A NEW *ARDYNOMYS* (RODENTIA, CYLINDRODONTIDAE) FROM THE EOCENE OF THE EASTERN GOBI DESERT, MONGOLIA

by

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ABSTRACT

A partial skull of *Ardynomys russelli* sp. nov. (Rodentia, Cylindrodontidae) is described. This was collected in the late Eocene of Alag Tsab locality in the eastern Gobi Desert, Mongolia. *Ardynomys russelli* sp. nov. is characterized by small size, brachyodont molars, and retention of P^3. It represents the earliest record of the genus *Ardynomys* MATTHEW & GRANGER, 1925, in Asia.

RESUME

Un crâne partiel d'*Ardynomis russelli* sp. nov. (Rodentia, Cylindrodontidae) eŝt décrit. Il a été récolté dans la localité éocène supérieur d'Alag Tsab en Mongolie, dans la partie est du désert de Gobi. *Ardynomys russelli* sp. nov. est caractérisé par une taille petite, des molaires brachyodontes et la rétention de P^3. Il représente la première découverte en Asie du genre *Ardynomys* MATTHEW & GRANGER, 1925.

INTRODUCTION

In August 1990 a paleontological field party headed by the author and organized by the Geological Institute of Mongolian Academy of Sciences collected the remains of Eocene mammals at the Alag Tsab locality in the eastern Gobi Desert, Mongolia. The new locality, discovered by the author in 1982, is situated 30 km south of Ulaanbadrakh sum (Dashzeveg 1985). Among the fossils discovered was a partial skull and lower jaw of a new fossorial rodent, here described as *Ardynomys russelli* sp. nov.

The remains of *Ardynomys russelli* were found in light-grey sand in the main

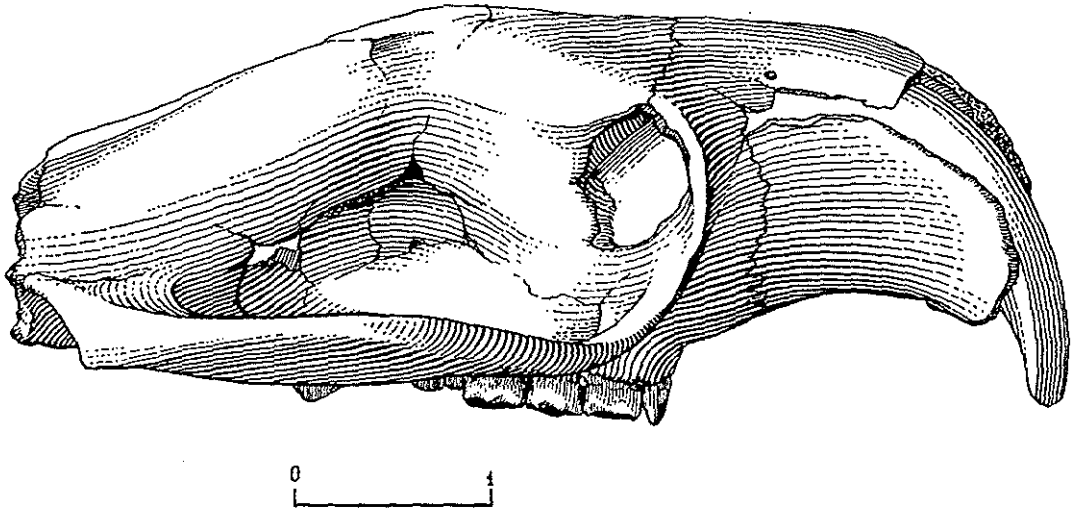

Figure 1.— Incomplete skull of *Ardynomys russelli* sp. nov. (PSS no. 40/6; holotype); lateral view.

exposures of Alag Tsab, associated with *Hyaenodon* sp., *Gigantamynodon*, and *Teleolophus* sp. (Dashzeveg 1985). The Alag Tsab locality is definitely older than the lower beds of the Ergilin Dzo Formation exposed at the classical localities of Ergilin Dzo and Khoer Dzan. The Alag Tsab Beds are late Eocene in age (Russell & Zhai 1987).

