ZOFIA KIELAN-JAWOROWSKA

PRELIMINARY DESCRIPTION OF TWO NEW EUTHERIAN GENERA FROM THE LATE CRETACEOUS OF MONGOLIA

(Plates I-VI)

Abstract. — A preliminary description for two new monotypic eutherian genera from the ?Middle Campanian Barun Goyot Formation or its stratigraphic equivalent informally designated Khermeen Tsav formation of the Gobi Desert (Mongolia) is given. These are: *Asioryctes nemegetensis* g. nov., sp. nov., assigned to the Palaeoryctidae and *Barunlestes butleri* g. nov., sp. nov., assigned to the Zalambdalestidae. *Asioryctes* is the oldest known palaeoryctid. *Barunlestes* is possibly a descendant of *Zalambdalestes* of the Djadokhta Formation. The morphological and possible phylogenetical relationships of the two new genera are discussed.

INTRODUCTION

During the Polish-Mongolian Palaeontological Expeditions to the Gobi Desert (Mongolia) in 1970 and 1971 Cretaceous mammals were discovered in the Barun Goyot Formation (known also as the Lower Nemegt Beds) and its stratigraphic equivalent designated here informally the Khermeen Tsav formation (see below) — (KIELAN-JAWOROWSKA & BARSBOLD, 1973). The age of the Barun Goyot Formation has been estimated on the basis of the multituberculates as ?Middle Campanian (KIELAN-JAWOROWSKA, 1974). In the same paper I assigned to the Barun Formation the red sandstones that crop out in four localities: at Nemegt and Khulsan, both situated in the Nemegt Basin and at Khermeen Tsav I and Khermeen Tsav II, situated approximately 40 km south-west from the westernmost part of the Nemegt Basin. GRADZIŃSKI and JERZYKIEWICZ (1974) assigned to the Barun Goyot Formation only the red sandstones that crop out at the localities of Nemegt and Khulsan in the Nemegt Basin. In the opinion of these authors (personal communication), the red beds of the localities of Khermeen Tsav I and Khermeen Tsav II show gross lithological similarity to the Barun Goyot Formation; they also yield numerous common species, but at present it is impossible to demonstrate lateral continuity and detailed lithological similarity between the Khermeen Tsav beds and the Barun Goyot Formation. For these reasons in the present paper I refer to the red beds of the localities of Khermeen Tsav I and Khermeen Tsav II as an informal stratigraphic unit Khermeen Tsav formation, insufficiently known at present to be designated formally as the Khermeen Tsav Formation.

The therian mammals occurring in the Barun Goyot Formation or the Khermeen Tsav formation include three forms: *Deltatheridium pretrituberculare tardum* (see KIELAN-JAWO-

ROWSKA, 1975) and two monotypic genera described in this paper as *Asioryctes nemegetensis* g. nov., sp. nov. and *Barunlestes butleri* g. nov., sp. nov. *Asioryctes* is assigned to the Palaeoryctidae, *Barunlestes* to the Zalambdalestidae.

The material of both new forms is abundant and well preserved, containing partial postcranial skeletons and in the case of *Asioryctes nemegetensis* a well preserved brain case, the detailed description of which will be given in a later paper. Because the information on the new genera will be relevent to the study of Cretaceous mammals from other territories, it was considered desirable to publish a preliminary description of these new forms rather than delaying publication until a detailed account could be completed.

The following abbreviations are employed in this paper:

long. — longitudinal, parallel to the plane of symmetry of the animal.
tr. — transverse, perpendicular and at right angles to the plane of symmetry.
AMNH — American Museum of Natural History (New York).
ZPAL — Palaeozoological Institute of the Polish Academy of Sciences (Warsaw).

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DESCRIPTIONS

Family PALAEORYCTIDAE (WINGE, 1917)

Genus **ASIORYCTES** nov.

Asioryctes nemegetensis sp. n.

(Pls I-IV, Text-fig. 1*B*)

Remark: The genus *Asioryctes* nov. is monotypic, erected to include *A. nemegetensis* sp. n.

Derivation of the name: *Asio* — occurring in Asia, *ryctes* — alludes to the similarity to the Paleocene palaeoryctid *Palaeoryctes; nemegetensis* refers to the locality of Nemegt, where the holotype was found.

Holotype: Almost complete skull, (ZPAL MgM-I/56, figured in Pl. I) associated with both mandibles. The zygomatic arches and most anterior part of the snout with upper incisors and right P^3 are not preserved. The right upper cannine is broken off, right and left P^3 and left M^2 are somewhat damaged. The right mandible is almost complete, with I_3 broken off; left mandible has the upper part of coronoid process broken off, but all teeth are preserved. Portions of some of the cranial roof bones are missing; the basicranial region is well preserved; all of the teeth are slightly damaged.

Type horizon and locality: Upper Cretaceous (?Middle Campanian) Barun Goyot Formation, locality of Nemegt, Southern Monadnocks, Nemegt Basin, Gobi Desert, Mongolian People's Republic.

Referred material. — An almost complete skull ZPAL MgM-I/98 figured in Pl. II, strongly compressed laterally, associated with both mandibles and fragments of postcranial skeleton, Khermeen Tsav II, Khermeen Tsav formation, stratigraphic equivalent of the Barun

Goyot Formation; fragment of right maxilla ZPAL MgM-I/73 with M^1-M^3, associated with partial right mandible with M_2-M_3 and partial left mandible with P_3-M_3 figured in Pls. III-IV Khulsan, Barun Goyot Formation, and two fragmentary mandibles and two maxillae associated with right and left mandibles (not figured in the present paper).

Stratigraphic and geographic occurrence. — Known only from the ?Middle Campanian Barun Goyot Formation of Nemegt Basin, and Khermeen Tsav formation at Khermeen Tsav II, Gobi Desert, Mongolian People's Republic.

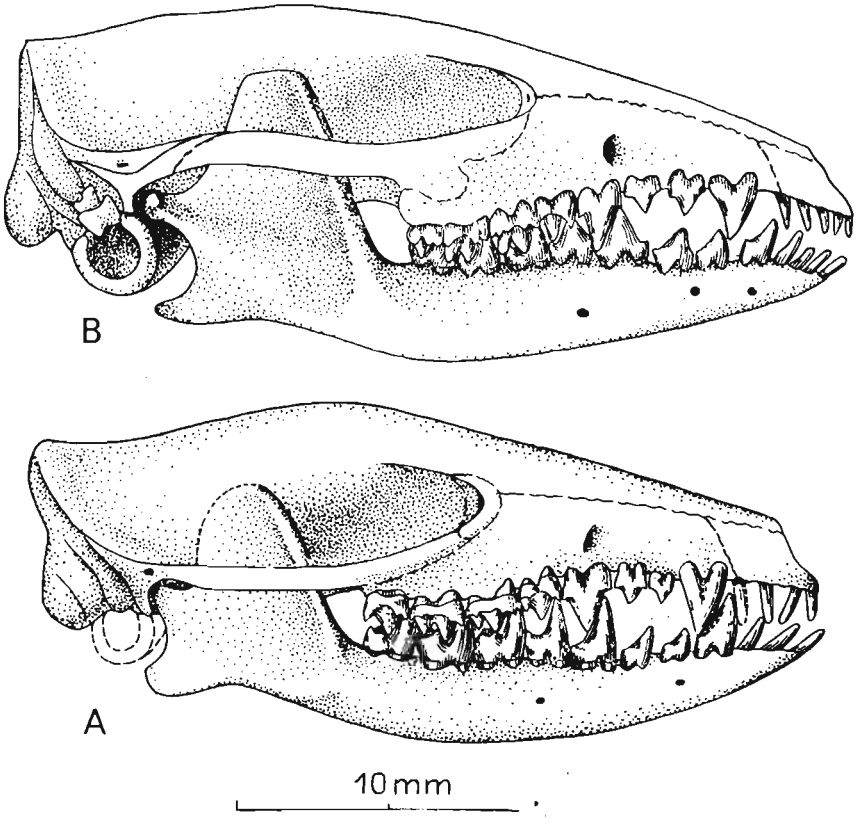

Fig. 1
Skulls of: *A — Kennalestes gobiensis*, *B — Asioryctes nemegetensis*, reconstructed.

