and the last teeth of both jaws. Besides an antero-posterior elongation, P_1 has, on the anterior part of the crown (in young individuals), an additional complex of enamel folds, formed by the enamel islets occurring on the crown or by numerous recesses in the enamel band (Pl. XI, fig. 4). In many specimens, an additional, small lingual reentrant fold is observed, which is situated close to the junction of the anterior and posterior parts of the crown. The bipartity of crowns on all lower teeth of young individuals is a relatively rapidly passing phenomenon so that, in adult animals, the crowns become S-shaped. Similar changes also occur in the upper dentition where they mostly apply to the last tooth (M^2). As a result of the internal enamel folds being connected with each other, enamel islets appear within the dentine fields of all teeth with strongly ground crowns. And, finally, there are changes in the number and structure of roots. It is assumed that upper molars are as a rule three-rooted and lower two-rooted but, in the material investigated, some upper teeth have four and lower three roots.

Long and broad nasal bones slightly widening anteriorly, a long diasteme (longer than the row of teeth), diagonally situated to the row of teeth and posterior palate, small, oval and fairly broad anterior palatine foramens, as well as fissured posterior palatine foramens, rows of teeth slightly diverging posteriorly and narrow posterior part of the

palate are observed on the fairly well preserved rostral part of the skull (Pl. X, fig. 2). The infraorbital foramen is large and a bridge, situated over it, is narrow in its upper part and broad and posteriorly shifted in its lower part.

Measurements of the lower and upper jaws and their dentition are given in Table 22.

Table 22

Prospalax priscus (Nehring)

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-340 Jaws with teeth			Detached teeth	Modal value	Number of specimens
Length of P_1—M_2 at the crown bases		6.0—9.0	—	8.0	26
Length of P_1—M_2 on the grinding surface		4.8—7.0	—	—	6
Length	P_1	1.7—2.6	1.6—2.8	2.4	122
Width		1.3—1.8	1.3—2.0	1.7	
Length	M_1	1.6—2.4	1.5—2.6	2.2	144
Width		1.3—2.0	1.2—2.2	2.0	
Length	M_2	1.4—2.0	1.3—2.2	2.0	65
Width		1.2—1.6	1.2—1.8	1.7	
Transverse width of incisor		1.7—2.0	1.6—2.1	1.8	34

B. Measurements of the upper jaws and their dentition (in mm)

Length of P^1—M^2 at the crown bases		6.0—7.5	—	—	3
Length of P^1—M^2 on the grinding surface		4.7—6.8	—	—	8
Length	P^1	1.7—2.5	1.6—2.7	2.4	93
Width		1.4—2.0	1.3—2.1	1.7	
Length	M^1	1.6—2.2	1.5—2.5	2.1	79
Width		1.3—2.0	1.3—2.2	1.8	
Length	M^2	1.3—1.9	1.2—2.0	1.6	41
Width		1.1—1.6	1.1—1.7	1.4	
Transverse width of incisor		1.8—2.1	1.7—2.2	1.9	42

Discussion. — The blind mole, discussed here, occurs in great numbers in the faunas of the late Pliocene and the early Pleistocene in South-east and Eastern Europe. It is recorded in Hungary (Beremend, Villány, Nagyharsány, Csarnóta, Kisláng; Méhely, 1908; Kormos, 1932; Kretzoi,

1955*a*, 1956, 1959), in Rumania (Barault-Capeni: Barot-Köpec and Malušteni; Simionescu, 1922, 1930; Kormos, 1932*b*; Kretzoi, 1956; Kowalski, 1960*c*), in Czechoslovakia (Hajnačka, and probably, Ivanovce near Trenčin; Fejfar, 1957, 1961*a*), in the U.S.S.R. (Odesskie Katakomby, Borisjak & Beljaeva, 1948) and in Poland (Rębielice Królewskie, Węże 2 and, maybe, also Podlesice near Kroczyce; Kowalski, 1960*a*, 1962*b*; Sulimski, 1962*a*).

Related species, described from Berešti and Malušteni, Rumania, i.e. *Pliospalax simionescui* Kormos, *P. macovei* Simionescu and *P. roumanus* Simionescu (Simionescu, 1922, 1930; Kormos, 1932*b*; Kowalski, 1960*c*) are considered congeneric and conspecific with *Prospalax priscus* (Nehring). Judging, however, from the morphology of dentition in these species, and particularly in the first two of them, their generic separateness seems fully justified.

According to Méhely (1908), *Prospalax priscus* (Nehring) is a direct ancestor of *Spalax* Güldenstaedt, while according to Stehlin (1923*a*) it is a separate link in the evolution of the Spalacidae Gray.

This species, similarly to the Recent forms of the genus *Spalax* Güldenstaedt, is a typical representative of the steppe fauna which avoids forested and marshy areas and is perfectly adapted to the underground mode of life. It is simultaneously considered one of the oldest elements of the assemblage of rodents, occurring at Węże 1.

Family **Muridae** Gray, 1821
Subfamily **Murinae** Murray, 1866
Genus *Micromys* Dehne, 1841
Micromys cf. *praeminutus* Kretzoi, 1959
(Text-fig. 24)

Material. — One left lower jaw with $M_2 - M_3$ *in situ*, a fragment of a right lower jaw with M_1, 28 detached molars of both jaws, including 16 M_1 and 5 M^1 (the latter probably belonging here).

Description. — The fragment of lower jaw preserved relatively strongly built, with long diasteme and considerably high below M_1. The incisor laterally flattened, with long sagittal diameter. M_1 with a small, often separated paraconid, symmetrically situated between the proto- and metaconid. In more strongly ground teeth, these cusps form a sort of a „trifolium", sagittally connected with the next, medial pair of cusps (the hypo- and entoconid). The posterior and medial pair of cusps are arranged at a slightly obtuse angle each. The posterior terminal cusp on the posterior cingulum is little visible. The labial side of M_1 with accessory cusps of which the posterior one is better developed near the posterior pair of cusps. The two anterior ones, on the other hand, are small and mostly in the form of swellings on the marginal cingulum. Besides, the

crown of the tooth is almost two times longer than its width. M_2 (Text-fig. 24—*1a*) with the anterior and posterior pair of cusps unconnected with each other. A distinct accessory cusp is presented in the antero-external corner of the crown, while there is no lateral (labial) cusp near the posterior pair of main cusps. The posterior terminal cusp is poorly developed or even does not occur at all. The M_2 crown is square with rounded corners. M_3 consists of three principal cusps. The anterior pair of cusps is not connected and the posterior cusp is large and somewhat asymmetrically situated. The antero-external cusp is missing on this tooth. All teeth have two well-developed roots each.

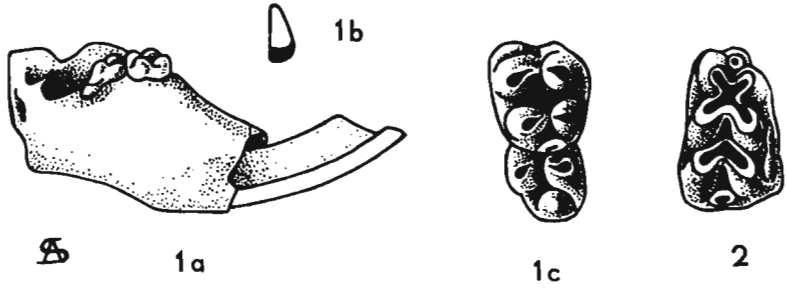

Fig. 24. — *Micromys* cf. *praeminutus* Kretzoi; Węże 1. *1* Left fragment of lower jaw with I, $M_2 - M_3$: *a* lingual view, *b* cross section of lower incisor, *c* $M_2 - M_3$, occlusal view (M.Z. No. VIII/Vm-341/1). *2* Right M_1, occlusal view (No. VIII/Vm-341/2); fig. *1a-b* ca. × 5, fig. *1c*, *2* ca. × 12.5.

Several M^1 have crowns similarly built as those of young individuals of *Apodemus sylvaticus* (Linnaeus). They are, however, pronouncedly smaller and on their crowns distinct modifications are visible of the anterocoronoid cusps. Cusp 7 is less-developed.

Measurements of the lower jaw and dentition are given in Table 23.

Discussion. — *Micromys praeminutus* Kretzoi was mentioned from the Pliocene fauna at Csarnóta 2, Hungary (Kretzoi, 1959, p. 243). It is considered there a primitive Pliocene ancestor of *M. minutus* Pallas. The remains of this small murid were not, however, more accurately described by Kretzoi. The drawings of Hungarian specimens, obtained by exchange, have not the degree of magnification given, hence it is difficult to compare them with the Węże 1 specimens. Judging, however, from the structure of M_1, the Csarnóta 2 and Węże 1 specimens are in principle in conformity with each other. M_1 (Text-fig. 24—*2*), compared with M_1 from Csarnóta 2, shows an only difference in the structure of the labial side of the crown which might be caused by the individual variability of this species. M^1 from Csarnóta 2 also does not differ from M^1 from Węże 1. These teeth are elongated and the presence of cusp 7 (in general poorly developed in both forms) and the situation of the remaining cusps speaks in fact for their being congeneric with the *Micromys* Dehne.

Table 23

Micromys cf. *praeminutus* Kretzoi

Measurements of the lower jaw and dentition (in mm)

M. Z. Cat. No. VIII/Vm-341		Detached teeth	Average	Number of specimens
Jaw with teeth				
Length of M_1—M_3	3.6*	—	—	1
Length of M_2—M_3	2.0	—	—	1
Length M_1	1.4—1.6	1.4—1.8	1.7	17
Width M_1	0.9—1.0	0.8—1.1	1.0	
Length of M_2	1.1—1.3	1.0—1.3	1.1	9
Length of M_3	0.6—0.8	0.6—0.9	0.7	5
Height below M_1	2.6	—	—	1
Thickness below M_1	1.5	—	—	1
Diasteme	ca. 2.4*	—	—	1
Sagittal diameter of incisor	1.1	—	—	3
Transverse diameter of incisor	0.4	—	—	3

* Measured along the alveoles.

Note: Length and width of M^1 (in 5 specimens) amounts to 1.3—1.6 and 0.9—1.0 mm respectively.

Fossil remains of *M. minutus* Pallas, related with the Pliocene *M. praeminutus* Kretzoi, were first known from the early Pleistocene on the territory of Eastern Asia (Zdansky, 1928; Young 1932, 1934; Pei, 1936 and others). The genus *Micromys* Dehne is also known from the same period in Central Europe.

Genus Rhagapodemus Kretzoi, 1959
Rhagapodemus frequens Kretzoi, 1959
(Pl. XII, fig. 1-5)

1938 *Apodemus* sp.; S. Schaub, Die Tertiäre..., p. 36, fig. 17e.
1959. *Rhagapodemus frequens* n.g., n.sp.; M. Kretzoi, Insektivoren..., p. 243-244.
1962. *Apodemus alsomyoides* Schaub; R. Dehm, Altpleistozäne..., p. 49-50, fig. 20. Partim.

Material. — Fourteen left and right lower jaws with I — M_3, 5 fragments of upper jaws with M^1 — M^3, M^2 — M^3 or single teeth *in situ*, about 600 detached molars and many incisors of both jaws.

Description. — The lower jaw large, fairly high and with a relatively short diasteme. The incisor laterally flattened and rectangular in cross section. The ratio of the sagittal to the transverse diameter of the incisor is expressed by about 2. The mental foramen — just in front of the anterior root of M_1. The masseteric crest is distinctly outlined and its tip is rounded. M_1 is two- and sometimes three-rooted with the paraconid symmetricaly situated between the proto- and metaconid. In adult

individuals, a „trifolium" is formed and, in more worn teeth, the anterior part of the crowns is connected with the next part by a sagittal isthmus. In the latter case, a small enamel islet appears in the field of the „trifolium" and disappears in the course of the crown wear. The medial and posterior pairs of cusps are situated at a strongly obtuse angle each. The terminal cusp on the posterior cingulum is large and oval. Four accessory cusps of almost equal sizes, occur on the labial side of the crown. The caudally situated cusp is stronger than the anterior ones and placed near the posterior pair of main cusps. The second posterior cusp is situated near the medial pair of main cusps. The remaining two are disposed between the anterior and medial pair of main cusps. The crown is high with prominent main cusps. M_2, with a high crown, consists of two pairs of main cusps, one cusp in the antero-external part of the crown and one terminal cusp on the posterior cingulum. The disposition of the pairs of cusps identical with the posterior pair of cusps on M_1. The tooth has no accessory labial cusps. The M_2 crown is square in outline with rounded corners. The width of M_2 is equal or, even more often, larger than the width of M_1. M_3 two-rooted and with three cusps. The anterior pair of cusps is connected by a narrow isthmus. The posterior cusp is broad, oval and symmetrically situated. A coarsened cingulum in the form of a small cusp is disposed on the antero-external corner of the crown. The tooth lacks any accessory labial cusps.

The fragments of upper jaw are, in general, poorly preserved but, on one of them, an anterior root of the jugal arch is visible distinctly in front of M^1. M^1 with cusp 1 shifted more to the posterior part of the crown. Sometimes, it forms an isolated node, adhering to the external wall of cusp 5. The posterior corona of cusps is, as a rule, broken in the place where cusp 1 and 4 are disposed. Cusp 7 in the form of a small cuspy knob or a small process, extending from cusp 8. The shifting of cusp 1 causes a narrowing of the anterior part of the crown. The M^1 crown is high and with prominent cusps. The tooth is always three-rooted. M^2 is three- or, sometimes, four-rooted with an accessory cusp, situated between cusps 6 and 9. This accessory cusp fills out a gap due to the posterior shifting of cusp 9 or 6. M^3, with three or, sometimes four roots (in some specimens, there are only two roots, the posterior ones being coalescent), is small and has a fine enamel. The cusp near the antero-internal part of the crown, isolated in specimens with little worn crown, is connected, in more worn specimens, with the remaining elements of the crown forming a tridactylous lump.

Measurements of the lower and upper jaws and their dentition are given in Table 24.

Discussion. — The characteristic cuspy structure of molars and the structure of lower jaws indicates that the Węże 1 remains belong to the family Muridae Gray. The dimensions of teeth and jaws, high crowns,

Table 24

Rhagapodemus frequens Kretzoi

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-342		Jaws with teeth	Detached teeth	Modal value	Number of specimens
Height below M_1		3.7—4.1	—	3.8	30
Thickness below M_1		2.0—2.2	—	2.0	30
Diasteme		3.0—3.3	—	3.2	21
Length of M_1—M_3		4.5—5.5	—	5.5	14
Length	M_1	1.8—2.4	1.7—2.6	2.3	190
Width		1.4—1.5	1.3—1.7	1.6	
Length	M_2	1.5—1.6	1.4—1.8	1.7	128
Width		1.4—1.6	1.3—1.7	1.6	
Length of M_3		1.2—1.4	1.2—1.6	1.4	88

B. Measurements of the upper jaws and their dentition (in mm)

Length of M^1—M^3		4.8—5.7	—	—	3
Length	M^1	2.2—2.5	2.0—2.7	2.3	144
Width		1.5—1.7	1.4—1.9	1.7	
Length	M^2	1.4—1.6	1.3—1.8	1.6	91
Width		1.4—1.5	1.3—1.7	1.5	
Length of M^3		1.2—1.4	1.2—1.6	1.4	61

well-developed cusps, disposition of cusps on M^1 and M^3 and the presence of four accessory cusps on M_1 allow one, at the same time, to classify them between the genera *Apodemus* Kaup and *Rhagamys* Schaub. The specimens with the structure type as that, described here, were determined from the Pliocene fauna at Csarnóta 2, Hungary, as *Rhagapodemus frequens* Kretzoi (Kretzoi, 1959, p. 243-244). The specimens of M_1, M_2, M^1 and M^3, as well as drawings, depicting this species, show a full morphological conformity with the specimens from Węże 1.