Specimens described here are conserved in the Section of Paleontology and Stratigraphy [PSS] at the Geological Institute of the Mongolian Academy of Sciences, Ulaanbaatar.

I thank Dr. J.L. Hartenberger and P.D. Gingerich for his consultation and assistance during preparation of this research.

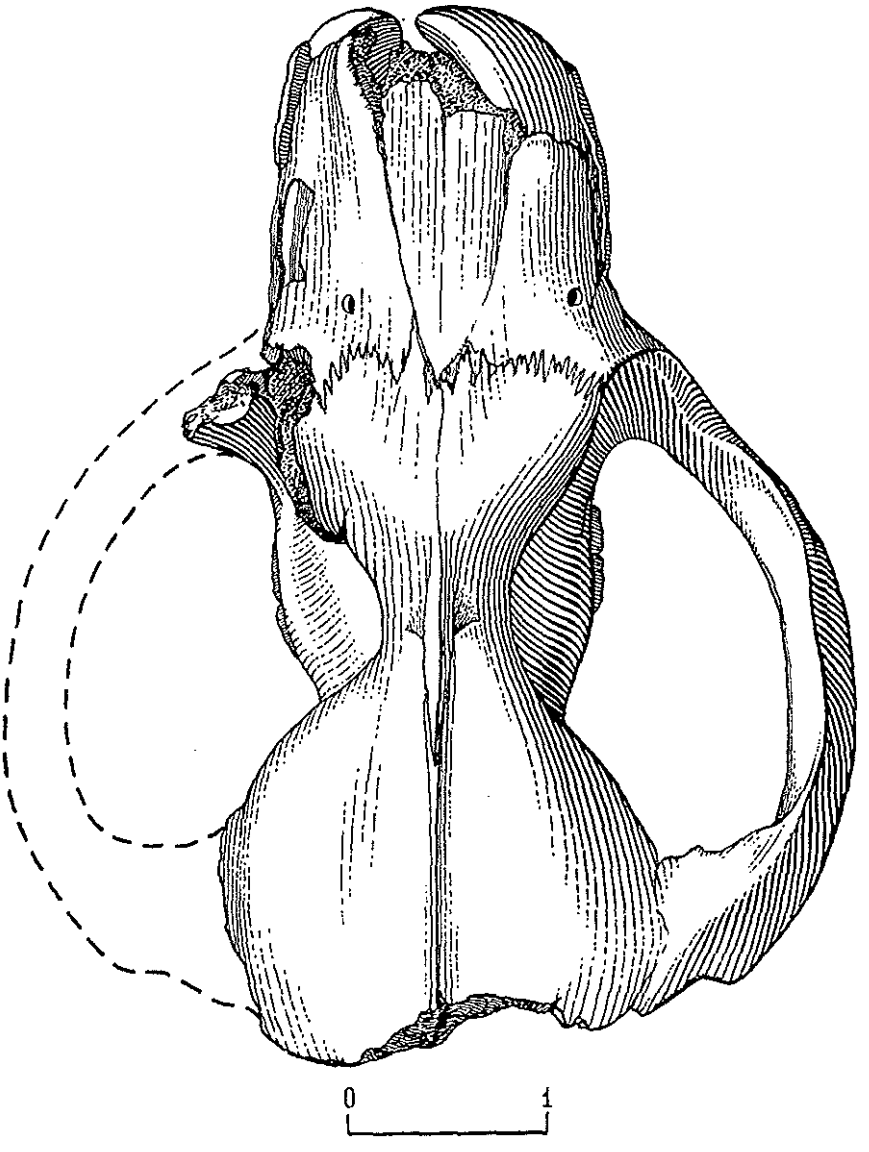

Figure 2.— Incomplete skull of *Ardynomys russelli* sp. nov. (PSS no. 40/6; holotype); dorsal view.

SYSTEMATIC PALEONTOLOGY

Order **RODENTIA** BOWDICH, 1821
Family **CYLINDRODONTIDAE** MILLER, 1899, GIDLEY, 1918
Genus *ARDYNOMYS* MATTHEW & GRANGER, 1925

Ardynomys russelli sp. nov.

