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LOWER PLIOCENE RHINOCEROTIDS FROM ALTAN TELI, WESTERN MONGOLIA

(Plates XX—XXV)

Abstract. — Numerous remains of the rhinocerotids, assigned to *Chilotherium wimani mongolicum* n. subsp., and a skull of a young individual, assigned to *Chilotherium* aff. *wimani* RINGSTRÖM, 1924, all coming from the Lower Pliocene of Altan Teli (Western Mongolia, Dzereg Valley), are described and figured. The diagnosis of the genus *Chilotherium* RINGSTRÖM, 1924 is revised.

INTRODUCTION

The remains of the rhinocerotids of the genus *Chilotherium* RINGSTRÖM, 1924, described in the present paper, come from the Lower Pliocene locality of Altan Teli (Western Mongolia, Dzereg Valley, 93°10′ longitude E, and 47°06′ latitude N).

The locality of Altan Teli was discovered by the Soviet Palaeontological Expedition in 1949. The age of the bone-bed was estimated as Lower Pliocene or Miocene by the Soviet palaeontologists (ROZHDESTVENSKY, 1954; DEVYATKIN & LISKUN, 1966) from a preliminary examination of the fauna. The geology and geomorphology of the locality were investigated by the members of the Polish-Mongolian Palaeontological Expedition of 1965 (GRADZIŃSKI *et al.*, 1968/69).

During the field work carried out in Altan Teli by this expedition in summer 1965 (KIELAN-JAWOROWSKA & DOVCHIN, 1968/69), a rather rich collection of the Lower Pliocene mammals has been amassed. A part of this collection (containing the here described *Chilotherium* bones) is housed in the Palaeozoological Institute of the Polish Academy of Sciences in Warsaw, referred to by *Z. Pal.* before the registered number. The rest of the material is housed in the Department of Palaeozoology, Institute of Geological Sciences, Academy of Sciences of Mongolian People's Republic, in Ulan Bator. This latter material has not been investigated by the present author.

Chilotherium bones form the bulk of the material from Altan Teli, the remainder consisting of bones of small bovids (CZYŻEWSKA, 1970), hipparions, pigs, one rodent (KOWALSKI, 1968/69) and turtles (MŁYNARSKI, 1968/69). The whole material was deposited by a stream over a short period and bears no traces of long transportation. It is therefore of the same age and comes from a not very large area. *Chilotherium* was a highly specialized steppe form, very common in the hipparion fauna of Upper Miocene—Lower Pliocene age, represented by about seventeen species from Asia and Europe. Only one species, *Chilotherium habereri* (originally known from China), has so far been described from Mongolia (Miocene-Pliocene locality

Oshih, about 70 km to the NW of Altan Teli) by BELAYEVA (1937); the occurrence of the second species, *Chilotherium wimani*, was only mentioned in the same paper (Pliocene, Holt).

The fauna from Altan Teli is a hipparion fauna of mixed type in the sense of KURTEN (1952), containing some typical browsing forms, such as *Gazella gaudryi* (see CZYŻEWSKA, 1970), as well as typical grazing ones, such as *Chilotherium*, which indicates that the environment must have been differentiated and was at the boundary between steppe and forest-clad areas.

The material described in the present paper was considerably damaged; the skulls and mandibles had to be pieced together from several fragments.

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DESCRIPTIONS

Order **PERISSODACTYLA**
Superfamily **RHINOCEROTOIDEA** GILL, 1872
Family RHINOCEROTIDAE OWEN, 1845
Subfamily TELEOCERATINAE HAY, 1902
Genus **CHILOTHERIUM** RINGSTRÖM, 1924

Revised diagnosis. — Hornless rhinoceros. Dorsal profile of the skull (nasals included) almost straight. Frontal region slightly concave, flat or convex. No supraorbital swellings. The orbit situated high up, just under the skull roof. Parietal crests never converge to form sagittal crest; minimum distance between them varies depending of the species (from about 30 mm to about 90 mm). Premaxillae formed as thin, vertical bone plates bearing no incisors. Symphysis mandibulae strongly broadened anteriorly. Trunk short and stout, hung on very shortened legs. Manus and pes tridactyl. Metatarsals short and divergent, the lateral ones slanting outwards and backwards.

Dental formula:

$$I\frac{0}{1(2)}, C\frac{0}{0}, P\frac{3(4)}{3}, M\frac{3}{3}, \text{ and } DI\frac{0}{2}, DC\frac{0}{0}, DP\frac{4}{3(4)}.$$

Stratigraphical and geographical distribution. — Upper Miocene — Lower Pliocene, **Europe and Asia.**

Chilotherium wimani RINGSTRÖM, 1924
Chilotherium wimani mongolicum n. subsp.

(Pls. XX—XXV)

Type specimen: Z. Pal. No. MgM-V/11. An almost complete skull of an old adult individual with lower jaw in occlusion. The distal part of nasals, premaxillae and symphyseal part of mandible missing. Left zygomatic arch, palate and teeth damaged. Temporal processes of both sides broken off.

Type horizon and locality: Lower Pliocene, Altan Teli, Dzereg Valley, Western Mongolia (GRADZIŃSKI *et al.*, 1968/69, p. 75).

Derivation of the name: *mongolicum* — from the name of the country where the material comes from.

Diagnosis. — Skull massive; index basal length/maximum width of the frontals about 3.00—3.25. Cheek teeth wide in comparison with length; index length/width about 0.75 for P^2, about 0.85 for M^1. Morphology of the cheek teeth typical for the species *Chilotherium wimani*. An unusually thin layer of cement on tooth crowns, rarely preserved in fossil state. Zygomatic arches not very strongly arched. Mean zygomatic breadth about 270 mm. Parietal crests situated high; minimal distance between them changing from about 30 mm to about 40 mm. Frontals slightly convex. Processus postglenoidalis strong, bilaterally compressed, curving anteriorly, provided with a narrow crest running along its posterior margin. Processus paroccipitalis the same length as postglenoidalis, curving anteriorly at the top, clearly distinct from processus posttympanicus. Meatus acusticus externus usually closed on the ventral side.

Material. — In addition to the type specimen, the following specimens were found:

Z. Pal. No. MgM-V/13. An almost complete skull somewhat distorted by dorso-lateral pressure from left side. The distal part of nasals and right zygomatic arch lacking. Premaxillae broken off at the level of the first cheek teeth. Occipital surface and paroccipital processes strongly damaged. Teeth strongly worn and badly preserved.

Z. Pal. No. MgM-V/14. An incomplete skull with right maxilla, both premaxillae and right zygomatic arch missing. The upper part of the occiput, parietal bones, left occipital condyle and paroccipital processes strongly damaged. Nasal bones of the same individual preserved as a separate fragment without any connection with the rest of the skull. Rostrum flattened laterally. Cheek teeth P^2—M^3 left slightly worn.

Z. Pal. No. MgM-V/15. An almost complete but poorly preserved skull with lower jaw in occlusion. Two maxillae preserved as two separate fragments. Both zygomatic arches and the top of nasals broken off. The upper part of the brain-case, especially in the region of the nuchal crest, strongly damaged. Mandible with vertical parts of the rami missing and symphyseal part broken off at the bases of the incisors. Upper and lower teeth strongly worn and badly preserved.

Z. Pal. No. MgM-V/16. Anterior part of a skull broken behind the orbits and distorted by pressure from left to right. The tops of premaxillae broken off. Naso-maxillary notches, right and left, enlarged by erosion. An almost complete lower jaw associated with the skull. Upper and lower teeth strongly worn and badly preserved.

Z. Pal. No. MgM-V/17. Anterior part of a skull broken off behind the supraorbital processes, flattened somewhat dorso-ventrally, with nasals missing. The distal parts of premaxillae broken off. Teeth P^2—M^3, right and left, slightly worn and very well preserved.

Z. Pal. No. MgM-V/18. An incomplete skull broken off just in front of M^2 right and M^1 left. The brain-case compressed laterally, distorted and strongly damaged, with its left lower part missing. Left zygomatic arch and the very top of nasals broken off. Teeth strongly worn.

Z. Pal. No. MgM-V/19. Anterior part of the skull of a young individual with dP^1—dP^4 and erupting M^1. The anterior parts of nasals and of premaxillae not preserved.

Z. Pal. Nos. MgM-V/20—38. Some twenty fragments of right and left maxillae with teeth.

Z. Pal. No. MgM-V/39. An almost complete lower jaw of a young individual with dP_2—dP_4, erupting M_1 and deciduous I_1, I_2 represented by roots only, the crowns broken off. Left part of symphysis damaged, the tops of temporal processes lacking.

Z. Pal. No. MgM-V/40. An almost complete but poorly preserved and somewhat distorted lower jaw with vertical part of the right ramus missing and incisors broken off at their bases. Cheek-teeth only slightly worn, M_3 erupting.

Z. Pal. Nos. MgM-V/41—43. Three incomplete mandibles with vertical parts missing, one of them with preserved left incisor.

Z. Pal. Nos. MgM-V/44, 45. Two incomplete mandibles of young individuals with deciduous dentition. Vertical parts of the rami unpreserved.