Rhagamys orthodon (Hensel), coming from the Pleistocene of Corsica and Sardinia (described there by Hensel (1856) as *„Mus" orthodon*), differs from *Rhagapodemus frequens* Kretzoi in a simpler structure of M_1 and M^2, more complex structure of M^3, slightly separated cusp 3 on M^1, broader, shorter and higher molar crowns and solid structure of lower jaws (Schaub, 1938).

The only M_1, coming from Csarnóta 2, with related structure was described by Schaub (1938, p. 36, text-fig. 17e) as *Apodemus* sp. This tooth is broad and high-crowned. A strong labial bent in the anterior pair of main cusp constitutes an only difference between the M_1 specimens from Węże 1 and this tooth. On the other hand, this tooth has four well-

developed accessory cusps on the labial side of the crown. Such teeth also occur among the specimens from Węże 1, this being an evidence of a rather fairly intensive individual variability in *Rhagapodemus frequens* Kretzoi. The specimen, described by Schaub, should therefore be considered conspecific with this species.

Teeth similar to those of *Rhagapodemus frequens* Kretzoi were described from the Plio-Pleistocene fauna from Schernfeld near Eichstätt and classified as *Apodemus alsomyoides* Schaub (Dehm, 1962, p. 49-50, fig. 20). They are somewhat slenderer and smaller than the specimens from Węże 1 and Csarnóta 2, but — morphologically — they fully correspond with the teeth of *Rhagapodemus frequens* Kretzoi. They also have four well-developed accessory cusps and both their anterior and posterior pairs of cusps are identically disposed. On the other hand, M^1 of the Schernfeld species, is different in structure. This applies mostly to its cusps 1, 4 and 7 which, according to Dehm, are characteristic of *Apodemus alsomyoides* Schaub.

Genus *Parapodemus* Schaub, 1938
Parapodemus schaubi Papp, 1947
(Pl. XIII, fig. 1-3)

1911*a*. *Mus (Acomys) Gaudryi* Dames; T. Kormos, Die pliozäne..., p. 179.
1938. *Parapodemus gaudryi* (Dames); S. Schaub, Die Tertiäre..., p. 14-17, pl. 1, fig. 1-3. Partim.
1947. *Parapodemus schaubi* n.sp.; A. Papp, Über Mus..., p. 371-374, fig. 1, 2.
1958*a*. *Parapodemus schaubi* Papp; S. Schaub, Simplicidentata..., p. 814, fig. 279.

Material. — Fifteen lower jaws with different numbers of teeth, including two with I — M_3, numerous detached molars (about 200), as well as several fragments of upper jaws with incomplete rows of teeth, probably belonging here.

Description. — The lower jaw with a short diasteme. The horizontal ramus below M_1 relatively low. The lower incisor laterally flattened, rectangular in cross section and with a rounded anterior edge of the enamel band. M_1 — two-rooted (a small medial root can be observed on some specimens), with anterior cusps combined and forming a „trifolium". The latter is somewhat asymmetrically connected to the next pair of main cusps. The terminal cusp on the posterior cingulum is well-developed. The posterior and medial pairs of cusps are arranged at an obtuse angle each. The labial edge of the crown with accessory cusps (there are 3 or 4 of them), the last of them, caudally situated is the largest. The anterior cusps are distributed between the anterior and medial pair of cusps. Sometimes, the first two of them are only marked in the form of protuberances on the cingulum. The crown is antero-posteriorly elongated. The cusps are not very high. M_2 is two-rooted with two pairs of main cusps situated at an obtuse angle each, with a cusp in the antero-external corner of the crown and a small terminal cusp on the posterior cingulum, as

well as with one or two accessory cusps on the labial side of the crown. Of the latter cusps, the first, stronger, is situated near the anterior pair of main cusps and the second, weaker — near the posterior pair of main cusps. M_3 is two-rooted with a cusp in the antero-external corner of the crown and without the accessory labial cusps. The anterior pair of main cusps is arranged at an obtuse angle, their both cusps being broadly connected one to the other. The posterior terminal cusp is large, broad and ellipsoidal in shape.

The still uncertain teeth of the upper jaw, despite a poorly-developed cusp 7 on M^1 and M^2, otherwise show a structure typical of *Parapodemus* Schaub. Cusp 1 is set back from cusp 4. Moreover, M^1 is distinctly three-rooted. M^2, also three-rooted, has on its crown cusp 7 in the form of a lateral bulging of cusp 8. The two posterior roots are sometimes coalescent and, in such case, the posterior root is formed in cross section as an antero-posteriorly flattened ellipse. M^3, two- or, more often, three-rooted is similar in structure to M^3 of *Apodemus* Kaup. The cusp in the antero-lingual part of the crown is mostly isolated.

Measurements of the lower and upper jaws and their dentition are given in Table 25.

Table 25

Parapodemus schaubi Papp

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-343 Jaws with teeth		Detached teeth	Modal value	Number of specimens
Height below M_1	2.9—3.3	—	3.2	12
Thickness below M_1	1.5—1.8	—	1.6	14
Length of M_1—M_3	4.1—4.5*	—	—	9
Length M_1	1.6—2.0	1.5—2.1	1.8	63
Width M_1	1.0—1.2	1.0—1.3	1.0	
Length M_2	1.3—1.5	1.2—1.6	1.4	50
Width M_2	1.0—1.1	1.0—1.2	1.1	
Length of M_3	1.1—1.2	1.0—1.3	1.2	21

B. Measurements of the upper jaws and their dentition (in mm)

Length of M^1—M^3	4.2—4.6*	—	—	3
Length M^1	1.9—2.1	1.8—2.3	2.0	52
Width M^1	1.3—1.5	1.2—1.7	1.3	
Length M^1	1.3—1.6	1.2—1.7	1.4	41
Width M^1	1.2—1.3	1.2—1.5	1.4	
Length of M_3	1.0—1.1	1.0—1.2	1.1	13

* Measured along the alveoles.

Discussion. — The presence of three cusps in the anterior part of the M_1 crown, the disposition of the main and accessory cusps, the poorly-developed cusp 7 on M^1 and, as a rule, the lack of this cusp on M^2, speak in favour of considering the remains from Węże 1 congeneric with the *Parapodemus* Schaub. The distribution of the accessory cusps on M_2 and M_3 and the dimensions of teeth, also indicate the species *P. schaubi* Papp. On the basis of the structure of a lower jaw from Pikermi, described by Dames (1883, p. 98-100, fig. 2-3) as *Mus* (*? Acomys*) *Gaudryi* Dames, of a skull from Samos, also determined as *Mus* (*Acomys*) *gaudryi* Dames (Schaub, 1926) and of the materials, consisting of lower jaws from Polgardi, mentioned by Kormos (Kormos, 1911*a*), Schaub (1938, p. 14-17) concluded that all these specimens belong to the same species to which, due to the structure of M^1, he gave a new generic name of the *Parapodemus* Schaub. It has, however, been proven by Papp's (1947, p. 371-374, fig. 1-2) more accurate investigations of the Polgardi material that these specimens were pronouncedly different from the specimens from Pikermi and Samos and related rather to the form from Veleš. He determined them therefore, as *Parapodemus schaubi* Papp. Accordingly, the specimens from Węże 1 are attributed to the latter species.

According to Schaub (1938), *Parapodemus* Schaub can be considered a direct ancestor of *Apodemus* Kaup in which the crowns of M^1—M^2 were subject to modification and modernization, effected by the development of the accessory cusp 7.

The early Pleistocene *P. coronensis* Schaub, described from Brassó (Schaub, 1938), from Podlesice near Kroczyce (Kowalski, 1956) and from Schernfeld near Eichstätt (Dehm, 1962) is closely related to the species *P. schaubi* Papp. In addition to small dimensions of teeth, this species differs from *P. schaubi* Papp in the structure of crowns, particularly in the disposition of main and accessory cusps on lower molars and on M^1. *P. lugdunensis* Schaub, described from the Lower Pliocene from Mollon (Ain) in France (Schaub, 1938), from Ivanovce near Trenčin (Fejfar, 1961*a*) and probably, from Kisláng in Hungary (Rémenyi, 1954) differs in the same characters. Other species of the genus *Parapodemus* Schaub such as, for instance, *P. ? hipparionum* (Schlosser), described from the Middle Pliocene from Ertemte in Mongolia (Schlosser, 1924; Miller, 1927; Schaub, 1938) and *P. ? vireti* Schaub (Schaub, 1938) differ from *P. schaubi* Papp in considerably larger dimensions of teeth and in different structure of crowns, particularly of M_1, M_2 and M^1.

Muridae gen. et sp. non det.
(Pl. XIII, fig. 6-13)

Material. — One left lower jaw with M_1 — M_2, one right lower jaw with M_1-M_3, two other left jaws, one with M_1-M_3 another with M_1-M_2 as well as a dozen or so detached M_1, M^1 and M^2.

Description. — The left M^1 (Fig. 7) with a structure typical of *Apodemus* Kaup. Cusp 7 distinctly outlined. Besides, the size of this tooth speaks in favour of its being conspecific with *A. dominans* Kretzoi, However, it differs from the same tooth of this species in the disposition of the cusps in the anterior part of the crown.

The left M^2 (Fig. 6) with anterior cusps connected to each other, cusp 1 being the strongest and slightly shifted posteriorly. Cusp 8 and 9 poorly-developed. Besides, the crown shows characters typical of the genus *Stephanomys* Schaub. In its dimensions, this tooth approximately corresponds with M^2 in *Rhagapodemus* Kretzoi.

The left M^1 (Fig. 9) with cusp 2 and 3 isolated from cusp 1 which is considerably shifted posteriorly towards cusp 4. Between cusps 1 and 2, there is an empty gap. The remaining part of the crown is identically built as that of *Rhagapodemus* Kretzoi. In addition, this tooth shows a tendency to reduce the anterior part of the crown. It is only a fairly high crown that would speak in favour of its being congeneric with the genus, mentioned above.

The left M_1 (Fig. 8), besides the main cusps with their structure normal in *Rhagapodemus* Kretzoi, has only two accessory cusps. The posterior one of them is situated near the posterior pair of main cusps and the other — between the medial and posterior pair of main cusps. This last cusp is barely marked. The crown of the tooth is elongated and its anterior part narrowed.

The left M_1 — M_3 (Fig. 10) belong to an adult individual. The anterior and posterior pairs of cusps on M_1 are connected by a broad isthumus. The anterior odd cusp is completely united with the two anterior main cusps. This also applies to the posterior terminal cusp, posterior accessory cusp and posterior main cusps. The anterior accessory cusps of the labial side, in the form of the two weak buds on the cingulum, are connected to each other into one nodular cingulum. M_2 has a structure identical with M_2 in *Apodemus sylvaticus* Linnaeus. M_3 has no cusp in its antero-external corner.

The left M_1 — M_2 (Fig. 11) with M_1 similar in structure to M_1 in the former specimen but, on the labial side of its crown, this tooth has three distinct small cusps (besides a caudal cusp near the posterior pair of main cusps). M_2 distinguishes itself by the presence of the four accessory cusps. The first of them is situated in the antero-external corner of the crown, the second and third — near the anterior pair of main cusps and the fourth — near the posterior pair of cusps. The lack of the last molar does not allow one to consider this specimen conspecific with any species from Węże 1, already described in this paper. It may well be that it belongs to a new form of the genus *Parapodemus* Schaub.

The right $M_1 — M_2$ (Fig. 12). M_1 with two accessory cusps on the labial side of the crown. The first of them is situated between the anterior and medial pair of main cusps, the second — near the medial pair of these cusps. M_2 with a slight trace of a swelling between the anterior and posterior pair of main cusps. By their dimensions, these teeth would correspond with the teeth of *Apodemus dominans* Kretzoi. It may well be that this specimen belongs to another representative of this genus.

The left $M_1 — M_2$ (Fig. 13). By their dimensions, the teeth of this specimen are related to *Rhagapodemus frequens* Kretzoi. They differ, however, from the teeth of this species in a shorter M_1, having a scanty paraconid and only three accessory cusps, as well as in a large, broad M_2 without any accessory cusp. The specimen from Węże 1 might also correspond with the east Asian *Parapodemus? hipparionum* (Schlosser). The lack of upper dentition, corresponding with it, makes difficult assigning it to this species.

Discussion. — The specimens, described above, show morphological differences in relation to the species, already determined from Węże 1. In view of the lack of an appropriate upper dentition, it is still impossible to attribute them to any of these species. These specimens were found in various layers of the breccia.

Family **Gliridae** Thomas, 1897
Subfamily **Glirinae** Thomas, 1897
Genus *Glis* Brisson, 1762
Glis minor Kowalski, 1956
(Pl. XIV)

The synonymy from 1956 to 1963 is given by Kowalski (1963). Besides:

1963. *Glis minor* Kowalski; K. Kowalski, The Pliocene..., p. 545-550, fig. 8 A-H, 9 A-H, 10 A-H.

Material. — Five lower jaws with various numbers of teeth *in situ*, including two jaws with $P_4 — M_3$ and two with $M_1 — M_3$, two upper jaws with $P^4 — M^3$ and D^1, about 320 detached premolars and molars, as well as numerous incisors.

Description. — The lower and upper dentition of the remains, occurring here, are, in their morphology, in conformity with the description of the dentition, presented by Kowalski (1963, p. 546-548). There are the following noteworthy additional characters in the structure of the lower and upper jaw of the species, described here: 1) the posterior edge of the jugal arch runs more or less over the edge of P^4 or close in front of it; 2) upper incisors have a strongly nothed occlusal surface, are laterally flattened and strongly inflected; 3) lower jaws are small, delicate,

and with a relatively short diasteme; 4) lower incisors are narrow with their sagittal diameter almost twice as long as the transverse diameter.

Measurements — according to those, given by Kowalski (1963, p. 548-549).

Discussion. — *Glis minor* Kowalski, first described from the fauna of Podlesice near Kroczyce (Kowalski, 1956), occurs also, besides Węże 1, at Rębielice Królewskie (Kowalski, 1960*a*, 1962*a*, 1963) and — outside Poland's boundaries — at Csarnóta 2, Hungary (Kretzoi, 1959).

Glis minor Kowalski is one of the forest representatives of the rodent assemblage at Węże 1.

Genus *Muscardinus* Kaup, 1829
Muscardinus pliocaenicus Kowalski, 1963

1963. *Muscardinus pliocaenicus* n.sp.; K. Kowalski, The Pliocene..., p. 538-543, text-fig. 3 A-F, 4 A-E, 5 A-C.

Material. — Four fragments of lower jaws, including two with M_1 — M_2 and two with M_2 — M_3; two fragments of upper jaws, including one with P^4 — M^2 and one with M^1; about 120 detached teeth, in this number 5 P_4, 26 M_1, 32 M_2, 8 M_3, 3 P^4, 17 M^1, 25 M^2 and 5 M^3.

Description. — The lower and upper jaws and their dentition in the remains, occurring here, are morphologically consistent with Kowalski's descriptions (1963, p. 538-542).

Measurements — according to those in Kowalski's work (1963, p. 542-543). Besides, larger decreasing and increasing deviations can be observed in the dimensions of individual teeth, particularly in M_1 and M^1 (the length).

Discussion. — The species, described here, is known — besides Węże 1 — also at Podlesice near Kroczyce, Rębielice Królewskie (Kowalski, 1963) and probably at Węże 2 (Sulimski, 1962a). The detached M^2 (?) from Węże 1, determined by Kowalski as *Muscardinus* sp. (Kowalski, 1963, p. 544, fig. 7) should belong to the species, described here, since teeth of this type are also found in the material, presented above and they constitute a proof of a considerable individual variability in the dentition of *M. pliocaenicus* Kowalski.

The materials, described from Węże 1, Podlesice and Rębielice Królewskie, indicate that the genus *Muscardinus* Kaup was bound to develop much earlier than assumed thus far. In addition to certain primitive properties, *M. pliocaenicus* Kowalski shows more specialized characters. It is considered by Kowalski to be a direct ancestor of Recent species of this genus (Kowalski, 1963, p. 545).