Figures 1-6, Tables 1-2

Etymology: Named for Prof. Dr. D. E. Russell to mark his valuable contributions to Paleogene mammalian studies.

Holotype: PSS no. 40/6, partial skull; skull lacking occipital and basicranial regions, and lower jaw lacking the ascending ramus.

Referred specimens: In addition to the holotype, a right mandible with P_4–M_3 (PSS no. 40/13).

Locality and **age**: Alag Tsab locality, 30 km south from the center of Ulaanbadrakh sum, approximately 35 km west from Khoer Dzan; late Eocene.

Diagnosis: Protrogomorphous skull. Massive and shortened rostrum. P^3 considerably reduced, single-rooted; submolarized P^4 and P_4. Differs from *A. olseni* and other specimens in its smaller size and more brachyodont structure of M^{1-3}. Deep entoflexid reaches crown base on M_1 and M_2. M_3 is not reduced.

Description

Size of a large gopher. Length of P^3–M^3 = 15 mm. The infraorbital foramen is small, ovate, and apparently did not enclose any part of the masseter. The great obliteration of molar crowns and of sutures between some skull elements are evidence that the type specimen represents a comparatively old individual. The dorsal surface of the skull rises in the form of a smooth arch from the rostrum, and its greatest height is

Measurements		PSS no. 40/6 (holotype)	Measurements		PSS no. 40/6 (holotype)
I^1	L	4.6	M^1	L	3.0
	W	4.1		W	4.5
P^3	L	1.0	M^2	L	3.2
	W	1.6		W	4.2
P^4	L	2.9	M^3	L	3.0
	W	4.2		W	3.5
Diastema between I^1 and P^3					14.3

Table 1.— Measurements of the Upper Cheek teeth of *Ardynomys russelli* sp. nov.

roughly above the anterior edge of the sagittal crest, it then falls toward the occipital. The skull is appears wide, but the index of its width to length could not be established owing to the missing occipital part of the skull. The nasal bones end on the same level as the premaxillae, and where they join the frontal bones. They form a suture that parallels and goes almost to the anterior margin of the orbit. The sagittal crest is well developed. The rostrum is robust and considerably shorter than the braincase. The suture between the premaxillary and maxillary bones passes ventrally through the incisive foramen. The incisive foramen is ordinary, comparatively narrow, but long (7.9 mm). The anterior edge of the palate is on level between M^2 and M^3, and the palatal

