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## NEW CREODONTS AND RODENTS FROM THE ARDYN OBO FORMATION OF MONGOLIA<sup>1</sup>

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The Third Asiatic Expedition secured in 1923 a considerable collection of fossil mammals from the Ardyn Obo formation. It adds materially to the small faunal list published by us in 1923,<sup>2</sup> and affords a somewhat more exact correlation with other Mongolian Tertiaries and with the Tertiary succession in North America and western Europe. The *Cadurcotherium* skulls have been described by Osborn<sup>3</sup>; the smaller *Perissodactyla* and *Artiodactyla* and the *Brontops* skull will be described in forthcoming numbers of *Novitates*.

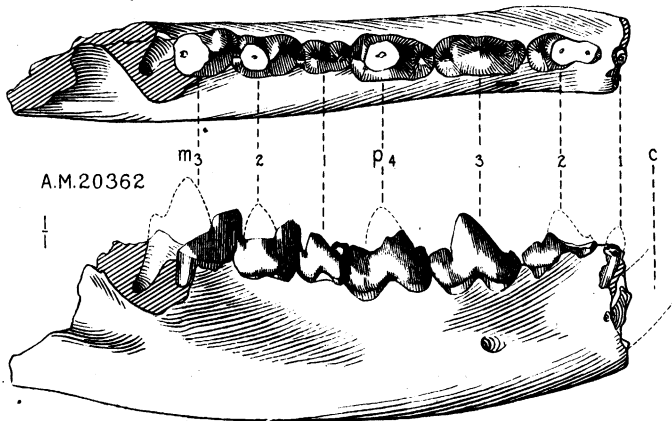


Fig. 1. *Hyænodon eminus*. Lower jaw, external and crown views. Type specimen No. 20362. Natural size.

<sup>1</sup>Publications of the Asiatic Expeditions of The American Museum of Natural History. Contribution No. 57.

<sup>2</sup>1923, The Fauna of the Ardyn Obo Formation, Amer. Mus. Novitates, No. 98, December 18.

<sup>3</sup>Osborn, Henry Fairfield, 1923, Amer. Mus. Novitates, No. 95, October 19; 1924, *idem.*, No. 147, November 11.

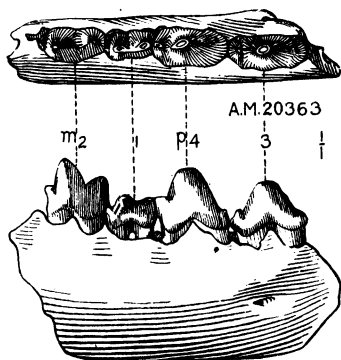


Fig. 2

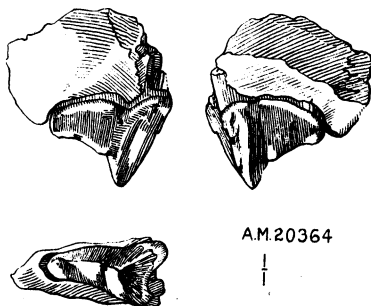


Fig. 3

Fig. 2. *Hyænodon eminus*. Part of lower jaw, external and crown views. No. 20363. Natural size.

Fig. 3. *Hyænodon eminus*. Last upper molar, external, internal, and crown views. No. 20364. Natural size.

## CARNIVORA

### Hyænodontidæ

#### *Hyænodon eminus*,<sup>1</sup> new species

TYPE.—No. 20362, a lower jaw with  $p_2$ - $m_3$  and roots of  $c$ - $p_1$ .

PARATYPES.—No. 20363, lower jaw,  $p_3$ - $m_2$ ; No. 20364, upper jaw fragment,  $m^3$ .

CHARACTERS.—Size of *H. minor* Gervais, but teeth and lower jaw more slender and compressed than in specimens of that species figured by Depéret. Anterior pre-molars not spaced,  $p_1$  small, one-rooted;  $p_3$  moderately pitched backwardly, with minute anterior basal cusp as well as the large posterior one.

This species agrees in teeth and jaw proportions rather nearly with referred specimens of *H. minor* from Euzet-les-Bains, identified by Professor Depéret. It belongs clearly to the brachyrhynchine group of the genus, not known in America.<sup>2</sup>

### Oxyænidæ

#### *Ardynictis furunculus*, new genus and species

TYPE.—No. 20366, front of skull and lower jaw.

PARATYPE.—No. 20365, upper and lower jaw. (Both found interlocked.)

