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**PARARHIZOMYS HIPPARIONUM TEILHARD & YOUNG, 1931  
(RODENTIA) FROM THE PLIOCENE OF ALTAN TELI,  
WESTERN MONGOLIA**

**(PARARHIZOMYS HIPPARIONUM TEILHARD & YOUNG, 1931 (RODENTIA)  
Z PLIOCENU AŁTAN TELI, ZACHODNIA MONGOLIA)**

(Plate XXI)

*Abstract.* — The description is given of a skull of *Pararhizomys hipparionum* TEILHARD & YOUNG, 1931, from the Pliocene of Altan Teli in Western Mongolia. The discovery of a nearly complete skull contributes to the knowledge of this species, known hitherto only from a unique fragment of the lower jaw from the Pontian of Shensi, China. A discussion of the systematic position of *Pararhizomys hipparionum* is also given.

INTRODUCTION

During Polish-Mongolian Palaeontological Expedition in 1965 (KIELAN-JAWOROWSKA & DOVCHIN, 1968), a unique rodent specimen was unearthed in a Pliocene locality at Altan Teli, Western Mongolia (GRADZIŃSKI *et al.*, 1968, Text-figs. 34, 35). Rodent remains had already been discovered in this locality by the Soviet palaeontological expedition in 1949 (ROZHDESTVENSKY, 1954), but no description was published.

The specimen under discussion undoubtedly belongs to the family Rhizomyidae, found as scarce fossils in the Tertiary and Quaternary beds of Central Asia, China and India. The family also contains three living genera: *Rhizomys* GRAY, 1831 and *Cannomys* THOMAS, 1915 from South Eastern Asia, and *Tachyoryctes* RÜPPEL, 1835 from East Africa. They are fossorial rodents, externally very much resembling the mole-rats, Spalacidae, with which they were sometimes placed in one family.

It has been supposed (STEHLIN, 1923; STEHLIN & SCHAUB, 1951) that the first molariform in Rhizomyidae and Spalacidae represents the last premolar (P4). This hypothesis is based on observations of the development of teeth in the Oligocene rodent *Rhizospalax perrieri* MILLER & GIDLEY, 1919 from France, which according to these authors is the ancestral form of the above mentioned families. The discovery of Rhizomyidae in the Oligocene of Asia, resembling rather primitive Cricetidae than the genus *Rhizospalax* MILLER & GIDLEY, 1919 (for which THALER, 1966, creates a special family Rhizospalacidae), makes phylogenetic connections between Rhizomyidae and *Rhizospalax* very doubtful. This is why in the present paper the molariforms of *Pararhizomys* are determined as M1-M3.

The relations between Rhizomyidae and Spalacidae being rather doubtful, it is here considered preferable to treat them as separate families, and not as two subfamilies of one family, as is the practice of some zoologists.

Family RHIZOMYIDAE MILLER & GIDLEY, 1918

Genus PARARHIZOMYS TEILHARD & YOUNG, 1931

**Pararhizomys hipparionum** TEILHARD & YOUNG, 1931

(Pl. XXI; Text-fig. 1)

1931. *Pararhizomys hipparionum* n. sp.; P. TEILHARD & C. C. YOUNG, Fossil mammals..., pp. 11-12, Pl. 5, fig. 34.

1936. *Pararhizomys hipparionum* TEILHARD & YOUNG; P. TEILHARD & C. C. YOUNG, On the mammalian..., p. 14.

1942. *Pararhizomys hipparionum* TEILHARD & YOUNG; P. TEILHARD & P. LEROY, Chinese fossil..., p. 36.

1950. *Pararhizomys hipparionum* TEILHARD & YOUNG; C. C. YOUNG & P. T. LIU, On the mammalian..., pp. 61, 63.

**Material.** — Nearly complete skull with appartenant lower jaws (Z. Pal. No. MgM-V/65). Zygomatic arches lacking, ascending rami of the lower jaws incompletely preserved. All teeth are present, molars slightly worn.

**Description.** — Skull is massive, but narrower and more elongated than in the recent *Rhizomys pruinosus* BLYTH, 1851. Seen from the side, it is distinctly lower than in the recent species. Occipital region forms a broad shield sloped slightly forwards. Foramen magnum rounded, occupies half of the height of the occipital shield. The sagittal crest and the external occipital crest are strongly protruding. Interorbital constriction is narrow. Bullae are large, meatus directed outwards, not upwards as in *R. pruinosus*. Rostrum longer than in recent representatives of the genus *Rhizomys* GRAY, 1831. Infraorbital foramen very small. Nasalia distinctly broadened in their anterior parts.



Fig. 1

*Pararhizomys hipparionum* TEILHARD & YOUNG, Altan Teli, Pliocene: pattern of left upper (A) and left lower (B) molars.

Mandible massive. The end of the alveole of the lower incisor forms a knob on the external surface of the condyloid process, which does not, however, exceed in height the process. On the lingual side of the mandible, the area between the alveolar border of the molars and the incisors' alveole is deeply depressed.