Generic and specific diagnosis. — Small palaeoryctid, length of the skull varying around 30 mm. Anterior part of the snout narrow, elongated, widening opposite P^3. Brain case narrow, zygomatic arch moderately deep. Nasals expanded posteriorly, in contact with lacrimals, lacrimal with small facial wing, lacrimal foramen on edge of orbit margin, infraorbital foramen deep, situated above P^3. Jugal extending back to the glenoid cavity; anterior portion of jugal very deep, meeting the maxilla with a sigmoid suture. Lambdoidal crests present, sagittal crest absent. Entotympanic apparently absent. Ectotymanic large, forming about 3/4 of a ring, open postero-dorsally, inclined in undistorted specimen about 45° with regard to the horizontal plane. Ectotympanic placed more anteriorly than in modern mammals, and having its antero--medial part concealed by the angular process of the mandible. Mandible slender, with three mental foramina placed beneath the canine, the junction of the first and second premolars and anterior portion of the fourth premolar. Angular process of the mandible inflected, coronoid process very large, with strong crest along its anterior border and a transverse upper

margin to the apex of the coronoid process. Dental formula $\frac{5\ 1\ 4\ 3}{4\ 1\ 4\ 3}$. Upper canine double-rooted, large and situated a short distance behind the premaxillo-maxillary suture. P^1 and P^2 short, not occluding with lower premolars, P^3 three-rooted, with long, piercing protocone; P^4 as long transversely as the molars, but not molariform (metacone absent); DP^4 molariform. Upper molars very strongly elongated transversely, with large parastyle, smaller stylocone, deep ectoflexus, large metastyle, comparatively narrow stylar shelf. Paracone and metacone connate at the bases, metacone much shorter than paracone. Paraconule larger than metaconule, paracrista and metacrista short, paracingulum very wide, shelf-like; protofossa strongly elongated transversely, precingulum and postcingulum absent. Lower canine double-rooted; on lower molars: trigonid short antero-posteriorly with entoconid, hypoconulid and hypoconid placed rather far posteriorly; hypoconid highest talonid cusp, entocristid very low.

Discussion. — In the external view of the skull and dentition *Asioryctes* resembles *Kennalestes* KIELAN-JAWOROWSKA (Text-fig. 1), known from the older Djadokhta Formation of Mongolia (see KIELAN-JAWOROWSKA, 1969). *Asioryctes* has five upper and four lower incisors, while the number of upper incisors in *Kennalestes* is unknown (possibly four); *Kennalestes* has three lower incisors. The structure and position of the double-rooted upper canine and of the premolars in both these genera, when seen in lateral view is similar. In both P^1 and P^2 are short and do not occlude with the lower premolars, P^3 has three roots and has a very long, piercing paracone; however, P^4 in *Kennalestes* has an incipient metacone, which is absent in *Asioryctes*. In the coronal structure of the molars, *Asioryctes* differs distinctly from *Kennalestes*. The upper molars are more transverse with the paracone and metacone situated more labially in *Asioryctes* than in *Kennalestes;* the precingulum and postcingulum which are present in *Kennalestes*, are absent in *Asioryctes* and the paracingulum is wider in *Asioryctes* than in *Kennalestes*. The lower molars of *Asioryctes* differ from those of *Kennalestes* in having a smaller paraconid and a trigonid that is shorter in relation to the talonid. Further differences concern the skull structure: the jugal is deeper in *Asioryctes* than in *Kennalestes* both anteriorly where it forms the lower border of the orbit and more posteriorly where it forms the zygomatic arch; the lacrimal has a smaller facial wing; there is a higher coronoid process of the mandible in *Asioryctes* than in *Kennalestes*, and 3 mental foramina in *Asioryctes*, rather than two as in *Kennalestes*.

The above comparison shows that *Kennalestes*, which was found in an older formation (Djadokhta) than *Asioryctes* (Barun Goyot Formation and Khermeen Tsav formation) is in some respects more advanced than *Asioryctes* and therefore cannot be regarded as an ancestral form of *Asioryctes*. However, it seems possible that both genera were derived from a common ancestor and that their separation took place at least as early as the late part of the Early Cretaceous.

Asioryctes is the earliest known member of the Palaeoryctidae. In North America the earliest known Palaeoryctidae appear in the Lance and Upper Edmonton Formations, which are of the Maastrichtian age, while the age of the Barun Goyot Formation which yielded *Asioryctes* is probably Middle Campanian. It is thus possible that the Palaeoryctidae originated in Asia and reached North America in the Late Cretaceous. However, *Asioryctes* cannot be regarded as an ancestor of the North American earliest palaeoryctid genera, because it shows some features of specialization (see below). *Asioryctes* differs from the Late Cretaceous North American palaeoryctid *Cimolestes* Marsh (LILLEGRAVEN, 1969, CLEMENS, 1971) in that it is smaller, has smaller double-rooted lower canine in contrast to the strong single-rooted canine of *Cimolestes*, and in having four small lower incisors, while there are two large lower incisors

in *Cimolestes*. The upper incisors and upper canine of *Cimolestes* are not known. Different species of *Cimolestes* differ from each other in the dimensions and in the degree of transverse elongation of the upper molars. In most species the precingulum and postcingulum are absent, as in *Asioryctes*, however, e.g. in *Cimolestes magnus* CLEMENS & RUSSELL from the Upper Edmonton Formation of Alberta (LILLEGRAVEN, 1969) and in *Cimolestes stirtoni* CLEMENS from the Lance Formation (CLEMENS, 1973), a small precingulum and postcingulum are present. A specialised feature found in *Asioryctes* is the apparent reduction in size of the metacone and the metaconule, whereas in *Cimolestes* both the metacone and metaconule, as well as the shearing surfaces associated with these cusps are well developed.

The Cretaceous palaeoryctid genus *Batodon* MARSH from North America from the Lance Formation and of which only a single species is known (*Batodon tenuis* MARSH (mandible)) resembles *Asioryctes* in the structure of the lower molars (MARSH, 1892, SIMPSON, 1929, 1951, CLEMENS, 1973). In both forms the trigonid is short anteroposteriorly, and the paraconid is very small. The structure of the premolars, in both *Batodon* and *Asioryctes* are similar and are not closely oppressed, but separated by narrow gaps. In *Batodon* the canine has a single root, while it has two roots in *Asioryctes*. LILLEGRAVEN (1969) described fragmentary mandibles of *Batodon tenuis* from the upper part of the Edmonton Formation, as well as fragment of maxilla with damaged M^1 and complete M^2, which he tentatively assigned also to *Batodon tenuis*. The upper molars assigned to *Batodon* differ markedly from those of *Asioryctes* in having paracone and metacone placed more lingually, and in possessing a strong precingulum and postcingulum. Also the poorly known monotypic genus *Telacodon laevis* MARSH from the Lance Formation, (MARSH, 1892, SIMPSON, 1929) represented by a single specimen, (anterior fragment of the mandible) is of approximately the same size as *Asioryctes*, and has a similar arrangement of premolars. However, because the molars of *Telacodon* are not known, it is difficult to venture an opinion on the degree of relationships of these genera.

The Paleocene palaeoryctids from North America do not invite a close comparison with *Asioryctes*, being much more advanced in various respects. One should, however, stress that *Palaeoryctes puercensis* MATTHEW of Torrejonian age (VAN VALEN, 1966) is similar to *Asioryctes* in having the upper molars narrow longitudinally and strongly elongated transversely, lacking pre and postcingula and in having a paracone and metacone strongly connate at the bases and placed labially. P^4 in *Palaeoryctes* is not molarized, nor is it in *Asioryctes*. The tympanic bone which is on the left side preserved in the type skull of *Palaeoryctes puercensis* MATTHEW (AMNH 15923) has been recognised by MCDOWELL (1958) as an entotympanic, while VAN VALEN (1966) was uncertain whether this bone is an ectotympanic or entotympanic. The comparison of the position of this bone and its shape with the undoubted ectotympanic of *Asioryctes* (see Plate I) shows that the bone in *Palaeoryctes puercensis* is an ectotympanic rather than an entotympanic.

