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Rodents from the Miocene of Opole

[Pp. 1—18, pls. I—VII and 17 text-figs]

Gryzonie miocenu Opola

Грызуны миоцена в Ополе

Abstract. Rodent remains from the Sarmatian lake deposits in Opole, Polish Silesia, are described. Following forms were recognized: *Sciurus* cf. *goeriachensis*, *S.* cf. *fissurae*, *„Sciurus" bredai*, *Sciuropterus gibberosus*, *Pseudotheridomys carpathicus*, *Democricetodon gaillardi*, *D. gregarius bavaricus*, *Cotimus bifidus*, *Anomalomys gaudryi*, *Glis* sp., *Steneofiber jaegeri*, *S. eseri*, *S. minutus*. Most of them are new to the fauna of Opole and at the same time to the Miocene of Poland.

A rich fauna of molluscs and vertebrates was found in the silts of the Sarmatian age at Nowa Wieś Królewska near Opole (now included in the town area of Opole) as early as the beginning of the present century. In the literature of that time this locality was known by the German name of Königsdorf bei Oppeln or simply Oppeln. In the monograph of this locality WEGNER (1913) mentions 4 forms of rodents: *Sciuropterus gibberosus* HOFMANN, *Steneofiber subpyrenaicus* LARTET, *Cricetodon minus* LARTET and *„Sciuridae* spec. indet.". WEGNER's collection of rodents from Opole has not been preserved in Poland and I have had no access to it.

In 1950—1958 the Palaeozoological Department of Wrocław University carried out further exploration at the same locality in Opole, but at a distance of about 1 kilometre from the place investigated by WEGNER (1913). More remains of vertebrates, especially of small ones, were found (RYZIEWICZ, 1957, 1959, 1961). The remains of rodents derived from these excavations were delivered to me for study by Prof. Dr. Zbigniew RYZIEWICZ, Head of the

Palaeozoological Department of Wrocław University, for which I am very grateful to him.

The material examined consisted almost exclusively of loose teeth: 63 molars and several dozen incisors and their fragments. There was only one mandible, which belonged to *Pseudotheridomys carpathicus* SCHAUB & ZAPFE, but it fell to pieces when being prepared. There were also 2 damaged humeri of the beaver.

All the specimens are in the possession of the Palaeozoological Department of Wrocław University.

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GENERAL PART

The following forms of rodents were represented in the material for study:
Sciurus cf. *goeriachensis* HOFMANN, 1893
Sciurus cf. *fissurae* DEHM, 1950
„*Sciurus*" *bredai* v. MEYER, 1848
Sciuropterus gibberosus (HOFMANN, 1893)
Pseudotheridomys carpathicus SCHAUB & ZAPFE, 1953
Democricetodon gaillardi (SCHAUB, 1925)
Democricetodon gregarius bavaricus FAHLBUSCH, 1964
Cotimus bifidus FAHLBUSCH, 1964
Anomalomys gaudryi GAILLARD, 1900
Glis sp.
Steneofiber jaegeri (v. MEYER, 1844)
Steneofiber eseri (v. MEYER, 1846)
Steneofiber minutus (v. MEYER, 1838)

The Miocene layers of Opole have been numbered among the Sarmatian formations on the ground of their fauna of molluscs and mammals. The rodential fauna provides some further details for age determination. The species of the *Cricetodontidae* present in Opole are also met with in the younger localities of freshwater molasse of Bavaria, in Giggenhausen and Oggendorf. The fauna of La Grive St. Alban also comes near that of Opole. The finds from Vieux Collonges and Sansan seem to be somewhat older. There is, besides, a likeness between the fauna from Opole and that from Nova Ves (Neudorf). In addition to geological age, these similarities and dissimilarities reflect the facial and geographical differences and, consequently, it is difficult to determine the age exactly. In general, however, the fauna of rodents confirms the Sarmatian age of the Opole layers.

In Opole the remains of mammals accumulated in a small water reservoir, the deposits of which were formed of material transported by a stream. The

presence of lignites suggests the occurrence of forests. The mammalian fauna of Opole, as a whole, indicates the presence of aquatic and forest habitats and a warm subtropical climate at the time of the formation of the deposits.

The rodents found in Opole may have come partly from the reservoir itself and its banks and partly from farther regions, from where they were brought by water or predatory birds. The presence of beavers indicates an aquatic environment, whereas that of tree squirrels and, above all, flying squirrels suggests a forest habitat. Little is known of the ecological demands of the remaining species of the Miocene rodents.

The knowledge of the Miocene rodents from Opole extends the range of many of their species to a great extent in eastern and northern directions. However, the remains collected are too fragmentary to make the basis for conclusions concerning the variation and systematics of these animals.

SYSTEMATIC PART

Family *Sciuridae* Gray, 1821
Subfamily *Sciurinae* Baird, 1857
Genus *Sciurus* Linnaeus, 1758

Sciurus cf. *goeriachensis* Hofmann, 1893

[Pl. I, 1]

Material: 1 M^1 or M^2.

Description: Tooth very large in size, with low crown and quadrangular outline. Structure simple, proto- and metaconus not marked, mesostyle present. The tooth is rather heavily worn.

Measurements: length, 3·8 mm; width, 4·5 mm.

Systematic notes: The simple structure and large size of the tooth confine the considerations concerning its systematic position to a small number of forms. Dehm (1950) describes a large member of the *Sciuridae* from Wintershof-West, which he calls *Ratufa? obtusidens* Dehm, 1950. However, the teeth of this species are considerably smaller (the measurements of M^1 or M^2 are 2·6—2·8 mm × 3·1—3·5 mm) and much more rounded than my specimen. Out of the known Miocene species, *Sciurus goeriachensis* Hofmann, 1893 from Goeriach is most closely related to it. Only one lower jaw of this form, with P_4 and M_3, is known from the type locality, the measurements of M_3 being 3·0 mm in width and 4·5 mm in length. This species was subsequently recorded from Viehhausen bei Regensburg (Seeman, 1938), La Grive and Nova Ves (Neudorf), but also on the basis of fragmentary remains. The specimen from Opole seems to exceed *S. goeriachensis* in size, though, as Dehm (1950) demonstrated by the example of *Sciurus fissurae* Dehm, 1950, squirrels show great variation in tooth dimensions. Owing to the fragmentariness of the material from Opole

it is difficult to make any further conclusions but only the statement that there was a large species of *Sciurus* LINNAEUS there.

Sciurus cf. *fissurae* DEHM, 1950

[Pl. I, 2]

Material: 1 M_1 or M_2.

Description: Crown low, with rounded corners. The tooth is badly worn; as a result, the structure of the crown cannot be fully examined. The metaconid is the highest cusp, but in spite of that it is not very high.

Measurements: length, 2·4 mm; width, 2·3 mm.

Systematic notes: This tooth differs both from the specimen from Opole identified as *S.* cf. *goeriachensis* in that it is much smaller and from the specimens of *S. bredai*, which have a higher crown with more quadrangular outlines and are smaller in size. The tooth structure evidently resembles that of modern *Sciurus vulgaris* LINNAEUS, 1758. The only member of the *Sciuridae* of the European Miocene that shows similar characters is *S. fissurae* DEHM, 1950, described from the Burdigal of Wintershof-West near Eichstät. This species has also been reported from Vieux Collonges (MEIN, 1958). WEGNER (1913) mentions the presence of a fragment of an incisor and humerus of a small sciuroid in Opole, but it is impossible to determine on the basis of this mention to which of the species represented in my material these remains might belong.