Generally speaking, the form of the skull suggests an adaptation to fossorial life, much slighter, however, than in the representatives of the family Spalacidae.

Upper incisors are in section triangular, with rounded corners. The layer of enamel on their front is thin, reaching slightly on the sides. Upper incisors are orthodont, directed downwards. Lower incisors with enamel layer only on the anterior surface, much thinner than in mole-rats, their surface covered by small hollows.

Molars semihypsodont, their crowns nearly as high as in the recent *Rhizomys*. In the upper jaw, the length of teeth diminishing backwards. All the molars have on the lingual side of the crown a re-entrant directed slightly forwards and reaching about a half of the width of the tooth. First upper molar is elongated, oval. It has two labial re-entrants, one situated in front, another behind the lingual re-entrant. They reach 2/3 of the width of the crown and are directed slightly backwards near their end. Second upper molar is smaller than the first one (in *Rhizomys* it is larger), its unique external re-entrant is situated behind the lingual one, reaching 3/4 of the width of the crown and directed slightly backwards. Third upper molar is oval, its unique external re-entrant is situated opposite the internal one and reaching only 1/3 of the width of the crown. In the specimen described, as can be seen from the figures, most re-entrants on the upper, as well as on the lower teeth are reduced by wear to enamel islands on the surface of the crowns.

Lower molars have one lingual re-entrant bended strongly forwards in the first tooth, and nearly transversal in remaining teeth. First molar egg-shaped, with anterior end blunt. It has externally one re-entrant situated to the rear of the lingual one and reaching half width of the crown. Second lower molar has two external re-entrants, the posterior one well marked, filling half the width of the tooth, the anterior one preserved in the form of a small enamel island, situated in the front of the internal re-entrant. Third lower molar has one lingual re-entrant, situated opposite to the labial one and touching it in the middle of the crown.

#### Dimensions (in mm):

Condylbasal length . . . . .	about 62.0	Largest thickness of the mandible . . . . .	about 7.0
Interorbital constriction . . . . .	6.8	Height of mandible before M <sub>1</sub> . . . . .	12.0
Length of foramen magnum . . . . .	8.0	Upper tooth-row . . . . .	9.8
Width of foramen magnum . . . . .	8.0	Lower tooth-row . . . . .	10.0

#### Dimensions of teeth (length/width):

Upper I . . . . .	4.3/3.6	Lower I . . . . .	±4.2/3.4
M <sup>1</sup> . . . . .	4.4/3.6	M <sub>1</sub> . . . . .	3.8/3.2
M <sup>2</sup> . . . . .	3.0/3.3	M <sub>2</sub> . . . . .	3.3/3.6
M <sup>3</sup> . . . . .	2.4/2.5	M <sub>3</sub> . . . . .	3.0/2.9

**Occurrence.** — *Pararhizomys hipparionum* has been described on the base of a fragmentary mandible from Loc. 1, situated near Chinglo in Shensi, Northern China. TEILHARD and YOUNG (1931) write that at this locality, the layer named Red Clays contained one pocket with numerous mammalian bones. Besides above mentioned mandible it yielded remains identified as: *Gazella blacki* TEILHARD & YOUNG, 1931, *Antilospira licenti* TEILHARD & YOUNG, 1931, Rhinocerotidae gen. indet., *Hipparion houfenense* TEILHARD & YOUNG, 1931, *Cervus* sp. and *Elephas* sp. This faunal assemblage is very peculiar, it is, however, according to TEILHARD and YOUNG, undoubtedly Pontian in age.

TEILHARD and YOUNG (1931) presume that a specimen from Lower Whiter Beds of the Dalai Noor, described under the name of "*Dipoides*?" by TEILHARD (1926), may belong to

*Pararhizomys hipparionum*. In the work of TEILHARD and LEROY (1942, p. 27), this specimen is mentioned as "*Dipoides* sp. (*Rhizomys*?)". There are no other data about this discovery.

The presence of *Pararhizomys hipparionum* in Altan Teli extends the known distribution of this form to the north-east.

**Discussion.** — The specimen from Altan Teli and the holotype of *Pararhizomys hipparionum*, a unique representative of the monotypic genus *Pararhizomys*, are identical in all of their respective features which may be compared. Especially characteristic is in both specimens the simplification of the molar pattern. The dimensions of the holotype (length of lower tooth-row 9.5 mm) are only slightly smaller than those in the Mongolian skull.

The oldest known representative of the family Rhizomyidae is *Tachyoryctoides* BOHLIN, 1937, discovered in the Oligocene of Shargaltein-Tal (BOHLIN, 1937) and Taben-Buluk (BOHLIN, 1946) in Kansu. The same genus was found in the Hsanda-Gol fauna in Mongolia. It is possible that *Aralomys gigas* ARGIROPULO, 1939, described by ARGIROPULO (1939) from the Early Miocene of Kazakhstan as a representative of Cricetidae, belongs also to *Tachyoryctes*. The typical characters of *Tachyoryctes* are elongated molars and short lower incisors, not reaching the ascending ramus of the mandible.