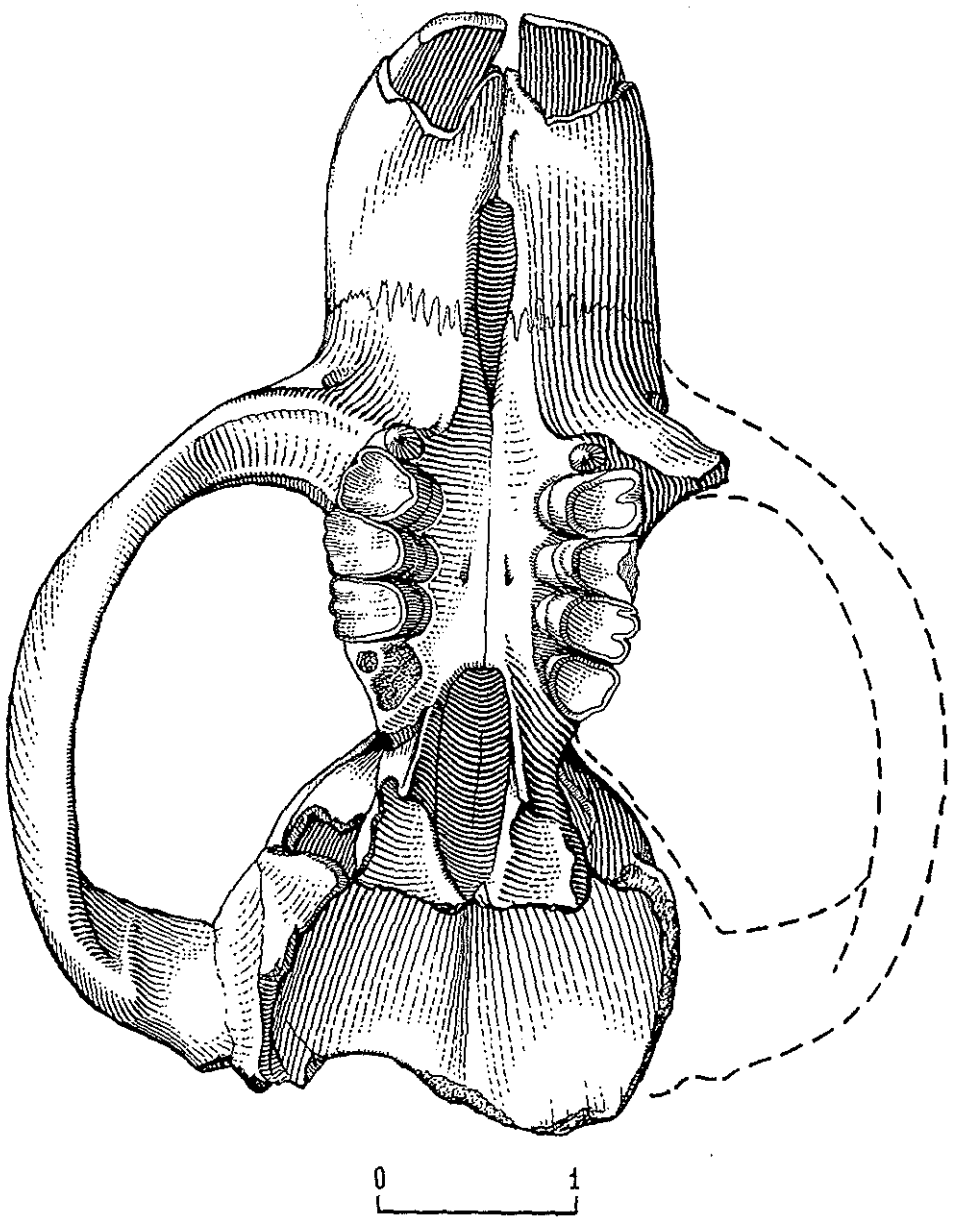

Figure 3.— Incomplete skull of *Ardynomys russelli* sp. nov. (PSS no. 40/6; holotype); ventral view.

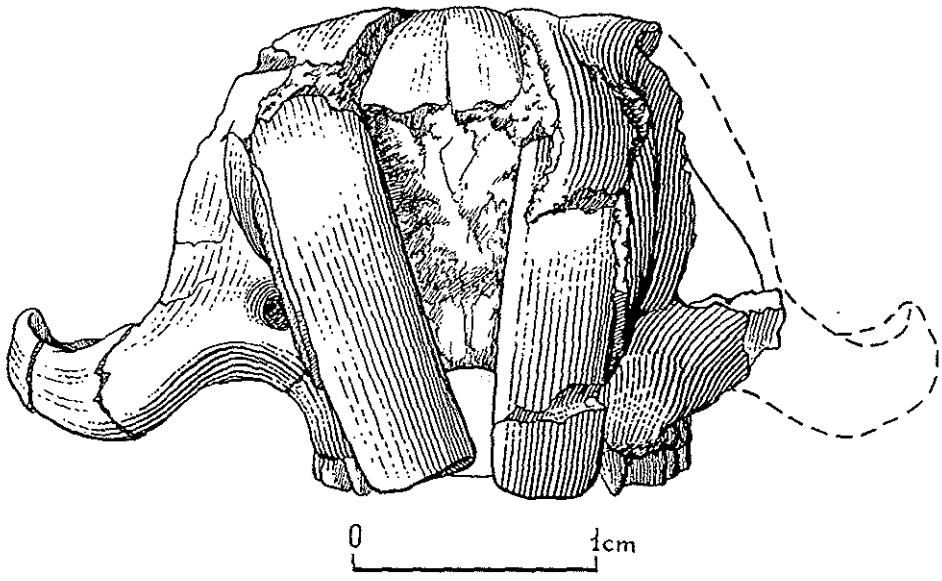

Figure 4.— Incomplete skull of *Ardynomys russelli* sp. nov. (PSS no. 40/6; holotype); anterior view.

foramen is opposite M^1. There is a furrow-like pit for the m. superficialis on the ventral side of the maxillary process of the jugal. The masseteric crest is buccally expressed by the anterior edge of the maxillary process. This crest limits anterior expansion of the m. superficialis muscle.

