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AN EARLY PLEISTOCENE FAUNA OF SMALL MAMMALS FROM THE KADZIELNIA HILL IN KIELCE (POLAND)

Abstract. — A description is given of the Insectivora, Chiroptera, Lagomorpha and Rodentia found in clay deposits filling up karst potholes in the Kadzielnia Hill of Kielce. The collected fauna is of early Pleistocene age and is probably referable to the Günz-Mindel Interglacial. The following species have been identified: *Talpa minor* Freudenberg, *T. fossilis* Petényi, *Sorex* cf. *runtonensis* Hinton, *Sorex* sp., *Beremendia fissidens* (Petényi), *Petenyia hungarica* Kormos, *Rhinolophus* cf. *ferrumequinum* (Schreber), *Myotis* cf. *exilis* Heller, *Myotis* sp., *Hypolagus brachygnathus* Kormos, *Pliolagus* cf. *tothi* Kretzoi, *Sciurus* sp., *Dolomys episcopalis* (Méhely), *D. kretzoi* n.sp., *Mimomys pliocaenicus* (F. Major), *M. reidi* Hinton, *M. newtoni* F. Major, *Apodemus* sp., *Muscardinus* sp. The description of a new species — *Promimomys insuliferus* n.sp., previously indetified by the writer as „*Mimomys* cf. *pusillus* (Méhely)", supplements his earlier paper on the fauna from Podlesice.

INTRODUCTION

The Kadzielnia Hill (20°38′E, 50°52′N) is an elevation of 295 m a.s.l., lying within the precincts of the town of Kielce, in the Holy Cross Mountains region. The central part of that hill, which is also its culmination point, consists of rocky Upper Devonian (Middle Frasnian) limestone. Limestone quarries in the Kadzielnia Hill have been worked for many years past, but its central portion is a protected area. In the course of the last war the nature protection regulations were violated, in consequence of which part of the reserve was devastated. Karst phenomena occur in the rocky Upper Devonian limestone building up the Kadzielnia peak, such as numerous tunnels, dolines and potholes as well as two large caves. The cave deposits have not thus far been investigated and have mostly been preserved untouched. The deposits filling in the potholes and dolines, however, are partly damaged through work at the limestone quarries. Sections of the material filling up some of these potholes are still observable in places where the working operations have ceased, i.e. on the sides of a rock-wall within the protected area. In the south-western portion a large doline (funnel--like pit) is readily noticeable, filled in by red clay. Its upper layer,

several tens of centimeters in thickness, is replete with bones of mammals, among which fragmentary remains of the Leporidae predominate. Bones from this layer are to be seen throughout the outwashed surface of the pit, as well as at the foot of the quarry below it where the bones have been transported by rain waters.

Bones of mammals have also been collected from potholes in the north-western part of the protected area. They have been yielded by the sandy clay deposits filling in the vertical outwashed fissure. In the systematic part, the sites of these two finds are referred to as the doline and the fissure. Furthermore, near the mentioned fissure, some fragments of a bone breccia have been discovered under remnants of the karst pothole destroyed during the working of the quarry. These bone breccia remains, however, proved so few and unsatisfactorily preserved as to be unidentifiable and have, hence, been left out from the General Remarks and from the Systematic Descriptions. They consist of teeth of *Myotis* sp., *Apodemus* sp. and some more closely indeterminate Microtinae and probably Ochotonidae.

The caves within the Kadzielnia Hill area have been known for a long time. As early as in 1926, E. L. Niezabitowski described the carpus bone of a rhinoceros *Coelodonta antiquitatis* (Blum.), discovered in the Kadzielnia Hill of Kielce, which was presented to him by J. Rostafiński. In 1932, J. Czarnocki wrote about the caves and potholes of Kadzielnia which yielded a fauna containing the remains of a rhinoceros, reindeer and a lemming, *Dicrostonyx torquatus* (Pall.). A mention of this Pleistocene fauna is also made in a note by the same author, printed in 1949. And again, during the same year, J. Czarnocki wrote about the karst potholes of Kadzielnia „with an interglacial fauna of steppe origin". The correctness of the identifications given in these notes cannot be verified owing to lack of descriptions or figures of the found fossil remains. If they have not been misplaced but actually do belong to young Pleistocene forms their presence would suggest the occurrence in the Kadzielnia Hill of a younger Pleistocene fauna too, though we do not know whether it was obtained from the area of the present nature reserve or from other parts of the hill, now devastated.

Early Pleistocene fossil remains were found by the present author in 1950. During field-work done in 1956 and 1957 he collected copious material from deposits filling in the large doline in the southern wall of the quarry, as well as some bone remains from the potholes and fissures in the north-western part of the protected area. In his paper on the fauna from Podlesice (1956) the author made mention of the occurrence in Kadzielnia of *Beremendia fissidens* (Petényi), an early Pleistocene species. Vertebrae and scales of a reptile, found by him in association

with bones of small mammals, have by Dr. M. Młynarski been identified as belonging to *Ophisaurus* cf. *pannonicus* Kormos. The collected material also comprises detached teeth of the indeterminate Mustelidae and some few remains of snails which have not so far been investigated.

The writer here conveys his thanks to Dr. M. Kretzoi, Director of the Geological Institute of Budapest, for the help shown during the work of identifying a part of the microtine material, as well as for his friendly comments and readiness to cooperate. The writer wishes also to thank Mrs. J. Humnicka for the English translation of the Polish text, and Mr. J. Świecimski for the pains he has taken in preparing the drawings.

ORIGIN AND AGE OF THE BEDS

The vertebrate remains in the deposits of the karst doline in the Kadzielnia Hill were probably accumulated by the action of rain water which carried there bones of animals who perished in the vicinity of the pit or perhaps partly in the holes of the Leporidae. The various bones were found lying side by side, without anatomical order and usually strongly cracked. The satisfactory state of preservation even of very small bones is due to the doline being gradually filled up by limestone residuum with a high content of calcium carbonate. The thinness of the bone-bearing bed undoubtedly suggests the contemporaneousness of the remains preserved therein.

The faunal composition of the material filling in the doline, is as follows (figures refer to number of specimens):

Insectivora

Talpa minor Freudenberg — 3
T.fossilis Petényi — 3
Sorex cf. *runtonensis* Hinton — 2
Sorex sp. — 3
Beremendia fissidens (Petényi) — 3
Petenyia hungarica Kormos — 3

Chiroptera

Rhinolophus cf. *ferrumequinum* (Schreber) — 2
Myotis cf. *exilis* Heller — 3
Myotis sp. — 6

Lagomorpha

Hypolagus brachygnathus Kormos — 38
Pliolagus cf. *tothi* Kretzoi — 7

Rodentia

Sciurus sp. — 1
Dolomys episcopalis (Méhely) — 4
D. kretzoii n.sp. — 8
Mimomys pliocaenicus (F. Major) — 29
M.reidi Hinton — 21
M.newtoni F. Major — 4
Apodemus sp. — 2
Muscardinus sp. — 1

Furthermore, scales of the glass lizard, *Ophisaurus* cf. *pannonicus* Kormos, identified by M. Młynarski, have also been collected there.

The material filling in the fissure of the north-western part of the protected area has yielded bones of *Sorex* cf. *runtonensis* Hinton, *Petenyia hungarica* Kormos and *Mimomys pliocaenicus* (F. Major). Hence we may suppose that this fauna is of the same age with that occurring in the doline.

With the exception of *Rhinolophus ferrumequinum* (Schreber), recorded from a number of early Pleistocene sites in Europe, but also still living now, all the other forms represent fossil species.

Talpa minor Freudenberg, usually referred to in literature under the synonymic name of *Talpa gracilis* Kormos, is known from early Pleistocene beds of Rumania (Püspökfürdö, Brasso), southern Hungary (Beremend 4, Villany 6,8, Nagyharsanyhegy 4), Austria (Hundsheim), Yugoslavia (Podumci), Germany (Sackdillinger Höhle, Erpfingen, Gundersheim, Mauer, Breitenberghöhle), Poland (Podlesice) and probably Italy (Verona). The other species of mole, *Talpa fossilis* Petényi, more often recorded under the synonymic name of *T.praeglacialis* Kormos, occurs either in association with the last named form or alone in many early Pleistocene faunas. Thus far it has been recorded from Rumania (Püspökfürdö, Brasso), Hungary (Beremend 6, Csarnota 1, Villany 3,5,6,7,8,11, Nagyharsanyhegy 4), Czechoslovakia (Gombasek and Koneprusy), Austria (Hundsheim and Laerberg in Vienna) and from Germany (Sackdillinger Höhle, Gundersheim, Erpfingen, Mauer, Hohensülzen). To this species may probably be referred fossil remains from Dodrecht in Holland, from the Fresh Water Beds of England and from Verona in Italy.

The remains of shrews from Kadzielnia have not been identified taxonomically with any certainty. They belong to two species, one of which apparently seems to be identical with *Sorex runtonensis* Hinton, known from early Pleistocene sites of West Runton and Backton in England, Sackdillinger Höhle in Germany, Hundsheim in Austria, Gombasek and Koneprusy in Czechoslovakia, Beremend 5, Csarnota 2, Nagyharsanyhegy 2,4 and Villany 3,5,6,7,8 in Hungary as well as from Podumci in Yugoslavia. The other species of Kadzielnia shrew approaches. *Sorex minutus* L., now living in Europe but also recorded as an early Pleistocene fossil form from Germany (Sackdillinger Höhle, Erpfingen, Gaisloch, Westhofen, Breitenberghöhle, Hohensülzen) and from Hungary (Villany 3,6,8, Csarnota 2), while during the younger Pleistocene it seems to have been a widely distributed form.

Beremendia fissidens (Petényi) is a characteristic species in early Pleistocene faunas of central Europe. It has been recorded from Püspökfürdö and Brasso in Rumania, from Csarnota 1,2,4, Beremend 5, Villany 1,2,3,5,6,7,8,11 also Nagyharsanyhegy 2,3,4,5 in Hungary, from

Sackdillinger Höhle and Gundersheim in Germany, from Gombasek in Czechoslovakia and from Verona in Italy.

Petenyia hungarica Kormos is associated with the last named form in many early Pleistocene sites. It is known from Püspökfürdö in Rumania, from Villany 3,5, Csarnota 1,2, Beremend 5 and Nagyharsanyhegy 2 in Hungary, from Gundersheim in Germany and from Podlesice in Poland. A closely related or even perhaps identical species has been described by A. Pasa (1948) from Verona. Finally, M. Kretzoi (1943), on a figure published in a paper by A. Dubois and H. G. Stehlin (1933), has described a new species, the *Petenyia stehlini* Kretzoi, from the younger Pleistocene deposits of Cotencher Cave in Switzerland. If Kretzoi's assignment is correct, it would indicate the persistance of genus *Petenyia* Kormos to the beginning of the Würm glaciation period.

None of the three species of bats discovered in Kadzielnia leads to conclusions as to the age of the collected fauna. *Rhinolophus ferrumequinum* (Schreber) is known from the early Pleistocene down to the present time, while specimens from genus *Myotis* Kaup are specifically indeterminate. One of them seems identical with *Myotis exilis* Heller, known from the early Pleistocene of Gundersheim in Germany, and probably also present in the fauna of Podlesice, Poland.

Hypolagus brachygnathus Kormos is recorded from Csarnota 1,2, Villany 3,5,6,7,8, from Nagyharsanyhegy 2,4 and Beremend 1,4,5 in Hungary, from Püspökfürdö in Rumania, from Podumci in Yugoslavia, from Gundersheim in Germany and from the Tegelen Clay Beds in Holland. *Pliolagus tothi* Kretzoi, to which are probably referable the fossil remains of a small hare from Kadzielnia, has thus far been recorded only from Betfia in Rumania. *Pliolagus beremendensis* Kormos, strongly resembling it and differing in smaller size only, is known from Csarnota 1, Villany 3 and Beremend 4 in Hungary. It is interesting to note that — as stated by Kretzoi (1941*a*) — in the older early Pleistocene faunas of Hungary we may encounter small numbers of *Pliolagus* Kormos associated with the predominant genus *Hypolagus* Dice (Csarnota, Villany, Beremend). In Püspökfürdö (Rumania), together with the dominating genus *Hypolagus* Dice, we may occasionally encounter *Lepus* L., while *Pliolagus* Kormos still persists there. In the still younger fauna from Betfia, *Lepus* L. is predominant, *Hypolagus* Dice constitutes 22 percent of the total number of Leporidae, while only 3 per cent are made up by *Pliolagus* Kormos, here represented by *P. tothi* Kretzoi. In Nagyharsanyhegy, *Pliolagus* Kormos is already absent, *Hypolagus* Dice is distinctly scarce, *Lepus* L. being the predominant genus. Finally, in Brasso and still younger faunas, genus *Lepus* L. is the only representative of the Leporidae. Hence, even

the composition of the Lagomorph fauna in Kadzielnia suggests its assignment to the older period of the early Pleistocene.

Genus *Sciurus* L. is known from the Early Tertiary up to Recent times. In early Pleistocene faunas it is extremely rare. It has been recorded from Koneprusy in Czechoslovakia, Betfia in Rumania, Sackdillinger Höhle and Gundersheim in Germany and from West Runton in England. Its occurrence invariably indicates the presence of a forest.

Dolomys episcopalis (Méhely) is known from Rumania (Püspökfürdö, Brasso), from Hungary (Beremend 6, Nagyharsanyhegy 3,4, Villany 3,7,8, Ostramos, Budapest), from Czechoslovakia (Gombasek, Koneprusy), from Austria (Hundsheim), from Italy (Verona) and from Germany (Sackdillinger Höhle, Mauer, Eschelbronn, Erpfingen, Gaisloch, Breitenberghöhle, Hohensülzen). O. Fejfar (1956*a*) regards it as a sylvan xerothermic species.

Dolomys kretzoi n.sp. is a species new to science, on whose relationships only very little can be said.