Z. Pal. Nos. MgM-V/46—48. Three symphyseal parts of lower jaws with horizontal rami and cheek-teeth partly preserved. No. MgM-V/47 with preserved I_2 right, No. MgM-V/48 with left.

About ten partly preserved mandibles with cheek dentition.

Description. — *Skull.* Dorsal profile of the skull (nasals included) almost straight, rising somewhat from the postorbital region, up to the base of nasals in one direction, and to the nuchal crest in the other. Upper surface of the skull rather flat, except interorbital region which is somewhat convex in transverse section. The orbit situated high up, just under the skull roof. Orbital margins of the frontals narrow, without any supraorbital swellings. Supraorbital processes tringular, not clearly individualized from the orbital margins. Postorbital and parietal crests very distinct, slightly converging backwards, never forming sagittal crest. Minimum distance between them from 32 to 40 mm. In the vicinity of the occipital surface, parietal crests curve strongly outwards and join the nuchal crest in its course outwards and downwards. Crista nuchalis slightly concave dorsally and, in a considerably stronger degree, concave posteriorly. Its lateral parts never extend backwards behind the level of the occipital condyles (in horizontal position of the skull). The middle part of the occipital surface forms a deep concavity, situated just under nuchal crest, for the insertion of ligamentum nuchae. Foramen occipitale magnum subtriangular, the top of the triangle directed upwards. Occipital surface gradually narrows to 2/3 of its height, then widens somewhat (maximum breadth at the bottom — 205 mm, at about 2/3 of occipital height — 160 mm, and at the upper part of the occiput — 165 mm, measured on type specimen).

Paroccipital process long, curving anteriorly at the top, clearly distinct from the posttympanic process (length from the lower margin of the posttympanic process about 48 mm, on type specimen). A longitudinal arching crest runs along the lateral side of the paroccipital process passing into the horizontal lower margin of the posttympanic process.

The temporal part of the occipital surface, together with the posttympanic process, forming its lower part, bends considerably forwards. These slanting part of the occiput are delimited from the central part by a strong irregular crest. Posttympanic process usually closely adjoins the postglenoid process, sometimes overlapping the latter from lateral side. In one case, however, they are separated by a cleft (Z. Pal. No. MgM-V/18). Postglenoid process strong, bilaterally compressed, curved anteriorly, provided with a narrow crest running along its posterior margin. Its length on type specimen about 68 mm from the horizontal level of the glenoid fossa, about 50 mm from the lower margin of the postympanic process. The tops of both processes (paroccipital and postglenoid) at about the same horizontal level.

The basal parts of the occipital and sphenoid bones form a wide bridge, delimited laterally by distinct, sharp crests. Anteriorly, from the occipito-sphenoidal suture, there is a strong unpaired basilar tubercule, passing backwards into longitudinal crest.

Zygomatic arches high but very thin, stronger anteriorly, becoming weaker posteriorly, sometimes bending rapidly upwards just behind the orbit (see Pl. XX, Fig. 2; Pl. XXI, Fig. 1). (On the type specimen its anterior height is about 45 mm, anterior thickness 26 mm, posterior height about 45 mm, minimum thickness, about the mid-length of arch, 18 mm). Facial crest runs from about this bend of zygomatic arch to about the level of anterior margin of M^2.

Nasal notch (very often badly preserved) situated above the middle of M^1. Nasals rarely preserved, triangular, the top forming an acute angle. Dorsal surface of the nasal convex in transverse section, ventral surface considerably thickened along the internasal suture.

The nasals extend to about the level of P^1, sometimes farther forwards (Z. Pal. MgM-V/16). Double infraorbital foramina can be observed on each side of the skulls Z. Pal. No. MgM-V/13 and MgM-V/17, being strongly damaged on other skulls. The shape of the lacrimal bone, which can be seen on the juvenil skull, is characteristic for the genus *Chilotherium* (see RINGSTRÖM, 1924).

Table 1

Chilotherium wimani mongolicum — dimensions of the skulls (in mm)

Measurements \ Z. Pal. cat. No. MgM-	V/11	V/13	V/14
Basal length (estimated)	530	521	517
Crista occipitalis (midpoint) to anterior edge of orbit	347	356	—
Crista occipitalis (midpoint) to supraorbital process	290	291	—
Maximum breadth of the occiput	205	ca. 190	ca. 196
Minimum distance between parietal crests	40	ca. 35	ca. 32
Breadth of frontals at supraorbital processes	173	165	160
Zygomatic breadth	283	ca. 287	ca. 277
Distance between the tops of postglenoid processes	ca. 123	ca. 102	ca. 114
Height of the occiput	184	182	—
Breadth of palate between P^4 right and left	32	40	—
Breadth of palate at the anterior top of the choanae	71	ca. 58	—

Only posterior parts of premaxillary bones are preserved in the material, the anterior ones being always (except a fragment in Z. Pal. No. MgM-V/16) broken off. The posterior part of the premaxilla is a perpendicular bone-blade adjoining the maxilla from the medial side. A triangular process with a very long base projects from this part of the premaxilla, its top directed medially and situated at the level of P^3.

Upper deciduous dentition (Z. Pal. Nos. MgM-V/19, 33, 34).

DP^1 (three specimens: Z. Pal. No. MgM-V/19 slightly worn right tooth, MgM-V/15 strongly worn right and left teeth) — unmolarized, triangular or somewhat oval (if unworn). Deuterocone not developed, protoloph rudimentary. Parastyle well developed with a distinct parastyle fold. On the worn tooth distinct medifossette can be observed. An enamel crest runs from its antero-lingual wall to the lingual cingulum and cuts the median valley into two parts.

Table 2

Chilotherium wimani mongolicum — dimensions of the upper dentition (in mm)

Measurements \ Z. Pal. cat. No. MgM-	V/17		V/14	V/11	V/58	V/13	V/15	V/62
	left	right	left	right	left	right	right	right
Length (at crown's bases, labially) of: P^2—M^3	240	240	239	231	220	—	—	—
P^2—P^4	105	100	101	89	90	—	106	—
M^1—M^3	143	139	140	144	ca. 135	139	—	140
Length (about the middle of the crown's breadth) of: P^2	26	28	27	25	22	—	27	—
P^3	33	33	32	26	28	—	32	33
P^4	39	39	37	35	33	—	34	38
M^1	47	45	46	39	39	40	49	45
M^2	50	48	49	39	42	43	49	47
Labial length of M^3	55	52	ca. 49	58	44	45	—	45
Breadth (over protoloph) of: P^2	—	33	—	—	—	—	—	—
P^3	52	50	55	—	—	—	47	—
P^4	56	56	62	—	57	—	57	59
M^1	63	64	62	71	67	—	58	—
M^2	60	65	59	66	62	65	60	65
M^3	52	61	43	60	51	63	—	56
Breadth (over metaloph) of: P^2	—	38	35	—	—	—	—	—
P^3	48	48	51	—	—	—	44	47
P^4	50	53	54	—	57	—	52	54
M^1	54	58	59	63	57	60	54	66
M^2	50	51	50	62	53	—	40	55

Lingual cingulum interrupted at the metaloph. Labial cingulum strongly reduced (except its very anterior part). Posterior cingulum always developed, closing postfossette from behind — the same is true for the other upper deciduous, as well as permanent cheek-teeth.

More posterior cheek-teeth are almost quadrangular in shape, the ectoloph being always slightly convex labially.

DP^2 — strong parastyle with distinct parastyle fold (the same is true for dP^3 and dP^4). Strong anterior cingulum delimits a distinct anterior fossette of triangular shape (see Pl. XXV, Fig. 1) and continues on the lingual side closing lingually the median valley, being interrupted on the lingual side of metaloph. Long and slender crochet cuts off the medifossette. Crista probably very small. Deuterocone not distinct from protoloph; antecrochet not modelled.

DP^3 and dP^4 — of the same form. Deuterocone well individualized, antecrochet distinct. Crochet long and slender, sometimes with some secondary folds on its lingual wall. Crista

rudimentary or missing. Medifossette not formed. Cingulum present only on the anterior and posterior sides of the tooth. On the anterior wall of the metaloph, at the lingual end of the latter there is a small furrow, which probably determines the situation of tetartocone. Cement not visible.

Dimensions (in mm) of deciduous cheek-teeth on the specimen Z. Pal. No. MgM-V/19:

	dP^1	dP^2	dP^3	dP^4
Length (maximum, labially)	20	40	44	50
Breadth (over protoloph)	17	32	42	44
Height	22	15	22	ca. 34

Upper permanent dentition:

P^1 not developed, dP^1 persisting during the whole of the animal's life.

P^2 (preserved only on five specimens: Z. Pal. Nos. MgM-V/11, 17, 20, 22, 26). Ectoloph with developed parastyle and parastyle fold. Metaloph somewhat stronger than protoloph (the reverse is true for the other cheek-teeth). Protoloph fuses lingually with metaloph usually at a high level of the crown, sometimes however (Z. Pal. Nos. MgM-V/17, 22) near the base of the crown. Protoloph strongly widened lingually. Neither deuterocone nor antecrochet are individualized. Crochet long and slender, crista presumably very feeble; they always form medifossette.