Family ZALAMBDALESTIDAE GREGORY & SIMPSON, 1926

Genus **BARUNLESTES** nov.

Barunlestes butleri sp. n.

(Pls V-VI, Text-fig. 2*B*)

Remark: The genus *Barunlestes* nov. is monotypic, erected to include *Barunlestes butleri* sp.n.

Derivation of the name: *Barun* — from Barun Goyot Formation, *lestes* — alludes to the similarity to *Zalambdalestes*, *butleri* — named in honour of Prof. P. M. BUTLER (Royal Holloway College, University of London) in recognition of his work on insectivores.

Holotype: Damaged right half of a skull (ZPAL MgM-I/77) with both mandibles associated; upper incisors not preserved, upper molars strongly worn; left mandible with broken anterior margin and with roots of I_1 and I_3, and C-M_3, and broken coronoid process; posterior part of left mandible with M_1-M_3, uppermost part of coronoid process broken off, articular and angular processes preserved. The portion of the postcranial skeleton found in association with holotype is not figured in this paper.

Type horizon and locality: Upper Cretaceous (?Middle Campanian), Barun Goyot Formation, locality of Khulsan, Nemegt Basin, Gobi Desert, Mongolian People's Republic.

Material. — In addition to the type specimon there are three damaged skulls, two of which have the right and left mandibles associated with them, and two isolated mandibles (from the Barun Goyot Formation or from Khermeen Tsav formation), not figured in the present paper.

Stratigraphic and geographic occurrence. — Known only from the ?Middle Campanian Barun Goyot Formation of Nemegt Basin, and Khermeen Tsav formation at Khermeen Tsav II, Gobi Desert, Mongolian People's Republic.

Generic and specific diagnosis. — A zalambdalestid with skull somewhat shorter but more robust than in *Zalambdalestes*, length of the skull varying around 35 mm. Anterior part of the snout elongated, but somewhat shorter than in *Zalambdalestes*, zygomatic arches slender, strongly expanded laterally. Nasals probably expanded posteriorly, in contact with lacrimals. Infraorbital foramen less deep than in *Zalambdalestes*, situated above P^2. Mandible deeper than in *Zalambdalestes*, with slightly inflected angular process; articular process situated high above the level of the molars, strongly elongated transversely and lacking a neck. Coronoid process high, with powerful coronoid crest, which widens towards the base and is provided with a nob-like projection on its lowermost part. The prominence of its projection varies. Coronoid crest provided with an internal prominence, well seen in the anterior view of the mandible, wide at the base of the coronoid crest and tapering upwards. Two mental foramina beneath P_1 and P_3. Dental formula $\frac{?\ 1\ 3\ 3}{3\ 1\ 3\ 3}$. Upper canine single-rooted, short, situated short distance behind the premaxillo-maxillary suture; P^1 absent; P^2 situated posterior to a diastema behind C; outer margin of maxilla along this diastema incurved. P^2 very short, not occluding with lower premolars, P^3 the tallest tooth, with high, piercing paracone, triple-rooted, without metacone. P^4 not molarized more elongated transversely than P^3, with paracone shorter than in P^3. M^1 and M^2 strongly elongated transversely, narrow longitudinally, M^1 wider (tr.) and shorter (long.) than M^2. Paracone and metacone on M^1 and M^2 situated far labially, paracone higher than metacone. Ectoflexus present, not very deep, parastyle larger than stylocone, metastyle present. Paracrista apparently absent, metacrista present, short. Conules apparently present but hardly discernible as a result of the wear of all available specimens. Paracingulum absent on the anterior wall of the teeth but there is a crest, apparently the preparaconule crista, extending from the paraconule to the parastyle (as in *Zalambdalestes*), along the edge of the tooth on the junction of the lower and anterior surfaces of the crown. Protofossa large, strongly elongated transversely and deeply worn in all the specimens. Precingulum and postcingulum absent. M^3 very small (as in *Zalambdalestes*), stylar shelf only present anteriorly, metastyle absent. First lower incisor very large, with a thick layer of an enamel, semi-porcumbent, apparently long, but damaged in all the specimens, with root extending back until beneath P_3. I_2 and I_3 short, peg-like, semiprocumbent, C similar to I_2 and I_3, with decreasing procumbency, single-rooted. Short spaces between all the incisors and C and between C and P_1. P_1 trenchant, double-rooted, with a prominent main cusp and small accessory cusp placed posteriorly. P_2 absent; a diastema between P_1 and P_3. P_3 tall, with a piercing main cusp and a small unbasined heel with one low cusp; the labial part of

the heel slopes steeply downwards. P_4 submolariform, tallest of all the teeth, with three-cusped trigonid and unbasined talonid sloping labially downwards. M_1 and M_2 similar, M_2 lower than M_1. Trigonid in M_1 shorter (long.) than in P_4, talonid larger. Paraconid and metaconid connate at their bases, paraconid lower than metaconid. Because of the wear of all the specimens one cannot state whether the protoconid was in unworn specimens taller than the metaconid. Talonid strongly basined, with 3 cusps, hypoconid projecting laterally, hypoflexid not very large. M_3 smallest of all the molars, with very short (long.) trigonid.

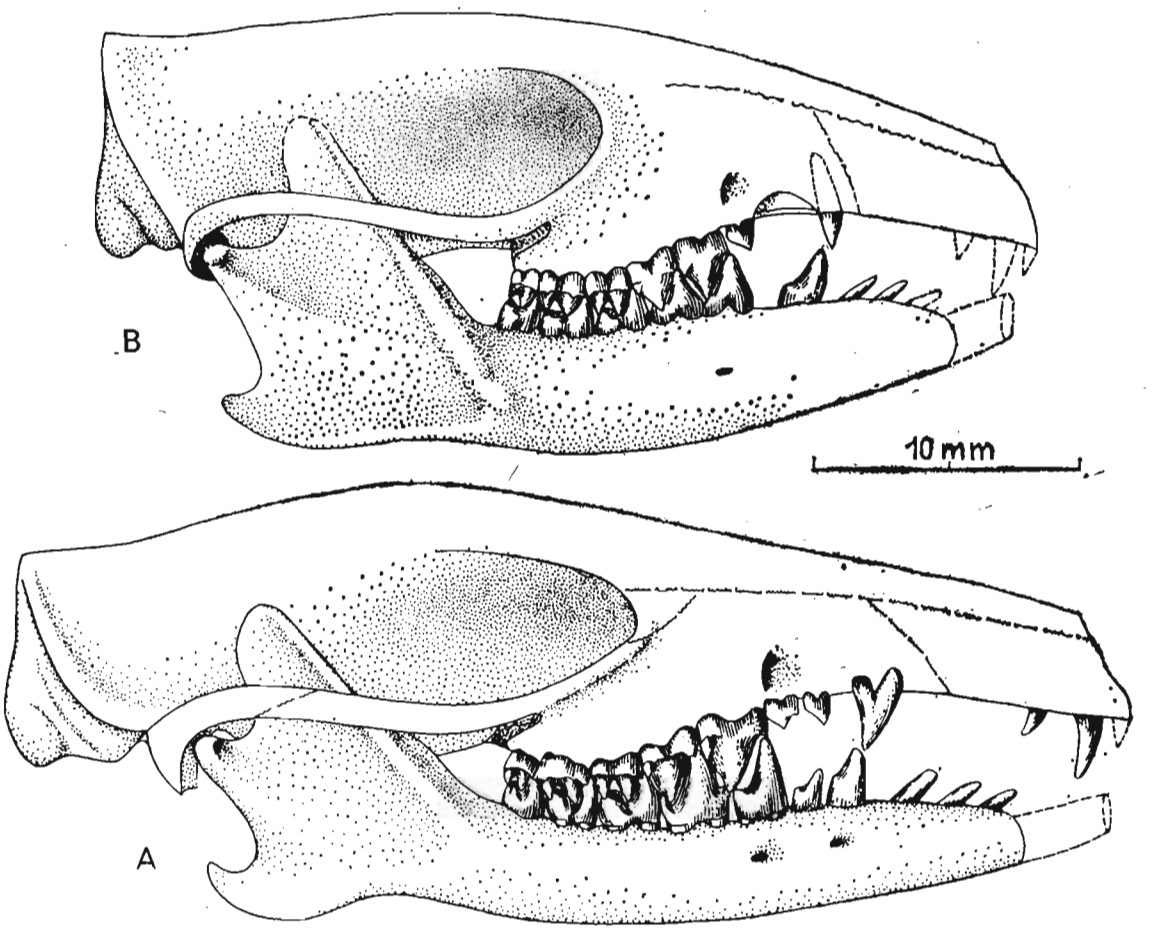

Fig. 2
Skulls of: *A — Zalambdalestes lechei*, *B — Barunlestes butleri*, reconstructed.