„*Sciurus*“ *bredai* v. MEYER, 1848

[Pl. I, 3—9]

Material: 1 D^4, 1 P^4, 1 M^1, 1 M^3, 2 P_4, 2 M_1.

Description: These teeth do not differ from the specimens of this species from La Grive, with which I managed to compare them directly, only that they are somewhat smaller. The crowns of the teeth are fairly high and quadrangular, the metaconid is very high and the mesostylid small.

Measurements (in mm):

	D^4	P^4	M^1	M^3	P_4 (1)	P_4 (2)	M_1 (1)	M_1 (2)
length	1·4	1·7	1·8	1·9	1·2	1·2	1·8	1·9
width	1·4	1·8	2·2	2·1	1·5	1·5	1·8	2·1

Systematic notes: *Sciurus bredai* v. MEYER is known from Oeningen in southern Germany, La Grive in France (described by DEPÉRET, 1887 as *Sciurus spermophilinus*) and Vieux Collonges (MEIN, 1958). MAJOR (1893) believes that this species bears similarity to the oriental members of the genus *Sciurus* L. In accordance with BLACK's (1963) opinion, in dentition *S. bredai* seems to refer rather to ground squirrels than to tree squirrels. In particular, the specimen of *Ammospermophilus?* sp. described by BLACK (1963, pp. 224—227, Pl. 22, 6) from the Pliocene of Oregon shows close resemblance to *S. bredai*.

Subfamily *Petauristinae* Simpson, 1945
Genus *Sciuropterus* Cuvier, 1824

Sciuropterus gibberosus (Hofmann, 1893)

[Pl. II, 1—2]

Material: 1 M^2, 1 M_3.

Description: M^2 (left) slightly worn, crown surface quadrangular, enamel with numerous depressions and protuberances. A ridge runs from the paracone to the anteroloph, whereas the middle ridge, extending from the protocone into the internal valley, is lacking. The lingual root is large and the two labial roots small and directed obliquely.

M_3 is quite unworn. It has 4 roots and its talonid is not particularly elongated.

Measurements (in mm):

	M^2	M^3
length	3·0	4·4
width	4·0	3·3

Systematic notes: The characteristic surface of enamel indicates the membership in the *Petauristinae*. The large Miocene forms of this subfamily from Europe belong to the genus *Sciuropterus* Cuvier, 1824 (Ellerman & Morrison-Scott, 1951, think that this genus should be named *Pteromys* Cuvier, 1900. As I do not want to engage in this dispute, I use the generic name *Sciuropterus*, which has generally been applied in palaeontological papers so far). Wegner (1913) described the remains of *S. gibberosus* from Opole. His material contained M^2 and M^3, which were also present in my collection, and owing to this fact it was possible to establish that they represented the same species.

As will be seen, among other things, from Dehm's (1962) list, there are some dozen Miocene localities of large flying squirrels known in Europe. *S. gibberosus*, described first from Goeriach, was also recorded from the upper freshwater molasse in southern Germany (Biberach, Reisenburg), from Jablanica in Hungary, and La Grive in France (from where Major, 1896 described *S. albanensis*, which seems to be identical with *S. gibberosus*). In Mein's (1958) opinion, *S. jourdani* Gaillard, 1899, is also synonymous with this species.

The other Miocene species of the genus *Sciuropterus* differ evidently from the remains found in Opole. *S. gaudryi* Gaillard, 1899 is much smaller and *S. lappi* Mein, 1958 shows a different structure of M^2, which has a transverse ridge descending from the paracone to the middle valley but lacks a ridge from the paracone to the anteroloph. Little is known of *S. sansaniensis* (Lartet, 1851), which may be identical with *S. lappi* Mein (Ginsburg, 1963).

Family *Eomyidae* Depéret et Douxami, 1902
Genus *Pseudotheridomys* Schlosser, 1926

Pseudotheridomys carpathicus Schaub & Zapfe, 1953

[Pl. IV, 3—4]

Material: I, M_2 and M_3 derived from the destroyed left half of a mandible.

Description: The incisor is very strongly contracted laterally, narrowly elliptical in cross-section. The ridge of enamel at its anterior edge is coloured dark brown.

The molars are so badly worn that it is difficult to restore their structure. M_2 is subsquare in outline. Since the mesolophid is lacking, there is only one open lingual syncline. The crown of M_3 is narrowed posteriorly. Owing to wear the anticlines have become joined and there are only two synclines, an external and an internal, which divide the crown into poorly differentiated, anterior and posterior parts.

Measurements: Incisor — height, 1·0 mm; width, 0·4 mm. M_2 — length, 0·6 mm; width, 0·6 mm; M_3 — length, 0·5 mm; width, 0·6 mm.

Systematic notes: Though the wear of the teeth makes their analysis difficult, the shape of the incisor and that of the crowns of the molars as well as their uncommonly small size indicate that they should be referred to the genus *Pseudotheridomys* Schlosser. This genus contains 2 species, *P. parvulus* Schlosser, 1926 known, among other localities, from Hochheim-Flörsheim and Vogelsberg (Tobien, 1954) as well as from Ravolzhausen (Tobien, 1960) in Germany, Saulcet, Laugnac and Bouzigues (Thaler, 1962) in France, Chaux in Switzerland (Stehlin & Schaub, 1951) and Kralup in Czechoslovakia (Čtyroký, Fejfar, Holý, 1964) and *P. carpathicus* Schaub & Zapfe, 1953 from Nova Ves (Neudorf) in Czechoslovakia. This last species differs from *P. parvulus* mainly in the simplified structure of its upper teeth and in their smaller measurements. The measurements of my specimens, consistent with those of the corresponding teeth from Nova Ves (where M_2 is 0·64—0·71 mm long and 0·66—0·77 mm wide and M_3, respectively, 0·51—0·61 mm and 0·54—0·66 mm), point to the presence of *P. carpathicus* in Opole. The reduction of the mesolophid in M_2 from Opole, unless it results from individual variation, indicates that evolutionarily this tooth is still more progressive than in *P. carpathicus* from Nova Ves.

Family *Cricetidae* Rochebrune, 1883
Subfamily *Cricetodontinae* Stehlin & Schaub, 1951
Genus *Democricetodon* Fahlbusch, 1964

Democricetodon (Democricetodon) gaillardi (Schaub, 1925)

[Pl. II, 3—5, Pl. III, 1—6, Pl. IV, 1—2]

Material: 4 M^1, 3 M^2, 1 M^3, 2 M_1, 5 M_2, 1 M_3.

Description: The anteroconid of M_1 is well developed, broad, divided in two in a young tooth, but the two parts fuse together, as the tooth becomes

more worn. The external valley extends almost transversely and the ectolophid (Längsgrat) is short. The external transversal crest (äusserer Quersporn) is present though poorly developed.