P^3 — similar to the preceding tooth. It differs from it mainly in the stronger degree of individualization of deuterocone (protocone on the molars) and antecrochet. This character gets more and more accentuated backwards along the tooth-row.

P^4 — protoloph and metaloph usually not fused lingually down to base of crown; sometimes however (Z. Pal. No. MgM-V/20) they fuse higher up. Crochet long and slender, curved labially. Crista small or absent, medifossette formed or sometimes missing. Parastyle stronger than on the preceding teeth, parastyle fold not developed.

M^1, M^2 — protoloph and metaloph separated down to base of crown. Strong antecrochet, directed lingually, is continued towards the entrance of the median valley by a row of enamel tubercules. Crochet strong, crista lacking or rudimentary. Medifossette usually absent, sometimes formed on M^2 (Z. Pal. No. MgM-V/17, left). Parastyle very long, without any parastyle fold behind.

Labial cingulum reduced on all cheek teeth, except for feeble metastyle, which is sometimes present. Anterior cingulum runs obliquely along the frontal walls of teeth, forming a well determined anterior fossette. It appears labially at about half the crown's height (observed on the unused teeth) and runs lingually downwards to the base of crown. Lingual cingulum is well developed on the anterior cheek teeth, becoming gradually weaker posteriorly. On P^2, P^3, P^4 and occasionally on M^2, it is in continuation with the anterior cingulum, forms a collar around deuterocone (or protocone) and closes median valley. At M^1 and M^3 it forms only a tubercule at the entrance of the median valley. Lingual cingulum seems to be very variable individually. It is, however, very often badly preserved and therefore it is difficult to describe its variability. Posterior cingulum cuts off the postfossette, which is oval at P^2, P^3 and more triangular at P^4, M^1 and M^2.

M^3 — metaloph forms a prolongation of ectoloph on the labial side of the tooth, being only slightly bent towards the lingual side. Talon is in the form of a tubercule or triangle, usually badly preserved or broken off. Crochet somewhat less developed than in the preceding teeth, almost perpendicular to the labial wall of the tooth. Protocone and antecrochet clearly modelled.

Table 3

Chilotherium wimani mongolicum — dimensions of the mandibles (in mm)

Z. Pal. cat. No. MgM- / Measurements	V/40	V/41	V/42	V/43	V/46	V/47	V/48	V/16	V/15	V/39 juv.	V/44 juv.	V/45 juv.
Minimum breadth of the mandible at the symphysis	122	108	—	111	107	111	95	98	101	—	85	78
Minimum distance between diastemal crests	61	58	55	53	64	68	48	ca. 58	ca. 55	—	49	ca. 50
Maximum breadth of symphysis (at the bases of I_2).	ca.132	138	127	ca.129	144	ca.150	ca.129	ca.121	ca.127	ca.110	ca. 97	ca. 94
Length of symphysis	ca.115	ca.137	ca.115	119	130	—	131	134	—	ca. 98	95	ca. 86
Length of diastema	—	80	ca. 63	65	71	66	69	53	—	ca. 63	ca. 67	ca. 55
Distance between I_2 right and left at alveolas	76	91	81	—	91	91	70	80	—	—	—	—

Mandible. Rarely preserved as a whole. Mandibular ramus long (maximum length, incisor excluded, about 472 mm on Z. Pal. No. MgM-V/16, about 433 mm of MgM-V/40) converging at an acute angle of about 10°. Symphysis mandibulae long (from 115 to 134 mm), extending backwards to about the level of P_3, strongly widened anteriorly. Its dorsal surface forms a longitudinal concavity, tapering slightly backwards. Ventral surface also concave, which renders the symphysis very thin and feeble along its sagittal axis. Ventral concavity, situated in the anterior part of the symphysis, tapers quickly backwards and disappears. Some pairs of mental foramina (rarely well preserved) can be observed in this region. Additional two mental foramina are on the labial side of right and left horizontal rami, under the anterior root of P_3. The minimum breadth of the mandible is at about the level of these lateral mental foramina (in adult individuals).

It is very difficult to determine exactly the ventral profile of the mandibular ramus because of the state of preservation of the lower jaws in the discussed material. It seems to be straight or gently concave and slightly but distinctly curved upwards in the symphyseal region. At the ventro-lateral margin of ramus ascendens there is a crest bordering the masseteric fossa from

below, which renders the profile of the jaw more straight. Coronoid process is small and triangular, rarely preserved in the material.

Condyloid processes directed almost perpendicularly to the sagittal axis of the mandible (as a whole), very slightly converging backwards and downwards. Height of the condyloid surface over the ventral profile of the mandible is about 215—230 mm; length of the ascending ramus at the level of the grinding surface — about 140 mm (at Z. Pal. Nos. MgM-V/40, 16).

Table 4

Chilotherium wimani mongolicum — dimensions of the lower cheek-dentition (in mm)

Measurements \ Z. Pal. cat. No. MgM-	V/42	V/17	V/11
Length (at the crown's bases, labially) of: P_2—M_3	254	246	—
P_2—P_4	99	97	—
M_1—M_3	152	149	134
Length (at about the middle of the crown's height, labially) of: P_2	28	25	—
P_3	33	31	30
P_4	39	34	33
M_1	45	43	40
M_2	51	ca. 48	44
M_3	53	50	43
Breadth (maximum) of: P_2	18	17	—
P_3	24	25	26
P_4	26	25	31
M_1	26	29	—
M_2	29	29	36
M_3	30	26	32

Two big divergent incisor-tusks (I_2) are situated in the antero-lateral parts of the symphyseal region. They are separated from the cheek teeth by diastemae, length from 53 to 80 mm. Diastemal crests run from the lingual side of P^2, curving anteriorly outwards. Distance between right and left I_2 varies from 70 to 91 mm.

Deciduous lower dentition:

dI_1 — preserved in only one specimen (Z. Pal. MgM-V/39) in the form of one damaged root;

dI_2 — small tooth, round in transverse section, its top covered with enamel; its diameter of about 8 mm (at Z. Pal. MgM-V/45);

dP_1 — its crown not preserved in the material. Its single root sometimes preserved, sometimes missing. The tooth was presumably rudimentary and not always present;

dP_2 — triangular, with metalophid almost straight.

The rest of the deciduous lower dentition typical for the Rhinocerotidae.

Labial cingulum reduced, except the anterior and posterior styles. Lingual cingulum developed, closing median valleys from lingual side.

Permanent lower dentition:

I_1, P_1 and C not developed;

I_2 — typical for the genus *Chilotherium*, in form of big tusks divergent upwards and outwards. Transverse section at the alveolus oval (see Table 5), its longer diameter directed upwards and inwards. The tooth gradually flatters from the initial part of the root to the crown, the latter being triangular in transverse section, in the region of the wearing surface. Index maximum/minimum diameter very variable (see Table 5), which can be partially connected with sexual dimorphism. It can be also due, in some degree, to the differences in the state of preservation of I_2, which caused some differences when taking measurements, some being taken on roots.

Table 5

Chilotherium wimani mongolicum — dimensions of I_2 (in mm

Measurements / Z. Pal. cat. No. MgM-	Maximum diameter (at the crown's base)		Minimum diameter (at the crown's base)	
	left	right	left	right
V/16	ca. 25	—	20	—
V/40	ca. 37	ca. 35	22	24
V/41	27	28	20	21
V/42	32	—	18	—
V/43	30	—	24	—
V/46	30	30	24	24
V/47	37	35	25	26
V/48	26	26	20	19

Cheek teeth of the rhinocerotid type. Labial cingulum reduced, except for the almost vertical styles in the very anterior and very posterior parts of the tooth wall. Lingual cingulum well developed. At the entrances into the anterior transversal valleys it forms some sort of oblique bars, sloping from the anterior lingual margins of metalophids downwards and backwards. It also forms strong tubercules, closing the posterior transversal valleys from the lingual side. Cingulum is more distinct at molars than at premolars. Cement forms a very thin layer, preserved only on very few crowns.

Discussion. — The bone material assigned in the present paper to *Chilotherium wimani mongolicum* differs from that of typical representatives of the genus *Chilotherium*, as defined by RINGSTRÖM (1924, pp. 26, 70, 74), in having frontals slightly convex, instead of slightly concave, and a comparatively small space between the parietal crests. In the opinion of the present author, these differences point to the necessity of completing the diagnosis of the genus *Chilotherium* RINGSTRÖM, 1924, as all the other features of the subspecies here described (skull profile, situation of orbit, lack of pneumatisation of frontals, development of premaxillae, shape of symphysis mandibulae, dental formula and morphology of teeth) leave no doubt but that it belongs to this genus.

Some data from the literature (WEBER, 1905; MEQUENEM, 1925) show that *Chilotherium (Aceratherium) samium* (WEBER, 1905) and *Chilotherium (Aceratherium) persiae* (POHLIG, 1885) assigned by RINGSTRÖM (1924) to the genus *Chilotherium* differ in a similar way from the diagnosis

of the genus. The former has a slightly convex frontals and highly placed parietal crests (numerical data missing; WEBER, 1905), the latter — a flat frontals (MEQUENEM, 1925).