Discussion. — *Barunlestes* resembles *Zalambdalestes* GREGORY & SIMPSON, 1926 in many respects, especially in the coronal structure of the molars, which are almost identical in both genera (in *Barunlestes* slightly smaller). The skull in *Barunlestes* is shorter and deeper than in *Zalambdalestes*, particularly the mandible which is more robust and deeper than in *Zalambdalestes*. The coronoid process is higher and more vertically directed in *Barunlestes* than in *Za-*

lambdalestes with a stronger coronoid crest, possessing a basal prominence which is absent in *Zalambdalestes*. The articular process in *Barunlestes* is situated higher with respect to the level of the lower molars than in *Zalambdalestes* and is more elongated transversely. The internal prominence on the coronoid process is larger in *Barunlestes* than in *Zalambdalestes*. The lower incisor is larger (wider) in *Barunlestes* than in *Zalambdalestes*. The upper canine, which is double-rooted and tall in *Zalambdalestes* is single-rooted and shorter in *Barunlestes*. P_1 and P_2 present in *Zalambdalestes* are absent in *Barunlestes*.

Zalambdalestes which occurs in the Djadokhta Formation may be regarded as an ancestor or close to the ancestors of *Barunlestes*, which occurs in the younger Barun Goyot Formation. If this is correct in the evolution of *Barunlestes* a shortening and deepening of the skull, a stronger development of the lower incisor, a loss of the large double-rooted upper canine and a development of a weaker, single-rooted canine, a loss of P^1 and P_2 and a development of a more powerful jaw musculature would have occurred.

SZALAY and MCKENNA (1971) proposed the order Anagalida, in which they placed the Zalambdalestidae, Pseudictopidae, Anagalidae and Eurymylidae as (*l. c.* p. 301): "...members of an endemic Cretaceous and early Tertiary radiation, whose closest living relatives are the Lagomorpha". The possible relationship among these groups was also discussed earlier by VAN VALEN (1964). The postcranial skeleton of the Zalambdalestidae was not known until recently. However, in 1968 and in 1970, large parts of postcranial skeletons of *Zalambdalestes lechei* were found by the Polish-Mongolian Palaeontological Expeditions in the Djadokhta Formation and of *Barunlestes butleri* in the Barun Goyot Formation and Khermeen Tsav formation. The description of this material will be published at a later date but preliminary investigations show that in the Zalambdalestidae the tibia and fibula are fused and the foot is very long, relatively longer than in modern rabbits. The structure and proportions of the hind limb of the Zalambdalestidae are similar to those in the modern Macroscelididae (EVANS, 1942, CORBET & HANKS, 1968). Zalambdalestidae also resemble the Macroscelididae in possessing entepicondylar and trochlear foramina in the humerus. However, most of the shared features of the postcranial skeleton are primitive features and do not necessarily indicate a relationship between the two families. The molars of the Macroscelididae are very different from those of the Zalambdalestidae.

The Zalambdalestidae, which are the oldest members of the Anagalida cannot be regarded as ancestors of two Anagalida families: the Pseudictopidae and the Anagalidae for the following reasons: 1. in the Paleocene genus *Pseudictops* of the Pseudictopidae (SULIMSKI, 1969) and in the Oligocene genus *Anagale* of the Anagalidae (SIMPSON, 1931, MCKENNA, 1963) the tibia and fibula are not fused, whereas they are fused in the Cretaceous Zalambdalestidae; 2. the foot is relatively shorter in *Pseudictops* and *Anagale* than in the Zalambdalestidae.

In the monotypic family Eurymylidae (WOOD, 1942, SYCH, 1971) from the Paleocene of Mongolia, which was assigned by SZALAY & MCKENNA (1971) to the Anagalida the postcranial skeleton is not known.

There is a superficial similarity in the structure of the molars, of the Zalambdalestidae and Eurymylidae, which in the representatives of both families have the paracone and metacone labially situated and lack the precingulum and postcingulum. Also the enlarged lower incisor with a long root is characteristic of both groups. However, the type of wear is very different. In *Zalambdalestes* and *Barunlestes* there are wide embrasures between the upper molars and the primary shearing surfaces 1 and 2 (CROMPTON, 1971) are present, whereas in *Eurymylus* there are no embrasures between the upper molars and the shearing surfaces 1 and 2 are absent. For this reason the type of shear in the Zalambdalestidae and Eurymylidae appears to be

very different; the molar teeth of the Zalambdalestidae would have to be modified greatly to give rise to the type of teeth characteristic of the Eurymylidae. A detailed study of the molar occlusion in both families will be presented at a later date; on the basis of current information it seems unlikely that the Eurymylidae arose from the Zalambdalestidae.

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REFERENCES

CLEMENS, W. A. Jr. 1973. Fossil mammals of the type Lance Formation Wyoming. Pt. III. Eutheria and summary. — *Univ. Calif. Publ. Geol. Sci.*, **94**, 1-102, Berkeley.

CORBET, G. B. & HANKS, J. 1968. A revision of the elephant-shrews, family Macroscelididae. — *Bull. Brit. Mus. (Nat. Hist.), Zoology*, **16**, 2, 1-112, London.

CROMPTON, A. W. 1971. The origin of the tribosphenic molar. — *In*: Early Mammals, D. M. Kermack & K. A. Kermack (eds.) Suppl. No. 1, *Zool. J. Linn. Soc.* **50**, 65—87, London.

EVANS, F. G. 1942. The osteology and relationships of the elephant-shrews (Macroscelididae). — *Bull. Amer. Mus. Nat. Hist.*, **80**, 85-125, New York.

GRADZIŃSKI, R. & JERZYKIEWICZ, T. 1974. Sedimentation of the Barun Goyot Formation. Results Polish-Mongol. Palaeont. Exped., V. — *Palaeont. Pol.*, **33**, 111-146, Warszawa.

KIELAN-JAWOROWSKA, Z. 1969. Preliminary data on the Upper Cretaceous eutherian mammals from Bayn Dzak, Gobi Desert. Results..., I. — *Ibidem*, **19**, 171-197.

— 1974. Multituberculate succession in the Late Cretaceous of the Gobi Desert (Mongolia). Results..., V. — *Ibidem*, **30**, 23-44.

— 1975. Evolution of the therian mammals in the Late Cretaceous of Asia. Pt. I. Deltatheridiidae. Results..., VI. — *Ibidem*, **33**.

— & BARSBOLD, R. 1972. Narrative of the Polish-Mongolian Palaeontological Expeditions 1967-1971. Results..., IV. — *Ibidem*, **27**, 5-13.

LILLEGRAVEN, J. A. 1969. Latest Cretaceous mammals of upper part of Edmonton Formation of Alberta, Canada, and review of marsupial-placental dichotomy in mammalian evolution. — *Univ. Kansas Paleont. Contr.*, **50**, (Vertebrata, 12), 1-122, Lawrence.

MARSH, O. C. 1892. Discovery of Cretaceous Mammalia, III. — *Amer. J. Sci.*, **43**, 249-261, New Haven.

MCDOWELL, S. B. Jr. 1958. The greater Antillean insectivores. — *Bull. Amer. Mus. Nat. Hist.*, **115**, 3, 117-214, New York.

MCKENNA, M. C. 1963. New evidence against tupaioid affinities of the mammalian family Anagalidae. — *Amer. Mus. Novit.*, **2158**, 1-16, New York.