M_2 is almost rectangular. On the lingual side the anterior margin is somewhat receding and formed by a strong cingulum. The external valley is directed transversely or slightly towards the front. The mesolophid extends to the margin of the tooth.

M_3 is elongated. The anterolophid almost reaches the margin of the tooth labially. The thickening of the cingulum is visible on the margin of the transverse external valley.

M^1. The anterocone is undivided and broad. The well-developed anterior crest extends to the margin of the tooth. The sturdy mesoloph reaches to the margin of the crown. The posterior internal valley runs transversely or more or less distinctly towards the front.

M^2. The external valley is almost transverse. The lingual portion of the anteroloph has not developed and, consequently, there is no distinct anterior internal valley. The mesoloph is sturdy and extends to the external margin of the tooth. The anterior ridge of the protolophule and metalophule (Vor- and Nachjochkante) is lacking. In my collection all the specimens of this tooth are badly worn.

M^3. The only specimen of this tooth represents an advanced stage of wear. Its anterior lingual portion is greatly reduced. The tooth is strongly tapered posteriorly.

Measurements (in mm):

				upper teeth				
	M^1 (1)	M^1 (2)	M^1 (3)	M^1 (4)	M^2 (1)	M^2 (2)	M^2 (3)	M^3
length	1·7	1·9	1·7(1·9)	1·7(1·9)	1·3	1·5	1·6	1·3
width	1·0(1·2)	(1·2)	0·9(1·2)	0·7(1·1)	1·2	1·2	1·3	1·2
				lower teeth				
	M_1 (1)	M_1 (2)	M_2 (1)	M_2 (2)	M_2 (3)	M_2 (4)	M_2 (5)	M^3
length	1·8	1·8	1·6	1·5	1·4	1·5	1·5	1·5
width	1·2	1·2	1·3	1·2	1·2	1·3	1·3	1·1

(For teeth exhibiting little wear the width of the whole crown is given in brackets.)

Systematic notes: The valleys running transversely or to the front, the short transverse ridge and the measurements indicate that the teeth described above represent the genus *Democricetodon*, within which the undivided anteroconid on M_1 suggests the nominative subgenus. On the basis of their measurements and the well-developed mesoloph the teeth may be assigned to the species *D. gaillardi*. Their external valleys are directed somewhat more anteriorly than in the material described by FAHLBUSCH (1964) as *D. gaillardi freisingensis* FAHLBUSCH, 1964. In my specimens of M^2, which unluckily are all badly worn, to be sure, the mesoloph is sturdy and reaches to the margin

of the tooth, but the anterior ridges of the protolophule and metalophule (Vor- and Nachjochkante) are lacking, and they are as a rule present, though variable, in the specimens from Bavaria. The lingual portion of the anteroloph of my specimens is not so well developed, either.

WEGNER (1913) described the remains of „*Cricetodon minus* LARTET 1851", but neither the figures nor the description allows their decisive assignment to any of the species distinguished in this genus. SCHAUB (1925), basing himself on the measurements offered by WEGNER, believes that these specimens belong to *D. gaillardi* (SCHAUB, 1925).

Cf. ***Democricetodon (Megacricetodon) gregarius bavaricus*** FAHLBUSCH, 1964

[Pl. IV, 5]

Material: right M^1 (the specimen was lost during the preparation of drawings).

Description: The anterocone is divided and has no distinct cingulum in front of it, at the margin of the tooth. The anterior portion of the tooth is narrowed and elongated. The external valley is almost transverse and the ectoloph (Längsgrat) forms a short semicircular connexion between the proto- and hypocone. There is no crest directed to the rear on the paracone. The well-developed mesoloph extends to the margin of the tooth, whereas the posteroloph is weakly marked.

Measurements: length, 1·9 mm; width, 1·2 mm.

Systematic notes: In spite of the similarity in measurements, this tooth differs from the specimens of M^1 from Opole referred to *D. gaillardi* in that its anterocone is divided in two, the anterior portion of the crown is more tapered and elongated and there is a connexion between the paracone and the anterior arm. The bifid anterocone suggests the reference to the subgenus *Megacricetodon* FAHLBUSCH, 1964. Within this subgenus the measurements of the tooth indicate that it belongs to the species *D. gregarius* (SCHAUB, 1925) described from La Grive. FAHLBUSCH (1964) described a subspecies from the Bavarian Miocene within this species and named it *D. g. bavaricus* FAHLBUSCH, 1964. A direct comparison of my specimen with 3 specimens of the nominative subspecies from La Grive shows that it diverges somewhat from them in structure: it is smaller, has no cingulum at its anterior margin and is provided with a mesoloph, which is lacking in all the specimens from La Grive examined by me. At the same time these characters agree with the characters of the subspecies *D. g. bavaricus* FAHLBUSCH. The species *D. gregarius* (SCHAUB) is not known out of Bavaria and La Grive, but some forms resembling it occur at Sansan and in the Spanish Miocene (FREUDENTHAL, 1965). *D. collongensis* occurring in Vieux Collonges (MEIN, 1958) may be an ancestral form to *D. gregarius* SCHAUB.

Genus *Cotimus* Black, 1961

Cotimus bifidus Fahlbusch, 1964

[Pl. IV, 6—7]

Material: left and right M_2.

Description: The greatest width of the crown is that in the region of the entoconid. The posterior arm of the protoconid, fairly long and posteriorly directed, unites with the mesolophid. The ectolophid runs more or less in the long axis of the tooth. The posterior arm of the hypoconid is present but connected with posterolophid owing to wear and the external valley is directed to the rear.

Measurements (in mm):

	M_2 (1)	M_2 (2)
length	1·6	1·6
width	1·2	1·2

Systematic notes: The posteriorly directed external valley and the free posterior arm of the protoconid indicate that the specimens should be referred to the genus *Cotimus* Black, 1961. According to Fahlbusch (1964), this genus, erected for the species *C. alicae* Black, 1961 from the Miocene of the U.S.A., includes also some medium-sized *Cricetodontinae* of the European Miocene. The presence of the distinct mesolophid united with the equally distinct posterior arm of the protoconid as well as the measurements of the teeth suggest that the specimens from Opole belong to the species *Cotimus bifidus* Fahlbusch, 1964, erected for the specimens from the upper freshwater molasse of Bavaria. In Fahlbusch's (1964) opinion, the specimens from Nova Ves which Schaub & Zapfe (1953) include in *Cricetodon helveticus latior* Schaub et Zapfe, 1953 come close to *Cotimus bifidus*. Since only the upper teeth of this species are known from Nova Ves, it was impossible to carry out a direct comparison with the specimens from Opole.

Subfamily *Anomalomyinae* Stehlin et Schaub, 1951
Genus *Anomalomys* Gaillard, 1900

Anomalomys gaudryi Gaillard, 1900

[Pl. V, 1—4, Pl. VI, 1—4, Pl. VII, 1—2]

Material: 2 M_1, 2 M_2, 1 M_3, 4 M^1, 4 M^2.

Description: The structure of these teeth does not deviate from the structure of the specimens of the same species from La Grive, with which I was in a position to compare them directly, though the specimens from Opole are generally somewhat more delicate. The metaconid of M_1 is as a rule separated from the rest of the tooth crown, which is also true of M_2.