Comparing the above described material with the known species of the genus *Chilotherium* and assigning or relating it to one of them was very difficult, due to the incompleteness of the material, by which some of the species are represented, and the lack of data in literature concerning the individual variability of features within the particular species. Because of this, several species were excluded from comparison on the base of only one or very few features which, in the opinion of the present authors, could be of diagnostic value. *Chilotherium schlosseri*, for example, was excluded mainly on the base of the shape of occiput (WEBER, 1905), *Ch. wegneri* — on the shape of occiput and paroccipital processes (ANDREE, 1920), *Ch. angustifrons* — on the base of skull proportions, which are, according to RINGSTRÖM (1924), very similar to those of *Ch. gracile* (in this latter, index basal length/maximum breadth of frontals is about 3.95).

The above described form, from Altan Teli, was considered by the present author as a new subspecies of the species *Chilotherium wimani* RINGSTRÖM, known up to now from China (prov. Shansi). The new subspecies differs from the nominal subspecies *(Chilotherium wimani wimani)* in the smaller width of the zygomatic arches and symphyseal region of the mandible, more rounded transverse section of I_2 (range of variability of this feature in *Chilotherium wimani wimani* not known), slightly convex frontals and higher placed parietal crests. *Chilotherium wimani mongolicum* has, in addition, a thin layer of cement on teeth, which is only rarely preserved in fossil state, while in *Ch. wimani wimani* the cement is absent.

Common to both subspecies is, above all, the massiveness of the skulls expressed in the index basal length/maximum breadth of frontals (see Table 6) and the identical structure of the upper cheek teeth, namely: permanent presence of medifossette on P^2, P^3, big role of the crochet in its formation, strongly developed inner cingulum, early fusion of the protoloph and metaloph on P^2, P^3, P^4, on the lingual side of teeth. There is a lack of exact data as to the structure of the processes in the region of the porus acusticus externus in *Ch. wimani wimani*, however from some remarks of RINGSTRÖM (1924) on the subject, it seems that it could correspond to the structure of this region in *Ch. wimani mongolicum*; both subspecies are, in this respect, close to the *Ch. anderssoni* type (paroccipital process distinct from posttympanic process, see Text-fig. 1*B*), but their processes were more massive and more strongly developed. In *Ch. wimani mongolicum* this latter refers mainly to the postglenoid process (see Text-fig. 1-C_1). According to RINGSTRÖM (1924), the Miocene species *Ch. samium* from Samos (two fragmentary specimens), is close in its structure of teeth to *Ch. wimani*, and thus also to *Ch. wimani mongolicum*. *Chilotherium samium* is also distinguished, as mentioned above, by slightly convex frontals and probably very highly placed parietal crests, which makes it all the more close to the form described from Altan Teli; it has, however, narrower frontals and less expanded zygomatic arches. Some length measurements of the skull given by the author of the species show that the skull of *Chilotherium samium* was, at the same time, shorter than the skulls of Asiatic forms close to it. It could, therefore, with smaller dimensions, correspond to them in massiveness (corresponding index not known). However, the lack of sufficient data on *Ch. samium* does not allow for any far reaching conclusions to be drawn as to its relationships.

In spite of the great uniformity of the morphology of skulls, jaws and teeth of *Chilotherium wimani mongolicum*, it is easy to observe some individual variability in their structure. The greatest variability is found in the symphyseal regions of the mandibles (see Table 3) and lower incisors (I_2) (see Table 5). The relation between minimum and maximum diameters of I_2 varies from 20:25 mm to 22:37 mm. Such a big variability in transverse section of I_2 is not surprising

in view of data given by RINGSTRÖM (1924). According to that author, the transverse section in *Ch. anderssoni* ranges from 18:28 mm to 26:47 mm. In spite of the wide range of variability of the symphysis and incisors and the considerable dispersion, sometimes suggesting the presence of two groups in the material, it was not possible to differentiate such groups. The most significant is the variability, undoubtedly individual, in the development of paroccipital processes of the skulls and their relation to posttympanic processes. RINGSTRÖM (1924) considered the

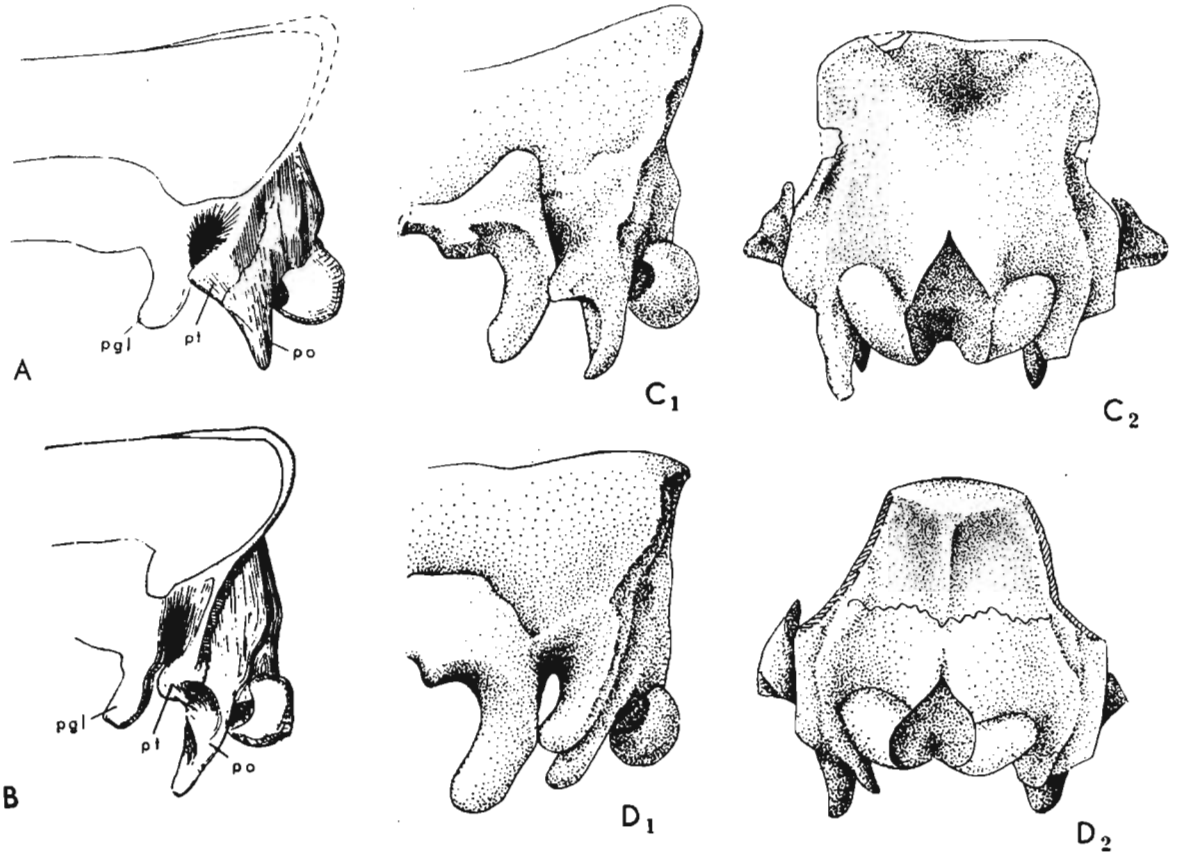

Fig. 1

Morphology of the processes in the occipito-temporal region of the skull in some representatives of the genus *Chilotherium* RINGSTRÖM, 1924: *A* — *Ch. habereri* (left side view), *B* — *Ch. anderssoni* (left side view) (*A* and *B* according to RINGSTRÖM, 1924: *pgl* proc. postglenoidalis, *pt* proc. posttympanicus, *po* proc. occipitalis); C_1 — *Ch. wimani mongolicum* (left side view of the specimen Z. Pal. MgM-V/11), C_2 — *Ch. wimani mongolicum* (occiput of the same specimen as in C_1); D_1 — *Ch.* aff. *wimani* (left side view, specimen Z. Pal. No. MgM-V/12), D_2 — *Ch.* aff. *wimani* (occiput of the same specimen as in D_1).

shape of the paroccipital processes as an important diagnostic feature of specific rank in the genus *Chilotherium*. That author did not mention individual variability in this region of skull, despite the rich collection of the skulls at his disposal. Individual variability of paroccipital and posttympanic processes, observed on the material from Altan Teli, is presented on Text-fig. 2. In the typical skull of Z. Pal. No. MgM-V/11, the left paroccipital process is long and cone-like, with a small base and anteriorly-bent top. It is very distinct from the posttympanic process. Along the anterior wall of paroccipital process run two crests, the antero-lateral one extending onto the posttympanic process, and the antero-medial one onto the petrotympanic one. Develop-

Table 6

Comparison of skulls and upper dentitions in some representatives of *Chilotherium* RINGSTRÖM, 1924