SIMPSON, G. G. 1929. American Mesozoic Mammalia. — *Mem. Peabody Mus. Yale Univ.*, **3**, 1, 1-235, New Haven.

— 1931. A new insectivore from the Oligocene, Ulan Gochu horizon of Mongolia. — *Amer. Mus. Novit.*, **505**, 1-22, New York.

— 1951. American Cretaceous Insectivores. — *Ibidem*, **1541**, 1-19, New York.

SULIMSKI, A. 1969. Paleocene genus Pseudictops Matthew, Granger & Simpson, 1929 (Mammalia) and its revision. Results Polish-Mongol. Palaeont. Exped., I. — *Palaeont. Pol.*, **19**, 101-129, Warszawa.

SYCH, L. 1971. Mixodontia, a new order of mammals from the Paleocene of Mongolia. — Results..., III. — *Ibidem*, **25**, 147-158, Warszawa.

SZALAY, F. S. & MCKENNA, M. C. 1971. Beginning of the age of mammals in Asia: the Late Paleocene Gashato Fauna, Mongolia. — *Bull. Amer. Mus. Nat. Hist.*, **144**, 4, 273-317, New York.

VAN VALEN, L. 1964. A possible origin for rabbits. — *Evolution*, **18**, 3, 484-495, Lawrence.

— 1966. Deltatheridia, a new order of mammals. — *Bull. Amer. Mus. Nat. Hist.*, **132**, Art. 1, 1-126, New York.

WOOD, A. E. 1942. Notes on the Paleocene Lagomorph, Eurymylus. — *Amer. Mus. Novit.*, **1162**, 1-7, New York.

EXPLANATION OF PLATES

PLATE I

Page

Asioryctes nemegetensis sp. n. 6
(see also Plates II-IV)

Upper Cretaceous, Barun Goyot Formation, Nemegt Basin, Southern Monadnocks, Nemegt, Gobi Desert, Mongolia

Fig. 1*a*. Stereo-photograph of nearly entire skull, associated with both mandibles and the atlas, before the final preparation, in right lateral view, holotype, ZPAL MgM-I/56, × 2.
Fig. 1*b*. Stereo-photograph of the same in oblique right ventro-lateral view, × 2.
Fig. 1*c*. Stereo-photograph of the same in left lateral view, × 2.
Fig. 1*d*. Stereo-photograph of the same in oblique left ventro-lateral view, × 3.
Fig. 1*e*. Stereo-photograph of the same in ventral view, × 3.
Fig. 1*f*. The same in dorsal view, × 3.

Photo: W. Skarżyński

PLATE II

Page

Asioryctes nemegetensis sp. n. 6
(see also Plates I, III and IV)

Upper Cretaceous, Khermeen Tsav formation, Khermeen Tsav II, Gobi Desert, Mongolia

Fig. 1*a*. Stereo-photograph of nearly entire skull, strongly compressed laterally, associated with both mandibles, in right lateral view, ZPAL MgM-I/98.
Fig. 1*b*. Stereo-photograph of the same in left lateral view.

All × 4

Photo: W. Skarżyński

PLATE III

Page

Asioryctes nemegetensis sp. n. 6
(see also Plates I, II and IV)

Upper Cretaceous, Barun Goyot Formation, Khulsan, Nemegt Basin, Gobi Desert, Mongolia

Fig. 1*a*. Scanning electron microscope stereo-photograph of right M^1-M^3 in oblique inner view, ZPAL MgM-I/73.
Fig. 1*b*. The same in posterior view.
Fig. 1*c*. The same in occlusal view.

All × 17.5

Photo: G. R. Pierce

PLATE IV

Page

Asioryctes nemegetensis sp. n. 6
(see also Plates I-III)

Upper Cretaceous, Barun Goyot Formation, Khulsan, Nemegt Basin, Gobi Desert, Mongolia

Fig. 1*a*. Scanning electron microscope stereo-photograph of left M_2-M_3 in posterior view, ZPAL MgM-I/73.
Fig. 1*b*. The same in oblique anterior view.
Fig. 1*c*. The same in occlusal view.

All × 17.5

Photo: G. R. Pierce

PLATE V

Page

Barunlestes butleri sp. n. 9
(see also Plate VI)

Upper Cretaceous, Barun Goyot Formation, Khulsan, Nemegt Basin, Gobi Desert, Mongolia

Fig. 1*a*. Stereo-photograph of the incomplete skull with right C-M^3, in lateral view. The mandibles found in association with this skull are figured on Plate VI. Holotype, ZPAL MgM-I/77.
Fig. 1*b*. Stereo-photograph of the same in occlusal view.

All × 4

Photo: W. Skarżyński

PLATE VI

Page

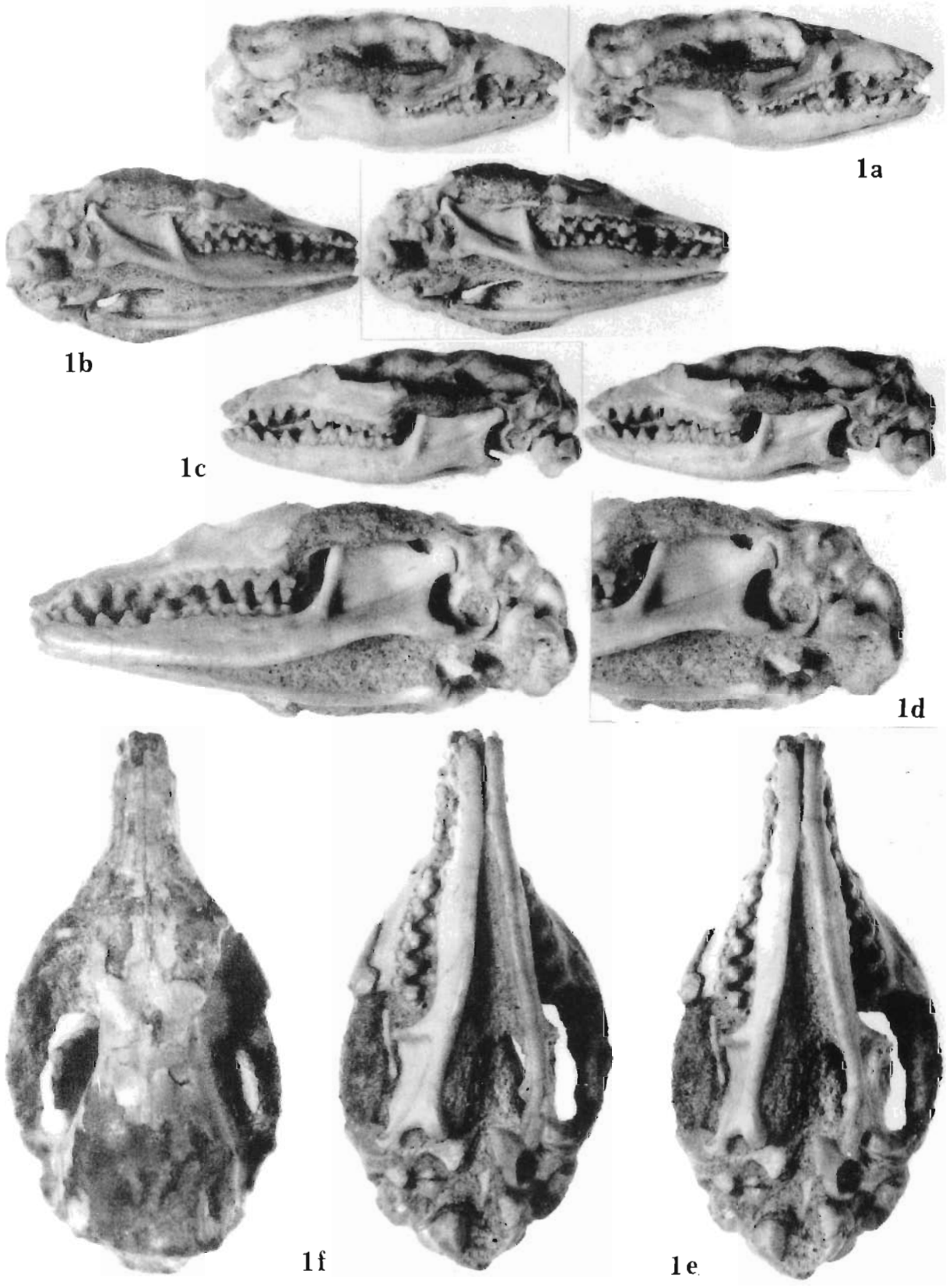
Barunlestes butleri sp. n. 9
(see also Plate V)

Upper Cretaceous, Barun Goyot Formation, Khulsan, Nemegt Basin, Gobi Desert, Mongolia

Fig. 1*a*. Right mandible with M_1-M_3 in outer view. Holotype, ZPAL MgM-I/77.
Fig. 1*b*. The same in inner view.
Fig. 1*c*. Stereo-photograph of the same in occlusal view.
Fig. 1*d*. Stereo-photograph of the left mandible of the same specimen in outer view.
Fig. 1*e*. Stereo-photograph of the same in inner view.
Fig. 1*f*. Stereo-photograph of the same in occlusal view.