Family **Selevinidae** Belosludov & Bashanov, 1938[3]
Genus *Plioselevinia* Sulimski, 1962
Plioselevinia gromovi Sulimski, 1962
(Pl. XV)

1962c. *Plioselevinia gromovi* n.gen., n.sp.; A. Sulimski, Two new..., p. 504-506, text-fig. 1 — 1, 2 a-c.

Material. — Besides the specimens, mentioned in Sulimski's work (1962c), no presence was recorded of additional bones which could belong to this species.

Description. — The diagnosis of the genus and of the species was given by Sulimski (1962c, p. 504-506). The dental formula, mentioned in that work, applies to adult individuals. In young individuals, this formula is increased by two upper premolars which easily fall out and their alveoles grow together and close (Gromov, 1963, p. 372).

Measurements — according to Sulimski's work (1962c, p. 506).

Discussion. — *Selevinia betpokdalensis* Belosludov & Bashanov with which the remains, occurring here, are compared, lives now in the desert, semi-desert and steppe regions of Kazakhstan, USSR, overgrown with *Salsola loricifolia* (Russian thistle) (the so-called hunger desert of Betpak-dala, the northern and eastern parts of the Pribalkhash and the region of the Džungar Gate) (Belosludov & Bashanov, 1938, 1939; Bannikov, 1953, 1954; Gromov, 1963, and others). The lack of a skull of *Plioselevinia gromovi* Sulimski does not allow one for a closer comparison with a skull of the Recent species. Judging from the structure of the lower jaw, the structure of the skull, particularly of its palatine part (the length of the diasteme — the prognathism, the length of the row of teeth, the size and structure of upper incisors, etc.) can be related to the corresponding elements of the skull in *S. betpakdalensis* Belosludov & Bashanov.

The remains of *Plioselevinia gromovi* Sulimski come from the lower layers of the breccia which are referred here to the Older Pliocene. Moreover, this species can be a direct ancestor of *S. betpakdalensis* Belosludov & Bashanov. The adaptation to a non-specific and, among rodents, rarely met with manner of feeding on insects, was bound to result in a secondary simplification of the structure of teeth (Gromov, 1963, p. 372). In the rodent assemblage from Węże 1, *Plioselevinia gromovi* Sulimski is rather one of the representatives typical of the steppe. And finally, its presence in this fauna speaks for the relations with the Pliocene rodent faunas of Central Asia.

[3] The name of the family Seleviniidae was first erected by Belosludov and Bashanov (in 1938) and not by Argyropoulo and Vinogradov (in 1939). Belosludov and Bashanov are also authors of the genus and the species of *Selevinia betpakdalensis*. *S. paradoxa*, described by Argyropoulo and Vinogradov is a synonym of *S. betpakdalensis*.

Family **Zapodidae** Coues, 1875
Subfamily **Zapodinae** Trouessart, 1880
Genus *Sminthozapus* Sulimski, 1962
Sminthozapus janossyi Sulimski, 1962
(Pl. XVI)

1962c. *Sminthozapus janossyi* n.gen., n.sp.; A. Sulimski, Two new..., p. 506-510, text-fig. 2 — 1-4, 5 a-b.

Material. — In addition to the material, presented by Sulimski (1962*c*), 2 lower jaws with $M_1 — M_3$ and $M_1 — M_2$, as well as a dozen or so detached molars of both jaws were found.

Description. — The diagnosis of the genus and of the species is presented in Sulimski's work (1962*c*, p. 507-508). In addition, the following observations were made in the structure of teeth:

M_1 — the paraconid in the form of a cusp or of a swelled anterior cingulum, sometimes split. The proto- and metaconid connected to each other and forming a symmetrical crescent with anteriorly pointing tips. The labial spur („Gegensporn") occurs only in young individuals. The ectolophid is diagonal and always turned towards the protoconid. The postentoconid reentrant fold is always open.

M_2 — a small ridge (in young individuals) which, in adult individuals, produces the protolophid, occurs between the protoconid and mesolophid. In old individuals, this ridge is connected to the protostylid, forming a protostylid spur. The anteroconid is connected to the ectolophid, as well as to the antero-labial and antero-lingual cingulum. The changes in the structure of the crown occur in the connection of the proto- and metaconid and in the size of the protostylid spur.

M_3 — the mesostylid spur has a tendency to the connection with the meta- or entoconid, sometimes (in a single case), occurs as a separate element unconnected to the ectolophid.

M^1 — the ectoloph broad. The hypocone indistinct. The anterocone absent. The anterior and posterior cingulum strongly developed. The pseudomesoloph is formed near the mesoloph and, sometimes, is connected to the paracone.

Measurements of the lower and upper jaws and their dentition are given in Table 26.

Discussion. — *Sminthozapus janossyi* Sulimski, having a zapodine type of the structure of the lower jaws and the dentition, when compared with Euroasian, Oligo-Miocene small species of the genus *Plesiosminthus* Viret (Schaub, 1930*b*; Bohlin, 1946), with the Pliocene, North American *Pliozapus solus* Wilson (Wilson, 1963; Klingener, 1962) and with the Recent East Asian *Eozapus setchuanus* (Pousargues), shows close similarities to the latter species. These similarities are recorded in the arrangement of cusps, lophids and lophs on the molars of both jaws, in

Table 26

Sminthozapus janossyi Sulimski

A. Measurements of the lower jaws and their dentition (in mm)

M. Z. Cat. No. VIII/Vm-329 Jaws with teeth			Detached teeth	Modal value	Number of specimens
Length of the jaw		10.9—11.7	—	—	5
Height below M_1		2.4— 2.6	—	—	8
Thickness below M_1		0.8— 1.0	—	—	8
Length of diasteme		2.7— 2.8	—	—	5
Sagittal diameter of incisor		0.8— 0.9	0.8—1.0	1.0	45
Transverse diameter of incisor		0.5	0.4—0.5	0.5	
Length of M_1—M_3		3.1— 3.5	—	—	6
Length	M_1	1.0— 1.2	1.0—1.3	1.2	26
Width		0.7— 0.9	0.7—1.0	0.8	
Length	M_2	1.1— 1.3	1.0—1.4	1.3	33
Width		0.7— 0.9	0.7—1.0	0.9	
Length	M_3	0.9	0.8—1.0	1.0	10
Width		0.7— 0.8	0.6—0.8	0.7	

B. Measurements of the upper jaws and their dentition (in mm)

Sagittal diameter of incisor		1.0—1.1	0.9—1.1	1.0	38
Transverse diameter of incisor		0.4—0.5	0.4—0.5	0.5	
Length of M^2—M^3		1.7	—	—	1
Length	P^4	0.7*	—	—	0
Width		0.7*	—	—	
Length	M^1	—	1.0—1.3	1.2	25
Width		—	0.8—1.0	0.9	
Length	M^2	0.9	0.9—1.3	1.2	19
Width		0.8	0.7—0.9	0.8	
Length	M^3	0.7	0.6—0.8	—	5
Width		0.6	0.6—0.7	—	

* Measured along the alveoles.

the grooved upper incisors and in the structure of articular processes of the lower jaw. Both forms differ, however, from each other not only in the dimensions but also in the details of the structure of the molar crowns. This primarily applies to additional ridges or spurs on M^2 (a pseudomesostyle spur) and on M_2 (a protostylid spur) which are characteristic of the rodent from Węże 1.

The Euroasian species of the genus *Plesiosminthus* Viret as, for instance, *P. parvulus* (Bohlin), *P. myarion* Schaub and *P. schaubi* Viret, similarly to *Sminthozapus janossyi* Sulimski, are characterized by the symmetrical structure of the anterior cusps on M_1, by the diagonal ectolophid, pointed towards the protoconid on M_1, by the presence of a foramen between the ascending ramus and M_3, by the grooved upper incisor (except in *P. parvulus* (Bohlin) from Taben-buluk), by the absence of perforation from the angular process and other characters which allow one to assign all these forms to the subfamily Zapodinae Trouessart. These characters also occur in typical representatives of this subfamily as, for instance, in the North American species, *Zapus* Coues and *Napaeozapus* Preble (Klingener, 1962).

Sminthozapus janossyi Sulimski differs from the Recent and fossil species of the genus *Sicista* Gray in the simplified structure of molars, in the symmetrically disposed proto- and metaconid on M_1, in the absence of the connection between the ectolophid and the two anterior cusps of M_1 (this connection takes place only in specimens with strongly worn crowns), in the accessory spurs on M_2 and M^2, in the four distinct reentrant folds on M_3, in the trace and situation of the ectolophid on molars and in many other characters which allow one for an easy distinction of a rodent from Węże 1 from the species of the genus *Sicista* Gray.

Sminthozapus janossyi Sulimski can be considered one of the steppe elements of the rodent assemblage at Węże 1. Besides, it is an evidence, speaking in favour of this rodent fauna being related in the Pliocene with the Central Asian faunas.

Family **Hystricidae** Burnett, 1830
Genus *Hystrix* Linnaeus, 1758
Hystrix primigenia (Wagner, 1848)

The synonymy and illustrations are given by Sulimski (1960). Besides:
1960. *Hystrix primigenia* (Wagner); A. Sulimski, Hystrix..., p.319-335,pl.1,fig.1-3; pl. 2, fig. 1-5; text-fig. 1-5.

Material. — Besides the material, described in Sulimski's work (1960), two upper and two lower incisors, as well as three molars were found.

Description. — New specimens, contained in this material, do not differ morphologically from those, described in Sulimski's work (1960).

Measurements: The dimensions of new specimens are in conformity with the dimensions, given by Sulimski (1960).

Discussion. — A dozen or so localities where large porcupines occur, have been discovered in the Pliocene of the Central and South-east Europe. They mostly represent the Pontian evolution line, „*primigenia-bessarabica*". They are, *Hystrix primigenia* (Wagner) from: Pikermi,

Węże 1, Roussillon, Polgardi, Cimislia, Veleš, probably also from Westhoffen, Germany and others, as well as *Hystrix bessarabica* Rjabinin from Taraklja, Moldavian SSR.

The remains from Węże 1 and from Roussillon are probably among the last representatives of this tribe and can be considered relics of the Lower Pliocene fauna. They also belong to the steppe forms of the mammal assemblages in both these localities.

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ANDRZEJ SULIMSKI

LAGOMORPHA I RODENTIA Z WĘŻÓW 1 KOŁO DZIAŁOSZYNA

Streszczenie

Bogate zbiory szczątków dwóch rzędów ssaków: Lagomorpha i Rodentia, pochodzące z brekcji kostnej Węży 1 koło Działoszyna, zgromadzone przez autora w ciągu kilku lat, stały się podstawą do ich monograficznego opracowania. Do chwili obecnej opublikowano pięć systematycznych prac, poświęconych części opisanych tu gryzoni (Kowalski, 1960c, *d*, 1963; Sulimski, 1960, 1962c). Ponieważ praca niniejsza obejmuje całokształt fauny Lagomorpha i Rodentia z Węży 1, uwzględniono w niej również gatunki opisane w poprzednich pracach.

Wśród Lagomorpha i Rodentia z Węży 1 znajdują się niemal wszystkie rodziny, charakterystyczne dla Starego Świata. Z Lagomorpha podane są nieliczne szczątki Ochotonidae gen. et sp.non det. i bogaty zbiór prymitywnego zająca *Hypolagus brachygnathus* Kormos. Opisany w pracy zespół gryzoni obejmuje około 25 gatunków (*vide* Tabela 1 na str. 153), w tym 4 nowe dla nauki: *Sciurus warthae* n.sp., *Eutamias orlovi* n.sp., *Pliosciuropterus schaubi* n.sp. i *Steneofiber wenzensis* n.sp.

Ponadto w niniejszej monografii podany jest pełny opis nowej dużej latającej wiewiórki *Pliosciuropterus dehneli* n. gen., n. sp., pochodzącej z Węży 2 (dane o tym znalezisku znajdują się częściowo w tekście angielskim, p. 172 i w pracy Sulimskiego, 1962*a*). Kompletny materiał kostny dotyczący tego gryzonia pozwolił autorowi na wydzielenie nowego rodzaju i na stwierdzenie obecności tego rodzaju również w materiale z Węży 1.

W badaniach nad Lagomorpha i Rodentia autor zastosował seryjne szlify, w szczególności tam, gdzie budowa zębów (płaska powierzchnia tarcia koron, pryzmatyczność koron itp.) pozwalała na ich wykonanie. Szlify te okazały się pomocnymi przy obserwacjach nad zmiennością układu pętli szkliwa, sposobu tworzenia się wysepek szkliwa w miarę ścierania się koron u badanych gatunków. Zastosowanie seryjnych szlifów było możliwe przy tym dzięki dużej ilości luźnych zębów, szczególnie trzonowych. Dzięki tym szlifom można było w pewnych przypadkach stwierdzić niezgodność oznaczenia pozycji systematycznej takich gatunków, jak np. *Stachomys trilobodon* Kowalski, *Trilophomys schaubi* Fejfar, *T. depereti* Fejfar i *Ungaromys weileri* (Heller).

W związku z obserwacjami nad stanem zachowania szczątków kostnych w Wężach 1 autor dochodzi do wniosku, że proces ich nagromadzenia się był zapewne bardziej złożony, przy czym na proces ten złożyły się głównie trzy przyczyny: a) działalność drapieżnego ptactwa, b) przypadkowe ginięcie dużych ssaków, c) ulewne deszcze oraz silne potoki zmywające szczątki do krasowego leja. Nagromadzenie się szczątków przy udziale dużych drapieżników (np. hienowate) wydaje się być mało prawdopodobne.

Na podstawie analizy faunistycznej Lagomorpha i Rodentia z Węży 1, autor dochodzi do wniosku, że zespół ten, podobnie jak i owadożerne, nietoperze, mięsożerne, kopytne, płazy i gady tego znaleziska, wykazuje dwojaki charakter. Swoisty charakter zespołu kręgowców był między innymi wynikiem przypadkowego wymieszania materiałów kostnych i brekcyjnych po eksploatacji. Próbna tabela stratygraficznego podziału Lagomorpha i Rodentia (str. 153) wykazuje, że przynajmniej część poznanych tu gatunków ma charakter archaiczny, wiążący je z zespołami faun starszego pliocenu, gdy pozostała część — z zespołami późnego pliocenu lub wczesnego plejstocenu. Dla sprawdzenia wysuniętego wniosku poddano szczątki kostne, pochodzące z szarej (wyżej leżącej) i czerwonej (z dolnych poziomów) brekcji, próbie oznaczenia bezwzględnego wieku metodą kollagenową (Wilczyński, 1961). Badania te wykazały wyraźną różnicę w okresie trwania fosylizacji, przy czym stosunek szarej do czerwonej brekcji wyrażający się w jednostkach wiekowych miał się tak, jak 1 : 3.

Zespół Lagomorpha i Rodentia, podobnie jak i inne kręgowce z Węży 1, wskazuje, że warunki ekologiczne w okresie nagromadzenia się szczątków miały charakter stosunkowo stały, z pewnymi sporadycznymi wahaniami klimatycznymi, a środowisko, w jakim żyła ta fauna, było zapewne bardzo różnorodne, z przewagą stepowo-leśnej wegetacji. Las typu parkowego (sawanna), nie zwartego, sąsiadować musiał z terenem nawodnionym (wychuchoły, prymitywne bobry, niektóre żółwie). Większość zespołu drobnych ssaków reprezentowana była, jak się zdaje, przez formy charakterystyczne dla terenów otwartych (norniki, prymitywne chomiki, zającowate, niektóre myszy itp.).