Species	*Ch. wimani mongolicum*	*Ch. wimani wimani*	*Ch. habereri*	*Ch. anderssoni*	*Ch. samium*
Locality; number of measured specimens	Altan Teli; 3	prov. Shansi loc. 51; 2	prov. Shansi loc. 43, 44; 2	prov. Shansi loc. 30; 4	Samos; 2
Basal length to maximum breadth of frontals	3.06; 3.16; 3.23	ca. 3.24	3.84; 3.84	3.09; 3.48; 3.64; 3.73	?
Zygomatic breadth (in mm)	277—283	310—350	250; 255	260—272	225—240
Medifossette at premolars	at P^3-P^3 always present; at P^4 sometimes present	at P^2-P^3 always present; at P^4 sometimes present	at P^2, P^3, P^4, sometimes present	absent	at P^2, P^3, P^4 present *
Length of cheek-teeth to breadth (over metaloph) (mean value)	P^3 — 0.77 M^1 — 0.8	P^3 — 0.77 M^1 — 0.8	P^3 — 0.9 M^1 — 0.81	P^3 — 0.94 M^1 — 1.02	P^3 — 0.71 M^1 — 0.77
Transverse section of frontals	slightly convex	slightly concave (?)	slightly concave	slightly concave	slightly convex

* Known only from one specimen.

ment of the anterolateral crest causes gradual effacing of the boundary between paroccipital and posttympanic processes, which to some degree can be observed on the right side of the skull MgM-V/11 (see Text-fig. 2-A_2). Development of both crests causes narrowing of the space between paroccipital and postglenoid processes (MgM-V/14; see Text-fig. 2-C_1, C_2). Also variable is the degree of overlapping of posttympanic process onto the preceding postglenoid one (Text-fig. 2), as well as the degree of closing of the meatus acusticus externus from below.

Worth mentioning is the exceptional stability of the form of postglenoid processes, which, within the examined group, were almost without any individual variability. In other species of the genus *Chilotherium* this process has a similar shape, in lateral view, differing however from that in the material discussed here in dimensions and possibly also in transverse section. As to the latter, there is a lack of data.

Very well visible in the material described here is the narrowing of the palate with individual development which, in the first stage, is caused by the substitution of deciduous dentition by permanent dentition (permanent teeth somewhat broader than deciduous) and then by the

gradual shifting of the teeth anteriorly as a result of wearing (molars wider than premolars, tooth-rows converge). In addition, a certain individual variability is observed in the width of palate which, however, is difficult to present numerically due to the deformation of the majority of skulls in this region.

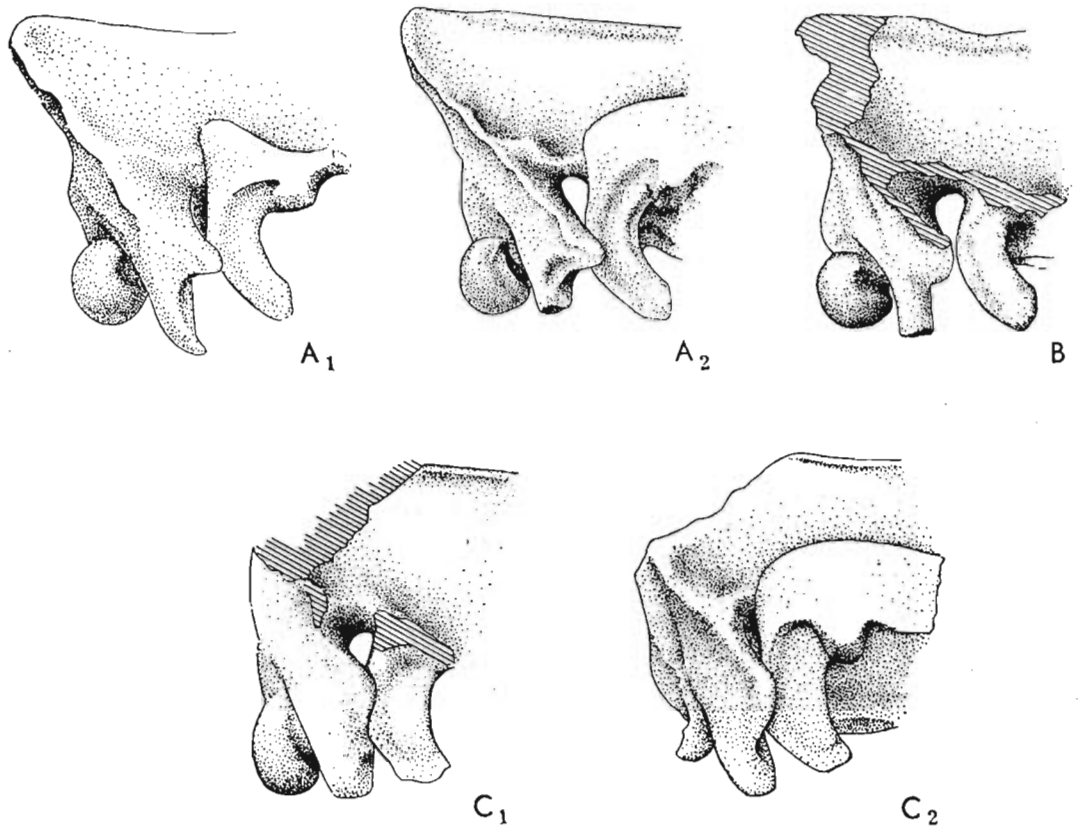

Fig. 2

Chilotherium wimani mongolicum n. subsp. Individual variability of the morphology of the processes in the occipito-temporal region of the skull: A_1 — left side view of the specimen Z. Pal. No. MgM-V/11 (figure reversed), A_2 — right side view of the same specimen as in A_1; B — right side view of the specimen Z. Pal. No. MgM-V/13; C_1 — right side view of the specimen Z. Pal. No. MgM-V/14, C_2 — left side view of the same specimen as in C_1 (figure reversed).

Chilotherium aff. **wimani** RINGSTRÖM, 1924

(Pls. XXI—XXIV)

Material (Z. Pal. No. MgM-V/12). — A complete skull of a young individual with functional deciduous dentition dP^2—dP^4 (strongly damaged), the first deciduous premolar being replaced by the permanent one. M^1 and M^2 already erupted, M^1 slightly worn, M^2 not yet grown up. Premaxillae lacking, the lateral parts of the occipital surface damaged. Left paroccipital process preserved, right one broken off near its base.

Description. — *Skull.* Dorsal profile of the skull is similar to that in *Chilotherium wimani mongolicum*. It differs from the latter in having a slight flattening on the skull roof, above the nuchal crest (which is probably secondary in nature), and a small longitudinal convexity (about 50 mm long, 23 mm wide) at the level of the fronto-parietal suture. Infraorbital region flat,

the orbit situated just under the skull roof, which is characteristic for the representatives of the genus; supraorbital processes identical with those described in *Ch. wimani mongolicum*. Nasals very short, extending to the level of dP^2. Their form is characteristic for the genus *Chilotherium* (the same as described in *Ch. wimani mongolicum*). Parietal crests not very distinct, rather highly situated. Minimum distance between them approx. 34 mm. The medial part of the nuchal crest forms a convexity, projecting backwards to a rather considerable degree, compared with the situation of its lateral parts, which can partly be connected with the damage of the lateral margins of the occipital surface. The concavity for the insertion of ligamentum nuchae, situated just under the nuchal crest, is rather flat and divided by a vertical crest into two concaivties. The shape of the occiput is difficult to determine exactly, because of the state of preservation of its margins (see above). Left paroccipital process is short (its length from the lower margin of the posttympanic process is about 31 mm), coniform, directed somewhat medio-anteriorly. The basal part of the right paroccipital process looks, however, somewhat different from the left one, suggesting its more vertical (in posterior view) position. As the left paroccipital process shows some breaks joined in preparation, it can be presumed that this process was subject to deformation.

Posttympanic process well distinct from paroccipital process, the suture between them well visible. It closely adjoins postglenoid process, however they are not fused to close meatus acusticus externus from below. Postglenoid process is, as to form and dimensions, similar to that described in *Ch. wimani mongolicum*, but more stout and more rounded in transverse section. Its length from the horizontal level of the glenoid fossa is about 74 mm.

The base of the sphenoid bone is very narrow between right and left foramen lacerum, and especially in the region of the occipito-sphenoid suture. Basilar tubercule of the sphenoid strongly developed, stout and rounded.

Zygomatic arches very similar to those in *Ch. wimani mongolicum* (anterior height 56 mm, anterior thickness 20 mm, posterior height 51 mm, minimum thickness, just behind the orbit, 12 mm), very slightly bent upwards, just behind the orbit. Facial crest extends forwards to the level of the posterior root of dP^4. Nasal notch (preserved on left) is situated above the anterior part of M^1; single infraorbital foramen above the middle of dP^4. Premaxilla not preserved. The palate is very wide, which is probably connected with the young age of the individual.

Some important sutures such as occipito-sphenoid, temporo-sphenoid, temporo-parietal, fronto-nasal, internasal, sutures on the occipital surface and some others, are not as yet fused.