All × 4

Photo: W. Skarżyński



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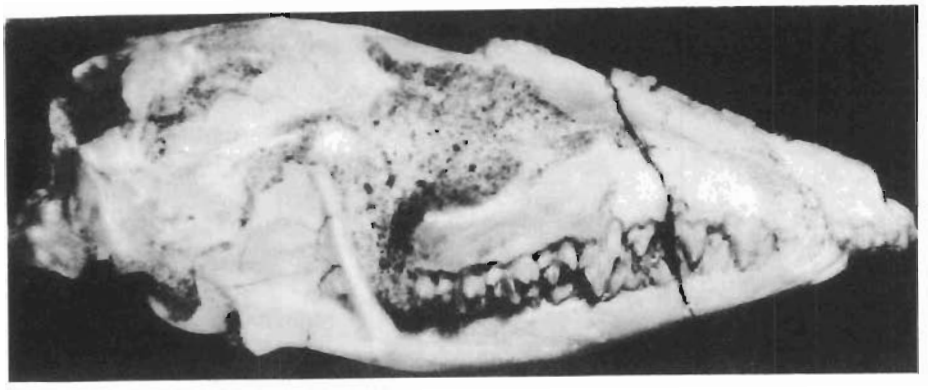

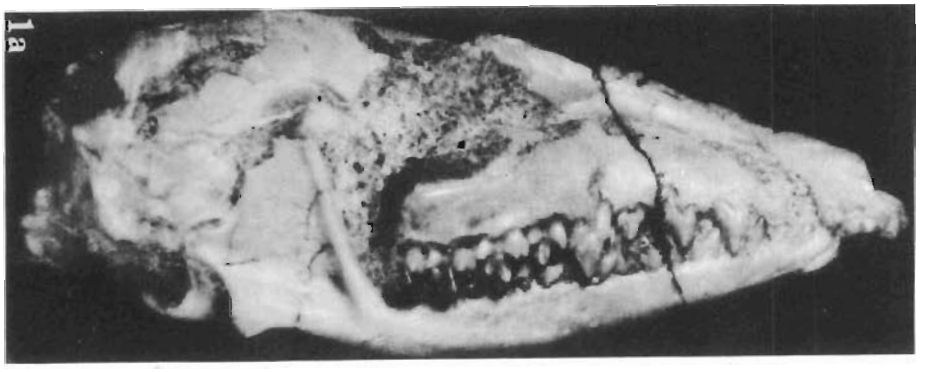
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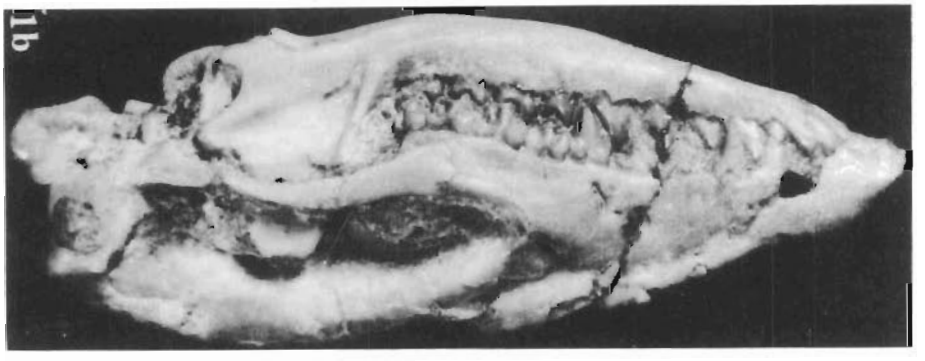
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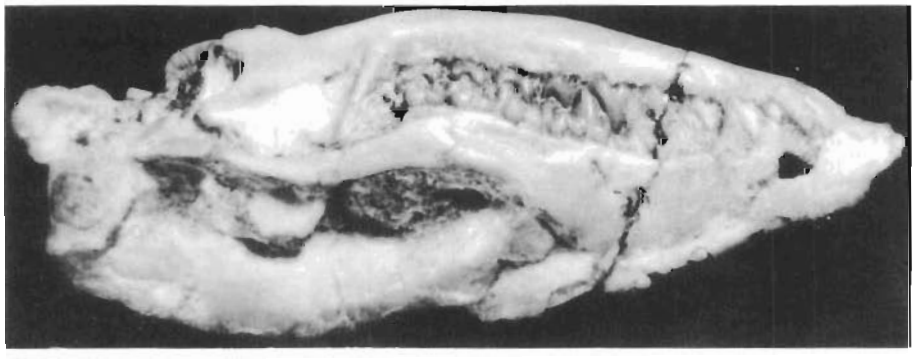