CHARACTERS.—Dentition  $\frac{3.1.3.2}{3.1.3.2}$ ; size of *Didymoconus colgatei*, but teeth less aberrant throughout, the protocones of upper molars higher and more compressed, without hypocone crest, the paracone and metacone somewhat more connate, para-styles of molars and metastyle of  $p^4$  more prominent,  $p^4$  smaller than  $m^1$  with metacone

<sup>1</sup>*Fminus* = at a distance or from afar.

<sup>2</sup>*H. paucidens* has been referred to this group, but has none of the distinctive group characters, and is probably a mere individual variant of *H. crucians*, with which it agrees in proportions of skull and jaws and detail construction of all the teeth, differing only in absence of  $p^1$  and partially transverse setting of  $p^3$  and  $p^4$  characters often seen as individual variants among Carnivora and not specific where not associated with confirmatory evidence of their constancy.

rudimentary and closely connate, no parastyle, and small low protocone (lingual cusp). Heel of  $p^3$  rudimentary. Lower molars with high, well separated, rounded, paired main cusps (protoconid and metaconid), low small paraconid and heel.  $M_2$  somewhat larger than  $m_1$ ;  $p_4$  with high main cusp slightly twinned, vestigial heel;  $p_3$  similar but without heel;  $p_2$  small, one-rooted, spaced. Canines large, stout; incisors small, not preserved.

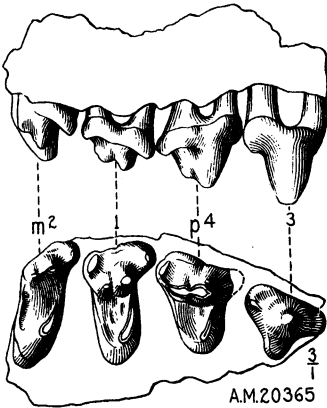


Fig. 4. *Ardynictis furunculus*. Upper jaw of type specimen. No. 20365, external and crown views. Three times natural size.

This genus is nearly related to *Didymoconus* and structurally ancestral throughout, connecting that very aberrant and peculiar genus with the more typical Oxyænidae of the Eocene. It differs from any Oxyænidae except *Didymoconus* in the well separated, rounded protoconid and metaconid and vestigial paraconid, as also in the corresponding but less obvious specializations in the upper teeth. It is a specialization more or less parallel to *Dissacus* among the Mesonychidæ, *Apterodon* among the Hyænodontidæ, and the Leptictidæ among Insectivora,

but unmistakably a derivative of the oxyænid stock. *Didymoconus* is a further development of the same specialization, more closely parallel to the Leptictidæ.

The adaptive significance of such a specialization would seem to be the piercing of somewhat hard tough shells of small prey, soft within

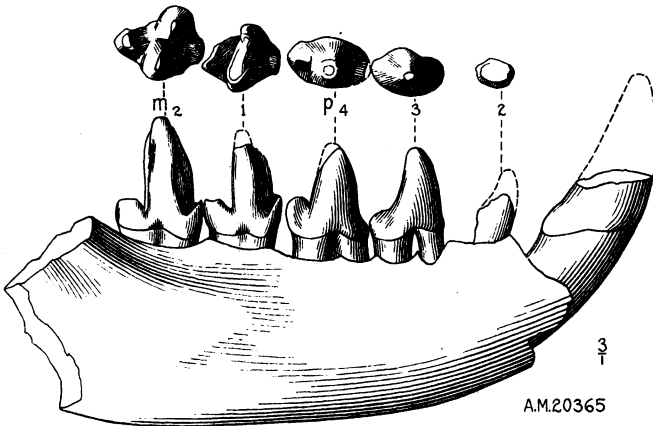


Fig. 5. *Ardynictis furunculus*. Lower jaw of type specimen. No. 20365, external and crown views. Three times natural size.

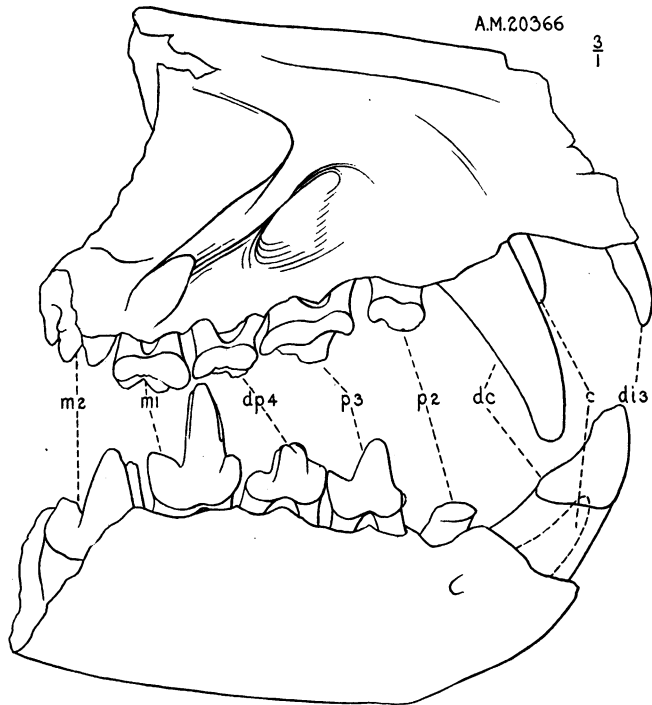


Fig. 6. *Ardynictis furunculus*. Front of skull and lower jaws, young individual. No. 20366. Three times natural size.