Alveoli for the upper incisors end at a point approximately above M^1 and M^2. Upper incisors are not completely preserved. P^3 is rudimentary, conical, single-rooted and comparatively high. Crowns of P^4 are trapezoidal and considerably molarized. M^1 and M^2 do not differ in size and structure. M^3 is extended in width and has an oval form.

The dentary is sciurognathous and massive, with a comparatively short diastema. The latter is 9.4 mm long, which is 68% of the tooth-row length. The symphyseal tubercle is well expressed on the dorsal surface of the jaw. There are two mental foramina, and the anterior one is 2.8 mm below the alveolar crest anterior to P_4. The incisor has a triangular cross section. Masseteric crests are clearly marked on the dentary, and the anterior end of the masseteric pit is on the level of the middle of M_2. The angular process is turned posteriorly and ventrally. The incisor ends in the base of the coronary process. P_4 is submolariform and the trigonid is considerably narrower than the talonid. The protoconid and metaconid are well separated at their apices, but fused at their bases. The hypoflexid descends slightly and does not reach the base of the crown.

The molars are brachyodont; the height of the crown gradually decreases from P_4 to M_3. M_1 and M_2 are closely similar in form and dimensions. Their crowns are almost rectangular in shape. The metaconid and protoconid are opposite, the former is higher than the latter. The trigonid basin is small. The entoflexid is wide and lingually closed.

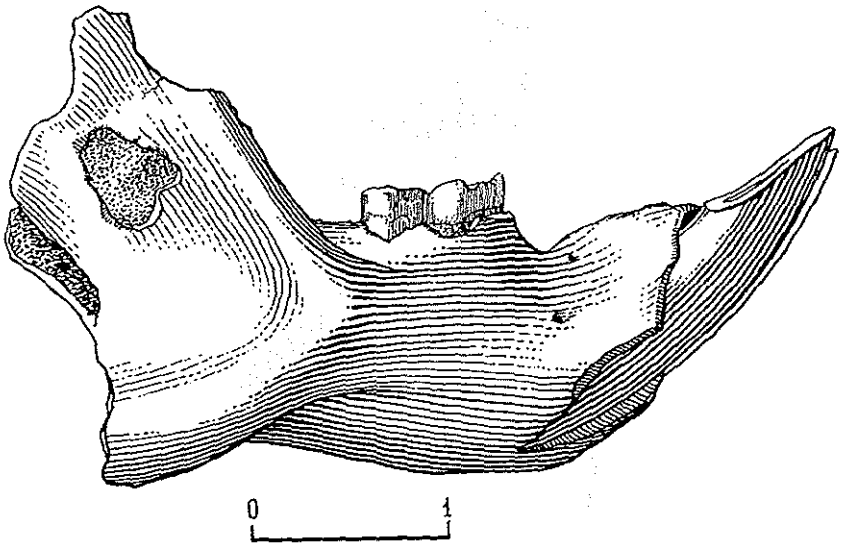

Figure 5.— Lateral view of lower mandible of *Ardynomys russelli* sp. nov. (PSS no. 40/6; holotype).

The hypoflexid descends to the base of the crown. The hypoconids of M_1 and M_2 form anteriorly-extending branches on the labial sides of the teeth. The hypoflexid is, therefore, always oblique to the longitudinal axis of the tooth. The postflexid is narrow, and the posterolophid is well developed.

The M_3 differs from M_1–M_2 in possessing a more rounded posterior heel. The metaconid is slightly shifted anterior to the position of the protoconid. The hypoconid is less developed than on M_1 and M_2. The hypoflexid does not reach the base of the crown. The M_3 is not significantly smaller than M_1–M_2, thus, it is possible to consider that M_3 must function in chewing, but it is equivalent in function to M_1 and M_2. Together with the brachyodont check teeth, this characteristic is relatively primitive.