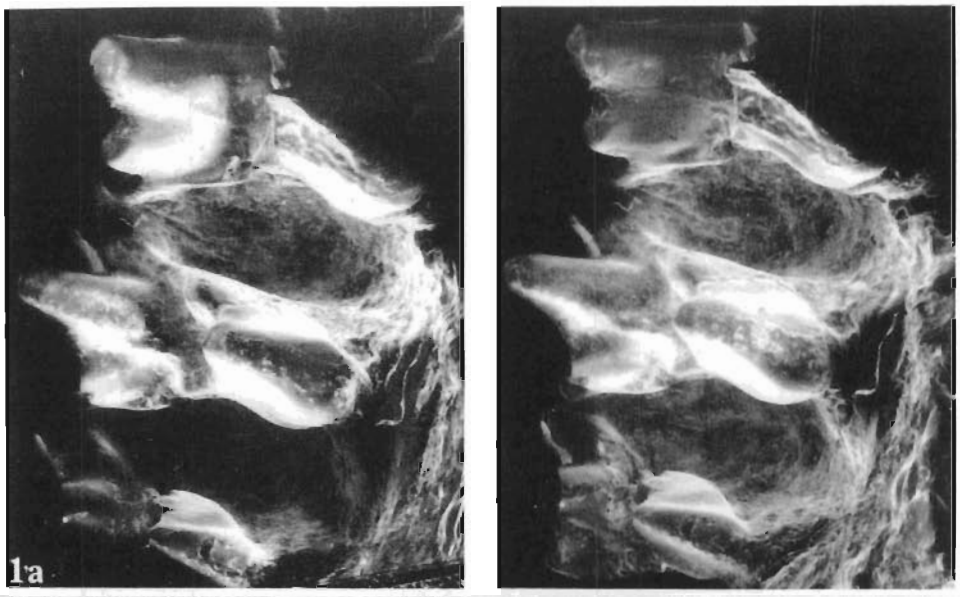
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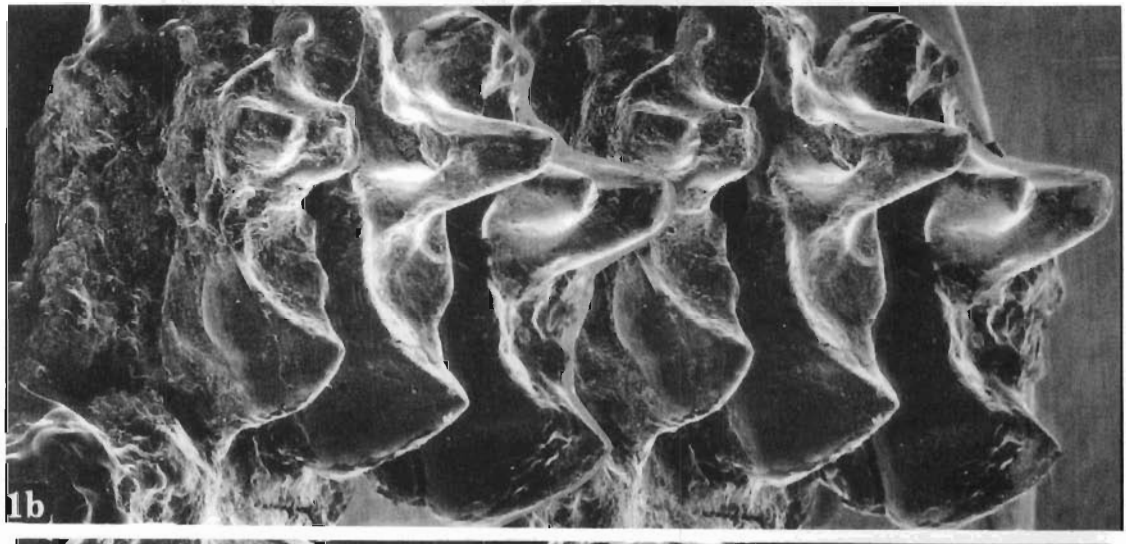
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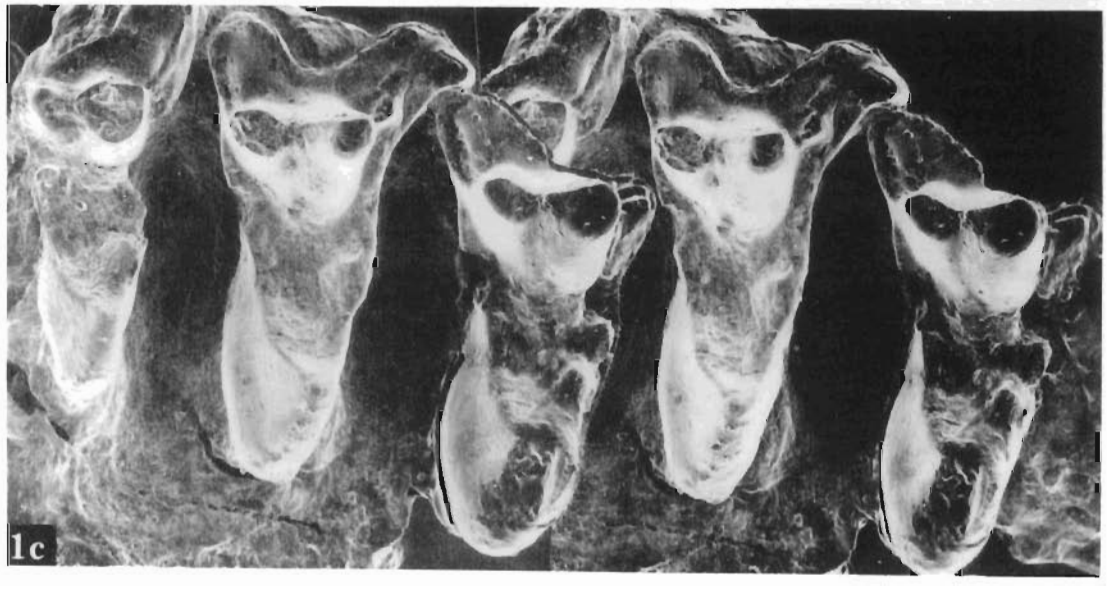
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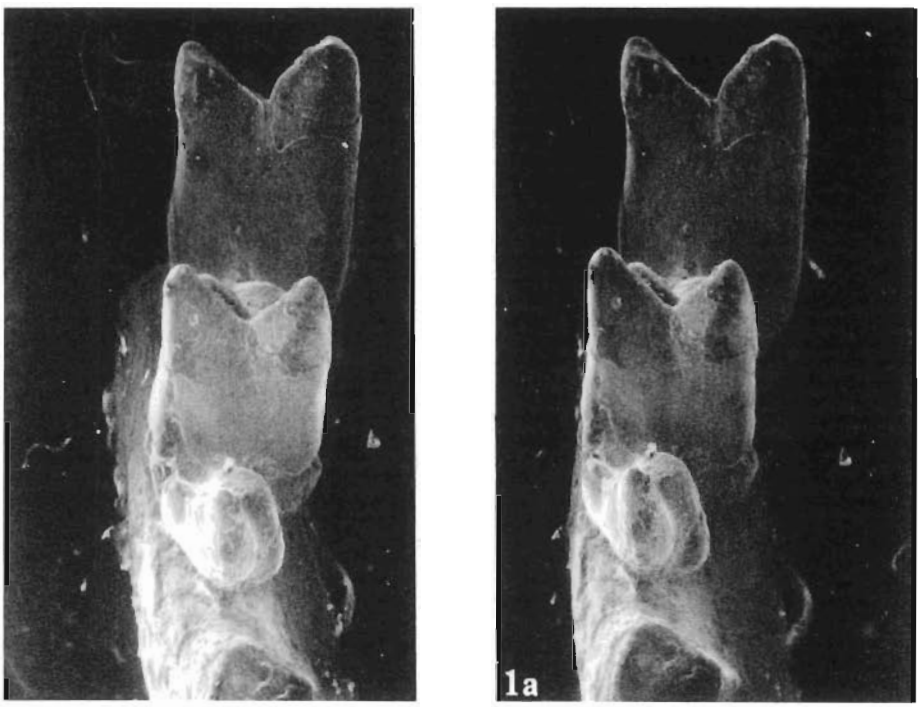
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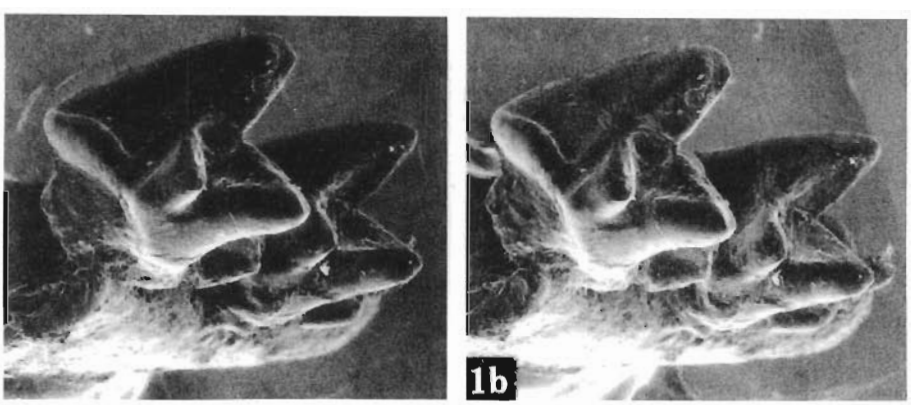