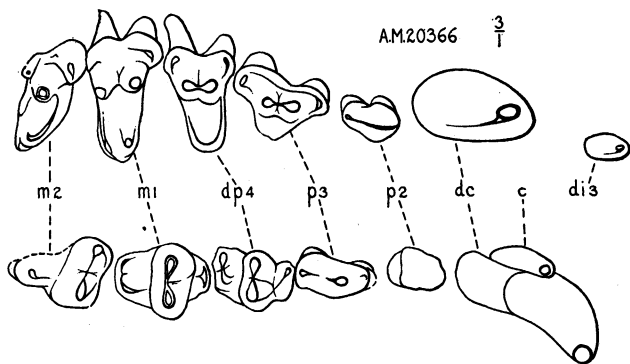


Fig. 7. *Ardynictis furunculus*. Crown views of upper and lower teeth of young individual. No. 20366. Three times natural size.

the shell, requiring only a moderate amount of cutting and little crushing. It is not adapted to vertebrate prey, save possibly small mailed fishes; nor is it adapted to very small insect prey, such as ants and termites, which are handled by crushing apparatus. It is too delicate for the heavy-shelled mollusks but might be adapted to the smaller and rather thin-shelled types, and to the larger mailed insects, crickets, beetles and such. No very close modern parallel can be cited; some of the smaller Mustelidæ are as near as anything.

### **Ischyromyidæ**

#### ***Ardynomys olseni*, new genus and species**

TYPE.—No. 20368, a lower jaw with  $p_4$ - $m_3$ , from the Ardyn Obo formation of Mongolia, found by George Olsen in 1923.

CHARACTERS.—Angle of jaw, so far as indicated, a deep vertical plate with the lower border inflected; the masseteric fossa posterior in position, its anterior border beneath the posterior part of  $m_2$ . Jaw rather short and deep anteriorly, incisor stout with anterior face flattened and slightly concave. Molars short-crowned, subequal in width,  $p_4$  slightly shorter anteroposteriorly, and  $m_3$  a little longer anteroposteriorly than the intermediate molars. Protomere of molars, a shallow inner basin with low protocone external to it, low anterior and internal marginal crests, and a commissure behind the protocone connecting with the metamere. Metamere, a stout hypocone crest considerably more external than the protocone, extending internally into two closely parallel transverse crests with a narrow valley between, the anterior crest of less height and width but extending further internally, and separated at its internal end by a notch from the internal crest of the protomere.

The premolar has a metamere similar in proportions to that of the molars but with only a single transverse crest, and the protomere consists of two stout cusps, the inner one extending into a crest curving around the anterointernal angle of the tooth, separated posterointernally by a notch from the metamere; the commissure behind the protoconid is weak.

In terms current for more hypsodont rodent teeth, the pattern consists essentially of a main external inflection, a principal central internal inflection, a narrow compressed posterior internal inflection, while the anterior internal inflection is quite rudimentary; the premolar is well developed but only its posterior half is molariform and that not fully so.

The teeth retain the partly subcircular outlines of *Tillomys* and have not taken on the rectangular proportions of *Ischyromys*, but the relationships of the genus are probably with this family, as Troxell has also urged for *Tillomys*. The posterior position of the masseteric scar probably indicates that the masseter was not extended forward on the