АНДРЖЕЙ СУЛИМСКИ

LAGOMORPHA И RODENTIA ИЗ МЕСТОНАХОЖДЕНИЯ ВЕНЖЕ 1 БЛИЗ ДЗЯЛОШИНА (ПОЛЬША)

Резюме

Богатые коллекции остатков двух отрядов млекопитающих: Lagomorpha и Rodentia из костной брекчии местонахождения Венже 1 близ Дзялошина, накопленные автором за несколько лет, стали основой их монографической обработки. До настоящего времени опубликовано пять систематических работ, посвященных части описанных тут грызунов (Kowalski, 1960*c*, 1960*d*, 1963; Sulimski, 1960, 1962*c*). Ввиду того что настоящая работа заключает в себе довольно большой объем фауны Lagomorpha и Rodentia из местонахождения Венже 1, необходимо было в ней учесть и ранее описанные виды.

Среди Lagomorpha и Rodentia из Венже 1 встречаются почти все семейства, характерные для Старого Мира. Из Lagomorpha упомянуты немногочисленные остатки Ochotonidae gen. et sp. non det. и находящиеся в коллекции в изобилии остатки примитивного зайца *Hypolagus brachygnathus* Kormos. Состав описанного тут комплекса грызунов включает около 25 видов (см. Таблица 1 в английском тексте), в этом 4 новые для науки: *Sciurus warthae* n. sp., *Eutamias orlovi* n. sp. *Pliosciuropterus schaubi* n. sp. и *Steneofiber wenzensis* n. sp.

Кроме того, в настоящей монографии дано полное описание новой большой летучей белки *Pliosciuropterus dehneli* n. gen., n. sp. из местонахождения Венже 2 (данные касающиеся этого местонахождения приведены частично в английском тексте, стр. 172, и в работе Сулимского, 1962*a*). Полный остеологический материал, касающийся этого грызуна, кроме выделения нового рода, дал автору возможность установить его присутствие в материалах из местонахождения Венже 1.

Изучая Lagomorpha и Rodentia автор применил метод серийных шлифов, в особенности в тех случаях, в которых строение зубов (плоская жевательная поверхность коронок, их призматическая форма и т.д.) давало возможность их изготовления. Эти шлифы оказались весьма помощными для изучения изменчивости уклада петлей эмали и образования островков эмали в процессе изношенности коронок зубов изучаемых видов. Применение серийных шлифов являлось возможным при этом благодаря большому количеству отдельных, особенно коренных зубов. Благодаря этим шлифам можно было в некоторых случаях установить ошибочность определения систематического положения таких видов, как *Stachomys trilobodon* Kowalski, *Trilophomys schaubi* Fejfar, *T. depereti* Fejfar и *Ungaromys weileri* (Heller).

В связи с наблюдениями касающимися сохранности костных остатков из местонахождения Венже 1, автор пришел к выводу, что процесс их накопления был более сложный, причем на нем оказалось влияние главным образом трех факторов: а) действие хищных птиц, б) случайная гибель больших млекопитающих, в) проливные дожди и сильные потоки смывающие остатки к карстовой воронке. Накопление костных остатков при участи больших хищников (например гиен) повидимому мало вероятно.

На основании фаунистического анализа Lagomorpha и Rodentia из Венжев 1, автор приходит к выводу, что эта фауна, подобна фаунам насекомоядных, хищных, летучих мышей, копытных, амфибий и пресмыкающихся, обнаруживает двойной характер. Смешанный характер фауны позвоночных, возникший между прочим вследствие случайного смешания материала брекчии после эксплоатации, очень затруднял выделение подкомплексов. Предварительная таблица стратиграфического расчленения Lagomorpha и Rodentia (Таблица 1) показывает, что по крайней мере часть присутствующих видов имеет архаический характер, связывающий с фаунами более старого плиоцена, в то время когда остальная его часть связана с фаунами позднего плиоцена или раннего плейстоцена. Для проверки приведенного вывода сделано попытку определения абсолютного возраста костных остатков из серой (выше залегающей) и красной (ниже лежащей) брекчии коллагеновым методом (Wilczyński, 1961), которая дала соотношение 1 : 3.

Lagomorpha и Rodentia, равным образом как и другие позвоночные из местонахождения Венже 1, указывают на довольно постоянный характер экологических условий во время накапливания остатков, с некоторыми спорадическими колебаниями климата, а среда существования этой фауны была повидимому очень разнообразная, с преобладанием степно-лесной растительности. Лес типа саванн выступал рядом с наводненными районами (выхухоли, примитивные бобры и некоторые черепахи). Большинство представителей комплекса мелких млекопитающих было повидимому представлено формами открытых районов (полёвки, примитивные хомяки, зайцеобразные, некоторые мыши и тому подобные.

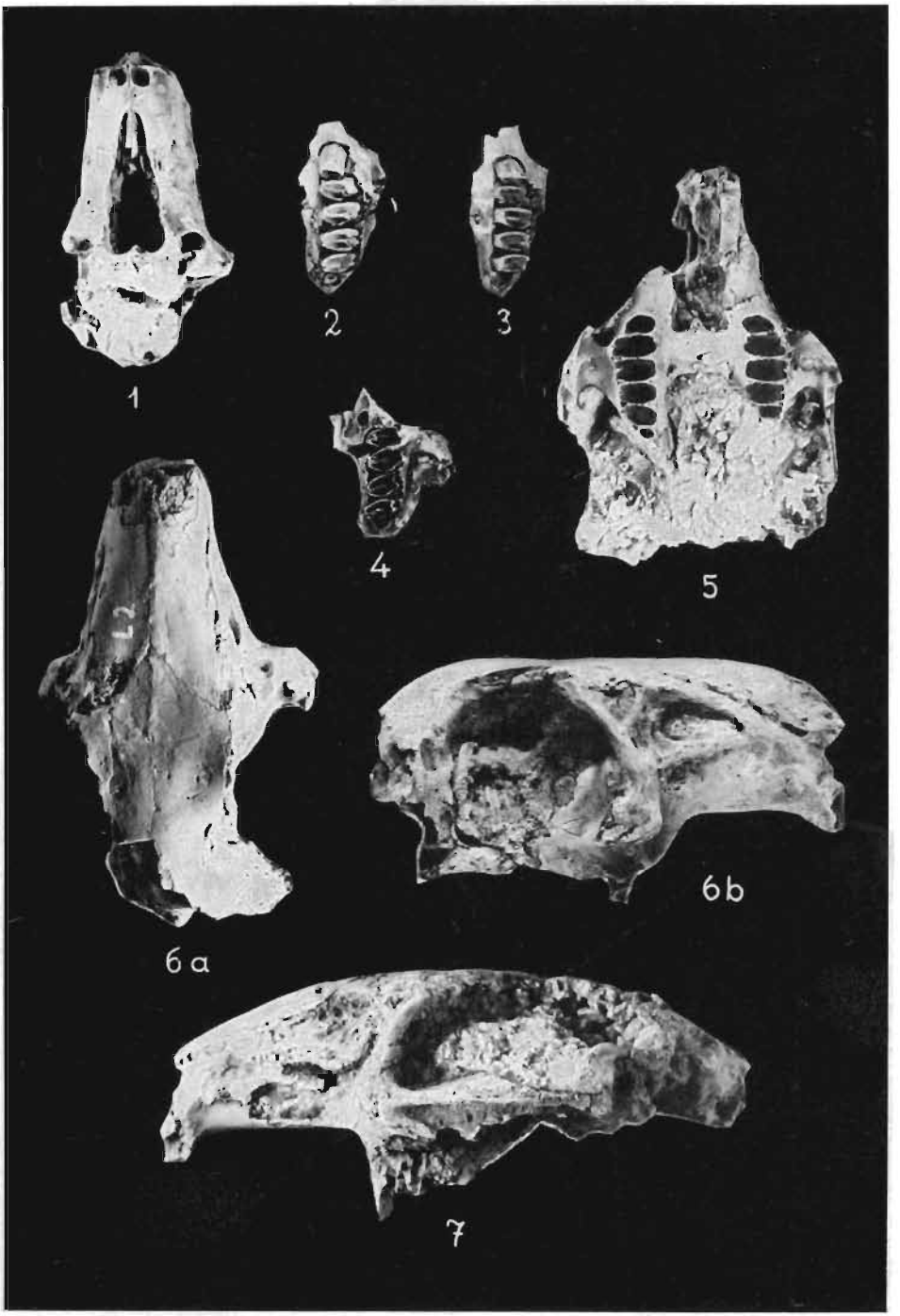
PLATES

Plate I

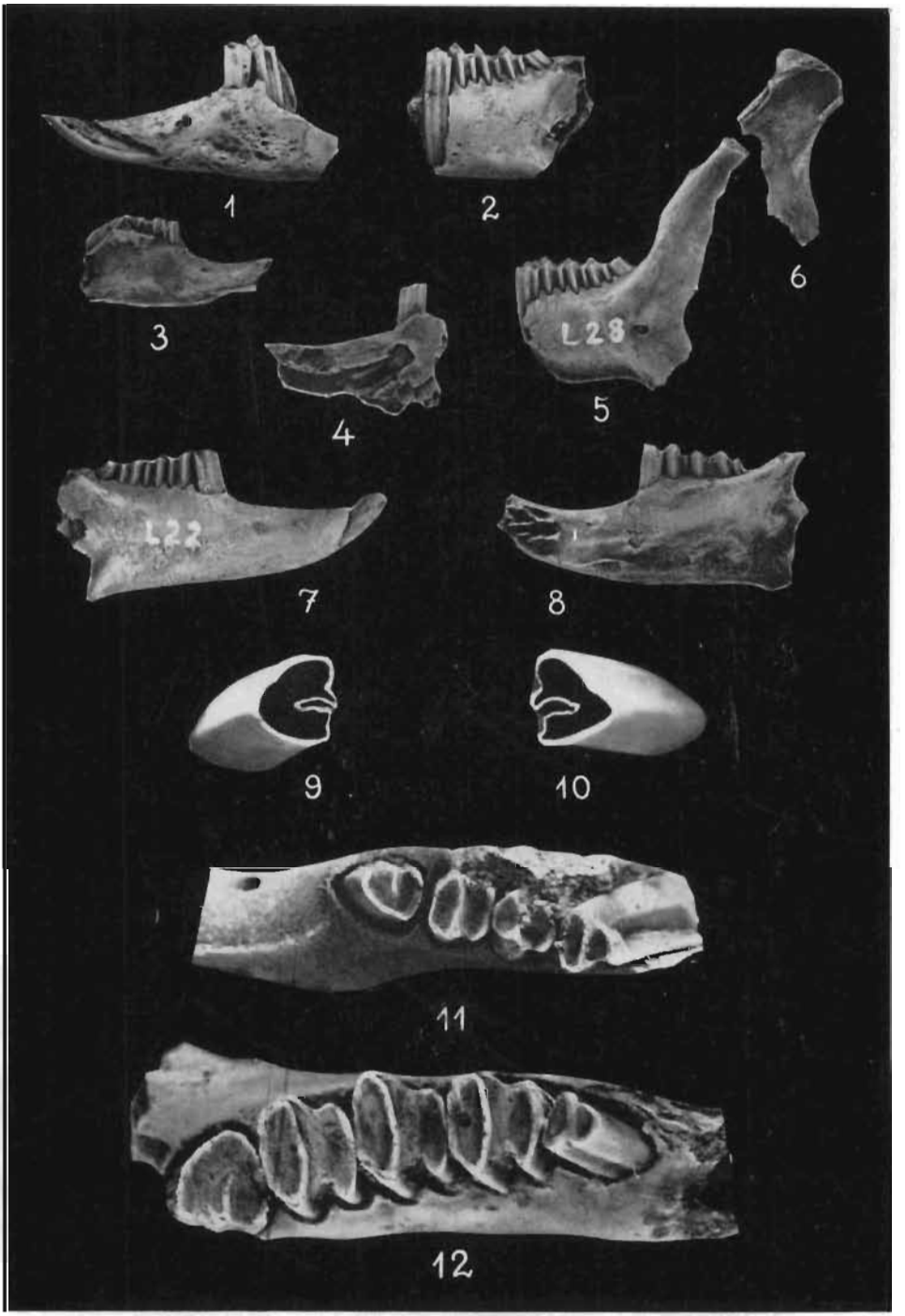
Hypolagus brachygnathus Kormos
(Węże 1)

Fig. 1. Rostral fragment of skull, palatal view (M.Z. No. VIII/Vm-321/5).
Fig. 2. Left fragment of the upper jaw with P^2 — M^3, occlusal view (M.Z. No. VIII/Vm-321/15).
Fig. 3. Left fragment of the upper jaw with P^2 — M^2, occlusal view (M.Z. No. VIII/Vm-321/12).
Fig. 4. Right fragment of the upper jaw with P^3 — M^2, from the roots (M.Z. No. VIII/Vm-321/14).
Fig. 5. Rostral fragment of skull, palatal view (M.Z. No. VIII/Vm-321/3).
Fig. 6. Rostral fragment of skull: *a* top view, b side view (M.Z. No. VIII/Vm-321/2).
Fig. 7. The skull, side view (M.Z. No. VIII/Vm-321/1).

All specimens of natural size



Phot. M. Czarnocka



Phot. M. Czarnocka

Plate II

Hypolagus beremendensis (Petényi)
(Beremend-5, Hungary)

Fig. 1. Left lower jaw with P_3 — P_4, labial view.

Hypolagus brachygnathus Kormos
(Betfia near Nagyvárad, Hungary)

Fig. 2. Left lower jaw with P_3 — M_3, labial view.

Hypolagus brachygnathus Kormos
(Węże 1)

Fig. 3. Right lower jaw with P_3 — M_2 (young individual), lingual view (M.Z. No. VIII/Vm-321/70).
Fig. 4. Fragment of the lower jaw with P_3 and incisor alveole, lingual view (M.Z. No. VIII/Vm-321/31).
Fig. 5. Left lower jaw with P_3 — M_3 and ascending ramus, labial view (M.Z. No. VIII/Vm-321/28).
Fig. 6. Fragment of articular process, labial view (M.Z. No. VIII/Vm-321/34).
Fig. 7. Right lower jaw with P_3 — M_3, labial view (M.Z. No. VIII/Vm-321/22).
Fig. 8. Right lower jaw with P_3 — M_3, lingual view (M.Z. No. VIII/Vm-321/24).
Fig. 9. Right P_3, root view (M.Z. No. VIII/Vm-321/100).
Fig. 10. Left P_3, root view (M.Z. No. VIII/Vm-321/100).
Fig. 11. Right lower jaw (young individual) with P_3 — M_2, tooth-row view (M.Z. No. VIII/Vm-321/70).
Fig. 12. Left lower jaw (adult individual) with P_3 — M_3, tooth-row view (M.Z. No. VIII/Vm-321/44).