Measurements (in mm):

upper teeth

	M^1 (1)	M^1 (2)	M^1 (3)	M^1 (4)	M^2 (1)	M^2 (2)	M^2 (3)	M^2 (4)
length	1·7	1·7	1·7	1·7	1·5	1·4	1·4	1·4
width	1·3	1·3	1·3	1·2	1·1	1·3	1·2	1·3

lower teeth

	M_1 (1)	M_1 (2)	M_2 (1)	M_2 (2)	M_3
length	1·7	1·5	1·5	1·6	1·2
width	1·1	1·1	1·2	1·4	1·0

Systematic notes: The structure of the crowns of these teeth is so distinctive that their membership in the genus *Anomalomys*, erected by GAILLARD (1900) for the specimens from La Grive, is unquestionable. In this genus VIRET & SCHAUB (1946) distinguished another species, *A. gaillardi* VIRET et SCHAUB, 1925, somewhat larger, more hypsodont and with slightly more simplified crowns than *A. gaudryi*. It occurs in Pliocene faunas. The specimens from Opole belong definitely to more primitive *A. gaudryi*, if only for their smaller size. *A. gaudryi* is known from many Miocene faunas, e.g., from Nova Ves (SCHAUB & ZAPFE, 1953), San Quirico near Barcelona, Steinheim am Albuch and Grosslappen near Münich.

Family *Gliridae* THOMAS, 1897
Genus *Glis* BRISSON, 1762

Glis sp.

[Pl. VII, 3—5]

Material: 1 M^1, 1 M^2, 1 M_2.

Description: The surface of these teeth is slightly concave, not so flat as in the genus *Muscardinus* KAUP, 1829, but also without any fairly distinct cusps at the ends of enamel ridges. The ridges run parallel to the anterior margin of the tooth.

M^1 (right) is heavily damaged. The crown has 4 main and 3 accessory ridges, of which the middle one extends more or less halfway across the crown, the anterior is somewhat shorter and the posterior longer.

The right M^2 has also 4 main ridges and 3 accessory ones, which run more than halfway across the tooth. It has 3 roots.

The right M_2, with 2 flattened roots, has 4 main ridges and 3 accessory ones, which extend for 3/4 of the crown width.

Measurements: M^1 is so badly damaged that it cannot be measured. The measurements of M^2 are 1·8 mm in length and 2·0 mm in width, and those of M_2 1·8 and 1·9 mm, respectively.

Systematic notes: The structure of these teeth differs fundamentally from that in all, so numerous, genera of the *Gliridae* from the Upper Miocene. At the same time it bears an almost thorough analogy with the structure of the

teeth of the genus *Glis* BRISSON, to which, therefore, these remains should be referred. In the faunas of the Miocene the genus *Glis* has hitherto been represented by only one species, *Glis spectabilis* DEHM, 1930 from the Burdigal of Wintershof-West. This species differs from my specimens in its more strongly developed accessory enamel ridges and somewhat smaller size. *Glis minor* KOWALSKI, 1956, described from the Pliocene, is also characterized by small measurements. My specimens correspond in size more or less closely to the modern species *Glis glis* (LINNAEUS, 1766) and represent a new element in the rodential fauna of the European Upper Miocene. Scanty material makes it impossible to characterize it fully and consequently it seems sensible to refrain from giving it a new name.

Family *Castoridae* GRAY, 1821
Genus *Steneofiber* GEOFFROY, 1833

Steneofiber jaegeri (v. MEYER, 1844)

[Text-fig. 1]

Material: 1 P_4.

Description: Tooth hypsodont, but with 2 distinctly marked roots. Crown surface oval, anterior portion of crown conspicuously higher than the posterior one. Labially, on the surface of the crown there is a deep oblique valley; the remaining elements of the structure of the crown have changed into enamel islets.

Measurements: Length of P_4, 10·3 mm; width, 6·6 mm.

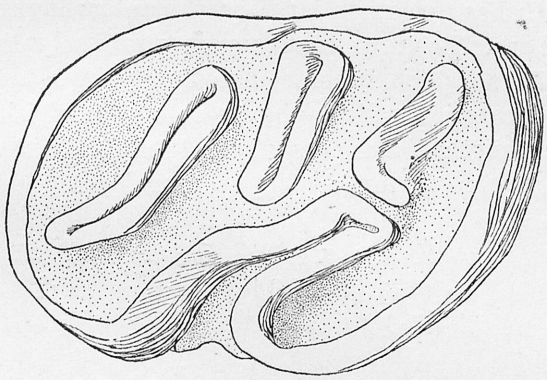


Fig. 1. *Steneofiber jaegeri* (v. MEYER), P_4, L = 10·3 mm.

Systematic notes: Three groups of different size can be easily distinguished in the poor material of beavers' remains from Opole. The scantiness of the material, which besides includes different teeth in each size group, makes it difficult to decide whether we have here to do with uncommonly great individual variation, known also from some other places, or with 3 distinct species. The very clear-cut difference in thickness of tooth enamel and that in size exceed

the individual variation known from various rodents and rather suggest the assignment of these specimens to 3 different species. On account of the presence of roots and the pattern of the crowns of molars, all of them may be included in the genus *Steneofiber* GEOFFROY. The problem of the systematic position of the species dicussed below in the genus *Steneofiber* (called into question, e.g., by STIRTON, 1935, who classified them in *Monosaulax* STIRTON, 1935), as well as the problem of the systematics of European fossil beavers in general, needs revision based on the whole of very abundant materials.

WEGNER (1913) described 2 teeth of the beaver from Opole as *Steneofiber subpyrenaicus* LARTET, 1851, which name is synonymous with *S. jaegeri* (v. MEYER, 1844). They were M_2 and P_4; this last tooth was damaged and its measurements were not given. Judging by the figure, however, its width may have been about 7 mm.

Writing about this species from Viehhausen, SEEMANN (1938) offers the measurements of P_4: length, 9·5 mm; width, 6·5 mm. *S. jaegeri* is known from numerous localities of the Upper Miocene in France, Switzerland, Austria and Germany.

Steneofiber eseri (v. MEYER, 1846)

[Text-figs 2—9]