Siwalik beds in India (Miocene and Pliocene in age) afforded 7 species of Rhizomyidae forming two genera: *Rhizomyides* BOHLIN, 1946 and *Protachyoryctes* HINTON, 1933 (LYDEKKER, 1885; COLBERT, 1935; HINTON, 1933). They all show closer relations to African forms than to recent Asian representatives of the family.

*Pararhizomys hipparionum* has less in common with the above mentioned Tertiary genera than with Pliocene, Quaternary and recent Rhizomyidae from Eastern Asia, containing extant genera *Cannomys* and *Rhizomys* (the last one known since Pliocene), as well as extinct *Brachyrhizomys* TEILHARD, 1942.

In the genus *Prachyrhizomys* two species are known: *B. shansius* TEILHARD, 1942 from the Pliocene of Yushê in Middle China, and *B. ultimus* YOUNG & LIU, 1950 from Middle Pleistocene of Koloshan in Szechwan (YOUNG & LIU, 1950). It is possible that *Brachyrhizomys* was present also in Choukoutien (YOUNG, 1934: „*Rhizomys* sp.“). This genus is distinctly brachyodont, the last molar is relatively large, not reduced as in *Pararhizomys*.

The genus *Rhizomys* displays great diversity. The common character of all its representatives, discerning them from *Pararhizomys*, is the lack of reduction in the third upper and lower molar. The distribution of *Rhizomys*, recently as well as in the past, is limited to Central and Southern China and to the regions situated further to the south. Besides three extant species, one of which, *R. sinensis* GRAY, 1831, is known also fossil (YOUNG, 1929; TEILHARD, 1942; CHIU, CHANG & TUNG, 1961), there are three extinct forms: *R. troglodytes* MATTHEW & GRANGER, 1923, broadly distributed in the Quaternary of China (MATTHEW & GRANGER, 1923; YOUNG, 1935, and others), *R. schlosseri* YOUNG, 1927 from Honan (YOUNG, 1927) and *R. provestitus* YOUNG & LIU, 1950, known from Kwangsi (cf. PEI, 1935) and from Szechwan (YOUNG & LIU, 1950).

*Pararhizomys hipparionum* displays some similarities with *Cannomys badius* (HODGSON, 1842), the unique representative of its genus, unknown as fossil form and distributed at the present days from Nepal to Siam. The teeth in both species have similar proportions and show simplification of its pattern. The reduction follows another way in the extant species: second lower molar has one external re-entrant, whereas in *Pararhizomys* it has two. The third lower molar has two internal re-entrants, dividing it into three lobes in *Cannomys*, but only one re-entrant forming two lobes in *Pararhizomys*.

The fossil remains so far discovered do not permit the detailed reconstruction of the history of the family Rhizomyidae. It probably developed in early Oligocene of Central Asia from some primitive Cricetidae. Its late Oligocene representatives (*Tachyoryctoides*) were present in Mongolia and Northern China and perhaps survived in Early Miocene of Kazakhstan ("Aralomys"). From these or related forms developed genera *Rhizomyoides* and *Protachyoryctes* in the Neogene of India as did recent *Tachyoryctes* in Africa. *Brachyrhizomys* and *Rhizomys* developed in tropical and subtropical regions of the Oriental Region, where one of them still lives. The colder, more continental climate of Central Asia favoured another, so far unknown line of evolution, giving rise to the development of *Pararhizomys*, a Pliocene form with molars more simplified than in any other extinct or extant genus of this family. From the same ancestor perhaps originated the living Indian *Cannomys*, but the reduction of molars here followed another course and never reached such a high degree.

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Kraków, February 1967*

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P L A T E



K. KOWALSKI: *PARARHIZOMYS HIPPARIONUM* TEILHARD & YOUNG, 1931

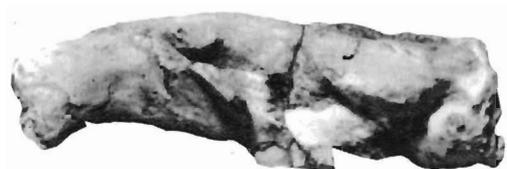
PLATE XXI

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<i>Pararhizomys hipparionum</i> TEILHARD & YOUNG . . . . .	164
(Altan Teli, Western Mongolia; Pliocene)	

Fig. 1. *a* Stereo-photograph of skull in occlusal view, *b* the same specimen in dorsal view, *c* the same in lateral view, *d* stereo-photograph of the mandible of the same specimen in occlusal view, *e* the same in lateral view (Z. Pal. No. MgM-V/65); nat. size.

*Photo: M. Czarnocka*





1c



1e



1d



1a



1b