Fig. 1-8 nat. size; fig. 9-12 ca. × 4

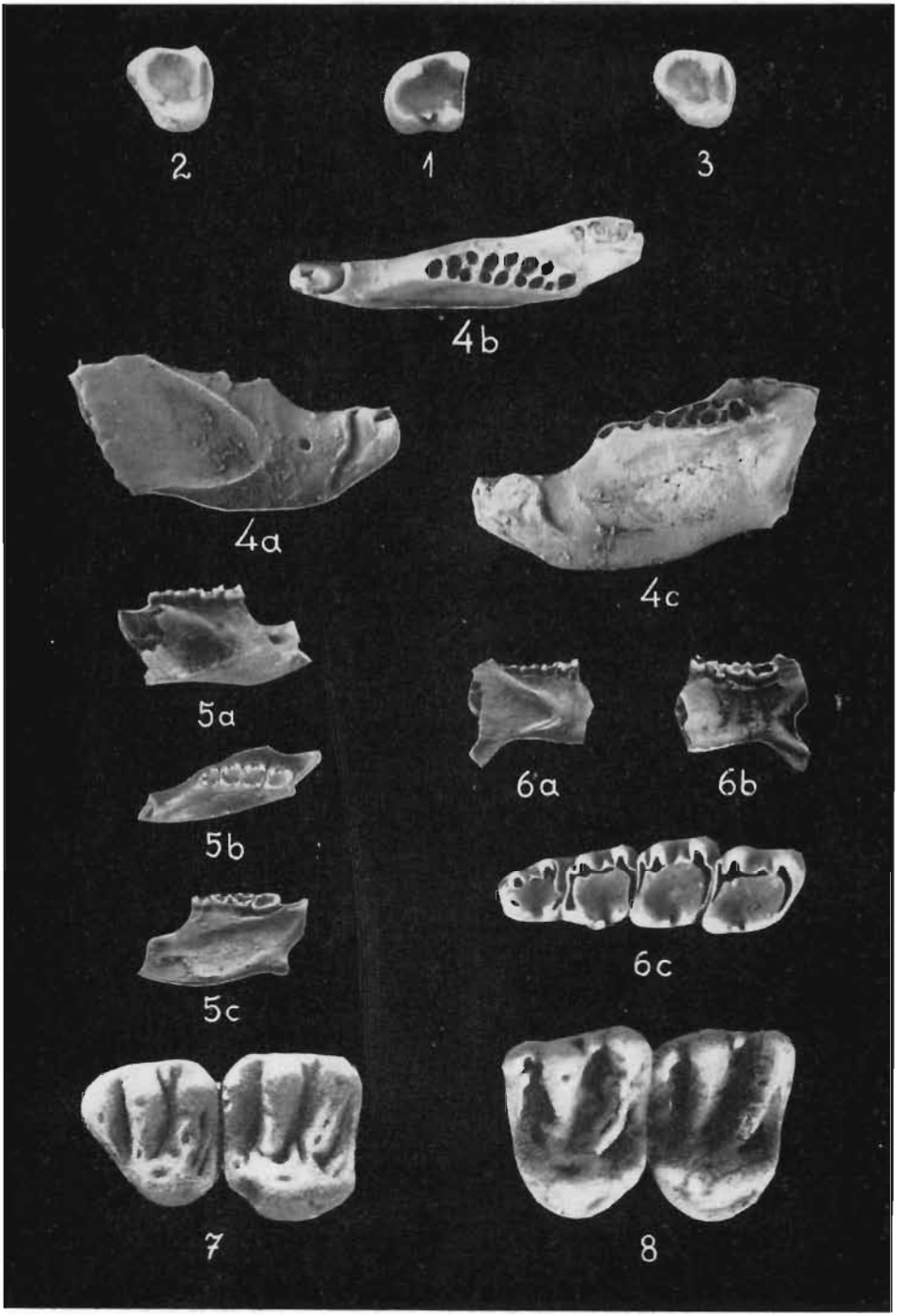
Plate III

Sciurus warthae n.sp.
(Węże 1)

Fig. 1. Left M_3. Fig. 2. Right M^3. Fig. 3. Right M^3. All specimens: occlusal view, (M. Z. No. VIII/Vm-322/20); ca. × 4.
Fig. 4. Right lower jaw, type specimen: *a* tooth-row view, *b* labial view, *c* lingual view (M. Z. No. VIII/Vm-322/1); ca. × 2.

Eutamias orlovi n.sp.
(Węże 1)

Fig. 5. Right lower jaws with $P_4 - M_3$, type specimen: *a* labial view, *b* tooth-row view, *c* lingual view (M. Z. No. VIII/Vm-323/1); ca. × 2.
Fig. 6. Right lower jaw with $P_4 - M_3$: *a* labial view, *b* lingual view, *c* tooth-row, occlusal view (M. Z. No. VIII/Vm-323/2); fig. 6*a*-*b* ca. × 2, fig. 6*c* ca. × 7.
Fig. 7. Left $P^4 - M^1$, occlusal view (M. Z. No. VIII/Vm-323/10); ca. × 13.
Fig. 8. Left $M^1 - M^2$, occlusal view (M. Z. No. VIII/Vm-323/11); ca. × 13.



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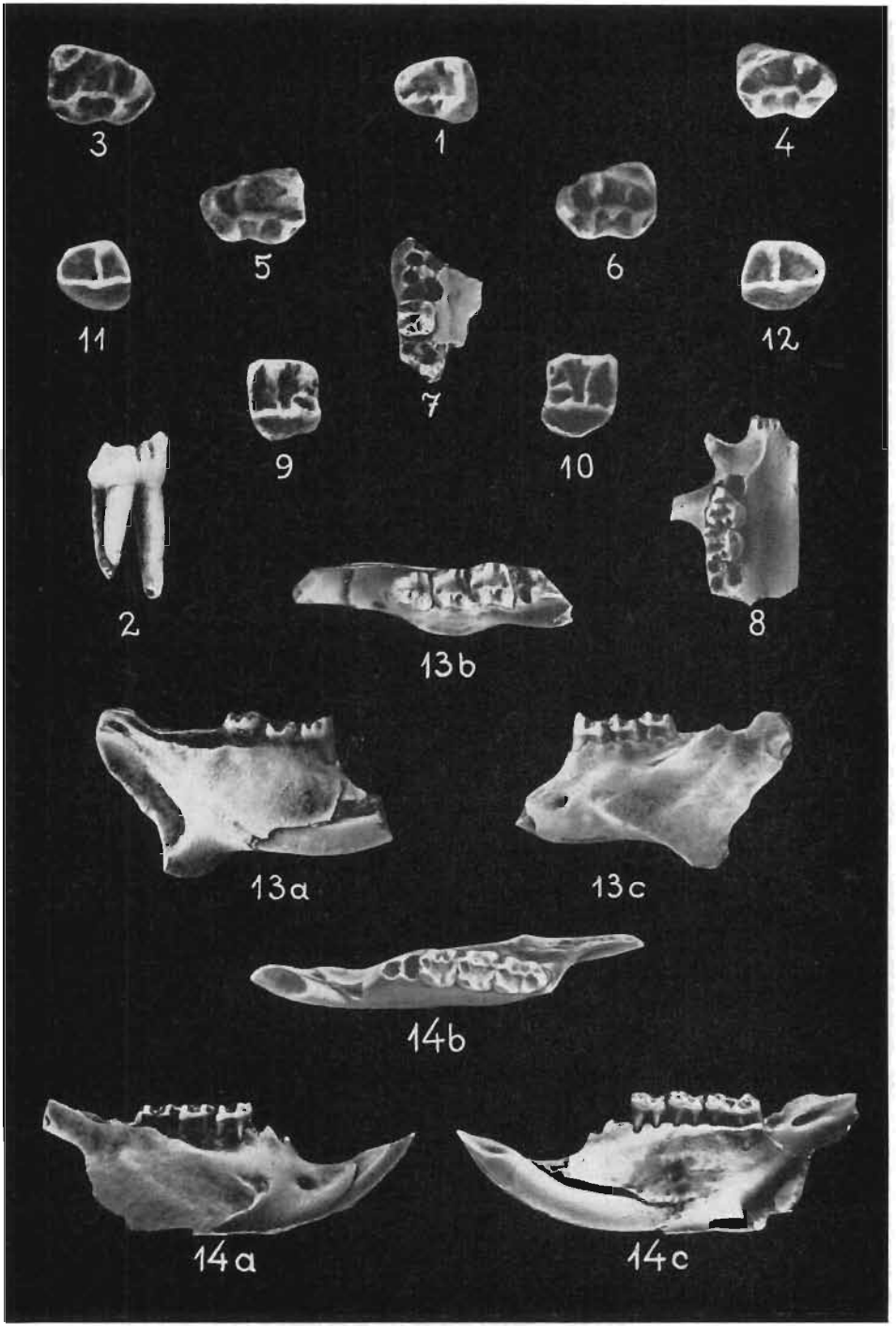

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Plate IV

Pliosciuropterus dehneli n.gen., n.sp.
(Węże 2)

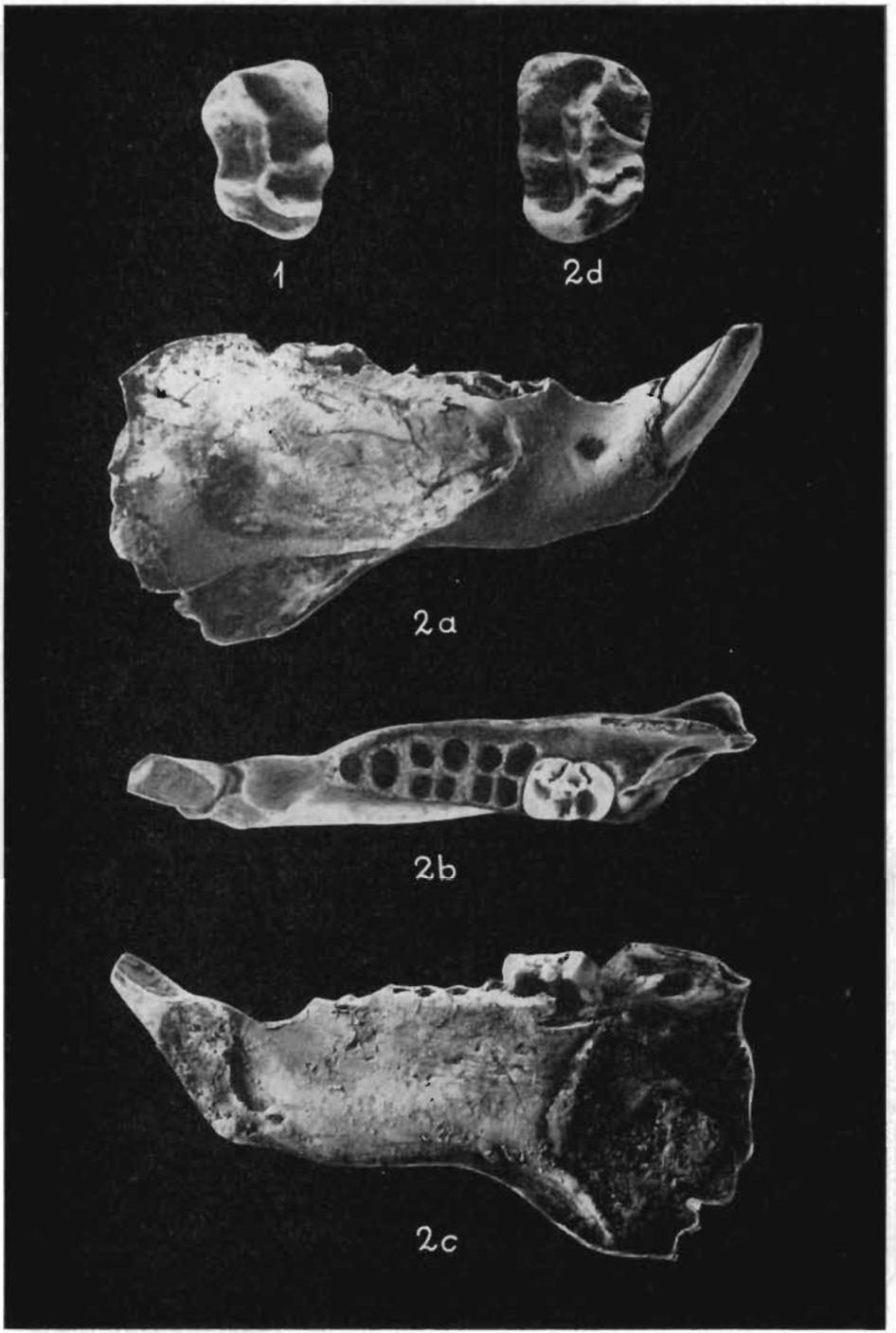
Fig. 1. Left P_4, occlusal view (Z. Pal. VM/I-25); ca. × 4.
Fig. 2. Left P_4, postero-lingual view (Z. Pal. VM/I-25); ca. × 4.
Fig. 3. Right M_3. Fig. 4. Right M_3. Fig. 5. Left M_3. Fig. 6. Left M_3.
Specimens 3-6, occlusal view (Z. Pal. VM/I-25); ca. × 4.
Fig. 7. Right fragment of the upper jaw with M^2, palatal view (Z. Pal. VM/I-3); ca. × 2.
Fig. 8. Right upper jaw with $P^4 — M^1$, alveoles P^1, M^2 and anterior root of the jugal arch, type specimen, palatal view (Z. Pal. VM/I-1); ca. × 2.
Fig. 9. Left M^1 or M^2. Fig. 10. Right M^1 or M^2. Fig. 11. Left M^3. Fig. 12. Right M^3.
Specimens 9-12, occlusal view (Z. Pal. VM/I-25); ca. × 4.
Fig. 13. Left lower jaw with $P_4 — M_2$: *a* lingual view, *b* tooth-row view, *c* labial view (Z. Pal. VM/I-2); ca. × 2.
Fig. 14. Right lower jaw without P_4: *a* labial view, *b* tooth-row view, *c* lingual view (Z. Pal. VM/I-4); ca. × 2.

Plate V

Pliosciuropterus schaubi n.sp.
(Węże 1)

Fig. 1. Left M_3, occlusal view (M. Z. No. VIII/Vm-324/2); ca. × 7.

Fig. 2. Right lower jaw, type specimen: *a* labial view, *b* tooth-row view, *c* lingual view, *d* M_3 occlusal view (M. Z. No. VIII/Vm-324/1); fig. 2*a*-*c* ca. × 3.2, fig. 2*d* ca. × 7.



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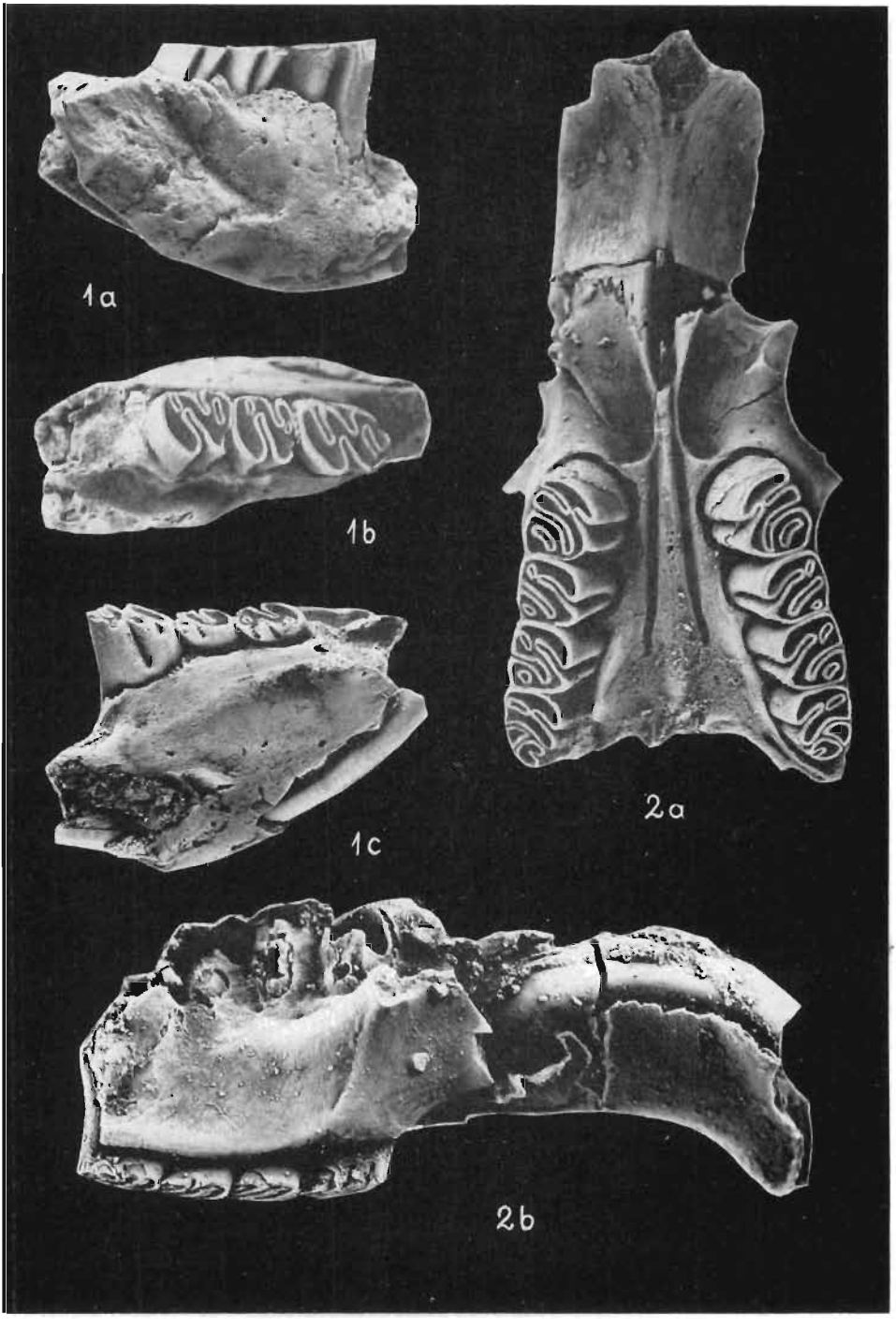

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Plate VI

Steneofiber wenzensis n.sp.
(Węże 1)

Fig. 1. Right lower jaw with $P_4 - M_2$: *a* labial view, *b* tooth-row view, *c* lingual view (M. Z. No. VIII/Vm-326/2); ca. × 3.