Mimomys pliocaenicus (F. Major), abundant in Kadzielnia, has so far been recorded from East Runton, Norfolk and Suffolk in England, from numerous borings in Holland, from Val d'Arno in Italy, from Senèze and Herault in France, from Gundersheim in Germany and from Püspökfürdö in Rumania. Specimens from early Pleistocene sites in Hungary (Beremend 4,5, Nagyharsanyhegy 1,4, Villany 3,5,11) have by Kretzoi (1956) been named *Mimomys mehelyi* Kretzoi. In that author's opinion *M. pliocaenicus* (F. Major) is restricted to the Calabrian horizon (Villafrankian), while *M. mehelyi* Kretzoi occurs in the younger faunas of Hungary. In the lack of a description *M. mehelyi* Kretzoi must be regarded as a nomen nudum and it would seem that the Hungarian specimens constitute no more than a distinct subspecies.

Mimomys reidi Hinton is known from Trimingham in England, from Breda and s'Gravendeel in Holland, from Gundersheim in Germany, from Verona in Italy, from Kislang and Beremend 4 in Hungary.

Mimomys newtoni F. Major, has, so far, been recorded from West Runton and Norfolk in England, from Tegelen in Holland, Senèze in France, Gundersheim in Germany and from Kislang, Nagyharsanyhegy 1,4, Villany 3,5,11 and Beremend 4 in Hungary. The Hungarian specimens have by T. Kormos (1938) been referred to a new subspecies, *Mimomys newtoni hungaricus* Kormos, while Kretzoi (1956) even considers them as a separate species, *Mimomys hungaricus* Kormos. *M. newtoni* F. Major is as a rule associated with the species *M. pliocaenicus* (F. Major) and *M. reidi* Hinton.

Genus *Apodemus* Kaup has been reported from many localities beginning with the early Pleistocene, through to Recent times. The Ka-

dzielnia specimens seem to belong to *A. alsomyoides* Schaub, recorded from Villany and Beremend in Hungary and from Magyarkö in Rumania, while its occurrence in Püspökfürdö is also possible.

Genus *Muscardinus* Kaup is of rare occurrence in early Pleistocene localities, probably owing to their mainly steppe character. It is an animal distinctly connected with forest environments. It remains have been reported from Koneprusy in Czechoslovakia, from Moggaster Höhle and Sackdillinger Höhle in Germany and from Püspökfürdö in Rumania.

Ophisaurus pannonicus Kormos has probably been recorded as early as from the Miocene, and subsequently from the Pliocene and early Pleistocene of Hungary and Poland.

The time distribution of the particular species constituting the Kadzielnia fauna clearly indicates its early Pleistocene age. On evidence of the stratigraphic column of the Pleistocene faunas of Hungary as given by Kretzoi (1956), the Kadzielnia fauna is referable to that author's Villanyium horizon, equivalent to the Günz-Mindel Interglacial. The Kadzielnia fauna is distinctly younger than that from Podlesice (K. Kowalski, 1956) which contains a number of archaic forms such as *Baranomys loczyi* Kormos, *Parapodemus coronensis* Schaub, *Promimomys insuliferus* n.sp., but lacks representatives of genus *Mimomys* F. Major. Hence the Podlesice fauna is in all probability referable to the earliest period of the Günz-Mindel Interglacial, being thus contemporaneous with the Hungarian fauna from Csarnota. Naturally, as compared with the Hungarian faunas, our fauna presents distinct differences readily interpreted by the considerable distance separating these two areas. Thus, e.g. *Dolomys episcopalis* (Méhely) is not encountered in Hungary before the Biharium, that is to say in faunas equivalent to the Mindel glaciation period.

In view of our poor knowledge regarding the early Pleistocene faunas it is yet too soon to attempt an interpretation of their geographical components. If *Hypolagus brachygnathus* Kormos really belongs to this genus, we are then dealing here with a representative of animal forms common to the Pleistocene faunas of both Europe and North America. Other species from the fauna of Kadzielnia are mostly known from localities in central Europe, partly also from those in Western Europe.

The definition of the climate prevailing in the Kadzielnia Hill at the time of the formation of deposits filling up the karst depressions is by no means easy. Practically all the faunal components there are fossil forms about whose climatic requirements no direct statement may be made. The presence of *Rhinolophus ferrumequinum* (Schreber), a bat, and of *Ophisaurus pannonicus* Kormos, a doubtlessly xerothermic reptile,

suggests a warmer climate than that now prevailing in Poland, possibly one approaching the Mediterranean climate. The material which has yielded the considered fauna, namely a red product of the chemical weathering process of limestone, belonging to the type of terra rossa, leads to the same suggestions. The presence of typically sylvan mammalian genera, such as *Sciurus* L. and *Muscardinus* Kaup are evidence of the existence there of forests. The scarcity of these forms, however, suggests that the wooded areas constituted only a secondary element of the landscape.

SYSTEMATIC DESCRIPTIONS

Insectivora Bowdich, 1821
Family **Talpidae** Gray, 1825
Subfamily **Talpinae** Murray, 1866
Genus *Talpa* Linnaeus, 1758
Talpa minor Freudenberg, 1914

The synonymics have been given in K. Kowalski's paper of 1956, Insectivores..., p. 341; also

1956. *Talpa minor* Freudenberg; M. Kretzoi, Die altpleistozänen Wirbeltierfaunen..., p. 162, 192, 197-200, 232.

1957. *Talpa gracilis* Kormos; G. Brunner, Die Breitenberghöhle..., p. 360, 363-365, fig. 3.

Material. — 2 humeri, one complete, the other damaged, also 7 mandibular fragments with P_1-M_3 and 2 detached teeth; all from the doline.

Description. — In structure the studied humerus resembles that of *Talpa europaea* L., differing in smaller dimensions only. Structure of mandible and teeth also approaching that observed in recent species. Foramen mentale underlying the trigonid of P_4.

Dimensions. — Length of the complete humerus 11.6 mm, width 3.0 mm, that of the damaged specimen 3.1 mm.

Dimensions of mandibular fragments (in mm) — see table on p. 9.

Another mandibular fragment contained P_1, P_2, P_3 with a length of 1.2 mm, 0.7 mm and 1.0 mm respectively.

Systematic position. — The dimensions of humeri and of the mandibular fragments are distinctly smaller than those of *T. europaea* L., suggesting their assignment to *T. minor* Freudenberg which is a smaller early Pleistocene mole.

Mandibles ——→	*1*	*2*	*3*	*4*	*5*	*6*
height of mandible on the inner side below M_2	1.8	1.6	1.6	1.9	—	—
thickness of same	0.9	1.0	1.0	0.9	—	—
P_4 length	—	—	—	—	1.75	—
M_1 length	—	—	—	—	—	1.9
M_2 length	1.9	1.5	1.6	1.6	—	—
M_2 width on trigonid	1.0	1.2	1.0	1.0	—	—
M_3 length	1.6	—	1.5	—	—	—
M_3 width on trigonid	1.0	-	0.9	—	—	—

Talpa fossilis Petényi, 1864

(fig. 1)

1864. *Talpa vulgaris fossilis* Petényi; S. J. Petényi,Hatrahágyott munkai, p. 53-58, pl. 1.

1914. *Talpa europaea* var. *major;* W. Freudenberg, Die Säugetiere..., p. 660-661, pl. 47, fig. 28-31, 34.

1930a. *Talpa praeglacialis* n.sp.; T. Kormos, Diagnosen..., p. 238-239.

1933. *Talpa* cf. *praegliacialis* Kormos; F. Heller, Ein Nachtrag..., p. 61.

1934. *Talpa praeglacialis* Kormos; G. Brunner Eine präglaziale Fauna..., p. 307-308.

1936a. *Talpa praeglacialis* Korm.; F. Heller, Eine oberpliocäne Wirbeltierfauna..., p. 106.

1936b. *Talpa praeglacialis* Korm.; F. Heller, Eine Forest-Bed-Fauna..., p. 5-6.

1937b. *Talpa praeglacialis* Kormos; T. Kormos, Revision der Kleinsäuger..., p. 25-26, fig. 1.

1938. *Talpa fossilis* Petényi; M. Kretzoi, Die Raubtiere..., p. 91-92.

1939. *Talpa praegliacialis* Kormos; F. Heller Kleinsäugerreste..., p. 11, fig. 5.

1943. *Talpa praeglacialis* Kormos; A. Schreuder, Fossil voles..., p. 405-406.

1952. *Talpa praeglacialis* Korm.; W. Weiler, Pliozän..., p. 158-159.

1954. *Talpa praeglacialis* Kormos; F. Heller, Neue Fundstellen..., p. 470.

1956b. *Talpa fossilis* Petényi; O. Fejfar, Seznam druhů.., p. 274.

1956. *Talpa fossilis* Petényi; M. Kretzoi, Die altpleistozänen Wirbeltierfaunen..., p. 165, 169, 171, 187, 193, 195, 197-201, 203, 232.

Material. — 6 specimens of humerus, of which two complete, also 4 mandibular fragments and some detached teeth representing P_4—M_3. All these remains were collected from the material filling in the karst doline.

Description. — In structure and dimensions the collected specimens of humerus do not differ from those displayed by recent specimens of *Talpa europaea* L. The structure of the mandible, howewer, differs distinctly as compared to that in the recent form. The molars, with a height similar to the height in recent specimens, are considerably less

broad, the talonid in M_2 being particularly narrower. The tooth-row is shorter than those in *T. europaea* L. The tips of teeth do not show distinct forward curving.

Dimensions. — The lenght of the two complete specimens of humerus is 14.0 and 14.1 mm, the width 4.1 and 4.1 mm respectively.

Dimensions of mandibular fragments (in mm):

Mandibles	*1*	*2*	*3*	*4*
height of mandible on the inner side below M_2	2.1	2.1	—	—
thickness of same	1.2	1.4	—	—
P_1 length	—	—	1.4	—
P_2 length	—	—	1.0	—
P_3 length	—	—	1.0	—
P_4 length	—	1.5	—	—
M_1 length	—	2.4	—	2.4
M_2 length	2.3	2.1	—	—
M_2 width on trigonid	1.2	1.3	—	—
M_3 length	2.0	—	—	—
M_3 width on trigonid	1.0	—	—	—

Systematic position. — Four species of genus *Talpa* L. are known from early Pleistocene beds of central Europe, namely: *T. minor* Freudenberg, *T. fossilis* Petényi, *T. stromeri* Brunner, *T. episcopalis* Kormos. *T. minor* Freudenberg is distinguished by particularly small dimensions, while *T. episcopalis* Kormos is distinctly larger sized. The other two species correspond in size to the recent species *T. europaea* L. and also agree with the here described fossil remains from Kadzielnia. *T. stromeri* Brunner, described from Gaisloch in Germany (G. Brunner, 1950), is distinguished by the tips of molars being bent forward. In the Kadzielnia specimens, however, this feature is lacking. As shown by Kormos in his paper of 1930*a*, *T. fossilis* Petényi is among others characterized by the posterior portion of M_3 being distinctly narrow. In the Kadzielnia specimens, the molars — M_3 included — are narrower than the corresponding teeth in *Talpa europaea* L. This feature, therefore, distinguishes the collected fossil remains from the recent species and

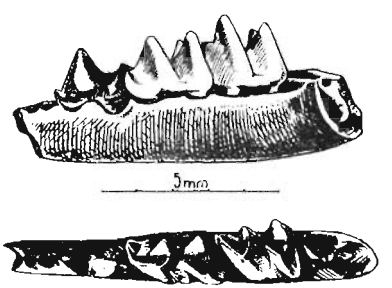

Fig. 1. — *Talpa fossilis* Petényi, fragment of mandible; side and top view.

reasonably refers them to *Talpa fossilis* Petényi, a species widely distributed in the early Pleistocene of Europe.

Family **Soricidae** Gray, 1821
Subfamily **Soricinae** Murray, 1866
Genus *Sorex* Linnaeus, 1758
Sorex cf. *runtonensis* Hinton, 1911
(fig. 2)

Material. — Mandibular fragment with processes and M_1 and M_3, another with P_4-M_2, and a detached mandibular incisive from the material filling the doline; also a fragmentary processus coronoideus and a fragment of mandible with M_2 from the material filling the fissure in the NW part of the quarry.

Description. — Anterior margin of the coronoid process meets the body of the mandible at a slightly obtuse angle, its upper part being somewhat inclined forward. Fossa pterygoidea high, triangular. Facets of processus articularis connected by a broad, slightly arcuate bone bridge. The points of teeth pigmented to a reddish-brown hue. Talonid of M_3 not reduced, this tooth being 5-cusped. The mandibular incisive has three distinct tubercles.

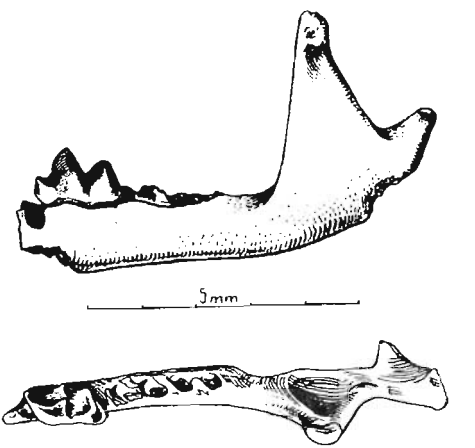

Fig. 2. — *Sorex* cf. *runtonensis* Hinton, fragment of mandible; side and top view.

Dimensions. — The length M_1-M_3 is about 3.7 mm, height of mandibular body below M_2 1.3 mm, thickness there 0.8 mm, length of M_1 1.6 mm and 1.5 mm, length of M_2 1.2 and 1.3 mm.