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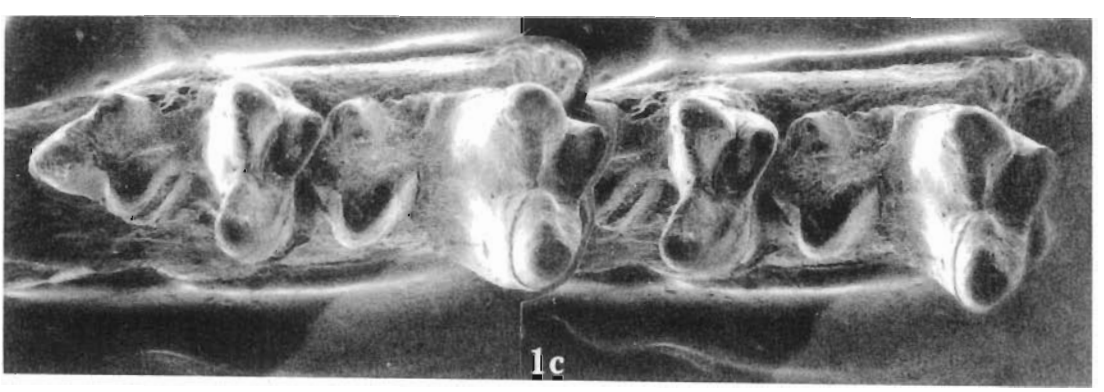
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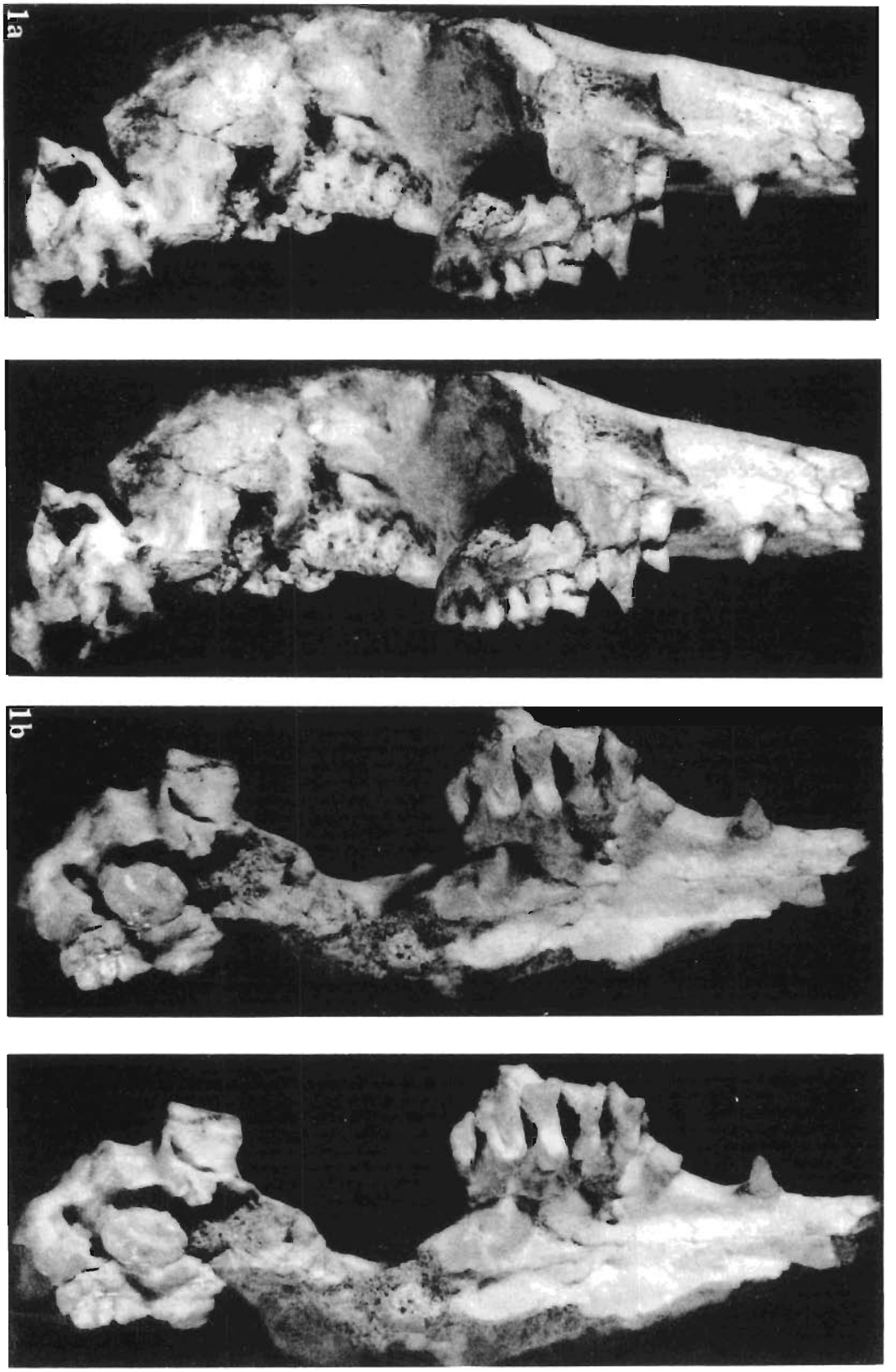
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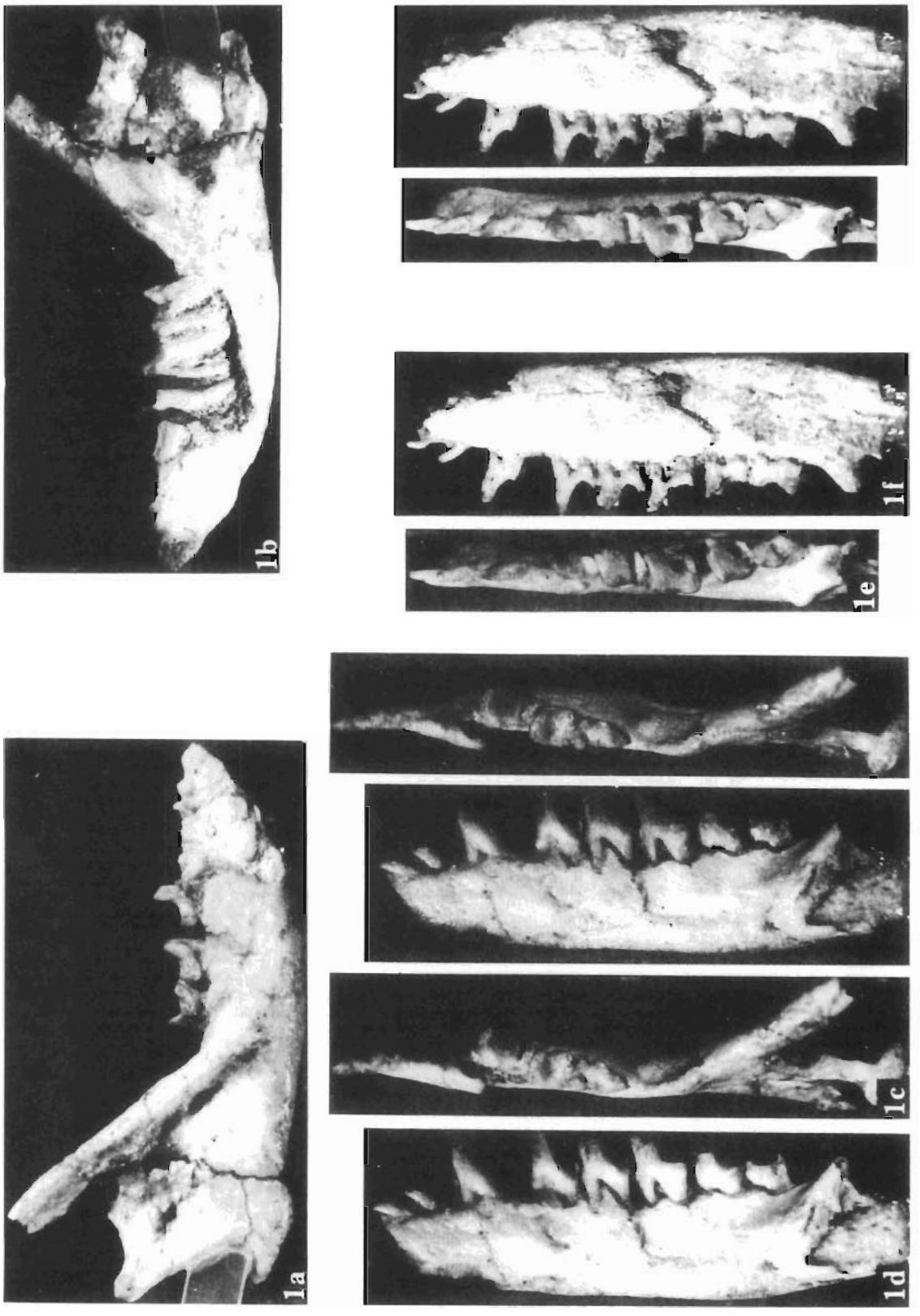
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