Fig. 2. Skull with alternating tooth-row, type specimen: *a* palatal view, *b* side view (M. Z. No. VIII/Vm-326/1); ca. × 3.

Plate VII

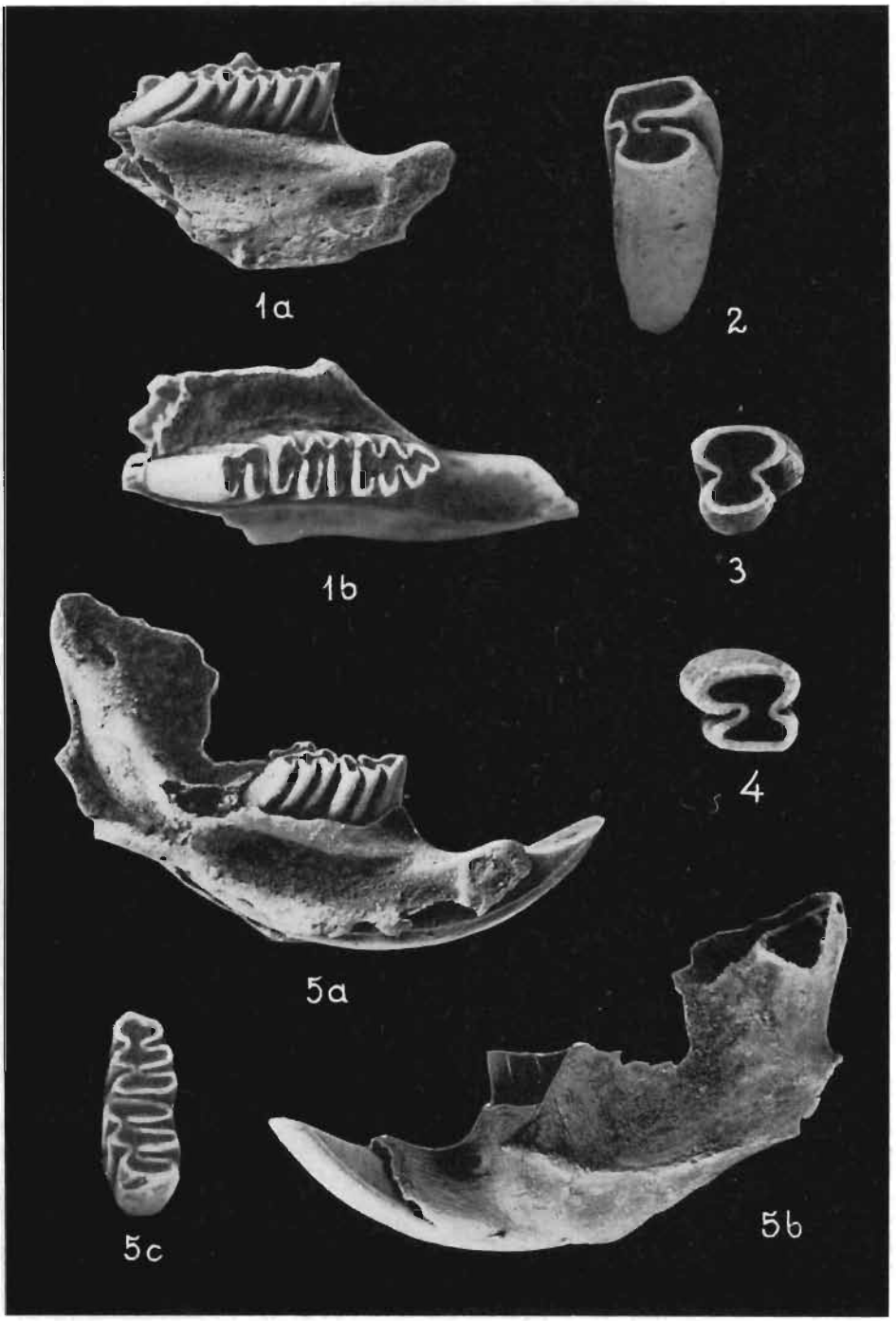
Trilophomys pyrenaicus (Depéret)
(Węże 1)

Fig. 1. Left lower jaw with $M_1 - M_3$: *a* lingual view, *b* tooth-row view (M. Z. No. VIII/Vm-327/1); fig. 1*a* ca. × 5, fig. 1b ca. × 6.5.

Fig. 2. Left M_3. Fig. 3. Right M^3. Fig. 4. Left M^3.

Specimens 2-4, occlusal view (M. Z. No. VIII/Vm-327/10); ca. × 10

Fig. 5. Left lower jaw with I, $M_1 - M_2$: *a* lingual view, *b* labial view, *c* $M_1 - M_2$, occlusal view M. Z. No. VIII/Vm-327/5); fig. 5*a*-*b* ca. × 5, fig. 5c ca. × 6.5.



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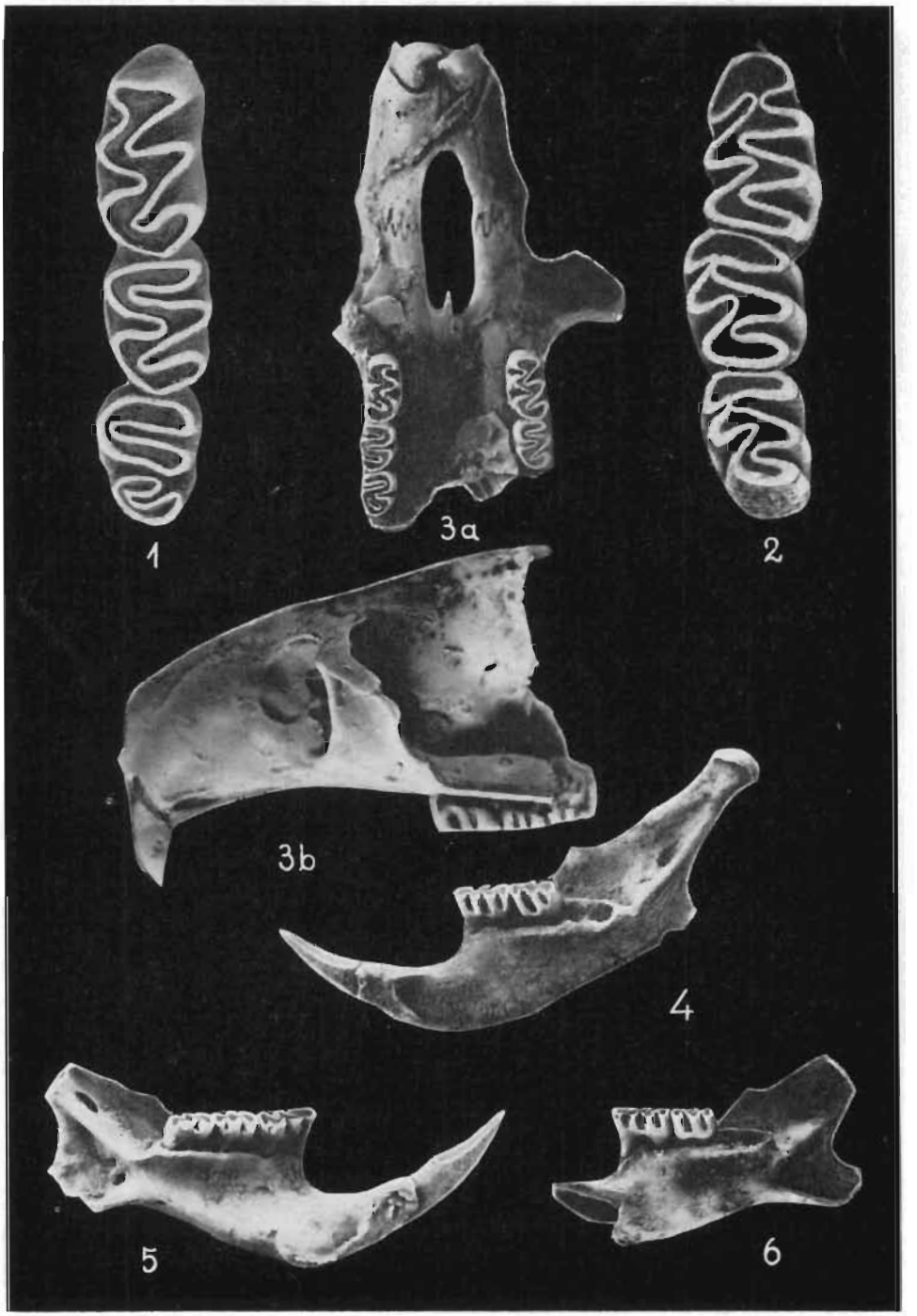

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Plate VIII

Baranomys longidens (Kowalski)
(Węże 1)

Fig. 1. The tooth-row of $M^1 - M^3$, occlusal view (M. Z. No. VIII/Vm-330/7); ca. × 16.
Fig. 2. The tooth-row of $M_1 - M_3$, occlusal view (M. Z. No. VIII/Vm-330/10); ca. × 16.
Fig. 3. Rostral fragment of skull: *a* palatal view, *b* side view (M. Z. No. VIII/V-330/5); ca. × 5.5.
Fig. 4. Right lower jaw with I, $M_1 - M_2$, lingual view (M. Z. No. VIII/Vm-330/12); ca. × 4.
Fig. 5. Left lower jaw with I, $M_1 - M_3$, lingual view (M. Z.No. VIII/Vm-330/9); ca. × 5.5.
Fig. 6. Right lower jaw with $M_1 - M_2$ and angular process, lingual view (M. Z. No. VIII/Vm-330/8); ca. × 5.5.

Plate IX

First lower cheek teeth (M_1)
(occlusal view)

Dolomys cf. *hungaricus* Kormos
(Węże 1)

Fig. 1. Left, young individual. Fig. 2. Left, young individual.
Fig. 3. Right, young individual. Fig. 4. Right, adult individual.
Fig. 5. Right, adult individual. Fig. 6. Left, adult individual.
Fig. 7. Left, adult-old individual.
All specimens M. Z. No. VIII/Vm-335/100.

Dolomys cf. *nehringi* Kretzoi
(Węże 1)

Fig. 8. Left, adult individual (M. Z. No. VIII/Vm-336/1).

Mimomys gracilis (Kretzoi)
(Węże 1)

Fig. 9. Left, young individual. Fig. 10. Left, adult individual.
Fig. 11. Left, old individual.
All specimens M. Z. No. VIII/Vm-338/50.

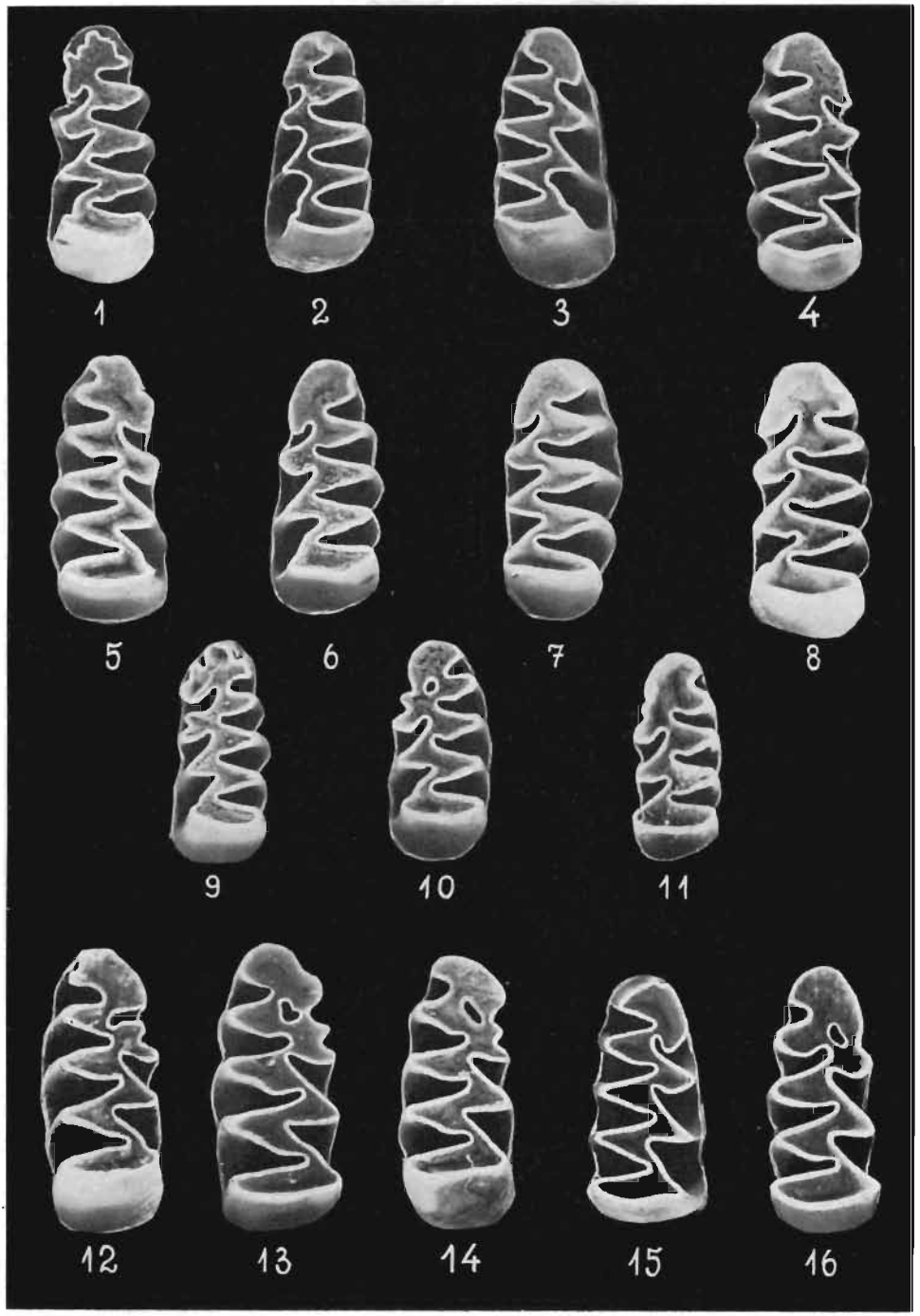
Mimomys cf. *stehlini* Kormos
(Węże 1)

Fig. 12. Right, young individual. Fig. 13. Right, adult individual.
Fig. 14. Right, old individual.
All specimens M. Z. No. VIII/Vm-337/100.

?Mimomys sp.
(Węże 1)

Fig. 15. Right, young individual. Fig. 16. Right, adult individual.
Specimens 15-16 M. Z. No. VIII/Vm-339/25.