Systematic position. — The pigmentation of molars, lack of reduction in talonid of M_3 and the shape of facets in the articular process reasonably refer the collected remains to genus *Sorex* L. Its specific identification, however, is strongly hampered by the fragmentary condition of the Kadzielnia specimens and cannot as yet be definitely determined. The shape of its articular process bars its assignment to the group of *S. alpinus* Schinz, while the moderate dimensions shut off any comparability with distinctly large forms such as e.g. *S. savini* Hinton or very small ones such as *S. minutissimus* Heim de Balsac. This leaves us with the group of moderately sized species, of the dimensions of *Sorex araneus* L., but from this species our fossil specimens differ in slightly smaller dimensions

and in different shape of the coronoid process. On the other hand, they closely approach *S. runtonensis* Hinton, a species widely distributed over Europe in early Pleistocene.

Sorex sp.

(fig. 3)

Material. — 4 fragmentary mandibles with preserved processes and M_1-M_3 from the deposits filling up the doline.

Description. — Anterior margin of the coronoid process meets the ramus of mandible at a nearly right angle without being curved forward at its upper part. This process is broader and more robust than that in *S. minutus* L. Fossa pterygoidea high, triangular. The bone bridge between the facets wide, slightly incised, the general shape of this process resembling that in *S. minutus* L. Tooth points pigmented to a reddish-yellow colour. M_3 five-cusped, hence its talonid is not reduced.

Dimensions of mandibular fragments (in mm):

Mandibles ——→	*1*	*2*	*3*
height of mandible on the inner side below M_2	0.9	0.9	1.1
thickness of same	0.7	0.6	0.7
M_1 length	—	1.4	—
M_1 width on trigonid	-	0.6	—
M_2 length	1.2	1.3	—
M_2 wiath on trigonid	0.5	0.6	—
M_3 length	0.9	—	0.9
M_3 width on trigonid	0.5	—	0.6

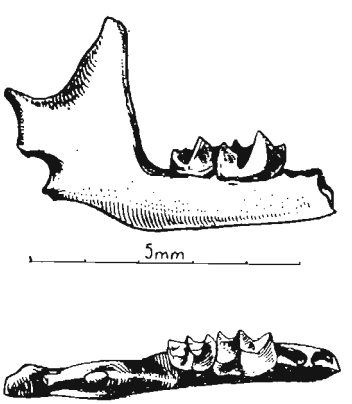

Fig. 3. — *Sorex* sp., fragment of mandible; side and top view.

Systematic position. — The presence in M_3 of five cusps suggests the assignment of the collected fragment to the subfamily of Soricinae, while on the shape of facets in the articular process we may reasonably refer it to genus *Sorex* L. The fragmentary condition of the available material does not permit to determine its specific position. The collected mandible resembles in size that of *S. minutus* L., from which it slightly differs in the proportions of the coronoid process. The Kadzielnia specimens are, in any case, referable to a larger form than that described by the present writer from Podlesice under the name of *Sorex* sp. (Kowalski, 1956), but smaller than *S. kennardi* Hinton from the Pleistocene of England.

Genus *Beremendia* Kormos, 1934

Beremendia fissidens (Petényi, 1864)

(fig. 4)

1864. *Crossopus fissidens;* S. J. Petényi, Hátrahagyott munkái, p. 60, pl. I, fig. 5.
1911. *Neomys fissidens* (Petényi); T. Kormos, Canis (Cerdocyon)..., p. 170, pl. 7, fig. 1-3.
1913. *Neomys fissidens* (Pet.) Kormos; J. Ehik, Die präglaziale..., p. 140.
1930b. *Beremendia fissidens* (Pet.) n.g.; T. Kormos, Beiträge... p. 57.
1930a. *Neomys* (?) *fissidens* (Pet.) Kormos; F. Heller, Eine Forest-Bed-Fauna..., p. 254-258, pl. 15, fig. 1-3, text-fig. 2-4.
1933. *Beremendia fissidens* (Pet.) Kormos; F. Heller, Ein Nachtrag..., p. 61-62.
1934a. *Beremendia fissidens* (Petényi); T. Kormos, Neue Insectenfresser... p. 299-301, fig. 33.
1934. *Beremendia fissidens* (Petényi); G. Brunner, Eine präglaziale Fauna..., p. 311, pl. 6, fig. 6-8, text-fig. 6,7.
1936a. *Beremendia fissidens* (Petényi); F. Heller, Eine oberpliocäne Wirbeltierfauna..., p. 107-108, pl. 7, fig. 1-2.
1941b. *Beremendia fissidens* (Petényi); M. Kretzoi, Weitere Beiträge..., p 110
1948. *Beremendia fissidens* Petényi; A. Pasa, I Mammiferi..., p. 14-16, fig. II, 1-4.
1949. *Beremendia fissidens* Petényi; M. Friant, Les Musaraignes..., p. 256-257, fig. 17.
1956. *Beremendia fissidens* (Petényi); K. Kowalski, Insectivores..., p. 349.
1956. *Beremendia fissidens* (Petényi); M. Kretzoi, Die altpleistozänen..., p. 164, 169-171,176,180, 183, 184, 187, 192, 193, 195, 197-201, 203.

Material. — Fragment of mandible with M_1-M_2 and damaged processes, fragment of mandible with complete processes and with M_2, fragment of mandible with M_2-M_3, four detached mandibular incisors, fragment of maxilla with P^4-M^2, fragment of maxilla with P^3-M^3, two detached incisors I^1 and a detached maxillar molar, all from material filling up the doline.

Description. — Anterior margin of the coronoid process meets the ramus of the mandible at an obtuse angle. The mandibular body very massive. The upper facet of the articular process placed obliquely in relation to the lower facet, the bone bridge uniting them wide, concave.

Molars with points pigmented to a dark brown colour. Mandibular incisor sharp, long, with tip prominently curving forward and strongly coloured, showing a distinct groove on the inner wall, without incisions on the margin. M_3 with a reduced small talonid, without metaconid.

I^1 large, with tip distinctly bifurcating and thus two-cusped. P^3 small, protruding lingually from the tooth-row. P^4-M^2 large, with pointed, dark-tinted cusps.

Dimensions. — Length of M_1-M_3 6.4 mm, height of mandibular ramus on the inner side, below M_2 2.6 mm. Length of P^4-M^2 is 6.7 and 6.6 mm respectively for the two considered specimens.

Systematic position. — The pigmentation of the molar points, together with the reduction of the talonid in M_3 and the large dimensions of the remains clearly indicate their assignment to genus *Beremendia* Kormos which embraces one species only, namely *Beremendia fissidens* (Petényi) recorded from a number of early Pleistocene localities in Europe. In 1955, I. G. Pidoplitschko mentions the species *„Blarina ucrainica* spec. nov.", in the early Pleistocene fauna from Czortków (western Ukraine). It rather seems that Pidoplitschko has committed an error in identifying a specimen of *Beremendia fissidens* (Petényi) with the American genus *Blarine* Gray, a form thus far never encountered in the Old World. Mention should be made here that C. C. Young (1934) described from Choukoutien in China a new species, *Neomys bohlini* Young, said to be distinguished by a reduced talonid in M_3. This character bars the assignment of the described form to genus *Neomys* Kaup and brings it nearer to genus *Beremendia* Kormos. Hence it is not out of the question that this genus had a wider range of distribution within the early Pleistocene than heretofore supposed.

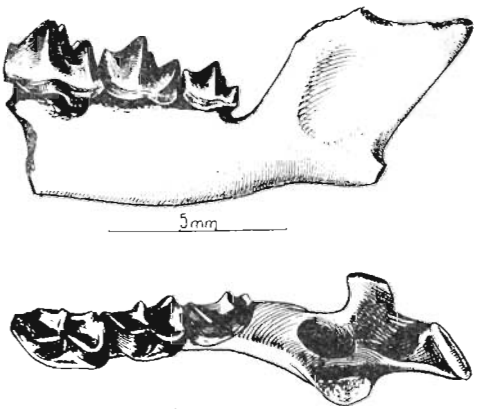

Fig. 4. — *Beremendia fissidens* (Petényi), fragment of mandible; side and top view.

Genus *Petenyia* Kormos, 1934

Petenyia hungarica Kormos, 1934

The synonimics have been given in K. Kowalski's paper of 1956, Insectivores..., p. 352; also:

1956. *Petenyia hungarica* Kormos; M. Kretzoi, Die altpleistozänen Wirbeltierfaunen..., p. 164, 169, 170, 175, 184, 187.

Material. — Incomplete mandible with P_4-M_3 and with preserved processes, collected from the material filling up the fissure in the NW part of the quarry, also a mandible with M_1-M_3, fragment of mandible with M_2-M_3, detached mandibular incisor and fragment of mandible without dentition, collected from the material filling up the doline.

Description. — Tooth-tips strongly pigmented to a dark-brown colour. M_3 with talonid strongly reduced, with one cusp only, lacking the metaconid.

Dimensions. — Length M_1-M_3 3.7 mm and 3.7 mm respectively, height of mandibular ramus on the inner side below M_2 1.5 and 1.6 mm respectively.

Systematic position. — The above mentioned characters of the collected mandibles clearly indicate their assignment to genus *Petenyia* Kormos. As has been stated by the present writer in his paper on the fauna from Podlesice (Kowalski, 1956, p. 353), the species described by Kretzoi (1943) and Pasa (1948) are so poorly differentiated that they ought probably to be regarded as synonymous with *P. hungarica* Kormos. It is to this species, as the only representative of genus that the Kadzielnia specimens are referable.

Chiroptera Blumenbach, 1779
Family **Rhinolophidae** Bell, 1836
Genus *Rhinolophus* Lacépède, 1799
Rhinolophus cf. *ferrumequinum* (Schreber, 1774)

Material. — Mandibular fragment with M_1-M_3 and with damaged processes , some fragments of maxilla and detached teeth, all collected from the material filling up the doline.

Description. — The preserved dentition as well as fragmentary processes display a structure identical with that in specimens of the Recent *Rhinolophus ferrumequinum* (Schreber) from central Europe and in early Pleistocene specimens from Podlesice (Kowalski, 1956). The teeth in the collected mandible are strongly used, indicating that they belonged to a very old individual.

Dimensions. — Length of M_1-M_3 6.1 mm, height of mandibular ramus on the inner side below M_1 1.9 mm.

Systematic position. — The correctness of the assignment of the Podlesice specimens to genus *Rhinolophus* Lacépède is beyond doubt, while its dimensions and agreement with recent specimens furthermore refer them to species *Rhinolophus ferrumequinum* (Schreber). As has been stated by the present writer with more detail in his paper published in 1956, evidence for the identity or differences between fossil and recent specimens cannot be obtained until more copious material has been made available for comparative studies.

Family **Vespertilionidae** Gray, 1821
Subfamily **Vespertilioninae** Miller, 1879
Genus *Myotis* Kaup, 1829
Myotis cf. *exilis* Heller, 1936

(fig. 5)

Material. — 6 fragments of mandible with P_3-M_3, without processes, collected from the material filling up the doline.

Description. — The alveoles indicate the presence of three one-rooted premolars. P_4 is slightly elongated, the tip protruding above the tips of other molars. M_3 does not show any stronger reduction of talonid. For. mentale between P_1 and P_2 of rather large size.

Dimensions of mandibular fragments (in mm) — see table below.

Systematic position. — The presence of three one-rooted premolars in the mandible and the considerable height of P_4 clearly indicate the assignment of the collected remains to genus *Myotis* Kaup. The small dimensions of these remains restrict the discussion concerning their identification to the smallest forms of this genus, to say: *M. exilis* Heller, *M. insignis* Heller, *M. daubentoni* (Kuhl), *M. capaccinii* (Bonaparte), *M. mystacinus* (Leisler in Kuhl). Of these forms *M. mystacinus* (Leisler in Kuhl) shows altogether different proportions of P_4, while analogies are observable between the studied species and the group of forms *M. daubentoni-exilis-capaccinii*. The Kadzielnia specimens are somewhat larger than *M. daubentoni* (Kuhl)

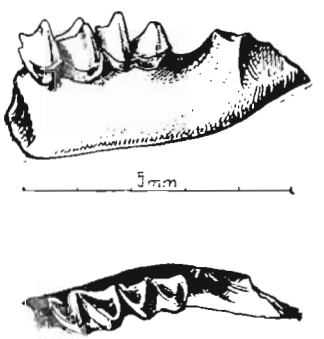

Fig. 5. — *Myotis* cf. *exilis* Heller, fragment of mandible; side and top view

Mandibles ——→	*1*	*2*	*3*	*4*	*5*	*6*
height of mandible on the inner side below M_2	1.6	1.5	—	—	—	—
thickness of same	0.7	0.7	0.7	—	—	—
symphysis length	—	—	—	2.1	—	2.0
P_4 length	—	—	—	0.7	0.7	—
P_4 width	—	—	—	0.6	0.6	—
M_1 length	—	1.3	1.3	1.3	1.3	—
M_2 length	1.4	1.3	—	—	—	—
M_3 length	1.2	—	—	—	—	—

and *M. insignis* Heller with dimensions more closely approaching to those of *M. exilis* Heller and *M. capaccinii* (Bonaparte). A very certain determination of their specific position is impossible owing to the fragmentary condition of the available specimens, the agreement of dimensions, however, as well as the proportions of P_4 suggest their assignment to the early Pleistocene species *M. exilis* Heller.

Myotis sp.

(fig 6)

Material. — 16 fragments of mandible without processes, containing P_2-M_3, 2 fragments of maxilla with M^1-M^3, collected from the material filling up the doline.

Description. — Alveole of incisor oval-shaped, slightly elongated. P_3 one-rooted, moderately large. P_4 with height almost that of molars, subquadrate in outline. Talonid of M_3 not reduced.

On their dimensions the fragment of maxilla is reasonably referable to the same species. Molars without protoconulus.

Dimensions. — Length of P_4-M_2 4.0 mm, length of M_1-M_3 (in another specimen) 4.1 mm, height of mandibular ramus on the inner side below M_2 1.7 mm in two specimens. Two specimens of P_4 show the length to be 0.9 and 1.0 mm, the width 0.8 and 0.75 respectively.