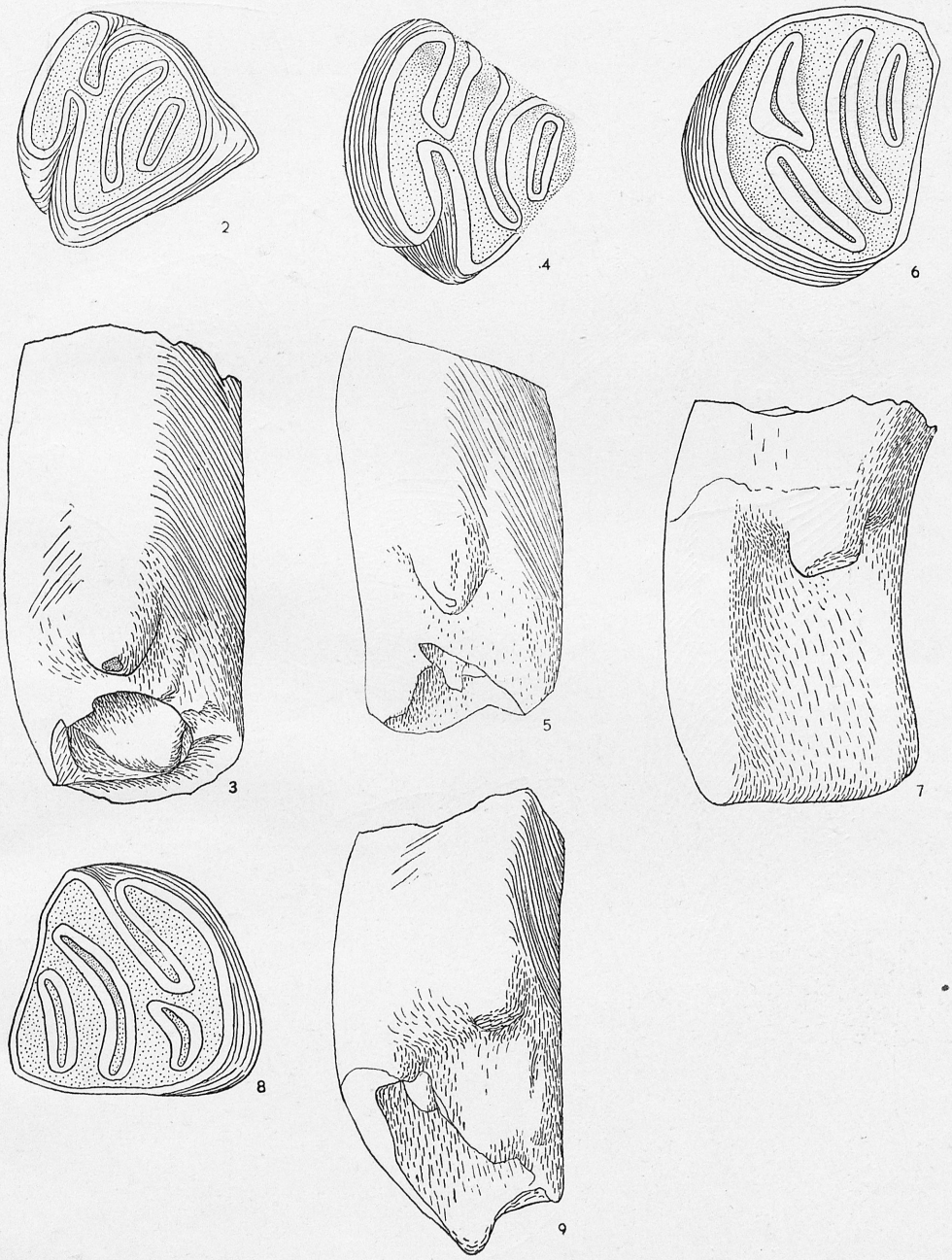
Material: 2 M^1, 2 M^2, 3 fragments of molars, 1 fragment of incisor, 1 almost complete humerus, 1 fragment of humerus.

Description: The teeth are hypsodont, but with distinctly marked rudiments of roots. Each tooth has 2 roots, a large on the anterolingual side and a small short posterolabial one. The crown is subsquare, provided in its anterior portion, with 2 deeper valleys, which become closed only in a very advanced stage of wear. The two posterior valleys change into enamel islands earlier.

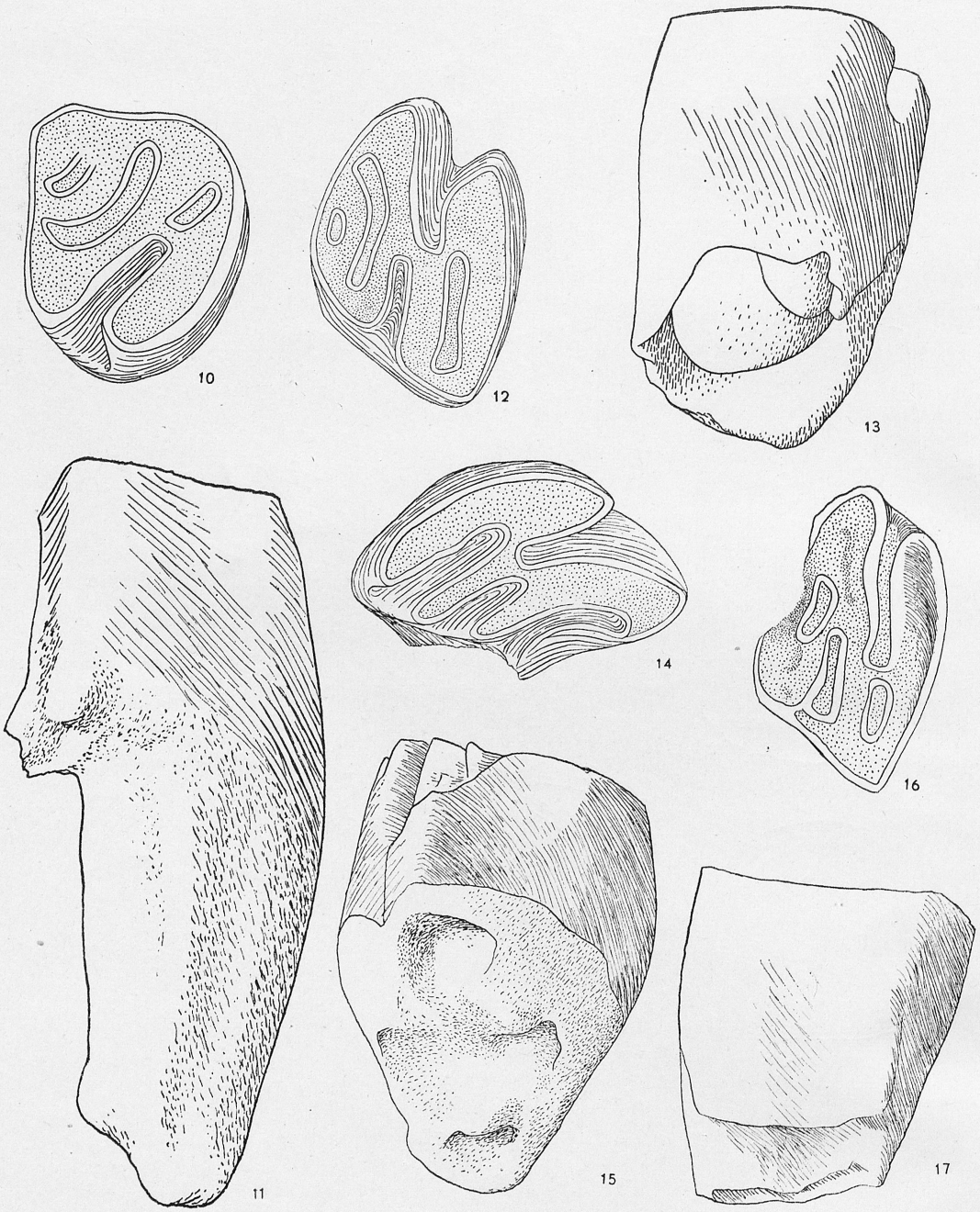
Measurements: Length of humerus, about 44 mm. Width of incisor, 5·6 mm. Measurements of molars (in mm):

	M^1 (1)	M^1 (2)	M^2 (1)	M^2 (2)
length	4·3	4·3	4·4	5·3
width	4·3	4·3	5·0	5·0

Systematic notes: In respect of size these remains belong to the intermediate group of beavers' remains from Opole. They are evidently smaller than the specimen reckoned in *S. jaegeri* and larger than those described as *S. minutus*. In the face of the unclear systematic position of the species *S. jaegeri* and *S. eseri*, now treated as separate systematic units, now combined into one species, it is impossible to determine the distribution of *S. eseri*. It has been described from the Miocene of southern Germany, namely, from Wiesenau near Mainz and Eggingen and Haslach near Ulm.