All specimens × 10



Phot. M. Czarnocka

1

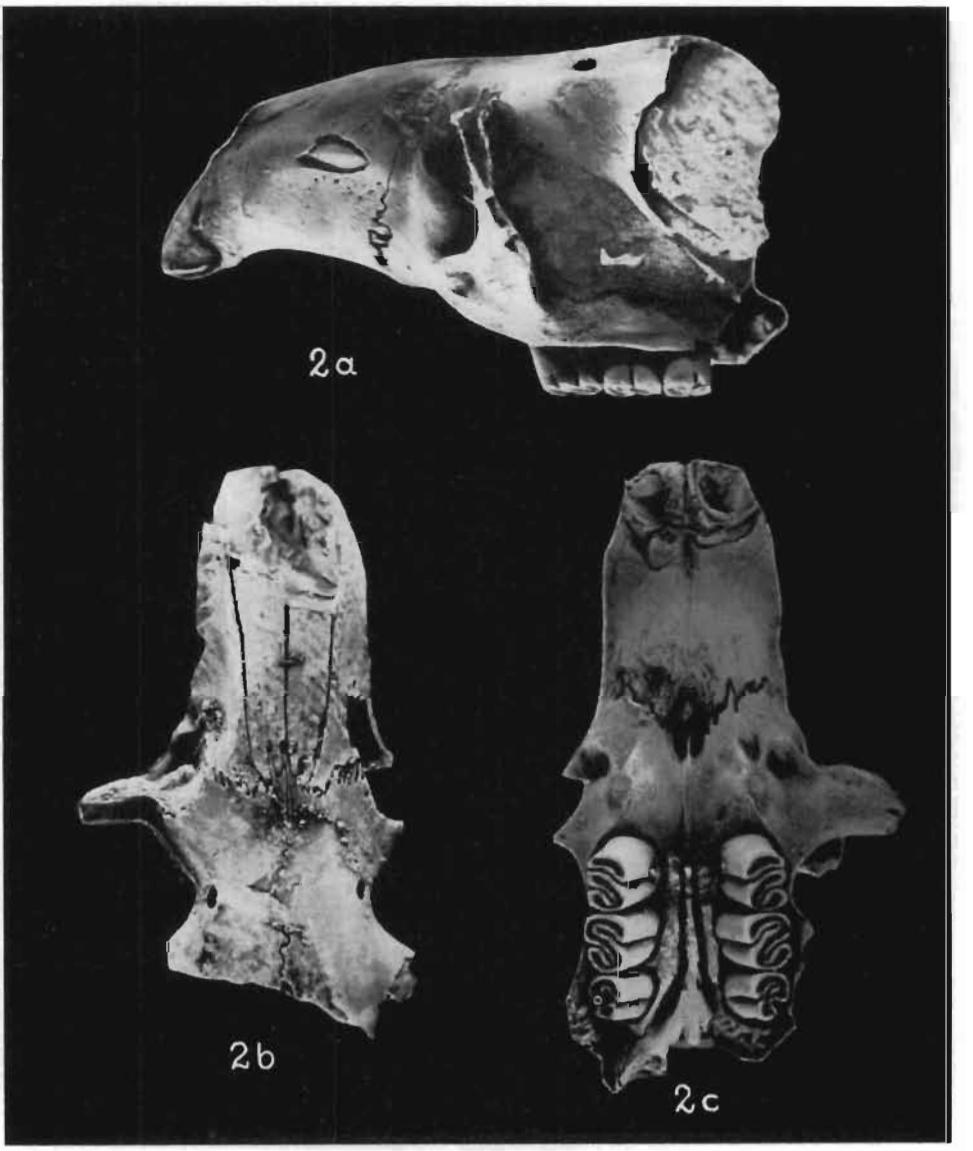


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Plate X

Prospalax priscus (Nehring)
(Węże 1)

Fig. 1. Left $P^1 - M^2$ (adult individual), occlusal view (M. Z. No. VIII/Vm-340/1); ca. × 10.

Fig. 2. Rostral fragment of skull with alternating $P^1 - M^2$: *a* side view, *b* top view, *c* palatal view (M. Z. No. VIII/Vm-340/1); ca. × 3.5.

Plate XI

Prospalax priscus (Nehring)
(Węże 1)

Fig. 1. Right $P_1 - M_2$ (adult individual), occlusal view (M. Z. No. VIII/Vm-340/3); ca. × 10.

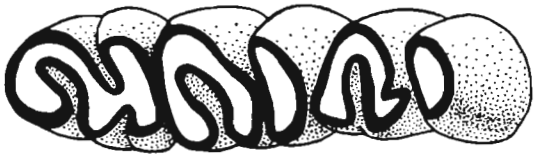
Fig. 2. Right P_1, adult individual. Fig. 3. Left P_1, old individual.

Fig. 4. Left P_1, young individual.

Specimens 2-4, occlusal view (M. Z. No. VIII/Vm-340/50); ca. × 10

Fig. 5. Left lower jaw with $P_1 - M_1$, adult individual: *a* lingual view, *b* labial view (M. Z. No. VIII/Vm-340/5); ca. × 3.5.

Fig. 6. Right lower jaw with $P_1 - M_2$, young individual, tooth-row view (M. Z. No. VIII/Vm-340/6); ca. × 3.5.



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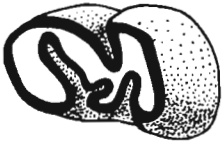

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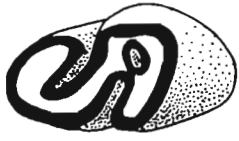

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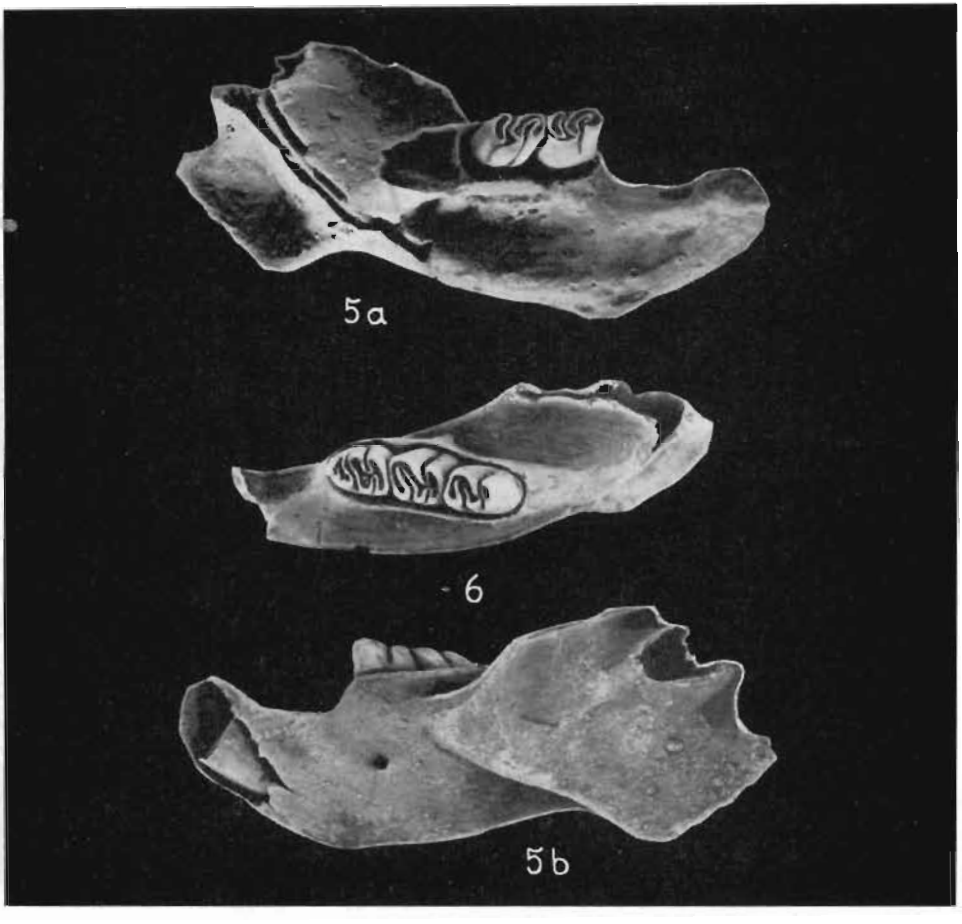

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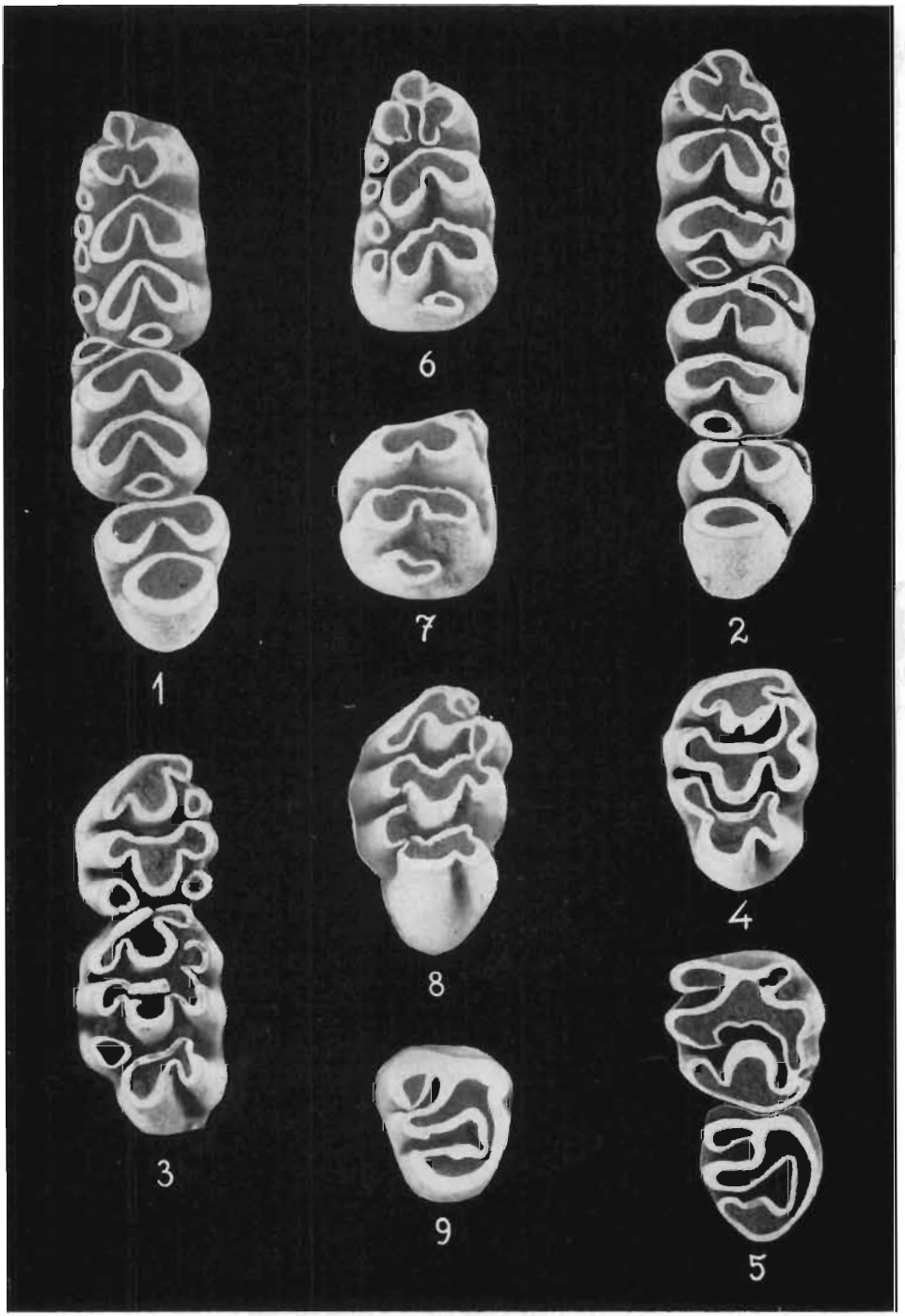


Phot. M. Czarnocka

Plate XII

Rhagapodemus frequens Kretzoi
(Węże 1)

Fig. 1. Left $M_1 - M_3$ (M. Z. No. VIII/Vm-342/1).
Fig. 2. Right $M_1 - M_3$ (M. Z. No. VIII/Vm-342/2).
Fig. 3. Right $M^1 - M^2$ (M. Z. No. VIII/Vm-342/3).
Fig. 4. Right M^1 (M. Z. No. VIII/Vm-342/50).
Fig. 5. Left $M^2 - M^3$ (M. Z. No. VIII/Vm-342/4).

Rhagapodemus frequens Kretzoi
(Csarnóta 2, Hungary)

Fig. 6. Left M_1. Fig. 7. Right M_2. Fig. 8. Right M^1. Fig. 9. Left M^3.

Specimens 1-9 belong to adult individuals, occlusal view; ca. × 15

Plate XIII

Parapodemus schaubi Papp
(Węże 1)

Fig. 1. Right M_1 — M_3, adult individual (M. Z. No. VIII/Vm-343/1).
Fig. 2. Left M_1 — M_2, adult individual (M. Z. No. VIII/Vm-343/3).
Fig. 3. Right M_1 — M_3, adult individual (M. Z. No. VIII/Vm-343/2).

Apodemus dominans Kretzoi
(Csarnóta 2, Hungary)

Rig. 4. Right M_1, young individual?
Fig. 5. Right M_2, adult individual.

?*Apodemus dominans* Kretzoi
(Węże 1)

Fig. 6. Left M^2, adult individual (M. Z. No. VIII/Vm-344/10).
Fig. 7. Left M^1, adult individual (M. Z. No. VIII/Vm-344/10).

?*Rhagapodemus* sp.
(Węże 1)

Fig. 8. Left M_1, old individual (M. Z. No. VIII/Vm-344/20).
Fig. 9. Left M^1, old-adult individual (M. Z. No. VIII/Vm-344/20).