Dimensions (in mm) of the specimen Z. Pal. No. MgM-V/12:

Basal length (estimated)	525
Crista occipitalia (midpoint) to anterior edge of orbit	325
Crista occipitalis (midpoint) to supraorbital process	278
Maximum breadth of the occiput	ca. 196
Minimum distance between parietal crests	ca. 34
Breadth of frontals at supraorbital processes	175
Zygomatic breadth	281
Distance between the tops of postglenoid processes	ca. 125
Height of occiput	172
Breadth of palate between P^2 right and left, estimated	50
Breadth of palate at the anterior top of the choanae	73

Dentition:

dP^1 is substituted by P^1;

P^1 — unmolarized, massive, rounded in transverse section. Its morphology is the same as that of dP^1 described in *Ch. wimani mongolicum*. It differs from the latter in its much bigger

dimensions and much higher crown, the base of which is at the same horizontal level as those of the other permanent teeth (M^1).

P^2 (removed from maxilla during preparation) — a big (see dimensions), quadrangular tooth, with distinct medifossette cut off by both crochet and crista. Strong cingulum runs without any interruption along the anterior, lingual and posterior walls. Deuterocone and antecrochet not modelled. Protoloph and metaloph fused at a high level on lingual side of the crown. Parastyle distinct, without parastyle fold.

DP^2—dP^4 seem to be of a very similar structure (as judged from the badly preserved dentition of the specimen in question), as those described in *Ch. wimani mongolicum*. They differ from the deciduous teeth of the latter in having larger dimensions, somewhat stronger cingulum of dP^4 and probably medifossette on dP^4. Some characters, such as the presence or absence of medifossette on dP^2, dP^3, the shape of anterior cingular fossette on dP^2, the development of cingulum, cannot be investigated on the specimen.

M_1 — is also very similar to the first molars in *Ch. wimani mongolicum*. It differs from them in having a somewhat more distinct cingulum (interrupted, however, on the lingual side of the protoloph) and a less isolated protocone.

Length dP^2—dP^4 is 130 mm.

Length P^1—M^2 (right) is about 265 mm.

Dimensions (in mm) of deciduous and permanent dentition, present on the specimen Z. Pal. MgM-V/12, are as follows:

Measurements	P^1	P^2	dP^2	dP^3	dP^4	M^1	M^2
Length (maximum, labially)	24	41	41	47	57	50	ca. 54
Breadth (over protoloph)	26	48	38	45	48	62	—
Height	32	55	13	15	28	56	—

Discussion. — The skull does not differ in general outline from other skulls of the described collection assigned to *Chilotherium wimani mongolicum*; in particular it shares those characters, which relate them to the subspecies *Ch. wimani wimani*, such as: morphology of the cheek teeth (degree of development of cingulum, presence of medifossette at P^2, weak degree of individualization of deuterocone, early fusing of protoloph and metaloph of premolars), similar dimensions and considerable massiveness of skull.

Differences common to both forms coming from Altan Teli, when compared with *Ch. wimani wimani*, are: less expanded zygomatic arches, higher situated parietal crests (minimum distance between them is 55 mm for *Ch. wimani wimani*, 32—40 mm for *Ch. wimani mongolicum*, 34 mm for the specimen in question) and lack of concavity between supraorbital processes. All the features common to *Ch. wimani mongolicum* and the specimen discussed here, as cited above, point to their close relation.

The skull was, however, differentiated from the rest of the material on the base of the following differences, when compared with *Ch. wimani mongolicum*:

1) a different structure of paroccipital process and different transverse section of postglenoid process,

2) presence of permanent P^1,

3) very large dimensions of cheek teeth, especially P^2,

4) flatter frontals,

5) presence of small convexity in the middle part of the nuchal crest (instead of concavity),

6) very narrow base of skull (in region of spheno-occipital suture),

7) very wide palate.

Some of these differences could be ascribed to the young age of the specimen. The palate narrows with individual development (see above) and the base of the skull can become somewhat wider as a result of progressive ossification of the spheno-occipital suture and medial margins of right and left foramen lacerum. Changes during postnatal development occur also in the nuchal crest as a result of the action of the strong nuchal muscles. It is doubtful, however, if in this way, convexity of the crista nuchalis could be changed into concavity. The character and number of the remaining differences speak for the distinctness of the here described specimen from *Ch. wimani mongolicum.*

The appearance of such essential similarities and, at the same time, of a number of distinct differences between two forms coming from one locality is somewhat confusing. The precise specific identification of the form in question is made still more difficult in view of the fact that it is represented by a single young specimen. It is, therefore, provisionally regarded as *Chilotherium* aff. *wimani* RINGSTRÖM, 1924.

In the present author's opinion, it cannot be excluded that the particular features of the specimen here discussed are within the range of variability for *Ch. wimani mongolicum*, which then would be much greater than appears from our relatively not very rich collection. The gap separating the specimen in question from *Ch. wimani mongolicum* would then be only the result of the incompleteness of the material.

Chilotherium sp. a

(Pl. XXV)

Material (Z. Pal. No. MgM-V/49). — A fragmentary symphysis mandibulae with two, well preserved huge incisors I_2. Form of symphysis and tusks typical for the genus *Chilotherium*, but is it not possible to determine the species.

Description. — Shape and size of wearing surface of teeth indicates the young age of the individual (according to RINGSTRÖM, 1924) the stage directly after the coming into use of M_2).

The specimen is of very large dimensions, with very deep concavity on ventral side of anterior part of symphysis (maximum depth of about 47 mm) and strongly flattened crowns of incisors (diameters 47:26 mm for left I_2, 48:27 mm for left one).

Dimensions (in mm):

Minimum breadth of mandible at the symphysis		127
Minimum distance between diastemal crests	approx.	70
Maximum breadth of symphysis		167
Length of diastema (left)	approx.	69
Distance I_2—I_2 at alveolas		100
Inner length of I_2 left	approx.	126
Inner length of I_2 right	approx.	130

Discussion. — The specimen was excluded from the main part of the collection on the base of the very great maximum breadth of symphysis which differs basicaly (see below) from that in *Ch. wimani mongolicum.*

Frequency distribution. Maximum breadth of symphysis (in mm) for *Chilotherium wimani mongolicum*, specimen No. MgM-V/49 included:

Measurements	Frequency	Measurements	Frequency
121—125	1	146—150	1
126—130	4	151—155	0
131—135	1	156—160	0
136—140	1	161—165	0
141—145	1	166—170	1 *

* Specimen Z. Pal. No. MgM-V/49.

Chilotherium sp. **b**

Material (Z. Pal. No. MgM-V/50). — A fragmentary mandible with horizontal rami broken off at their bases. Form of symphysis typical for the genus *Chilotherium*, but it is impossible to determine the species.

Dimensions (in mm):

Minimum breadth of mandible at symphysis . . . approx. 117
Minimum distance between diastemal crests 72
Maximum breadth of symphysis . . . . . approx. 155
Length of diastema (left) . . . . . approx. 38
Maximum and minimum diameters of I_2 right 30:22
Concavity on the ventral side of symphysis mandibulae much shallower than in the preceding specimen.

Table 7

Dimensions (in mm) of the humerus in the representatives of *Chilotherium* RINGSTRÖM, 1924 from Altan Teli and China

Measurements	Z. Pal. cat. No. MgM-V/64 Altan Teli			*Ch. anderssoni* Shansi, loc. 30 (RINGSTRÖM, 1924)	*Chilotherium* sp. Shansi, loc. 110 (RINGSTRÖM, 1924)
	a	b	c		
Breadth over tuberositas deltoidea. .	ca.104	—	—	120	111
Breadth of the trochlea humeri, over crista epicondyli lateralis	—	110	127	150	132
Breadth of the trochlea humeri . .	—	85	90	90	84

The specimen is of similar measurements to the larger representatives of *Ch. wimani mongolicum*. It differs from the latter in its symphysis, which is strongly bent upwards. This is manifested in the considerable shortening of the diastema (approx. 50% of the diastemal

length for *Ch. wimani mongolicum*) and, connected with this, curving of the diastemal crests. It is not clear from the state of preservation, whether this form of symphysis is here natural or due to *post mortem* deformation, which makes it more difficult to assign the species.

Table 8

Dimensions (in mm) of the radius in the representatives of *Chilotherium* RINGSTRÖM, 1924 from Altan Teli and China

Measurements	Z. Pal. cat. No. MgM-V/64 Altan Teli			*Ch. anderssoni* Shansi, loc. 30 (RINGSTRÖM, 1924)
	d	e	f	
Breadth of the proximal articulation surface . .	80	—	—	90
Breadth of the distal articulation surface . . .	—	71	—	90
Breadth about the middle of the shaft	—	—	53	56

Chilotherium sp. c

Material (Z. Pal. MgM-V/64). — Three proximal and five distal fragments of humerus; a fragment of corpus humeri; two proximal and two distal fragments of radius; four proximal and three distal fragments of femur; one proximal fragment of tibia; five carpals.

Dimensions are given in Tables 7 and 8.

The state of preservation of the long bones does not allow for a more detailed examination. They do not differ in general outline from the bones of genus *Chilotherium*, described and illustrated by RINGSTRÖM (1924). They are generally of smaller breadth than the corresponding bones of *Ch. anderssoni* from the locality 30 (Shansi). The lack, however, of data on the individual variability of long bones of this and other species of *Chilotherium*, as well as not very exact measurements of the long bones from Altan Teli, makes an exact comparison impossible.