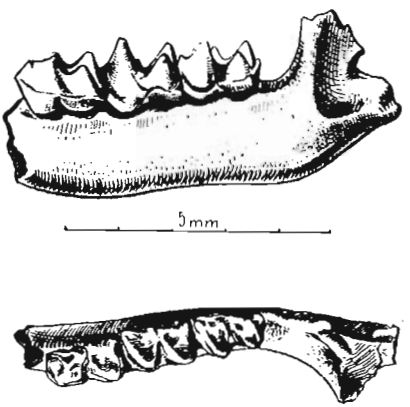

Fig. 6. — *Myotis* sp., fragment of mandible; side and top view.

Systematic position. — The structure of molars, and more particularly so the presence of three one-rooted premolars, as well as the height of P_4, indicate the assignment of all the collected specimens to genus *Myotis* Kaup. The approximately similar dimensions suggest that in spite of certain differences all the remains belong to one species. Their specific identification, however, meets with difficulties in view of the fragmentary material. On their dimensions they are referable to one of the moderately sized forms, though they all display a slight dissimilarity in the proportions of P_4.

Lagomorpha Brandt, 1855
Family **Leporidae** Gray, 1821
Subfamily **Palaeolaginae** Dice, 1917
Genus *Hypolagus* Dice,, 1917
Hypolagus brachygnathus. Kormos, 1934

(fig. 7, 8)

1930b. *Lepus brachygnathus* n.sp. (nomen nudum); T. Kormos, Beiträge...

1934b. *Hypolagus brachygnathus* n. sp.; T. Kormos. Zur Frage...., p. 75, fig. 2 a-o.

1934. *Hypolagus brachygnathus* Kormos; J. J. A. Bernsen & A. Schreuder, Eine Revision..., p. 84.

1936a. *Hypolagus brachygnathus* Kormos; F.Heller, Eine oberpliocäne Wirbeltierfauna..., p. 137-139, fig. 1-2.

1937. *Hypolagus brachygnathus* Kormos; A. Schreuder. Hypolagus.... p. 225-229, pl. 2, fig. 1-2.

1941a. *Lagotherium brachygnathum* (Kormos): M. Kretzoi. Die unterpleistozäne Säugetierfauna..., p. 323-324, fig. 7.

1954. *Lagotherium beremendense* (Petényi); M. Kretzoi. Bericht..., p. 248.

1956. *Lagotherium beremendense* (Petényi); M.Kretzoi, Die altpleistozänen Wirbeltierfaunen..., p. 160, 162, 164, 169, 170, 176, 179, 184, 188, 193, 195, 198, 201, 208.

Material. — 60 fragments of mandible with different parts of dentition, 3 maxillae with complete row of molariform teeth and numerous fragments of maxillae, numerous detached incisors, upper and lower premolars and molars, numerous, mostly fragmentary bones of the skeleton, all collected from the material filling up the doline.

Description. — Mandibular incisor more strongly curved than that in *Lepus europaeus* Pallas, extremely massive and broad. Diastema very short. On the outer side of P_3 two enamel folds: the anterior fold shallow, the posterior penetrating to mid-width of the tooth. No enamel folds on the inner side of the tooth. P_4-M_3 distinctly more massive than those in *Lepus europaeus* Pallas.

The first maxillar incisor flattened out; over one third of its surface there is a distinctly marked groove, shallow and without cement. The maxillar premolars more massive than the corresponding teeth in *Lepus europaeus* Pallas. On the anterior surface of P^2 a deep central incision, another one on the outside. The re-entrant enamel folds on P^3-M^2 extend over two thirds of their width. M^3 strongly reduced but always present.

For dimensions of mandible see table on p. 20. For dimensions of premolars and molars see table on p. 19.

Systematic position. — In 1929 L. R. Dice was the first to attempt a reasonable division of the Leporidae — a family whose systematics presented considerable difficulties — by splitting it up into three subfamilies on the structure of the third lower premolar. Later on

Mandibles →	*1*	*2*	*3*	*4*	*5*	*6*
length of tooth-row	15.0	—	—			
P^2 length	1.7	1.7	—	—	—	—
P^2 width	3.9	3.8	—		—	
P^3 length	2.9	2.9	2.7			—
P^3 width	5.5	5.5	5.4		—	
P^4 length	2.9	2.8	2.7	2.8	2.8	
P^4 width	5.7	5.5	5.5	5.3	5.7	—
M^1 length	2.9	2.9	2.6	2.7	2.7	2.5
M^1 width	5.5	5.2	5.6	5.0	5.0	5.2
M^2 length	2.4	2.3		2.3	2.6	2.3
M^2 width	5.1	4.8	—	4.4	4.6	4.9
M^3 length	1.1		—	1.2	1.1	—
M^3 width	1.9			2.0	1.8	—

Dice himself decided that, in consideration of the presence of numerous intermediate forms between the subfamilies Palaeolaginae and Archaeolaginae, that subdivision ought to be confined to only two clearly distinct subfamilies, namely the Palaeolaginae and the Leporinae. In the former, the fold extending from the outer edge of P_3 reaches approximately to the mid-width of that tooth, while in the latter it extends as far to the inner edge.

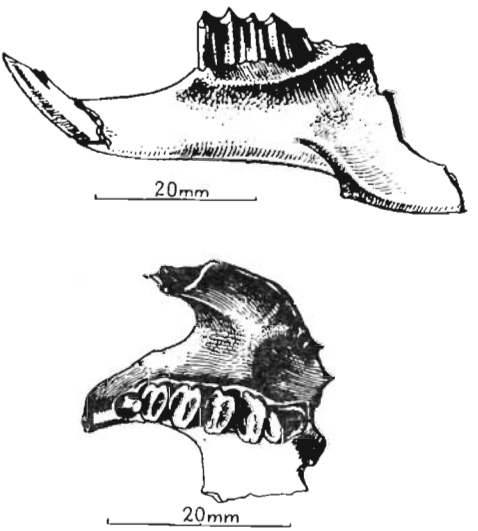

Fig. 7. — *Hypolagus brachygnathus* Kormos; *A* incomplete mandible, *B* maxilla.

On evidence of the separation made by Dice, Kormos (1934) differentiated three genera of fossil Leporides from the early Pleistocene of central Europe: *Pliolagus* Kormos, *Hypolagus* Dice and *Lepus* L. The first named form, represented by species *Pliolagus beremendensis* Kormos, was said to be distinguished, in addition to its small dimensions, also by the presence of a vestigial re-entrant fold on the outer edge of P_3. This fold is not, however, always discernible. The second of the here named early Pleistocene Lagomorphs is by Kormos (1934) referred to the fossil American genus *Hypolagus* Dice, which he called *H. brachy-*

Hypolagus brachygnathus Kormos
Dimensions of mandibular fragments (in mm)

Mandibles ⟶	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
Distance f. mentale to masseter impression	19.5	19.0	18.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Length of diastema	20.5	—		17.0	—	—	—	—	—	—	—	—	—	—	—	—	18.4	—	17.8	17.5
Height of mandible between P_4 and M_2	14.6	14.8	15.0	15.0	14.5	13.7	14,0	13.7	13.9	14.2	14.9	14.2	14.0	15.0	—	—	—	—	15.4	14.5
Thickness of same	5.8	6.2	5.8	6.4	6.0	5.9	5.9	6.4	6.2	5.8	5.8	6.0	6.0	6.2	6.0		—	—	6.0	6.1
Length over P_3-M_2 (on crowns)	14.8	—	14.8	—	15.5	15.0	14.5	—	—	—	—	—	—	—	—	15.5	—	15.0	15.7	—
Width I	3.7	—	—	3.7	—	—	—	—	—	—	—	—	—	—	—	—	3.8	—	3.5	3.3
P_3 length	3.1	3.4	3.3	3.7	3.3	3.3	3.1	3.1	3.2	—	—	—	3.3	—	—	3.3	3.5	3.0	3.5	3.2
P_3 width	3.0	3.4	3.5	3.6	3.7	3.2	3.4	3.4	3.3	—	—	—	3.0	—	—	3.6	3.5	3.4	3.4	3.4
P_4 length	3.0	3.1	3.1	3.4	3.2	3.1	3.0	3.0	3.1	2.7	3.7	3.0	3.0	3.2	3.0	3.3	—	3.0	3.5	3.0
P_4 width	4.0	4.0	3.8	—	4.0	4.0	4.0	4.0	4.0	3.6	3.5	3.8	4.2	4.1	3.9	4.2	—	4.0	4.2	4.0
M_1 length	3.2	3.3	3.1	3.3	3.3	3.1	2.8	2.9	3.1	3.0	3.3	2.9	2.9	3.1	3.0	3.3	—	3.0	3.4	3.0
M_1 width	3.9	4.0	3.9	4.1	4.0	4.0	3.9	3.9	4.0	3.6	3.4	3.6	4.2	4.2	3.8	4.1	—	4.0	4.2	3.9
M_2 length	3.3	—	3.0	—	3.3	3.1	3.0	—	—	3.0	3.3	2.9	3.0	3.3	3.1	3.1	—	3.1	3.2	—
M_2 width	3.8	—	3.7	—	3.8	3.9	3.8	—	—	3.5	3.3	3.4	4.1	4,2	3.8	4.1	—	4.0	4.0	—
M_3 length	1.9	—	1.6	—	1.9	1.8	2.1	—	—	1.8	—	1.7	—	—	1.8	2.1	—	1.0	2.3	—

gnathus Kormos. It is of the size of the European species *L. europaeus* Pallas, being distinguished, besides a completely different structure of P_3, also by considerably shortened mandible. The last named form, genus *Lepus* L., occurs in younger early Pleistocene faunas of central Europe, while in the west of Europe it is known already from the Pliocene.

On the structure of the third lower premolar the above described Kadzielnia fossils may undoubtedly be referred to the subfamily Palaeolaginae. Their massive, stout mandible points out to species *Hypolagus brachygnathus* Kormos as is also confirmed by the great conformity of dimensions within specimens from Hungary and Holland (Schreuder, 1937). A short diastema and strongly curved incisor are here particularly characteristic features.

The mandibular dentition of *H. brachygnathus* Kormos has never, thus far, been described.

Kretzoi (1941) uses for the here considered species the name of *Lagotherium brachygnathum* (Kormos), stating that the generic name

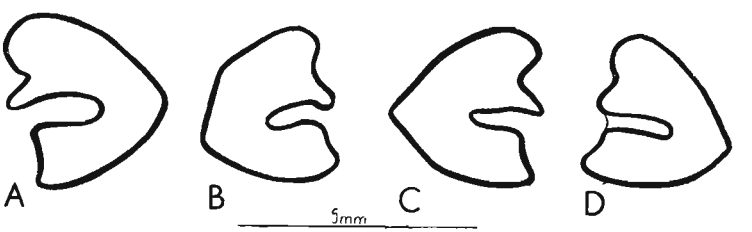

Fig. 8. — *Hypolagus brachygnathus* Kormos, P_3; *A-C* from below, *D* from above.

of *Lagotherium* Croizet & Jobert has long been applied to the Leporidae with a short massive skull, recorded from Perrier. Kretzoi, however, does not say whether the structure of the third lower premolar in the Perrier specimens was identical with that in the Hungarian specimens, while Schreuder (1936, p. 227) referred the Lagomorphs from Perrier to genus *Lepus* L. This problem must, therefore, be still considered an open question. In his papers published in 1954 and 1956 Kretzoi introduces still another name, namely that of *Lagotherium beremendense* (Petényi) which he regards as synonymous with *Hypolagus brachygnathus* Kormos. This opinion, however, calls for evidence, thus far not supplied by Kretzoi. The mandible, as figured by Petényi (1864, pl. II, 1) seems to differ from that in *H. brachygnathus* Kormos, in having its incisors less strongly bent. There is, however, no description of it.

Genus *Pliolagus* Kormos, 1934
Pliolagus cf. *tothi* Kretzoi, 1941
(fig. 9, 10)

Material. — 5 fragments of mandible, numerous detached incisors, mandibular and maxillar molars and premolars from the material recovered from the karst doline.

Description. — Mandible small, delicate. Incisor narrow, slightly curved. On the outer side of P_3 two depressions passing into re-entrant folds filled by cement. Of these the anterior one shallow, the posterior deep, reaching to mid-width of tooth. On the inner side of P_3, a depression usually occurs opposite to the posterior, inner re-entrant fold. Both the outer and inner edges of P_3 display distinctly protruding ridges. P_4-M_2 are small, about the same size as those in *Oryctolagus cuniculus* L. Mandibular incisor strongly flattened. A groove lacking cement runs over one third of its width.

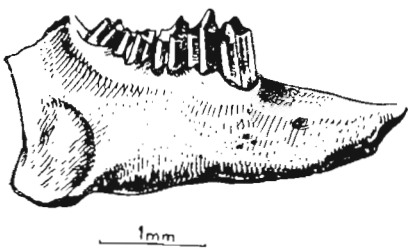

Fig. 9. — *Pliolagus* cf. *tothi* Kretzoi incomplete mandible.