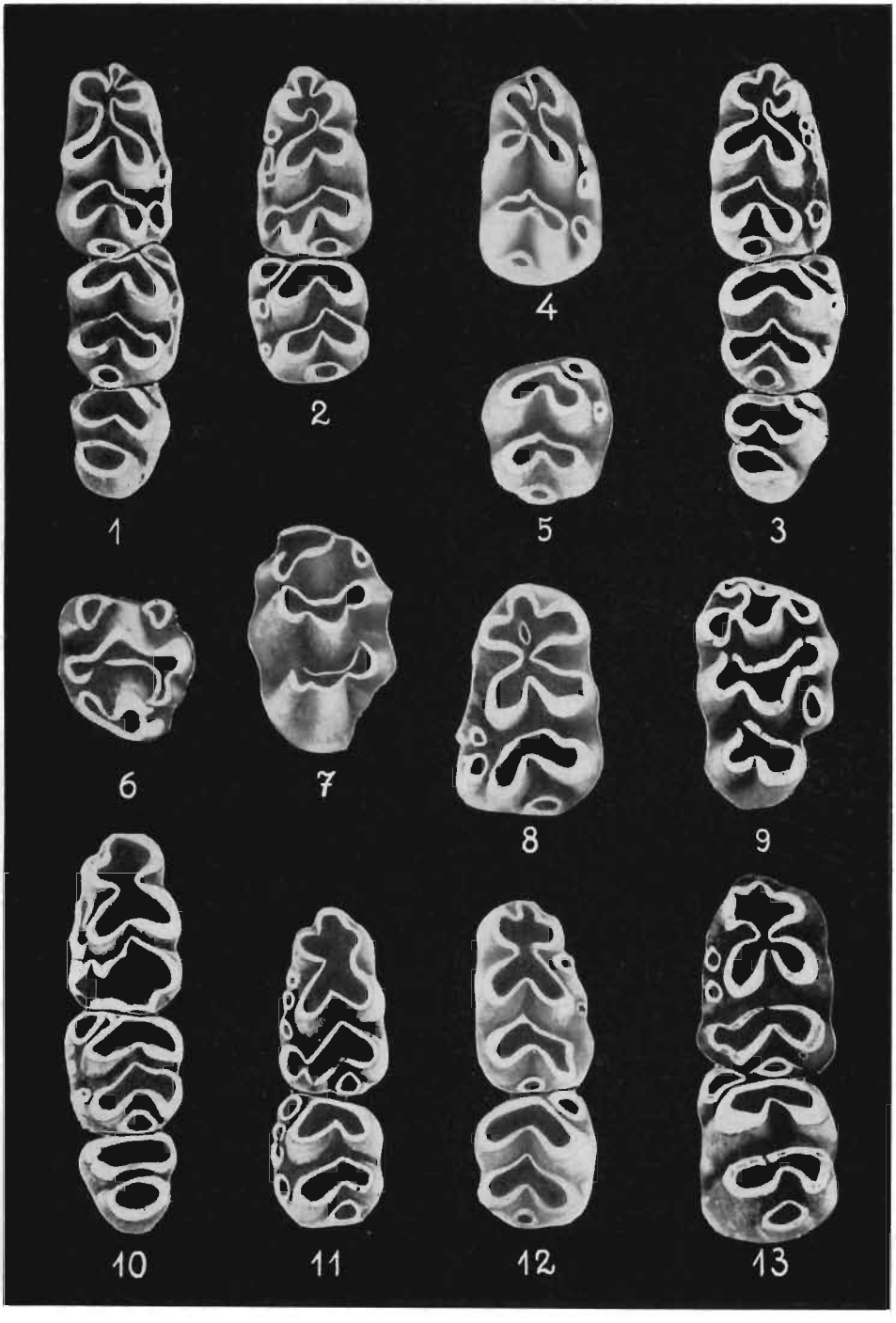
?*Apodemus* sp.
(Węże 1)

Fig. 10. Left M_1 — M_3, old individual (M. Z. No. VIII/Vm-344/3).
Fig. 11. Left M_1 — M_2, adult individual (M. Z. No. VIII/Vm-344/6).
Fig. 12. Right M_1 — M_2, adult individual (M. Z. No. VIII/Vm-344/6).

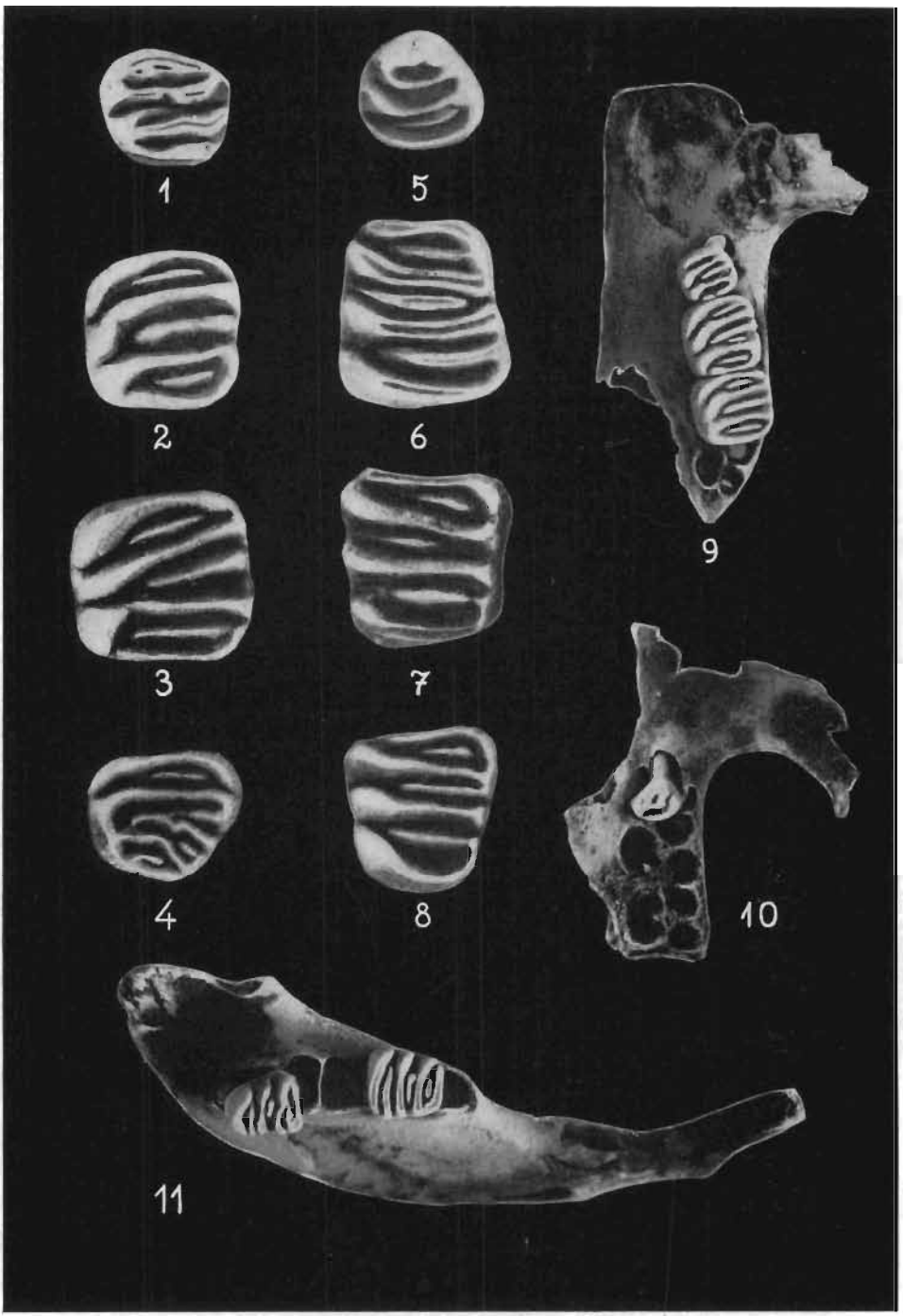
?*Rhagapodemus* Kretzoi or *Parapodemus* Schaub
(Węże 1)

Fig. 13. Left M_1 — M_2, adult individual (M. Z. No. VIII/Vm-344/2).

All specimens, occlusal view; ca. × 15



Phot. M. Czarnocka



Phot. M. Czarnocka

Plate XIV

Glis minor Kowalski
(Węże 1)

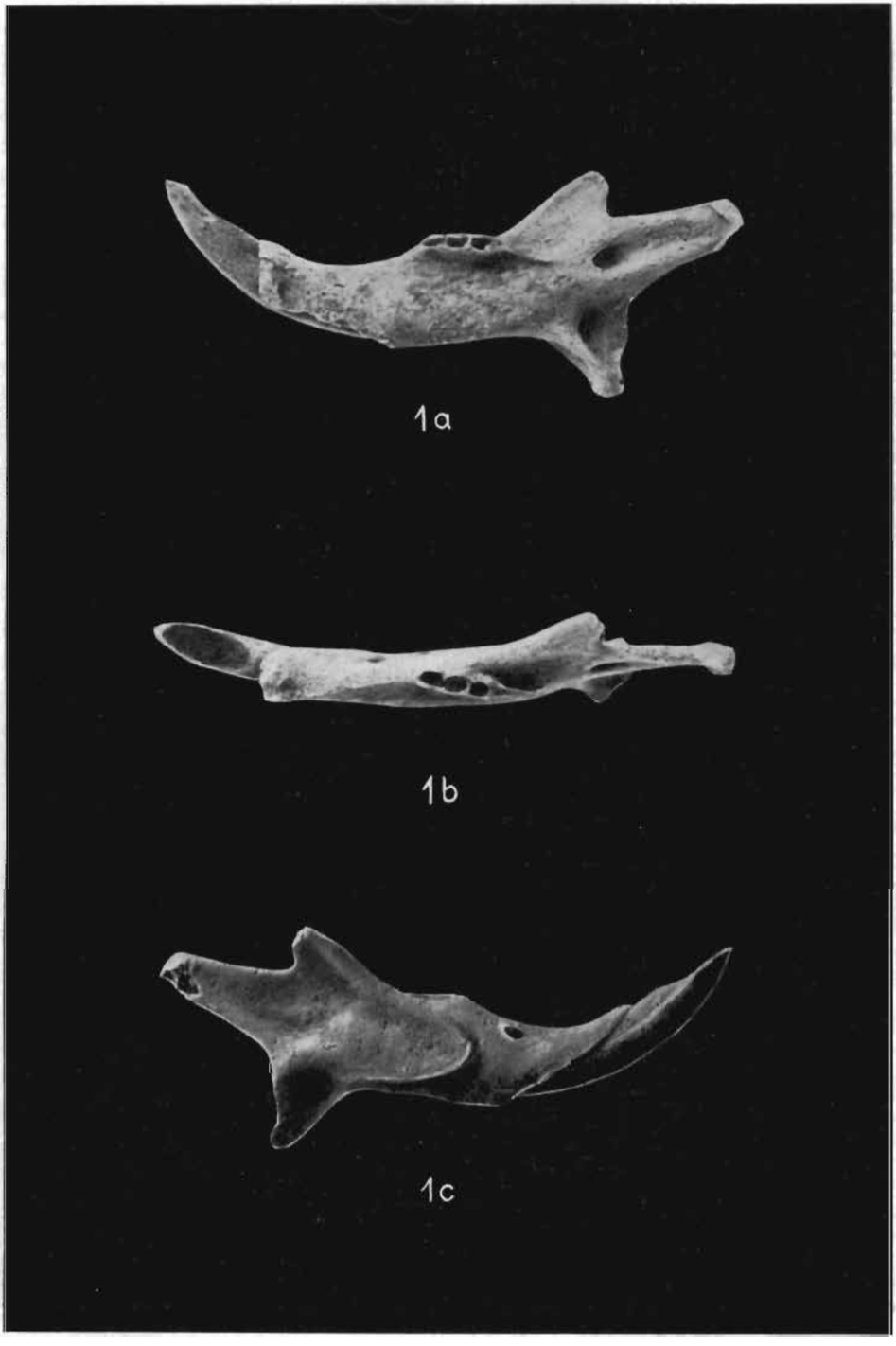
Fig. 1. Left P^4. Fig. 2. Left M^1. Fig. 3. Left M^2. Fig. 4. Left M^3.
Fig. 5. Left P_4. Fig. 6. Left M_1. Fig. 7. Left M_2. Fig. 8. Left M_3.
All specimens, occlusal view (M. Z. No. VIII/Vm-345/25)
Fig. 9. Left upper jaw with $P^4 - M^2$, palatal view (M. Z. No. VIII/Vm-345/1).
Fig. 10. Left upper jaw with DP^4, and $M^1 - M^2$ alveoles, palatal view (M. Z. No. VIII/Vm-345/3).
Fig. 11. Left lower jaw with I, M_1 and M_3 tooth-row view (M. Z. No. VIII/Vm-345/2). 345/2).

Fig. 1-8 ca. × 12, fig. 9-11 ca. × 6.5

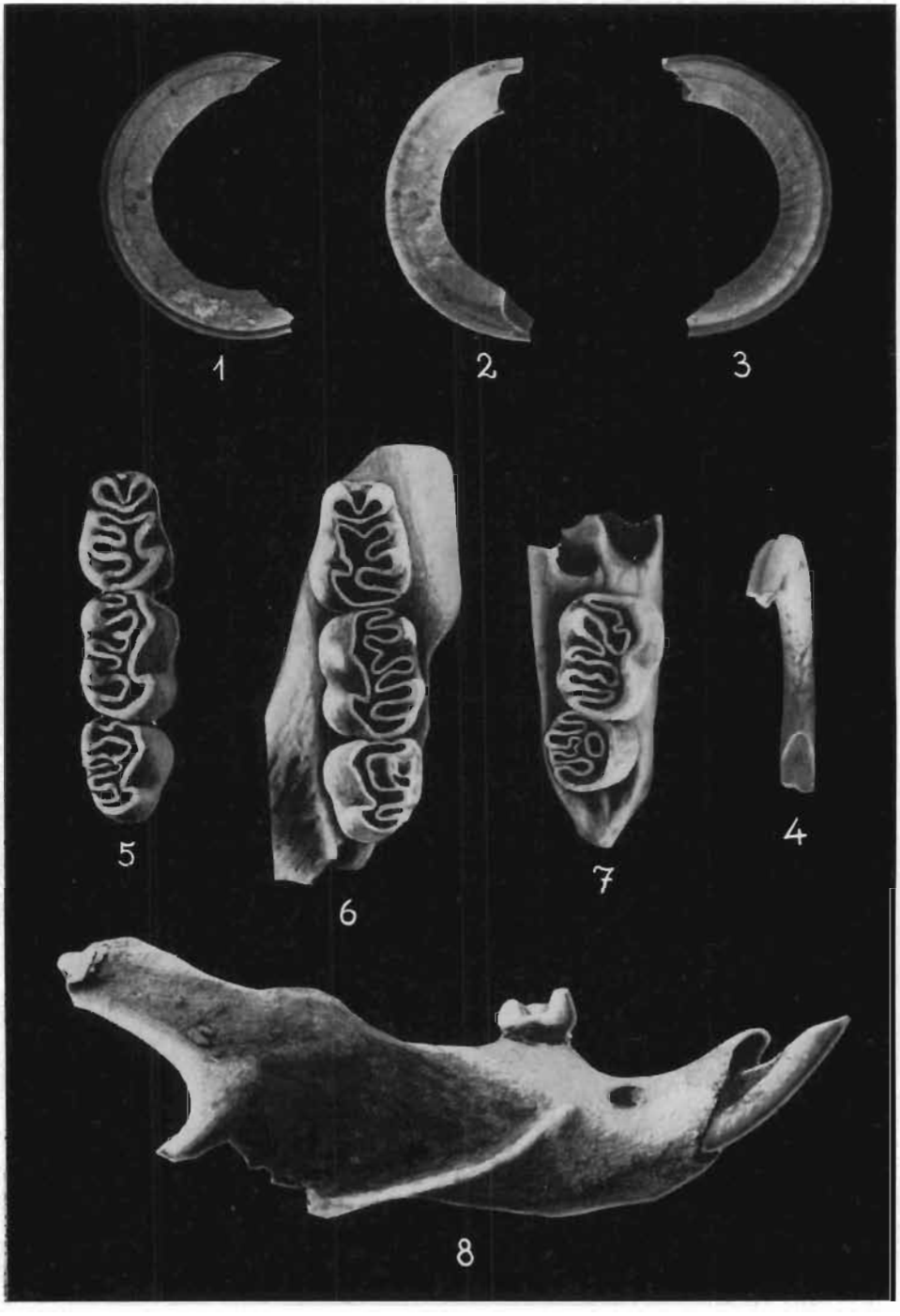
Plate XV

Plioselevinia gromovi Sulimski
(Węże 1)

Fig. 1. Right lower jaw, type specimen: *a* lingual view, *b* tooth-row view, *c* labial view (M. Z. No. VIII/Vm-328/1); ca. × 6.5.



Phot. M. Czarnocka



Phot. M. Czarnocka

Plate XVI

Sminthozapus janossyi Sulimski
(Węże 1)

Fig. 1-4. Four upper incisors: *1, 3* labial view, *2* lingual view, *4* behind view (M. Z. No. VIII/Vm-329/10); ca. × 8.

Fig. 5. Right $M_1 - M_3$, adult individual, occlusal view (M. Z. No. VIII/Vm-329/1); ca. × 15.

Fig. 6. Left lower jaw with $M_1 - M_3$, adult individual, occlusal view (M. Z. No. VIII/Vm-329/3); ca. × 15.

Fig. 7. Fragment of upper jaw with $M^2 - M^3$, adult individual, occlusal view (M. Z. No. VIII/Vm-329/2); ca. × 15.

Fig. 8. Right lower jaw I, M_1, labial view (M. Z. No. VIII/Vm-329/5); ca. × 10.