Figs. 2—9. *Steneofiber eseri* (v. MEYER). 2 — M^1 (No 1), L = 4·3 mm; 3 — the same tooth in side-view; 4 — M^1 (No 2), L = 4·3 mm; 5 — the same tooth in side-view; 6 — M^2 (No 1), L = 4·4 mm; 7 — the same tooth in side-view; 8 — M^2 (No 2), L = 5·3 mm; 9 — the same tooth in side-view.



Figs. 10—17. *Steneofiber minutus* (v. MEYER). 10 — M^1 or M^2, L = 3·0 mm; 11 — the same tooth in side-view; 12 — M_1 or M_2 (No 1), L = 3·3 mm; 13 — the same tooth in side-view; 14 — M_1 or M_2 (No 2), L = 3·4 mm; 15 — the same tooth in side-view; 16 — M_1 or M_2 (No 3), L = 2·8 mm; 17 — the same tooth in side-view.

Steneofiber minutus (v. MEYER, 1838)

[Text-figs 10—17]

Material: 3 M_1 or M_2, 1 M^1 or M^2, 2 damaged molars.

Description: The teeth are hypsodont, but with distinctly marked roots. The maxillary tooth is subsquare, has one main root and two small accessory ones on the labial side. Lingually, a valley is visible on the surface, the other valleys being changed into enamel islands.

The mandibular teeth have two flattened roots each, an anterior and a posterior. Their crowns are more or less square and divided by two valleys, an external and an internal, into two parts, an anterior and a posterior. In the anterior portion of the crown there are two enamel islands, in the posterior portion there is one. Specimen No 3 is exceptionally strongly flattened anteroposteriorly.

Measurements (in mm):

	M_1 or M_2 (1)	M_1 or M_2 (2)	M_1 or M_2 (3)	M^1 or M^2
length	3·3	3·4	2·8	3·0
width	3·4	3·7	3·7	2·6

Systematic notes: These specimens form a series of the smallest remains of beavers from Opole and, at the same time, of those with the thinnest layer of enamel. In size and structure they correspond to the teeth of *Steneofiber minutus* recorded from the Miocene of southern Germany, occurring also in Austria and probably in France.

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STRESZCZENIE

Autor opisuje szczątki gryzoni wydobyte w latach 1950—1958 w warstwach mioceńskich Nowej Wsi Królewskiej w Opolu przez Katedrę Paleozoologii Uniwersytetu Wrocławskiego. Fauna ssaków tego stanowiska znana była

uprzednio z badań WEGNERA (1913), który znalazł tu jednak tylko 3 gatunki gryzoni. Obecnie na podstawie 63 zębów trzonowych stwierdzono obecność 13 gatunków gryzoni:

Sciurus cf. *goeriachensis* HOFMANN, 1893
Sciurus cf. *fissurae* DEHM, 1950
„*Sciurus*" *bredai* v. MEYER, 1848
Sciuropterus gibberosus (HOFMANN, 1893)
Pseudotheridomys carpathicus SCHAUB & ZAPFE, 1953
Democricetodon gaillardi (SCHAUB, 1925)
Democricetodon gregarius bavaricus FAHLBUSCH, 1964
Cotimus bifidus FAHLBUSCH, 1964
Anomalomys gaudryi GAILLARD, 1900
Glis sp.
Steneofiber jaegeri (v. MEYER, 1844)
Steneofiber eseri (v. MEYER, 1846)
Steneofiber minutus (v. MEYER, 1838)

Szczątki gryzoni wskazują, że warstwy mioceńskie Opola pochodzą z sarmatu i są podobnego wieku co stanowiska La Grive we Francji, Giggenhausen i Oggendorf w Bawarii. Wskazują one na obecność lasu i środowisk nadwodnych. Opole jest najbardziej na północny wschód wysuniętym stanowiskiem występowania ssaków lądowych miocenu w Europie.

РЕЗЮМЕ

Автор описывает остатки грызунов, обнаруженные в годы 1950—1958 в миоценовых слоях Новой-Веси-Крулевской в Ополе работниками Кафедры палеозоологии Вроцлавского университета. Фауна млекопитающих этого местонахождения была известна ранее по работам Вегнера (1913), который однако обнаружил здесь всего лишь 3 вида грызунов. В настоящее время, на основании 63 коренных зубов установлено наличие 13 видов грызунов:

Sciurus cf. *goeriachensis* HOFFMANN, 1893
Sciurus cf. *fissurae* DEHM, 1950
„*Sciurus*" *bredai* v. MEYER, 1848
Sciuropterus gibberosus (HOFMANN, 1893)
Pseudotheridomys carpathicus SCHAUB & ZAPFE, 1953
Democricetodon gaillardi (SCHAUB, 1925)
Democricetodon gregarius bavaricus FAHLBUSCH, 1964
Cotimus bifidus FAHLBUSCH, 1964
Anomalomys gaudryi GAILLARD, 1900
Glis sp.
Steneofiber jaegeri (v. MEYER, 1844)

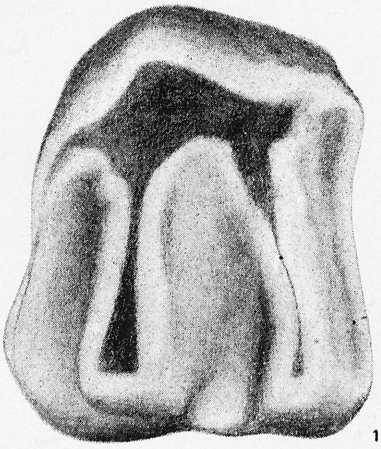
Steneofiber eseri (v. Meyer, 1846)
Steneofiber minutus (v. Meyer, 1838)

Остатки грызунов доказывают, что миоценовые слои Ополя относятся к сармату и близки по возрасту стоянкам Ла Грив во Франции, Гиггенгаузен и Оггендорф в Баварии. Они доказывают наличие леса и надводной среды. Ополе является найболее выдвинут к северо-востоку местонахождением материковых млекопитающих миоцена в Европе.