Dimensions of mandibular fragments (in mm):

Mandibles ⟶	*1*	*2*	*3*	*4*	*5*
distance f. mentale to masseter impression	16.0	—	—	—	—
length of diastema	14.0	—	—	—	—
height of mandible between P_4 and M_2	13.3	—	13.2	—	—
thickness of same	5.5	—	5.5	—	—
length over P_3-M_3 (on crowns)	13.7	—	—	—	—
width I	—	—	—	—	2.2
P_3 length	2.9	3.0	2.7	2.6	—
P_3 width	2.6	2.9	2.4	2.6	—
P_4 length	2.7	2.6	2.6	2.6	—
P_4 width	3.5	3.5	3.5	2.9	—
M_1 length	2.6	2.9	2.7	2.6	—
M_1 width	3.3	3.5	3.2	2.9	—
M_2 length	2 8	3.0	2.7	2.7	—
M_2 width	3.3	3.4	3.1	2.6	—
M_3 length	1.1	—	—	—	—

Systematic position. — Kormos (1934) described genus *Pliolagus* Kormos as a monospecific form, embracing *P. beremendensis* Kormos from Villany in Hungary. As has been figured by that writer, this species displays two depressions on the outer side of P_3, and another, strongly characteristic, on the inner side of that tooth, which, however, is not discernible at the base of the tooth, but on its surface. In his paper Kretzoi (1941) figures a specimen of Kormos, which represents the type of a new species. On the description and figures as given by Kretzoi it may be inferred that the depression in the enamel described and figured

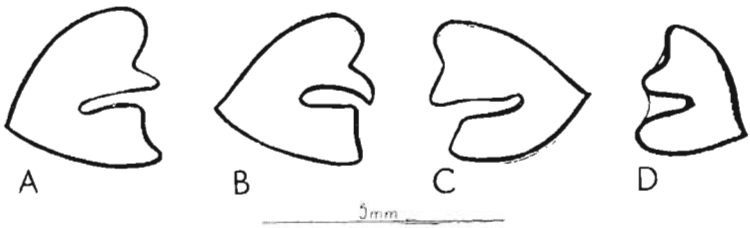

Fig. 10. — *Pliolagus* cf. *tothi* Kretzoi, P_3; *A-C* from below, *D* from above.

by Kormos apparently from the outer side of P_3, did not actually exist in the investigated specimen. Nevertheless, Kretzoi recognizes the validity of genus *Pliolagus* Kormos, and moreover, from Betfia in Rumania, describes a new species of that genus, *P. tothi* Kretzoi. The only character distinguishing that new species is its size somewhat larger than *P. beremendensis* Kormos ("Der einzige Unterschied den ich zwischen den beiden Formen feststellen kann ist die um ein Viertel beträchtlichere Grösse der Form aus Betfia gegenüber der geologisch ältere Stammform aus dem Saintprestium des Villany Gebirges". — Kretzoi, 1941). It is to be regretted that the descriptions by both Kretzoi and Kormos do not give any dimensions nor even state the scale to which the figures were drawn. Kretzoi only writes that his species is of the size of a rabbit.

The different shape of P_3, together with its small dimensions, distinguish genus *Pliolagus* Kormos from *Hypolagus* Dice. In many early Pleistocene faunas of central Europe, *Pliolagus* Kormos is encountered in unimportant quantities together with the predominating *Hypolagus* Dice.

The presence of a depression on the inner side of P_3, and their small dimensions reasonably refer the Kadzielnia specimens to genus *Pliolagus* Kormos. Their specific position within one of the two described species cannot be quite surely determined, since as stated above, their difference

consists in size only and neither of the descriptions contains any data as regards dimensions. Since, however, the Kadzielnia remains are in size those of a rabbit, and since that same size is by Kretzoi (1941) assigned to his species, it is probable that we are dealing here with *Pliolagus tothi* Kretzoi. Upon investigation of the Polish specimens, Kretzoi has, likewise, confirmed that, in what size is concerned, the Kadzielnia specimens agree with this species.

Rodentia Bowdich, 1821
Family **Sciuridae** Gray, 1821
Subfamily **Sciurinae** Baird, 1857
Genus *Sciurus* Linnaeus, 1758
Sciurus sp.
(fig. 11)

Material. — Detached P^4 found in the material filling up the doline.

Description. — The collected tooth belonged to a young individual. Its structure corresponds to that of P^4 in *Sciurus vulgaris* L.

Dimensions. — Length 2.6 mm, width 2.4 mm.

Systematic position. — Genus *Sciurus* L., to which the collected tooth is undoubtedly referable, has been recorded in Europe beginning from the early Tertiary up to Recent times. In early Pleistocene faunas, however, the remains of *Sciurus* L. are extremely rare, being even altogether absent from the classical south-Hungarian localities. Their occurrence is most likely dependent on the predominant type of vegetation since genus *Sciurus* L. is a decidedly sylvan form. Its remains have been recovered only from Sackdillinger Höhle (fragments of mandibles), Gundersheim fragment of tibia) and Betfia (incisors). In 1914, M.A.C. Hinton described from the Upper Fresh Water Beds of West Runton a new species, *Sciurus whitei* Hinton. The description of this species is based on the discovery of one P^4, showing differences in the structure of cusps as compared with that in *S. vulgaris* L., and of smaller size than the recent species.

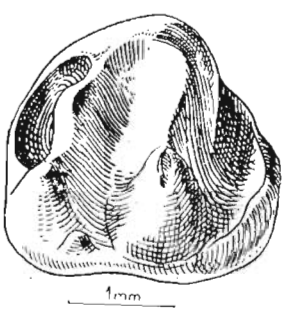

Fig. 11. — *Sciurus* sp., P^4.

The Kadzielnia tooth is with dimensions somewhat larger than those in *Sciurus vulgaris* L. — length of tooth particularly so — but in arrangement of cusps it approaches the recent species. A closer systematic determination is here impossible owing to the fragmentary condition of the remains.

Family **Cricetidae** Rochebrune, 1883
Subfamily **Microtinae** Miller, 1896
Genus *Dolomys* Nehring, 1898
Dolomys episcopalis (Méhely, 1914)
(fig. 12, 13)

1914. *Pliomys episcopalis* n.sp.; L. Méhely, Fibrinae Hungariae, p. 198-203, pl. IV, 9-14; pl. V, 1-10.
1926. *Dolomys episcopalis* Méhely; M. A. C. Hinton, Monograph..., p. 342-343.
1934. *Dolomys episcopalis* Méhely; G. Brunner, Eine präglaziale Wirbeltierfauna..., p. 317, pl. VII, 14-15.
1936b. *Dolomys episcopalis* (Méh.); F.Heller, Eine Forest-Bed-Fauna..., p. 16-17, fig. 2.
1937a. *Dolomys episcopalis* (Méhely); T. Kormos, Zur Frage..., p. 301, 321.
1937b. *Dolomys episcopalis* (Méhely); T.Kormos, Revision der Kleinsäuger..., p. 160-161, fig. 40.
1937. *Dolomys episcopalis* (Méh.); F.Heller, Über fossilführende..., p. 76.
1938. *Pliomys episcopalis* Méhely; M.Kretzoi, Die Raubtiere..., p. 95-96, fig. 2a.
1939. *Dolomys episcopalis* Méhely; F.Heller, Kleinsäugerreste..., p. 9-10, fig. 3.
1948. *Dolomys episcopalis* Méhely; A.Pasa, I Mammifieri..., p. 53-54, pl. VII, 4-6.
1950. *Dolomys episcopalis* Méhely: G. Brunner, Das Gaisloch...
1952. *Dolomys episcopalis* N.; W. Weiler, Pliozän..., p. 158.
1955b. *Pliomys episcopalis* Méhely; M. Kretzoi, Dolomys..., p. 348-351.
1956. *Pliomys episcopalis* Méhely; M. Kretzoi, Die altpleistozänen Wirbeltierfaunen...., 165, 178, 179, 184, 195, 197-201, 222.
1956a. *Pliomys episcopalis* Méhely; O.Fejfar, Nové druhy...., p. 95, 99, fig. 12.
1956b. *Pliomys episcopalis* Méhely; O.Fejfar, Seznam...,' p. 274.
1956c. *Pliomys episcopalis* Méhely; O.Fejfar, Zprava..., p. 359.
1956d. *Pliomys episcopalis* Méhely; O.Fejfar, Prvni..., p. 244.
1957. *Dolomys episcopalis* Méhely; G. Brunner, Die Breitenberghöhle..., p. 361, 370, fig. 8, nr 8.

Material. — 2 mandibular fragments with incisors and M_1-M_2, also 6 detached M_1, collected from the karst doline.

Description. — The incisor stretches between roots of M_2. Molars always with closed up roots. No cement in the re-entrant folds. Thickness of enamel in re-entrant folds same as in salient angles of molars. Enamel pattern more or less symmetric.

M_1 consists of posterior loop, five enamel triangles and an anterior loop of fairly simple design. The two anterior enamel triangles communicate by a broad canal, the remaining ones are closed up. The anterior loop communicates with the enamel triangle, placed behind it, by a canal of varying width. The anterior loop is set obliquely, on the whole with simple pattern, occasionally only with two additional shallow re-entrant folds on its antero-external surface (transition to *Pliomys lenki* (Heller)).

M_2 composed of a posterior loop and four enamel triangles, of which two anterior ones communicate by a broad canal.

Dimensions of teeth and of mandibular fragments (in mm):

Mandibles ——→	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
height of mandible on the inner side below M_2	3.6	—	—	—	—	—	—	-
thickness of same	2.7	2.8	—	—	—	—	—	-
length M_1-M_2	4.5	4.5	—	—	—	—	—	—
M_1 length	2.8	2.8	2.8	2.7	2.7	2.8	2.8	2.5
M_1 width	1.2	1.3	1.2	1.1	1.2	1.1	1.2	1.1
M_2 length	1.7	1.7	—	—	—	—	—	—

Systematic position. — Closed up roots, presence of five triangles of enamel in M_1, and lack of cement in re-entrant folds of molars, reasonably suggest the referability of the collected remains to genus *Dolomys* Nehring. Within this genus we may easily differentiate a group of species with small dimensions and a simple anterior loop in M_1. Our species belongs to that group too. In 1914 L. Méhely established genus *Pliomys* into which he included the only recorded species *P. episcopalis* Méhely. In 1926, Hinton assigned this species to genus *Dolomys* Nehring, this being concurrent with the opinion of most writers. Kretzoi (1938, 1955b) postulates the generic separation of genus *Pliomys* Méhely, but it seems that it would be more reasonable to consider it as a subgenus.

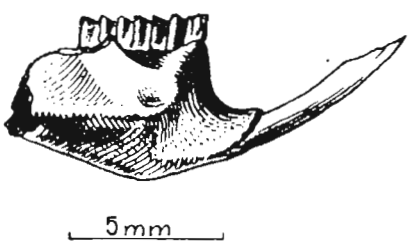

Fig. 12. — *Dolomys episcopalis* (Méhely), incomplete mandible.

Within subgenus *Pliomys* Méhely, in addition to *Dolomys episcopalis* (Méhely) the following species are known: *D.lenki* Heller, *D.progressus* (Kretzoi) and *D.simplicior* (Kretzoi). *D.lenki* Heller is distinguished by intricacy of design of the anterior loop of M_1, which displays strong variability even within that same species. *D.progressus* (Kretzoi) has by Kretzoi (1938) been described as a new species; it seems, however, that it is a case of extreme variation of the anterior loop of M_1 and that this name may be regarded as synonymous with *D.lenki* Heller. Even Kretzoi does not take this form into consideration in his later paper (1955). Moreover, it should be noted that *D.lenki* Heller occurs in association with

D.episcopalis (Méhely) and is perhaps an expression of individual variation in the structure of M_1, so common in Microtinae. The Kadzielnia specimens, however, only display that type of dental structure typical for *D.episcopalis* (Méhely). *D.simplicior* (Kretzoi) mentioned in Kretzoi's paper of 1956, is to be regarded as nomen nudum. Its description (Kretzoi, 1956, p. 176) which only states that: "kleiner als *P.episcopalis* mit unvollständig abgeschnürter Vorderkappe am M_1", is inadequate.

Apistomys coronensis Méhely, also referred to genus *Pliomys* Méhely (Kretzoi, 1955), is distinguished by transversal arrangement of the anterior loop on M_1, not displayed by the Kadzielnia specimens.

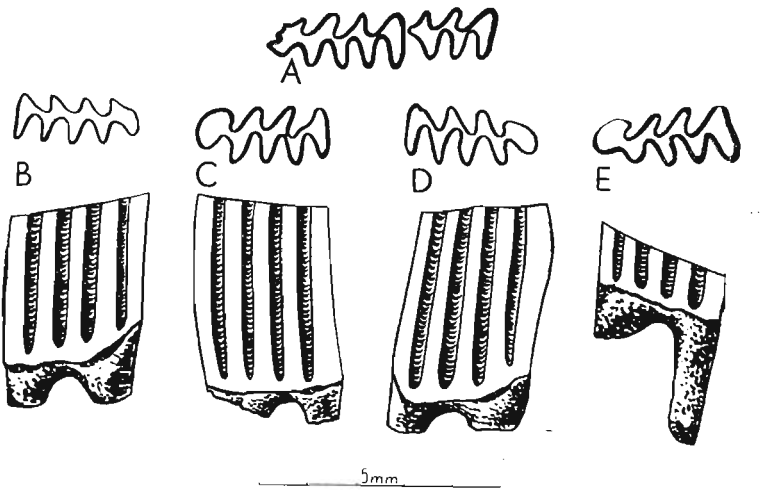

Fig. 13. — *Dolomys episcopalis* (Méhely); *A* M_1-M_3, *B-E* M_1 in successive stages of wear.

Within the species of *Dolomys episcopalis* (Méhely), Kormos (1931) described subspecies *D.episcopalis bolkayi* Kormos, collected from the bone breccia at Podumci in Yugoslavia. Kretzoi (1956) mentions this form as a distinct species. It differs from the type form in slightly greater dimensions, more rounded and clearly separated anterior loop in M_1, in the triangles being more closed up and in the incisor directed between the roots of M_2 and M_3. The Kadzielnia specimens may be assigned to the type form on the course of the incisor running between the two roots of M_2.

Dolomys kretzoii n. sp.
(fig. 14, 15)

Holotypus: a damaged mandible with M_1-M_2.
Stratum typicum: early Pleistocene.
Locus typicus: Kadzielnia Hill in Kielce.

Derivatio nominis: kretzoii — in honour of Dr. Miklos Kretzoi, Director of the Geological Institute of Hungary and an authority of high renown on the early Pleistocene faunas from Hungary.

Material. — 2 fragments of mandible with M_1-M_2, fragment of mandible with M_1, 7 detached first lower molars, all collected from the karst doline.