Comparison

The new species differs from *Ardynomys olseni* (Matthew & Granger 1925, Wood 1970) in its comparatively smaller size, and in having sharply-curved lower incisors and a longer diastema. Furthermore, in *A. olseni* P_4 is comparatively narrow, and M_2 is more massive than M_1 and M_3 which is not typical of the new species.

A. russelli differs from the Oligocene *A. vinogradovi* (Shevyreva 1972, 1976) from the Ergilin Dzo Formation of Ergilin Dzo by comparatively large M_3 relative to M_2 and more developed hypoflexid on M_1 and M_2. The new species is similar to *Ardynomys kazachstanicus* described by Vinogradov & Gambaryan (1952) from the Oligocene of Kazakhstan. The structure and position of cusps on the molars are very similar between the two species. However, an exact comparison is impeded because the Mongolian specimen and the type of *A. kazachstanicus* show different degrees of wear. Despite general resemblance of the Mongolian specimens with *A. kazachstanicus*, there are also differences. In particular, P^4 is quite less molarized in the Mongolian form

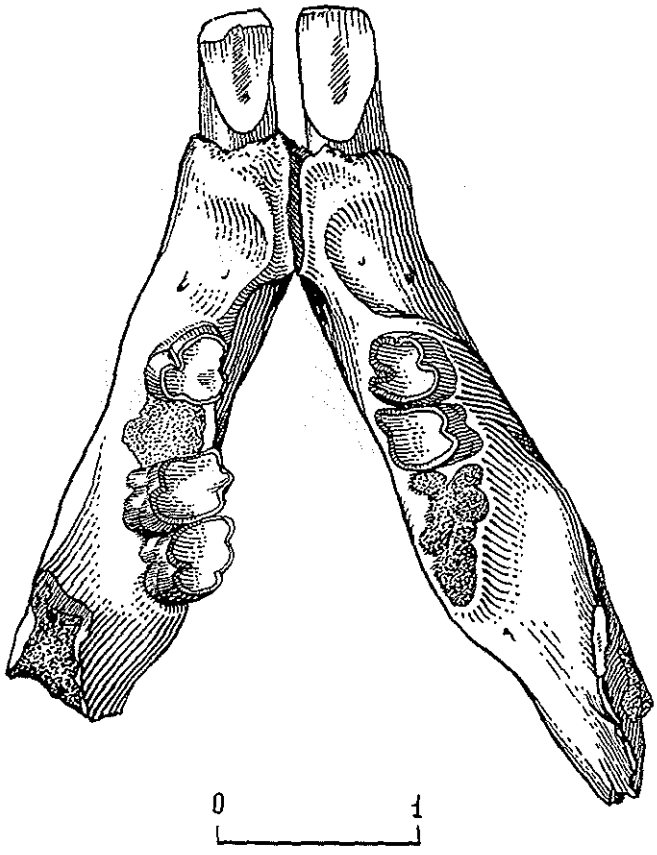

Figure 6.— Dorsal view of lower mandible of *Ardynomys russelli* sp. nov. (PSS no. 40/6; holotype).

Measurements		PSS no. 40/6 (holotype)	PSS no. 40/13
I_1	L	–	–
	W	3.8	–
P_4	L	3.4	3.0
	W	4.1	3.2
M_1	L	3.4	2.9
	W	4.1	3.3
M_2	L	3.7	2.9
	W	4.2	3.4
M_3	L	3.5	2.5
	W	3.7	3.1
Length P_4–M_3		14.1	11.0
Length M_2–M_3		10.1	9.0
Diastema between I_1 and P_4		9.6	–

Table 2.— Measurements of the lower cheek teeth and mandibles of *Ardynomys russelli* sp. nov.

while the last premolar in the species from Kazakhstan is considerably molarized, molars are more brachyodont, and P^3 is present.

A. russelli differs from *Ardynomys occidentalis* from the Oligocene of North America (Burke 1936, Wood 1974) in having an ordinary upper incisor foramen and a comparatively large M^3 relatively to M^2.