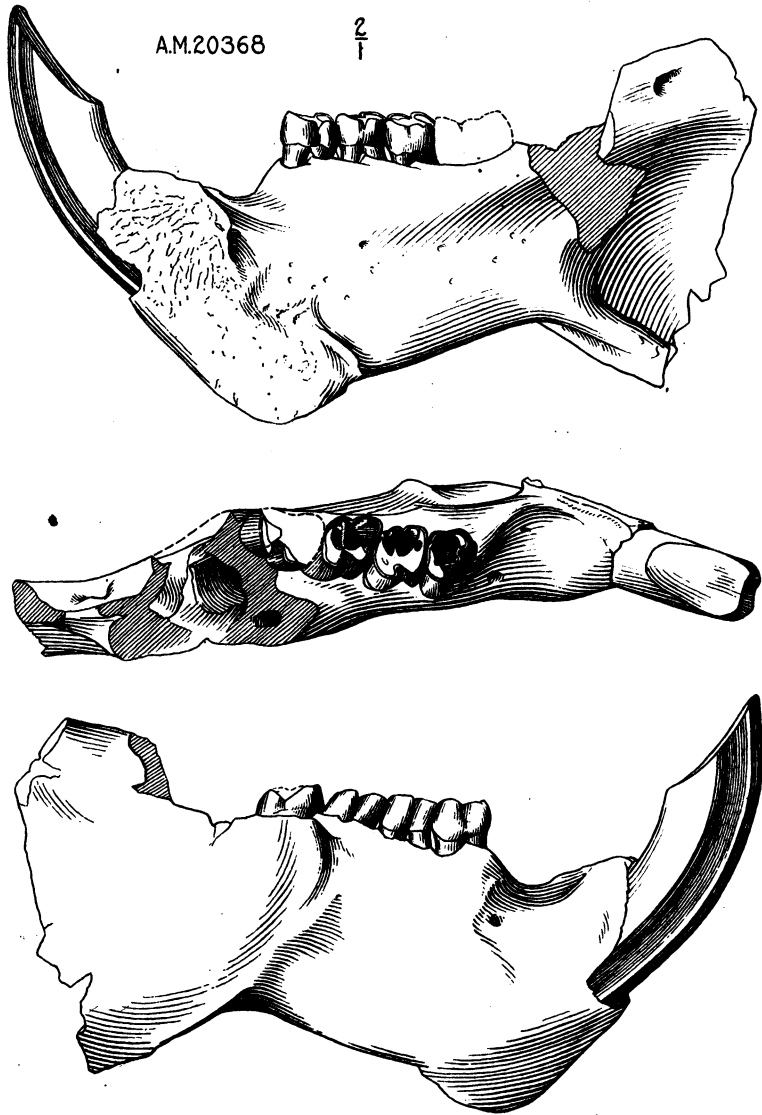


Fig. 8. *Ardynomys olseni*. Lower jaw, internal, superior, and external views. Type specimen. No. 20368. Twice natural size.

muzzle, but limited as in the more primitive rodents to the zygomatic arch. The flat vertical angle is as in the Paramyidae, Ischyromyidae, Theridomyidae, Eomyidae, retained also in many myomorphs, pedetids, etc.

The genus is provisionally referred to the Ischyromyidae, but without more complete material its true relationships can hardly be determined. It might represent a group ancestral to *Palaeocastor* of the Upper Oligocene, but lacks the specialized construction of teeth and jaws of the beaver group.

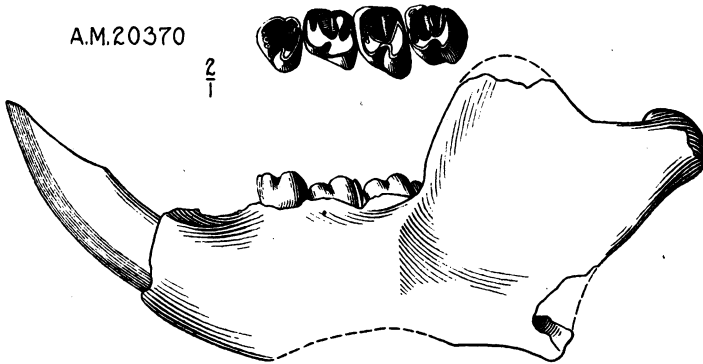


Fig. 9. *Ardynomys chihi*. Lower jaw, external view, and crown view of lower cheek teeth. From the type specimen. No. 20370. Twice natural size.

#### ***Ardynomys chihi*, new species**

TYPE.—No. 20370, lower jaws,  $i-m_3$  r.,  $p_4-m_3$  l.

PARATYPES.—No. 20371, lower jaw,  $dp_4-m_3$  r.,  $p_4$  preformed in the jaw; and No. 20372, lower jaw with heavily worn teeth,  $p_4-m_3$ .

SIZE one-tenth less than the preceding, molars less robust, central inner valley of  $m_3$  closed by a marginal inner crest, posterior inner valley more widely open.

#### **Ochotonidae**

##### ***Desmatolagus robustus* Matthew and Granger**

Two lower jaws, Nos. 20373-4, referable to this species, are in the Ardyn Obo collection. The better one shows a minute vestigial stump of a tooth which may be the last remnant of the lost  $p_2$ . Until this is shown to be a constant character of the Ardyn Obo species, it is inadequate to distinguish it from the Hsanda Gol *D. robustus*, with which the rest of the teeth agree in structural details.