Description. — Both roots in M_2 extend on the outer side of the incisor. Roots of molars present. Enamel fairly thick, nearly uniform throughout. Cement in re-entrant folds scarce or altogether lacking.

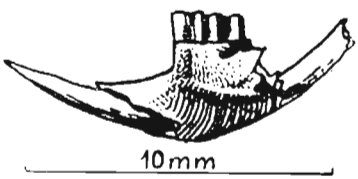

Fig. 14. — *Dolomys kretzoii* n. sp., fragment of mandible.

M_1 consists of an posterior loop, five triangles and a simple anterior loop. The two anterior triangles communicate by a broad passage. The other triangles are likewise fused or not distinctly separated. The anterior loop communicates by a broad passage with the anterior triangle; it is placed obliquely with the outer edge bent backwards.

M_2 displays a fair symmetry, in front of the posterior loop are two pairs of triangles placed opposite each other and communicating by a broad passage.

Dimensions of fragments of mandibles and detached M_1 as follows (in mm):

Mandibles ⟶	1	2	3	4	5	6	7	8	9	10
height of mandible on the inner side below M_2	2.3	—	—	—	—	—	—	—	—	—
M_1 length	2.4	2.2	2.4	2.0	2.3	2.3	2.4	2.1	2.3	2.3
M_1 width	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0
M_2 length	1.4	1.5	—	—	—	—	—	—	—	—

Systematic position. — The presence of five triangles, a simple anterior loop in M_1, also the presence of rooted molars, permit the assignment of the described form to *Dolomys* Nehring. Within this genus, however, it strongly differs from all the recorded species in different enamel pattern and exceptionally small dimensions. From genera *Villanyia* Kretzoi, *Ungaromys* Kormos and *Germanomys* Heller, thus far described from the early Pleistocene of Europe, and also distinguished by extremely small

dimensions, our species differs in the presence of five triangles and another shape of the anterior loop in M_1. The mutual relations and

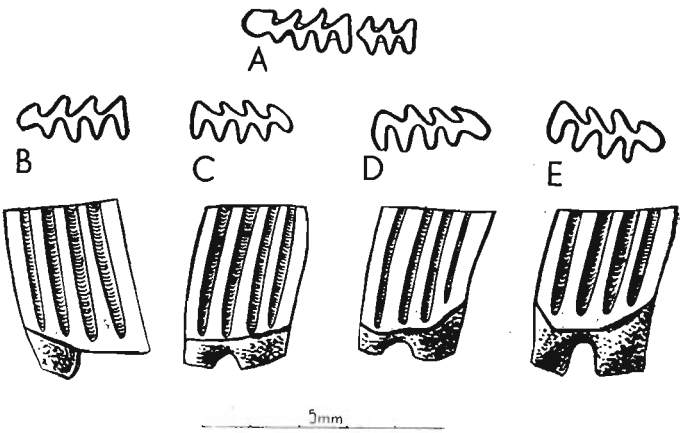

Fig. 15. — *Dolomys kretzoii* n. sp.; *A* M_1-M_2 (holotype), *B-E* M_1.

alliance of the mentioned forms and those of the here described species, call for additional studies.

Genus *Mimomys* F.Major, 1902

Mimomys pliocaenicus (F.Major, 1889)

(fig. 16—18)

For synonymics up to the year 1926, see M. A. C. Hinton's Monograph (1926, p. 357).

1930*b*. *Mimomys pliocaenicus* Maj.; T.Kormos, Beiträge..., p. 54.

1931*a*. *Mimomys pliocaenicus* F. Major; T. Kormos, Oberpliozäne Wühlmäuse..., p. 3-5, fig. 1-2.

1933. *Mimomys pliocaenicus* Forsyth Major; A. Schreuder, Microtinae..., p. 4-7, pl. 30, fig. 1; text-fig. 1-3.

1936*a*. *Mimomys pliocaenicus* (Forsyth Major); F. Heller, Eine oberpliozäne Wirbeltierfauna.., p. 131-132, pl. 10, fig. 7-9.

1936. *Mimomys pliocaenicus* F.M.; A.Schreuder, Fossil voles..., p. 3-4.

1937*a*. *Mimomys pliocaenicus* F. Major; T. Kormos, Zur Frage..., p. 300, 321.

1943. *Mimomys pliocaenicus* F.M., A.Schreuder, Fossil voles..., p. 399-401.

1953. *Mimomys pliocaenicus* Maj.; M. Friant, Présence d'un rongeur..., p. 730-732, fig. 1-4.

1954. *Mimomys pliocaenicus* Major; M. Friant, Une faune..., p. 166-168, fig. 4-5.

1954. *Mimomys pliocaenicus* Maj.; M.A.C.Hinton, Note sur le Mimomys..., p. 170.

1957. *Mimomys pliocaenicus* F.Maj.; F.Heller, Die fossilen Gattungen.... p. 219, 224-228, 231, fig. 3-4.

Material. — Fragment of palate with both M^1, numerous complete or damaged halves of mandibles, detached incisors, and mandibular and maxillar molars, all collected from the karst doline. One M^3 and

a fragment of another molar from fissure in the NW portion of the quarry.

Description. — Molars have distinct roots already in young individuals. Tooth enamel fairly thick, in younger individuals thinner in peaks of re-entrant folds. Cement fairly abundant in re-entrant folds of molars.

Mandible massive, with clearly indicated osseous ridges. Anterior edge of coronoidal process descending to mandibular body at posterior edge of M_1. M_1 displays a most characteristic structure: it consists of the posterior loop, three closed up triangles and an extremely complicated anterior loop. In its frontal portion there is an obtuse salient angle lying along the long axis of the tooth. Beyond that salient angle in a young specimen (fig. 17*B*) there is a deep outer re-entrant fold (by Kormos, 1931, called "Inselfalte"). In older individuals this salient angle

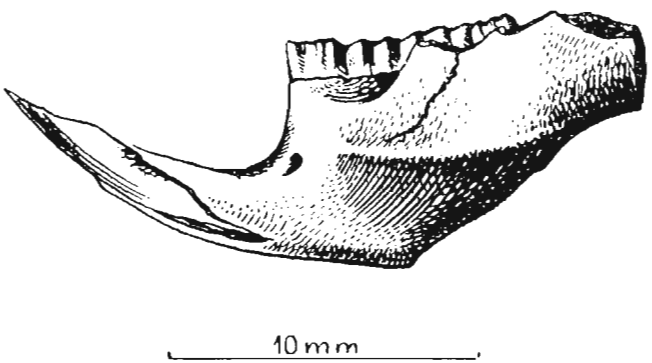

Fig. 16. — *Mimomys pliocaenicus* (F. Major), incomplete mandible.

disappears, its terminal part being altered into an islet of enamel. In a senile specimen (fig. 17*E*) with a low crown, this islet disappears completely. In M_1, beyond the re-entrant fold passing into an islet of enamel, a narrow salient angle is observable on the outer edge of the anterior loop, by Kormos called "Mimomyskante". In addition to it, we can note in the anterior loop still another, shallow re-entrant fold, the „Prismenfalte". On the inner side of the anterior loop in M_1, are discernible a shallow re-entrant fold with a salient angle lying beyond it.

M_2, in addition to the terminal loops, has two enamel triangles communicating by a broad passage. The outer salient angles are less strongly developed. Structure of M_3 resembles that of M_2, but the outer salient angles show here a still lower degree of development.

In M^1, between the anterior and posterior loops, we see three triangles, almost entirely closed up. M^2, besides the terminal loops, has only two

intervening triangles, communicating by a narrow passage. In a young individual, M^3 (fig. 18*A*) is with three salient angles and two re-entrant folds, on the inner as well as on the outer side. In older individuals the posterior inner re-entrant fold becomes reduced through insulation, so that this tooth is then with only one re-entrant fold on the inner side. The islet is discernible even on strongly used teeth. The vestigial re-entrant fold persists as an incision visible on the inner side of the enamel.

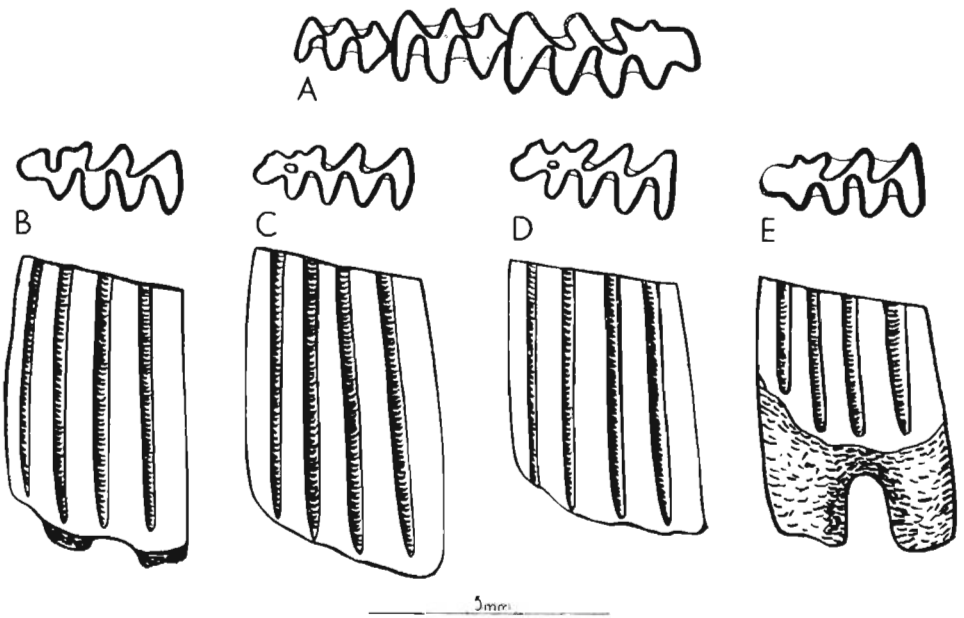

Fig. 17. — *Mimomys pliocaenicus* (F. Major); *A* M_1-M_3, *B-E* M_1 in successive stages of wear.

Dimensions of maxillar teeth are as follows: M^1 length 2.8 to 3.3 mm, an average of 3,0 mm; M^2 length 2.3 to 2.5 mm, an average of 2.4 mm; M^3 length 1.9 to 2.4 mm, an average of 2.2 mm. The table on p. 32 shows dimensions of mandibles and their fragments (in mm).

Systematic position. — The presence of the islet on the surface of the intricate anterior loop, also that of only three triangles in M_1, as well as the presence of roots in the molars, all suggest the assignment of the collected remains to genus *Mimomys* F.Maj. Within this genus, we may at once bar off the assignment of this form to that specific group allied with *M.majori* Hinton, in which the islet of enamel is not developed. Out of the forms developing this islet, the following species belong to the

Mandibles →	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
height of mandible on the inner side below M_2	4.3	4.5	4.2	4.3	4.2	—	—	—	—
thickness of same	3.8	3.8	3.7	4.0	—	3.5	—	—	—
M_1—M_3 length	7.7	—	—	8.5	8.0	—	8.3	—	—
M_1 length	3.6	3.8	3.5	3.8	3.7	3.6	3.7	3.4	3.8
M_1 width	1.7	1.7	1.5	1.7	1.7	1.7	1.7	1.6	1.75
M_2 length	2.2	2.3	4.2	2.5	2.5	2.4	2.3	2.4	2.6
M_3 length	2.0	—	—	2.0	2.1	—	1.9	—	—

same group as our specimens in what size is concerned: *M.pliocaenicus* (F.Major), *M.intermedius* (Newton), *M.savini* Hinton and *M.hassiacus* Heller. This last species is distinguished by lack of cement in re-entrant folds and different structure of loop in M_1. In *M.intermedius* (Newton) and *M.savini* Hinton the islet of enamel disappears at an early moment before the roots of the molars are closed up, while in our specimens the roots are closed up prior to the final development of the islet.

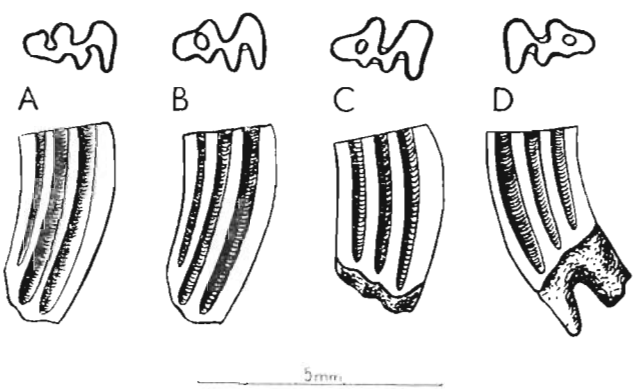

Fig. 18. — *Mimomys pliocaenicus* (F. Major); M^3 in successive stages of wear.

Species *M.coelodus* Kretzoi, in 1954 described by Kretzoi, also those described by that author in 1956, namely *M.arvalinus* Kretzoi and *M.obtusus* Kretzoi, are not comparable with our specimens, since the author has neither stated their dimensions, nor figured or adequately described them. Until these data are published, the names mentioned by Kretzoi are to be regarded as nomina nuda.

M.pliocaenicus (F.Major), the most primitive and at the same time one of the most widely distributed forms from genus *Mimomys* F. Maj., fully agrees with the characters displayed by the Kadzielnia specimens. These most conspicuously display such primitive specific features as the early development of roots in molars, late development and retarded disappearance of the enamel islet in M_1 and M_3, complicated structure of M_1 etc.

In his paper of 1954, Kretzoi writes on p. 261-262: "*M. pliocaenicus* (welche Art nicht mit *M."pliocaenicus"* der cromerischen Faunen des innenkarpatischen Gebietes, dem *M.méhelyi* mit bedeutend verlängerter Vorderkappe und kreisrunder Schmelzinsel verwechselt werden darf)." Hence it may be inferred that *M.pliocaenicus* (F.Major) occurs in Villafrankian faunas only, being altogether absent from Hungarian faunas where we may encounter a different form, *M.méhelyi* Kretzoi. Owing to the lack of figures and adequate description, *M. méhelyi* Kretzoi must tentatively be regarded as a nomen nudum; the differences mentioned above from a paper by Kretzoi seem to suggest no more than a subspecies, or maybe only differences within the limits of individual variations.