DISCUSSION

The genus *Ardynomys* with two species *A. olseni* and *A. chini* was first established by Matthew & Granger (1925) for specimens from the Oligocene Ergilin Dzo fauna (=Ardyn Obo) of Mongolia. Later Wood (1970) made a detailed description of the remains of *Ardynomys* from the Oligocene of Mongolia, and he considered *A. chini* to be a synonym of *A. olseni.* Shevyreva (1972) described a new genus and species, *Morozomys silenti* from the Ergilin Dzo Formation in Ergilin Dzo. This is characterized by small size, clearly rectangular outlines of P_4 and M_{1-3}, and well expressed ectolophid on M_{1-3}, features not typical of *Ardynomys* and other representatives of Cylindrodontidae. At present, three cylindrodonts are known from the Ergilin Dzo: *Ardynomys olseni*, *Ardynomys* cf. *A. olseni*, and *Morozomys silenti.* The exact stratigraphic positions of localities yielding these taxa within the Ergilin Dzo locality are not indicated in the original descriptions. and their age ranges are at present unclear.

In 1981 I found the jaw of *Ardynomys olseni* in yellow gravels of the lower Oligocene Ergilin Member (Ergilin Dzo Formation) at Bajan Tsav in the western part of Ergilin Dzo Ridge (Dashzeveg 1993). *Ardynomys* has also been recovered recently from Khoer Dzan. Specimens were collected from two stratigraphic levels at Khoer Dzan: (1) *Ardynomys* sp. (PSS no. 27/129) is known from the locality of *Desmatolagus vetustus* and *Lophiomeryx* in light-grey sands of the late Eocene Sevkhul Member in the southwestern part of Khoer Dzan; and (2) the closely related form *A. olseni* was found on the slopes of Ikh Dzan from the lower Oligocene Ergilin Member.

REFERENCES

BURKE, J.J., 1936. — *Ardynomys* and *Desmatolagus* in the North American Oligocene. *Ann. Carnegie Mus.*, 25: 135-154.

DASHZEVEG, D., 1985. — Nouveaux Hyaenodontinés (Creodonta, Mammalia) du Paléogène de Mongolie. *Ann. Paléont.*, 71 (4): 223-256.

DASHZEVEG, D., 1993. — Asynchronism of the main mammalian faunal events near the Eocene-Oligocene boundary. Tertiary Research, 14 (4): 141-149.

MATTHEW, W.D. & GRANGER, W., 1925. — New Bathyergidae from the Oligocene of Mongolia. *Amer. Mus. Novit.*, 101: 1-5.

RUSSELL, D.E. & ZHAI, R.J., 1987. — The Paleogene of Asia: Mammals and Stratigraphy. *Mém. Mus. nat. Hist. nat.*, Paris, Sci. Terre, 52: 1-488.

SHEVYREVA, N.S., 1972. — Novie Grizhuni izh Palaeogene Mongolii i Kazakhstana. *Akad. Nauk SSSR, Paleontol. Zh.*, 3: 134-145.

SHEVYREVA, N.S., 1976. — Paleogenovie grizhuni Azhii (semeistva Paramyidae, Sciuravidae, Ischyromyidae, Cylindrodontidae). *Akad. Nauk SSSR, Trudi Paleontol. Inst.*, 158: 1-115.

VINOGRADOV, B.C. & GAMBARYAN, P.P., 1952. — Oligotsenovie Tsilindrodonti Mongolii i Kazakhstana (Cylindrodontidae, Glires, Mammalia). *Akad. Nauk SSSR, Trudi Paleontol. Inst.*, 41: 13-42.

WOOD, A.E., 1970. — The early Oligocene rodent *Ardynomys* (Family Cylindrodontidae) from Mongolia and Montana. *Amer. Mus. Novitates*, 2418: 1-18.

WOOD, A.E., 1974. — Early Tertiary vertebrate faunas, Vieja Group, Trans-Pecos Texas: Rodentia. *Texas Mem. Mus. Bull.*, 21: 1-112.