Palaeozoological Laboratory
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Warszawa, February 1968

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PLATES

(All photographs retouched)

PLATE XX

Fig. 1. Skull (after the separation of the lower jaws, figured on Pl. XXIV, Fig. 5), type specimen (Z. Pal. No. MgM-V/11): *a* left side view, *b* right side view; ca. × 0.3.

Fig. 2. Skull in lateral view (Z. Pal. No. MgM-V/13); ca. × 0.3.

Photo: L. Łuszczewska

M. Borsuk-Białynicka: Lower Pliocene rhinocerotids

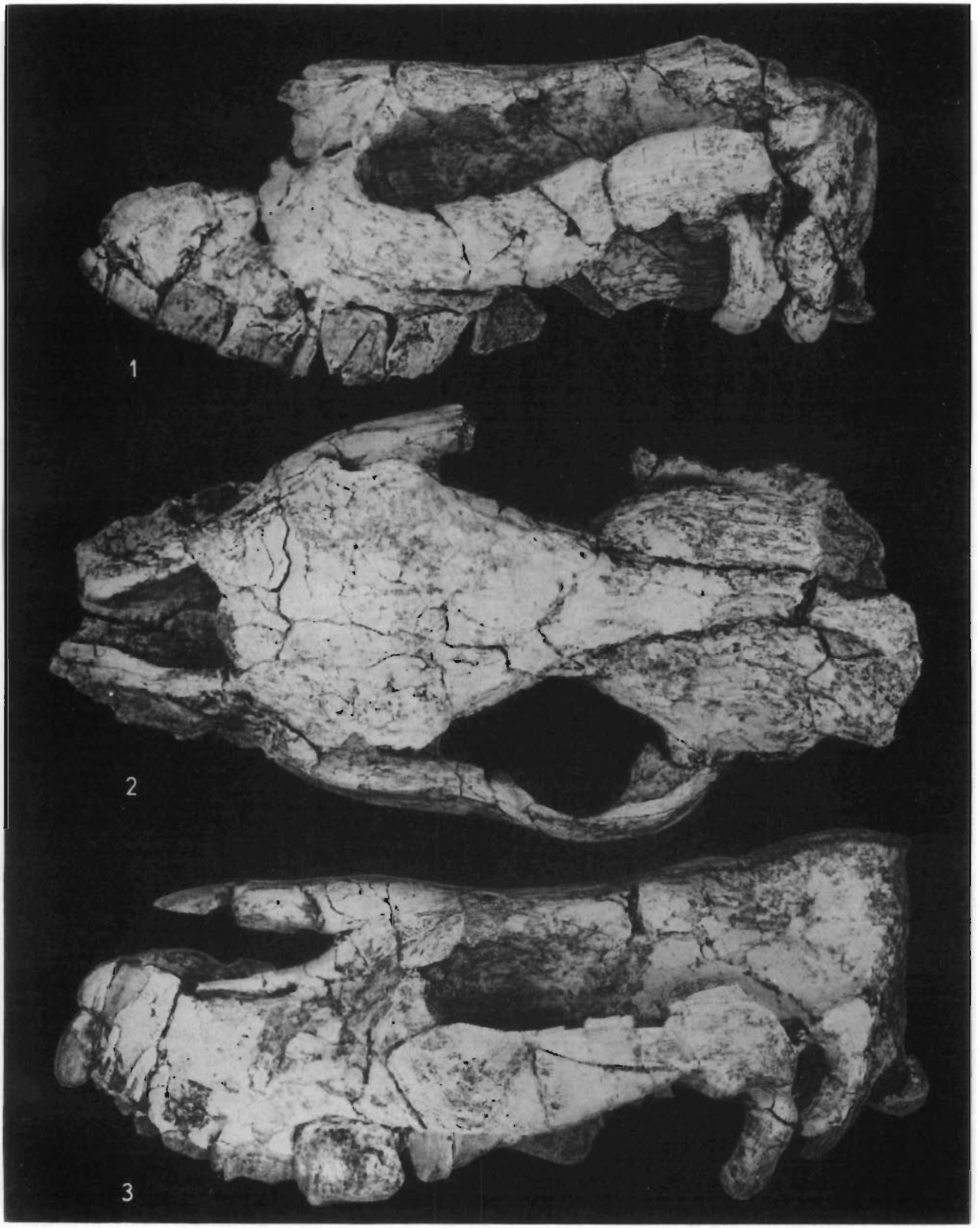
PLATE XXI

Fig. 1. Incomplete skull in lateral view (Z. Pal. No. MgM-V/14); ca. × 0.3.
Fig. 2. Skull in dorsal view (Z. Pal. No. MgM-V/13); ca. × 0.3.

Fig. 3. Skull of a young individual with functional deciduous dentition, lateral view (Z. Pal. No. MgM-V/12); ca. × 0.3

Lower Pliocene, Altan Teli, Western Mongolia

Photo: L. Luszczewska



M. BORSUK-BIAŁYNICKA: LOWER PLIOCENE RHINOCEROTIDS

PLATE XXII

Fig. 1. Visceral part of a skull of a juvenile individual (Z. Pal. No. MgM-V/19); *a* dorsal view, *b* lateral view; ca. × 0.3.

Fig. 2. Skull of the type specimen, dorsal view (Z. Pal. No. MgM-V/11); ca. × 0.3.

Fig. 3. Skull of a young individual, dorsal view (Z. Pal. No. MgM-V/12; ca. × 0.3.