Mimomys reidi Hinton, 1910

(fig. 19, 20)

For synonymics up to the year 1926, see p. 363 of M.A.C.Hintons's Monograph (1926).

1936*a*. *Mimomys reidi* Hinton; F. Heller. Eine oberpliozäne Wirbeltierfauna.... p. 134-135. pl. 11, fig. 6-8.
1936. *Mimomys reidi* Hinton; A. Schreuder. Fossil voles..., p. 4-5. fig. 1.
1943. *Mimomys reidi* Hinton; A.Schreuder. *Ibid.*, p. 401, fig. 1.
1948. *Mimomys Reidi* Hinton; A. Pasa, I Mammiferi.... p. 68-70. fig. VII. 16-18.
1954. *Mimomys reidi* Hinton; M. Kretzoi, Bericht..., p. 246, fig. 1/b.
1957. *Mimomys reidi* Hint.; F.Heller. Die fossilen Gattungen... p. 226-227.

Material. — 9 damaged halves of mandibles, 32 detached first lower molars. It is for the time being impossible with certainty to determine the derivation of mandibular fragments, detached incisors, maxillar molars and of the 2nd and 3rd lower molars since, within the deposits filling the karst doline from which these fossil remains have been collected, the presence has been ascertained of three Microtinae species of similar dimensions, viz. *M.reidi* Hinton, *M.newtoni* F.Major and *Dolomys episcopalis* (Méhely).

Description. — Incisor long, mandibular body small but of massive structure. Molars with roots clearly differentiated even in very young individuals. In one of the specimens (No. 4), the incisor is distinctly seen

to pass between two roots of M_2. Scarce occurence of cement in re-entrant folds. Thickness of enamel practically uniform throughout.

M_1 consists of the posterior loop, three triangles and a complicated anterior loop. The posterior loop is separated from the triangles by a narrowed passage. The particular triangles usually communicate with one another by a broad canal. In the case of the two anterior triangles particularly, no distinct narrowing is ever observable. The anterior loop is with two lateral salient angles placed obliquelly and a tall one placed centrally. The islet of enamel on the surface of the anterior loops is always lacking.

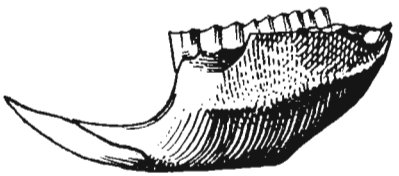

Fig. 19. — *Mimomys reidi* Hinton, incomplete mandible.

M_2 displays nearly perfect symmetry; both on the inner and on the outer side it has three salient angles and two re-entrant folds of practically the same depth. The median triangles are almost exactly opposite and communicating by broad passages. At the front of the tooth there is medially a narrow salient angle directed anteriorly.

M_3 structurally resembles M_2, but its opposite triangles communicate by still broader canals.

Dimensions. — Fragments of mandibles have the following dimensions (in mm):

Mandibles ⟶	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
height of mandible on the inner side below M_2	3.1	3.0	3.1	3.0	—	—	—	—	—
thickness of same	2.7	2.8	2.8	2.7	2.7	—	—	—	—
M_1—M_3 length	5.7	—	—	—	—	—	—	—	—
M_1 length	2.6	2.7	2.7	2.8	2.7	2.6	2.8	2.7	2.7
M_1 width	1.3	1.3	1.1	1.3	1.4	1.2	1.3	1.2	1.3
M_2 length	1.7	1.8	1.7	1.75	1.7	1.7	1.7	1.7	—
M_3 length	1.4	—	—	—	—	—	—	—	—

Systematic position. — The number of the present triangles and the structural intricacy of the anterior loop in M_1 determine the assignment of the here described specimens to genus *Mimomys* F.Maj. The selection of their specific position within the genus is limited to the group of small forms such as *M.reidi* Hinton, *M.pusillus* (Méhely), *M.newtoni* F.Major and *M.franconicus Heller*. In *M.pusillus* (Méhely) an islet of

enamel is commonly encountered, always lacking in our specimens. *M.newtoni* F.Major, which also occurs in the Kadzielnia material, differs in the structure of its first lower molar. *M.franconicus* Heller, which is a species described on evidence of one first lower molar belonging to an old individual, comes near to *M.reidi* Hinton, differring from it in absence of the enamel ridge in the anterior loop of M_1. As already mentioned in the description of *M.pliocaenicus* (F. Major), species of

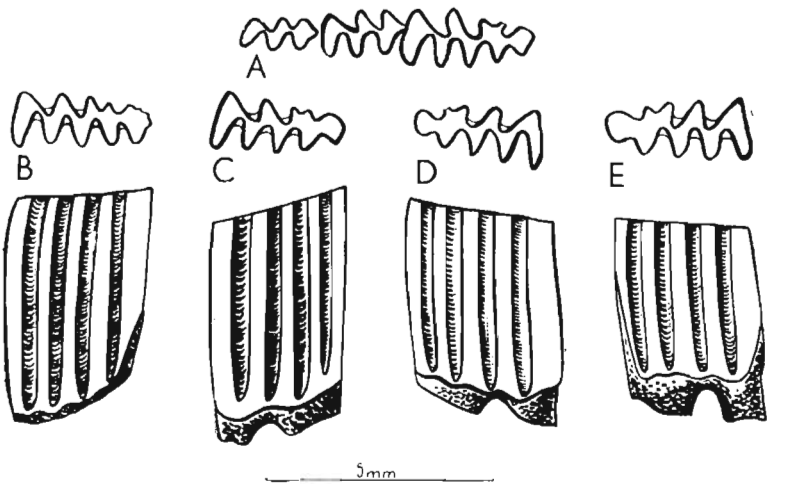

Fig. 20. — *Mimomys reidi* Hinton; *A* M_1-M_3, *B-E* M_1 in successive stages of wear.

genus *Mimomys* F.Maj., described by Kretzoi in his papers of 1954 and 1956, are for the time being to be regarded as nomina nuda.

The Kadzielnia specimens concur in dimensions and structural details with the descriptions of species *M.reidi* Hinton. In addition to the typical structure of the anterior loop in M_1 we can also observe here the characteristic passages uniting the triangles. Hinton (1926) thinks that the reduction of the anterior loop in this species is produced through the formation of an islet, at the same time asserting that the occurrence of this islet has never been recorded. Méhely (1914) likewise, when describing species *M.petenyi* Méhely, clearly stresses the lack of that islet both in the case of old and young individuals. This is confirmed by the state of conditions in our specimens.

The majority of authors, following the opinion of Hinton (1926), regard *M. petenyi* Méhely as synonymous with *M. reidi* Hinton. Kretzoi (1956) ascertains that *M. reidi* Hinton differs from *M. petenyi* Méhely, without, however, giving any evidence in support of his statement.

Mimomys newtoni Forsyth Major, 1902
(fig. 21, 22)

For synonymics up to the year 1926. see p. 375 of M.A.C.Hinton's Monograph 1926).

1931*a*. *Mimomys Newtoni* F.Major; T.Kormos, Oberpliozäne Wühlmäuse..., p. 5-6. fig. 3.

1933. *Mimomys newtoni* Forsyth Major; A. Schreuder, Microtinae..., p. 8.

1936*a*. *Mimomys newtoni* Forsyth Major; F. Heller. Eine oberpliozäne Wirbeltierfauna..., p. 135-136, pl. 11, fig. 9-10.

1938. *Mimomys newtoni* F. Major; T. Kormos. Mimomys newtoni...

1954. *Mimomys* cf. *newtoni* Hinton; M.Kretzoi, Bericht.., p. 246. fig. 2a.

1957. *Mimomys newtoni* F.Maj.; F.Heller. Die fossilen Gattungen..., p. 219, 222-223. 226, 230-231, fig. 8.

Material. — Fragment of mandible with M_1-M_2, 2 fragments of mandible with M_1, a detached damaged M_1. Two other fragments of mandible with strongly used teeth are most likely also referable to this species. All these remains have been collected from the deposits filling up the karst doline.

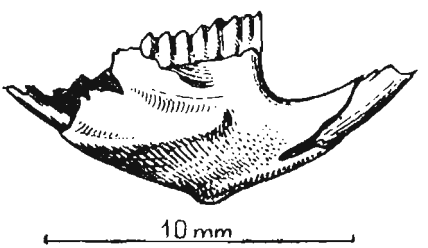

Fig. 21. — *Mimomys newtoni* F. Major. incomplete mandible.

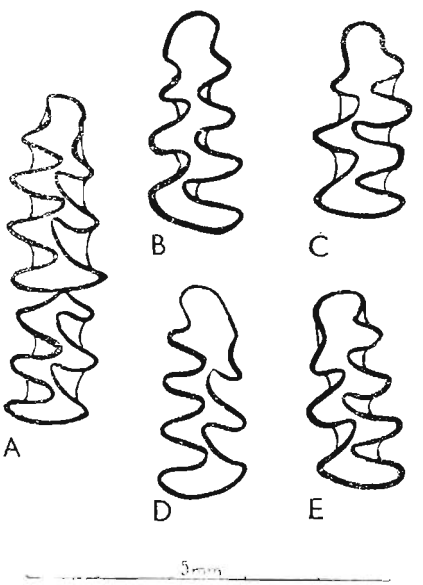

Fig. 22. — *Mimomys newtoni* F. Major: *A* M_1-M_2. *B-E* M_1.

Description. — Both roots of M_2 placed on the outer side of the incisor. Cement abundant in re-entrant folds. Molars always with conspicuous roots. Thickness of enamel nearly uniform throughout. slightly thinner at bottom of re-entrant folds only.

M_1 consists of a posterior loop, three closed up triangles and an anterior loop. Structure of anterior loop displays strong variation. A shallow

re-entrant fold occurs on the outer side, on the inner side the 4th triangle is blunt and moderately broad while its corresponding re-entrant fold varies in depth. In old individuals structure of anterior loop on M_1 is simplified, never bearing any traces of an islet.

M_2 is with closed up triangles, two anterior ones only communicating by a broad pasage.

Dimensions of fragments of mandible and detached first lower molars are as follows (in mm):

Mandibles	1	2	3	4	5	6
height of mandible on the inner side below M_2	3.0	—		—		
M_1 length	2.7	2.8	2.75	2.6		3.0
M_1 width	1.3	1.2	1.2	1.2	1.1	1.25
M_2 length	1.75	—	—	—		—

Systematic position. — The assignment to genus *Mimomys* F. Maj. is beyond doubt in view of the number of triangles present, structural intricacy of anterior loop in M_1 and the closed up roots of molars. Dimensions of teeth and characteristic structure of anterior loop in M_1 indicate species *M.newtoni* F. Major. This is a form relatively little known and fairly variable. Its older specimens resemble *M.pusillus* (Méhely), from which they differ in closed up triangles of M_2. The identification, therefore, of the mandibles, represented solely by a strongly used first lower molar, is thus somewhat uncertain. Specimens of *M. newtoni* F. Major from Hungary are said to be distinguished by complete lack of cement in re-entrant folds; it is on this evidence that Kormos (1938) described them as *M. newtoni hungaricus* Kormos, while Kretzoi (1956) even establishes a new species of *M.hungaricus* Kormos.

Family **Muridae** Gray, 1821

Subfamily **Murinae** Murray, 1886

Genus *Apodemus* Kaup, 1829

Apodemus sp.

(fig. 23)

Material. — 2 upper first molars, a left and a right one, probably belonging to two specimens since they display a different degree of wear. They were collected within the karst doline.

Description. — M^1 shows a structure typical of genus *Apodemus* Kaup. Cusps 4-7 and 9 (according to Schaub's terminology, 1938) are arranged as an uniform girdle with cusps 1-3 stretching before them as a belt. A strongly characteristic feature of one of the two collected teeth is the presence on the cingulum of a conspicuously tall cusp between cusps 2 and 3. No such cusp is discernible in the other specimen. There is also another cusp on the cingulum — though not so prominent — between cusps 7 and 9. On the less used tooth that cusp is isolated, while on the other tooth it is fused into the girdle formed by the united cusps, and swollen outwards between cusps 8 and 9.

Dimensions. — Both teeth are 1.9 mm in length and 1.3 mm in maximum width.

Systematic position. — The assignment to genus *Apodemus* Kaup is doubtless on evidence of the characteristic girdle-like arrangement of the united cusps in the posterior portion of M^1. Genus *Apodemus* Kaup is frequently encountered in many of the early Pleistocene faunas. A specific identification, however, meets with difficulties. The collected teeth are notably larger than the corresponding teeth in *Apodemus sylvaticus* (L.). while they are of equal size with *A. flavicollis* (Melchior), a species thus far never recorded from the early Pleistocene. The description of *A. leptodus* Kretzoi from Villany in Hungary is so cursory that it does not permit any comparative studies. *A. atavus* Heller is only known on a mandibular fragment from Gundersheim, which, likewise, does not allow a comparison with our specimens. Neither are there any data on M^1 in the description of *A. whitei* Hinton from the Pleistocene beds of England.

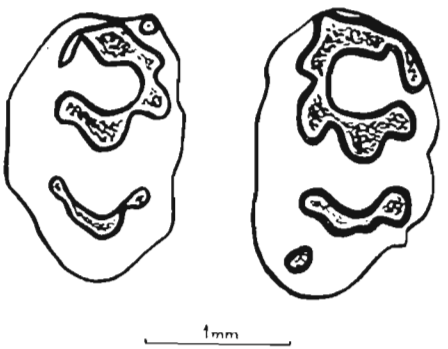

Fig. 23. — *Apodemus* sp., two M^1.