PLATES

Plate I

1. *Sciurus* cf. *goeriachensis* HOFMANN, M^1 or M^2. L = 3·8 mm.
2. *Sciurus* cf. *fissurae* DEHM, M_1 or M_2. L = 2·4 mm.
3. „*Sciurus*" *bredai* v. MEYER, D^4. L = 1·4 mm.
4. „*Sciurus*" *bredai* v. MEYER, P^4. L = 1·7 mm.
5. „*Sciurus*" *bredai* v. MEYER, M^1. L = 1,8 mm.
6. „*Sciurus*" *bredai* v. MEYER, M^3. L = 1·9 mm.
7. „*Sciurus*" *bredai* v. MEYER, P_4 (No 2). L = 1·2 mm.
8. „*Sciurus*" *bredai* v. MEYER, M_1 (No 1). L = 1·8 mm.
9. „*Sciurus*" *bredai* v. MEYER, M_1 (No 2). L = 1·9 mm.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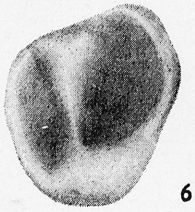
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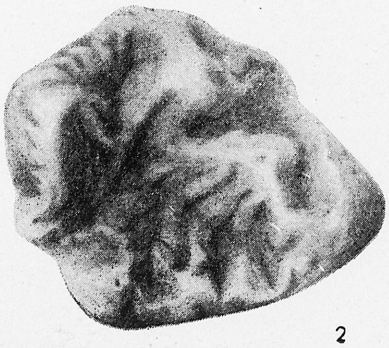
Plate II

1. *Sciuropterus gibberosus* (HOFMANN), M^2. L = 3·0 mm.
2. *Sciuropterus gibberosus* (HOFMANN), M_3. L = 4·4 mm.
3. *Democricetodon (Democricetodon) gaillardi* (SCHAUB), M^1 (No 1). L = 1·7 mm.
4. *Democricetodon (Democricetodon) gaillardi* (SCHAUB), M^1 (No 2). L = 1·9 mm.
5. *Democricetodon (Democricetodon) gaillardi* (SCHAUB), M^2 (No 1). L = 1·3 mm.

1



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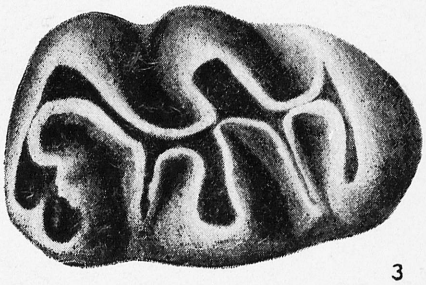

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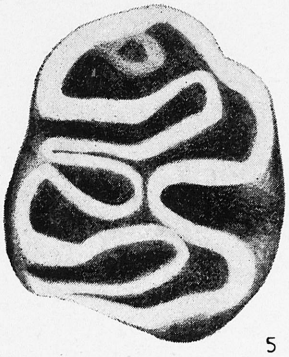

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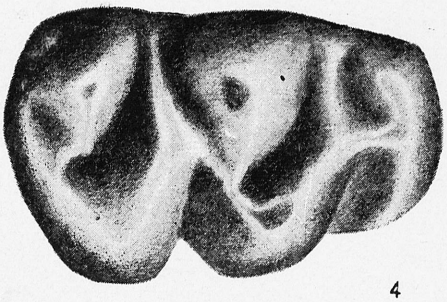

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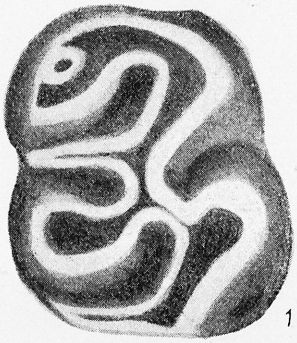
Plate III

Democricetodon (Democricetodon) gaillardi (SCHAUB)

1. M^2 (No 2). L = 1·5 mm.
2. M^3. L = 1·3 mm.
3. M_1 (No 1). L = 1·8 mm.
4. M_1 (No 2). L = 1·8 mm.
5. M_2 (No 1). L = 1·6 mm.
6. M_2 (No 2). L = 1·7 mm.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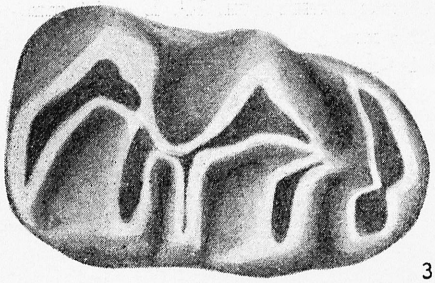
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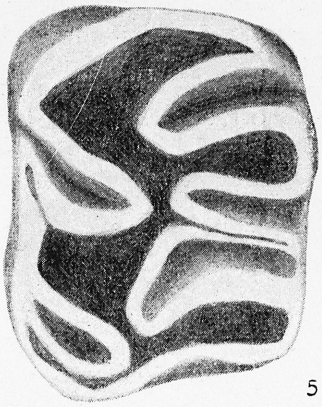
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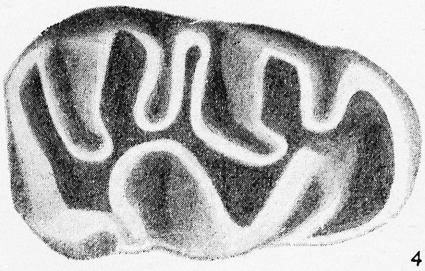
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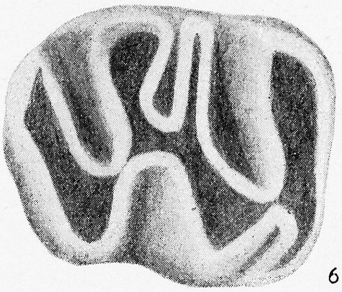
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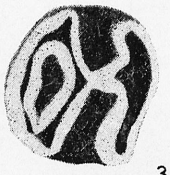
Plate IV

1. *Democricetodon (Democricetodon) gaillardi* (SCHAUB), M_2 (No 3). L = 1·4 mm.
2. *Democricetodon (Democricetodon) gaillardi* (SCHAUB), M_3. L = 1·5 mm.
3. *Pseudotheridomys carpathicus* SCHAUB & ZAPFE, M_2. L = 0·6 mm.
4. *Pseudotheridomys carpathicus* SHAUB & ZAPFE, M_3. L = 0·5 mm.
5. *Democricetodon (Megacricetodon) gregarius bavaricus* FAHLBUSCH, M^1. L = 1·9 mm.
6. *Cotimus bifidus* FAHLBUSCH, M_2 (No 1). L = 1·6 mm.
7. *Cotimus bifidus* FAHLBUSCH, M_2 (No 2). L = 1·6 mm.

1

2



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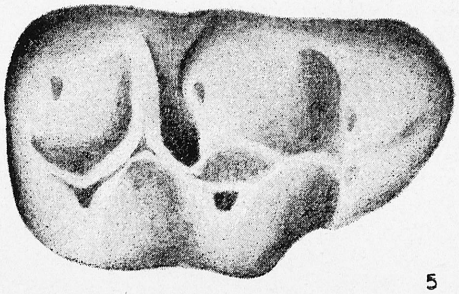

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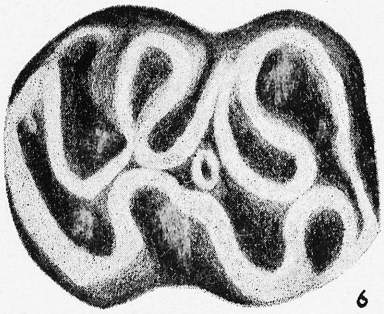

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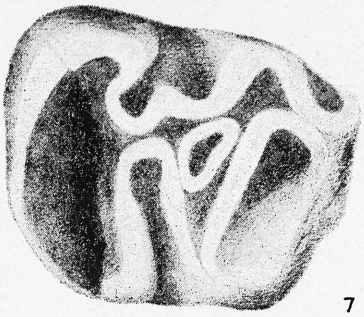

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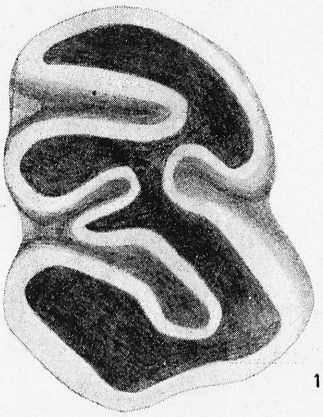
Plate V

Anomalomys gaudryi GAILLARD

1. M^1 (No 1). L = 1·7 mm.
2. The same tooth in side-view.
3. M^2 (No 1). L = 1·5 mm.
4. The same tooth in side-view.



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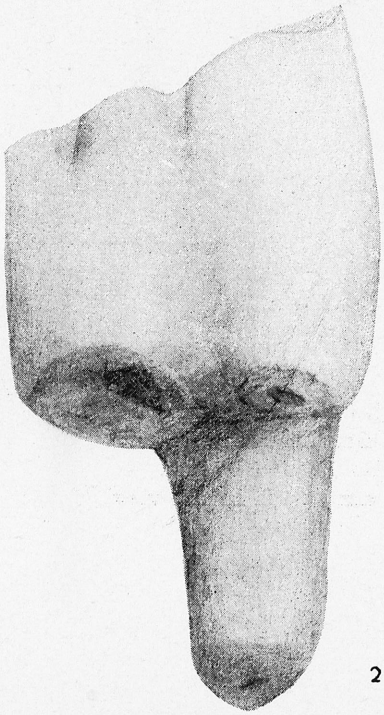

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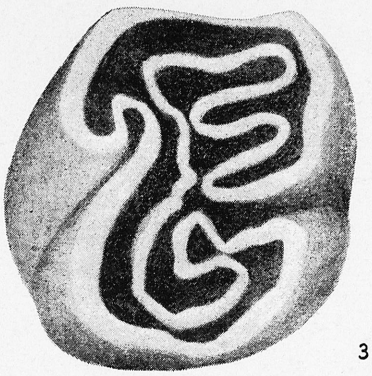

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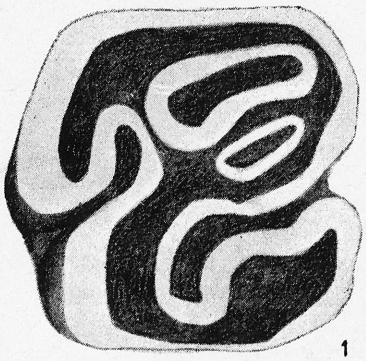
Plate VI

Anomalomys gaudryi GAILLARD

1. M^2 (No 1). L = 1·5 mm.
2. The same tooth in side-view.
3. M_1 (No 1). L = 1·7 mm.
4. The same tooth in side-view.



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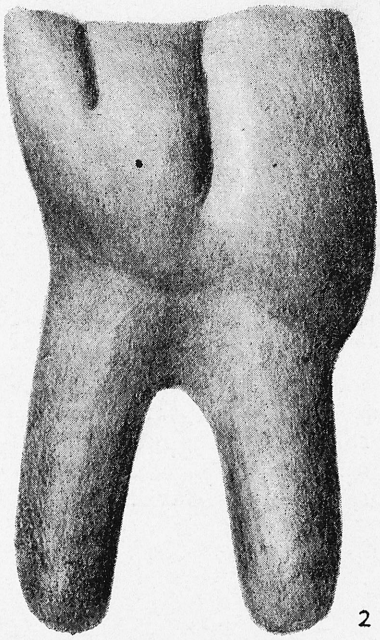

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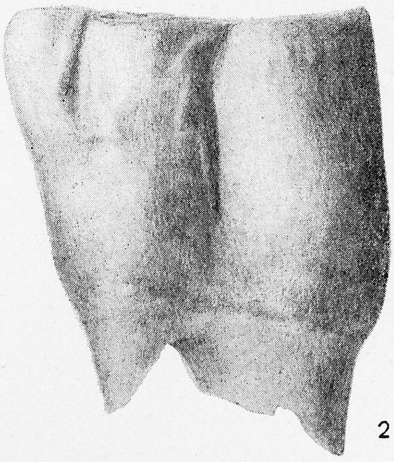
Plate VII

1. *Anomalomys gaudryi* GAILLARD. M_2 (No 1). L = 1·5 mm.
2. *Anomalomys gaudryi* GAILLARD, the tooth from fig. 1 in side-view.
3. *Glis* sp., M^1.
4. *Glis* sp., M^2. L = 1·8 mm.
5. *Glis* sp., M_2. L = 1·8 mm.

1



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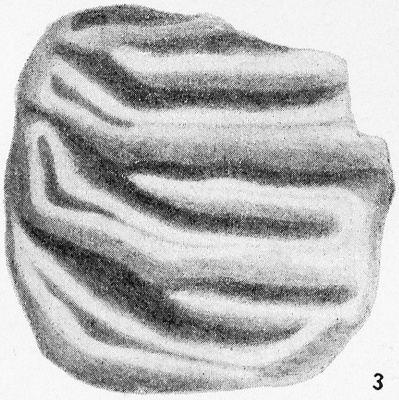

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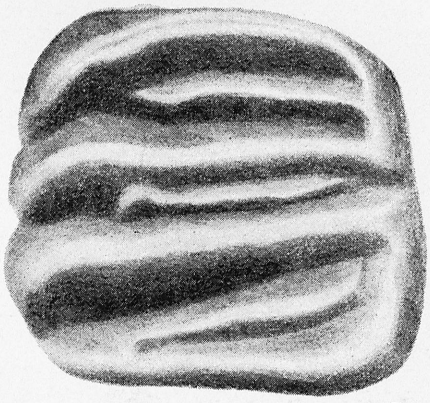

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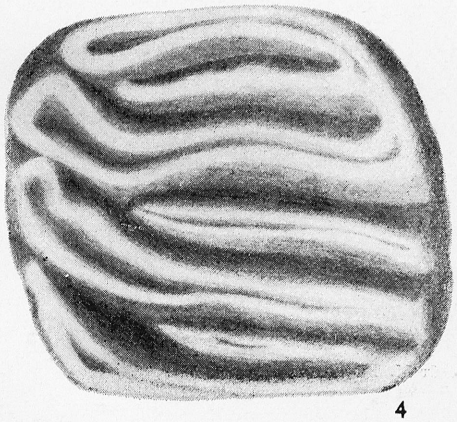

4

K. Kowalski

Redaktor zeszytu: doc. dr M. Młynarski

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