A highly interesting remark is contained in Schaub's paper (1938, p. 38). When describing the remains of *A. sylvaticus* (L.) from Püspökfürdö he says: „Bei einer einzigen Oberkieferreihe von 4 mm Länge fand ich ein interessantes Detail. M^1 sup. hat bei diesem Individuum auffalend schlankes Umriss, da die Vorderknospe über den Hügel 2 hinaus durch ein weiteres kleines Hügelchen verlängert ist. Die Bucht zwischen den Hügeln 2 und 3 ist durch ein Cingulum begrenzt, das weiter nach vorn reicht als der Vorderabhang des mittleren Vorderknospenhügels und das erwähnte Hügelchen trägt. Eine ähnliche Bildung habe ich bisher nur bei dem grossen mandschurischen *Apodemus (Alsomys) major* (Radde)

beobachtet. In systematischer Hinsicht kommt ihr wohl kaum Bedeutung zu".

From this we can readily infer the complete agreement of the structure of the described tooth with that displayed by the Kadzielnia specimens. Moreover, the dimensions of Schaub's specimen are those attained by the largest individuals of *A. sylvaticus.* (L.). From early Pleistocene faunas of Hungary (Villany, Beremend) and Rumania (Magyarkö) Schaub described (1938, p. 36) a new species, *Apodemus alsomyoides* Schaub, on the evidence of several collected mandibles. This form is distinguished by larger dimensions than those in *A. sylvaticus* (L.) attaining the size of *A. flavicollis* (Melchior). In dental structure, however, it differs from the last mentioned species, but approaches *Apodemus (Alsomys) major* (Radde).

It may be reasonably suggested that the Kadzielnia teeth are referable to *A. alsomyoides* Schaub. It also seems likely that the tooth from Püspökfürdö, by Schaub regarded as an outcome of individual variation, belongs to the same species too. The similarity of this form to *Apodemus (Alsomys) major* (Radde) would then involve the structure of both maxillar and mandibular dentition and might actually have resulted from really existing relationship. The solution of this problem, however, must await the discovery at some future time of more adequate remains.

Family **Gliridae** Thomas, 1897
Subfamily **Glirinae** Thomas, 1897
Genus *Muscardinus* Kaup, 1829
Muscardinus sp.
(fig. 24)

Material. — A detached first lower molar from the karst doline.

Description. — The collected tooth does not in its structure differ from recent specimens of *Muscardinus avellanarius* (L.), though it is apparently slightly smaller. It has 6 transverse enamel ridges and 3 roots.

Dimensions. — The length of the collected M_1 is 1.5 mm, its width 1.2 mm.

Systematic position. — The structure of that tooth clearly accounts for its assignment to genus *Muscardinus* Kaup. Remains of this type are known from early Pleistocene sites in Czechoslovakia (Koneprusy), Germany (Sackdillinger Höhle, Moggaster Höhle) and Rumania (Püspökfürdö). In Moggaster Höhle (Heller, 1930*b*) a third upper

Fig. 24. — *Muscardinus* sp., M_1

molar was found displaying larger dimensions than those in *M. avellanarius* (L.). The dimensions of mandibular teeth from Sackdillinger Höhle (Brunner, 1934) exceed those in the Kadzielnia specimens. A new species, *M. dacicus* Kormos, was described by Kormos (1930) from Püspökfürdö, whose first upper molar is said to differ from this tooth in the recent species in greater length and smaller width. All these data, however, do not contribute any diagnostic evidence for specific determination of the Kadzielnia specimen.

ADDITIONAL CONTRIBUTION TO THE KNOWLEDGE OF THE EARLY PLEISTOCENE FAUNA FROM PODLESICE

Promimomys insuliferus n. sp.

1956. *Mimomys* cf. *pusillus* (Méhely. 1914): K. Kowalski. Insectivores..., p. 376-379. pl. IV, fig. 7; text-fig. 2 A-D.

1957. *Promimomys insuliferus* n. sp. (nomen nudum); K. Kowalski. Académie..., p. 48-49.

Holotypus: mandible with complete dentition figures in K. Kowalski's paper published in 1956: Insectivores..., pl. IV, fig. 7, and text-fig. 2A.

Stratum typicum: Günz-Mindel Interglacial.

Locus typicus: Podlesice near Kroczyce, Olkusz district.

Derivatio nominis: insuliferus — meaning bearing an islet of enamel in the anterior loop of M_1.

In his paper on the fauna from Podlesice the present writer has described and figured a rodent from the subfamily of Microtinae, giving its name as "*Mimomys* cf. *pusillus* (Méhely)". In describing it he wrote: "The Podlesice species of genus *Mimomys* F. Major thus shows closest similarity to the variable species *M. pusillus* (Méhely) though it does rather seem that it cannot be included within the variations of this form thus far known" (Kowalski, 1956, p. 379). He also stressed there the resemblance of the Podlesice specimens to species *Mimomys moldavicus* Kormos.

Additional studies of the Podlesice specimens and their comparison with the type representatives of genus *Mimomys* F. Major from Kadzielnia have led the writer to ascertain that we are dealing here with a representative of genus *Promimomys* Kretzoi recently (1955) established by M. Kretzoi. This new genus, to which Kretzoi refers *P. moldavicus* (Kormos) and *P. cor* Kretzoi, is distinguished by brachyodontism, shortened and simplified anterior loop in M_1, fused triangles in molars, finally by lack of cement in re-entrant folds. All these characters are displayed by the Podlesice specimens. Here the writer wishes to note that the statement on page 378 of his 1956 paper regarding the presence of

cement in re-entrant folds, is not correct. A closer investigation of the specimens has proved the absence of cement in re-entrant folds. *Promimomys insuliferus* n. sp. may be distinguished from all species of genus *Mimomys* F. Major by prominent brachyodontism and the simplicity of the short anterior loop in M_1. From *P. cor.* Kretzoi and *P. moldavicus* (Kormos) the Podlesice species differs in smaller dimensions and in the exceptionally long duration of the islet of enamel in the anterior loop of M_1.

Zoological Institute
of the Polish Academy of Sciences
Cracow Branch
Kraków, November 1957

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KAZIMIERZ KOWALSKI

WCZESNOPLEJSTOCEŃSKA FAUNA DROBNYCH SSAKÓW Z KADZIELNI W KIELCACH

Streszczenie

Na terenie miasta Kielc, na wzgórzu Kadzielnia, znaleziono w zagłębieniach krasowych bogatą faunę drobnych ssaków. Kości ich znajdowały się w glinach będących produktem wietrzenia wapienia w dość ciepłym klimacie. Większość kości stanowiły resztki zającowatych. Skład fauny przedstawia się następująco:

Insectivora

Talpa minor Freudenberg
T. fossilis Petényi
Sorex cf. *runtonensis* Hinton
Sorex sp.
Beremendia fissidens (Petényi)
Petenyia hungarica Kormos

Chiroptera

Rhinolophus cf. *ferrumequinum* (Schreber)
Myotis cf. *exilis* Heller
Myotis sp.

Lagomorpha

Hypolagus brachygnathus Körmos
Pliolagus cf. *tothi* Kretzoi

Rodentia

Sciurus sp.
Dolomys episcopalis (Méhely)
D. kretzoii n. sp.
Mimomys pliocaenicus (F. Major)
M. reidi Hinton
M. newtoni F. Major
Apodemus sp.
Muscardinus sp.

Ponadto znaleziono resztki *Ophisaurus cf. pannonicus* Kormos oznaczone przez M. Młynarskiego, oraz bliżej nie oznaczone resztki Mustelidae.

Występowanie poszczególnych elementów fauny z Kadzielni w faunach wczesnoplejstoceńskich Europy środkowej, a w szczególności obecność starszych geologicznie przedstawicieli rodzaju *Mimomys* F. Major i skład fauny zającowatych — wskazują na przynależność znaleziska do wyróżnionego przez M. Kretzoi'a piętra Villanyium, odpowiadającego okresowi międzylodowcowemu Günz-Mindel. Fauna z Kadzielni jest młodsza niż fauna z Podlesic i — nie opracowana dotychczas pod względem składu drobnych ssaków — fauna z Wężów koło Działoszyna. Skład jej wskazuje na cieplejszy klimat umiarkowany, obecność zaś rodzajów *Sciurus* L. i *Muscardinus* Kaup dowodzi istnienia lasu.

Część szczegółowa pracy zawiera opisy i wymiary szczątków drobnych ssaków znalezionych na Kadzielni oraz uwagi systematyczne. Po raz pierwszy podano w niej opis i wymiary zębów szczęki *Hypolagus brachygnathus* Kormos.

Na końcu pracy, w uzupełnieniu publikacji autora o faunie z Podlesic (Kowalski, 1956) podano opis nowego gatunku *Promimomys insuliferus* n. sp. Szczątki tego gryzonia opisane zostały we wspomnianej pracy jako „*Mimomys* cf. *pusillus* (Méhelyi)", jednak bliższe ich zbadanie i porównanie z typowymi przedstawicielami rodzaju *Mimomys* F. Major wykazało, że należą do opisanego w r. 1955 przez Kretzoi'a prymitywnego rodzaju *Promimomys* Kretzoi. W związku z tym należy przypuszczać, że fauna z Podlesic jest starsza, niż podano w poprzedniej pracy autora, i pochodzi z początku interglacjału Günz-Mindel.

OBJAŚNIENIA DO ILUSTRACJI

Fig. 1 (p. 10)
Talpa fossilis Petényi, fragment żuchwy — z boku i z góry.

Fig. 2 (p. 11)
Sorex cf. *runtonensis* Hinton, fragment żuchwy — z boku i z góry.

Fig. 3 (p. 12)
Sorex sp., fragment żuchwy — z boku i z góry.

Fig. 4 (p. 14)
Beremendia fissidens (Petényi), fragment żuchwy — z boku i z góry.

Fig. 5 (p. 16)
Myotis cf. *exilis* Heller, fragment żuchwy — z boku i z góry.

Fig. 6 (p. 17)
Myotis sp., fragment żuchwy — z boku i z góry.

Fig. 7 (p. 19)
Hypolagus brachygnatus Kormos; *A* uszkodzona żuchwa, *B* szczęka.

Fig. 8 (p. 21)
Hypolagus brachygnathus Kormos, P_3; *A-C* z dołu, *D* z góry.

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Pliolagus cf. *tothi* Kretzoi, uszkodzona żuchwa.

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Pliolagus cf. *tothi* Kretzoi, P_3; *A-C* z dołu, *D* z góry.

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Mimomys pliocaenicus (F. Major); M^3 w kolejnych stadiach ścierania.

Fig. 19 (p. 34)
Mimomys reidi Hinton, żuchwa niekompletna.

Fig. 20 (p. 35)
Mimomys reidi Hinton; *A* M_1-M_3, *B-E* M_1 w kolejnych stadiach ścierania.

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Mimomys newtoni F. Major, uszkodzona żuchwa.

Fig. 22 (p. 36)
Mimomys newtoni F. Major: *A* M_1-M_2, *B-E* M_1.

Fig. 23 (p. 38)
Apodemus sp., two M^1.

Fig. 24 (p. 39)
Muscardinus sp., M_1.

КАЗИМЕРЖ КОВАЛЬСКИ

РАННЕПЛЕЙСТОЦЕНОВАЯ ФАУНА МЕЛКИХ МЛЕКОПИТАЮЩИХ КАДЗЕЛЬНИ В КЕЛЬЦАХ (ПОЛЬША)

Резюме

В городе Кельце, на возвышенности Кадзельня, в карстовых впадинах найдено богатую фауну мелких млекопитающих. Их кости заключались в суглинках, продуктах выветривания известняков в довольно теплом климате. Большая часть костей принадлежала останкам заячьих. Состав фауны представлен нижеследующими формами:

Insectivora

Talpa minor Freudenberg
T. fossilis Petényi
Sorex cf. *runtonensis* Hinton
Sorex sp.
Beremendia fissidens (Petényi)
Petenyia hungarica Kormos

Chiroptera

Rhinolophus cf. *ferrumequinum* (Schreber)
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Myotis sp.

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Hypolagus brachygnathus Kormos
Pliolagus cf. *tothi* Kretzoi

Rodentia

Sciurus sp.
Dolomys episcopalis (Méhely)
D. kretzoii n. sp.
Mimomys pliocaenicus (F. Major)
M. reidi Hinton
M. newtoni F. Major
Apodemus sp.
Muscardinus sp.

Сверх того найдены останки *Ophisaurus* cf. *pannonicus* Kormos, определенные М. Мльнарским, равно как не определенные точнее останки Mustelidae.

Нахождение отдельных элементов фауны Кадзельни в фаунах раннего плейстоцена средней Европы, а в особенности присутствие более древних геологически представителей рода *Mimomys* F. Major и состав фауны заячьих — указывают на принадлежность местонахождения к выделенному Крецоием (M. Kretzoi) этажу Villanyium, отвечающему межледниковой эпохе Günz-Mindel. Фауна Кадзельни моложе чем фауна из Подлесиц и чем — до настоящего времени еще не обработанная в отношении состава мелких млекопитающих — фауна из Венжев около Дзялошина. Состав ее указывает на более теплый умеренный климат, наличие родов *Sciurus* L. и *Muscardinus* Kaup доказывают присутствие леса.

Работа заключает описание и размеры останков мелких млекопитающих, найденных в Кадзельне, равно как систематические замечания. Впервые приведено тут описание и размеры зубов челюсти *Hypolagus brachygnahus* Kormos.

В конце работы, как пополнение публикации автора о фауне Подлесиц (K. Kowalski, 1956) приведено описание нового вида *Promimomys insuliferus* n. sp. Останки этого грызуна описаны в указанной работе как „*Mimomys* cf. *pusillus* (Méhely)", однако более тщательное их исследование и сравнение с типичными представителями вида *Mimomys* F. Major показало, что относятся они к описанному в 1955 г. Крецоием примитивному виду *Promimomys* Kretzoi. В связи с этим надо предполагать, что фауна Подлесиц старше чем это представлено в предыдущем труде автора и происходит из начала интерглициала Günz-Mindel.