Lower Pliocene, Altan Teli, Western Mongolia

Photo: L. Łuszczewska

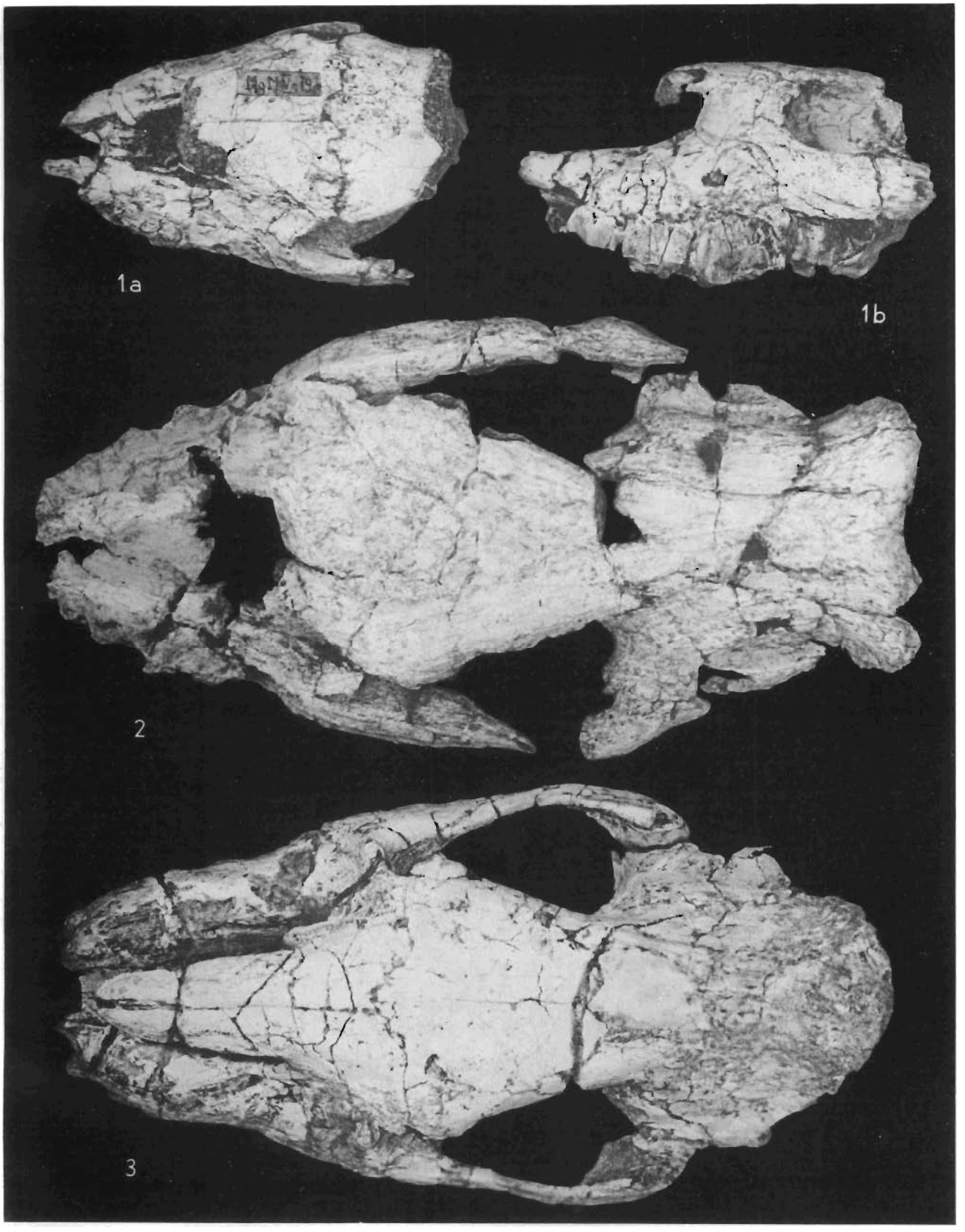

1a
1b
2
3

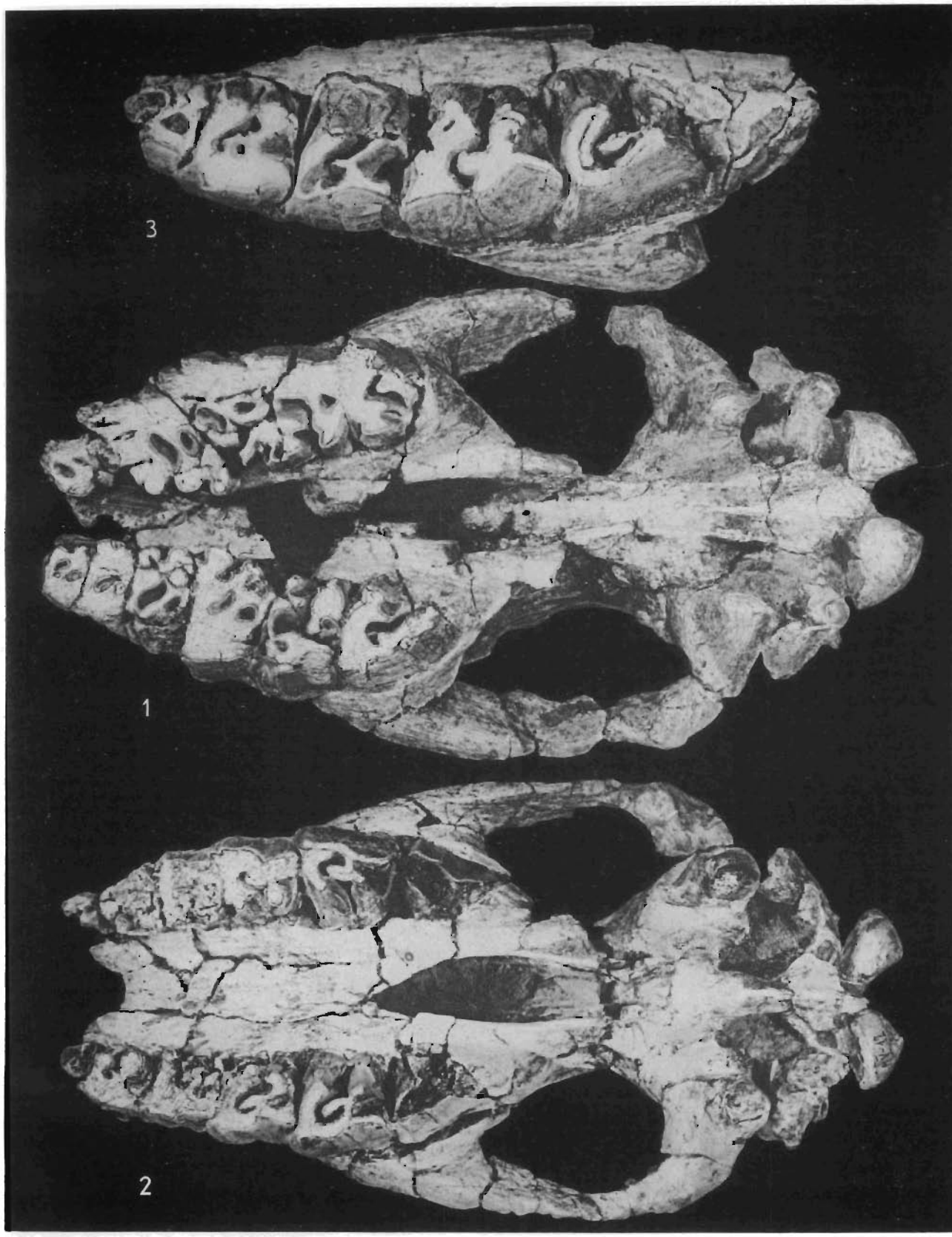
PLATE XXIII

Fig. 1. Skull of the type specimen, ventral view (Z. Pal. No. MgM-V/11); ca. × 0.3.
Fig. 3. Right maxilla, occlusal view (Z. Pal. No. MgM-V/20); ca. × 0.5.

Fig. 2. Skull of a young individual with functional deciduous dentition, ventral view (Z. Pal. No. MgM-V/12); ca. × 0.3.

Lower Pliocene, Altan Teli, Western Mongolia

Photo: L. Łuszczewska



M. BORSUK-BIAŁYNICKA: LOWER PLIOCENE RHINOCEROTIDS

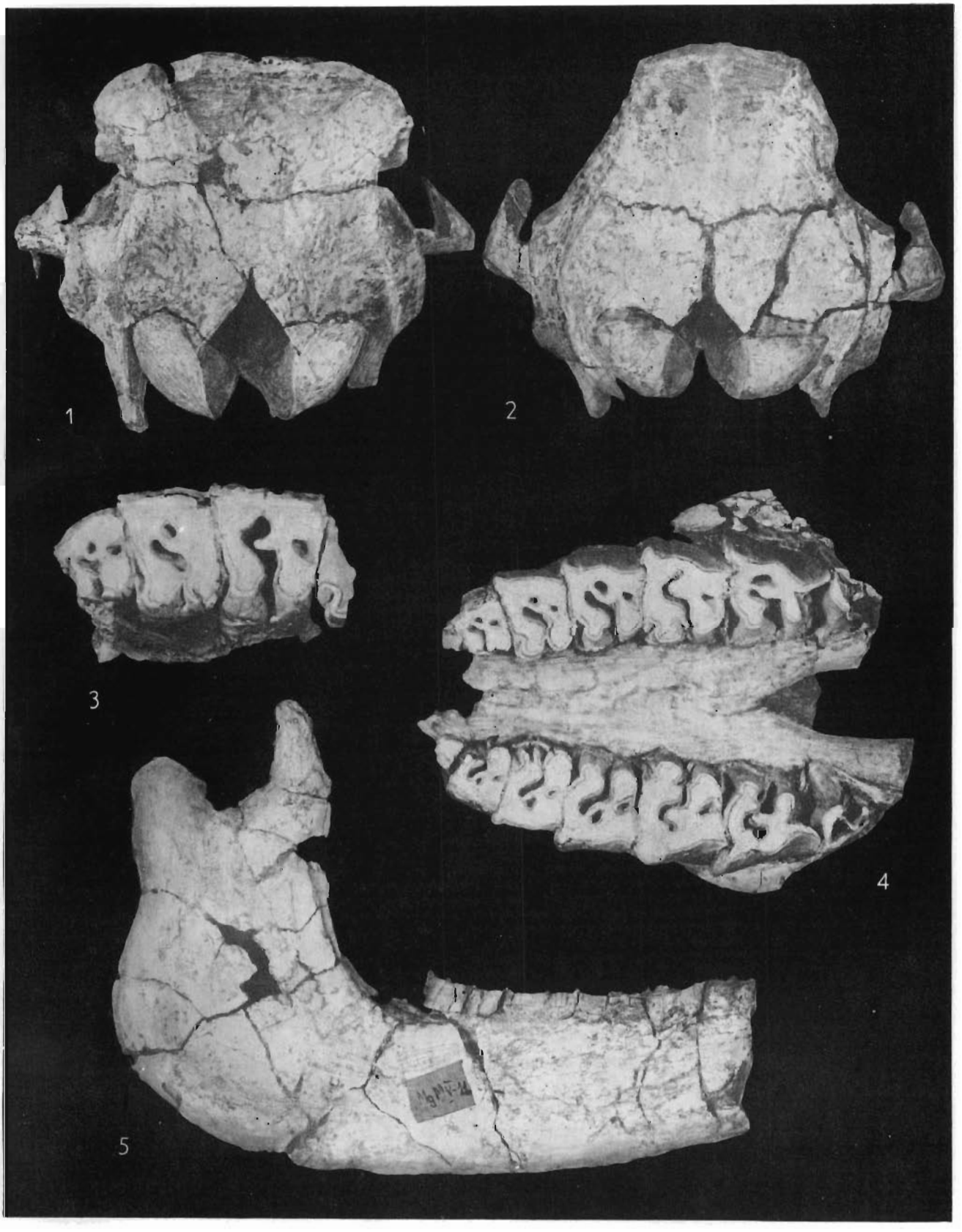
PLATE XXIV

Fig. 1. Occiput of the type specimen (Z. Pal. No. MgM-V/11); ca. × 0.3.
Fig. 3. Cheek-teeth P^2—P^4, occlusal view (Z. Pal. No. MgM-V/22); ca. × 0.5.
Fig. 4. Visceral part of a skull, occlusal view (Z. Pal. No. MgM-V/17); ca. × 0.3.
Fig. 5. Right mandible of the type specimen, lateral view (Z. Pal. No. MgM-V/11); ca. × 0.3.

Fig. 2. Occiput of a young individual (Z. Pal. No. MgM-V/12); ca. × 0.3.

Lower Pliocene, Altan Teli, Western Mongolia

Photo: L. Łuszczewska



M. BORSUK-BIAŁYNICKA: LOWER PLIOCENE RHINOCEROTIDS

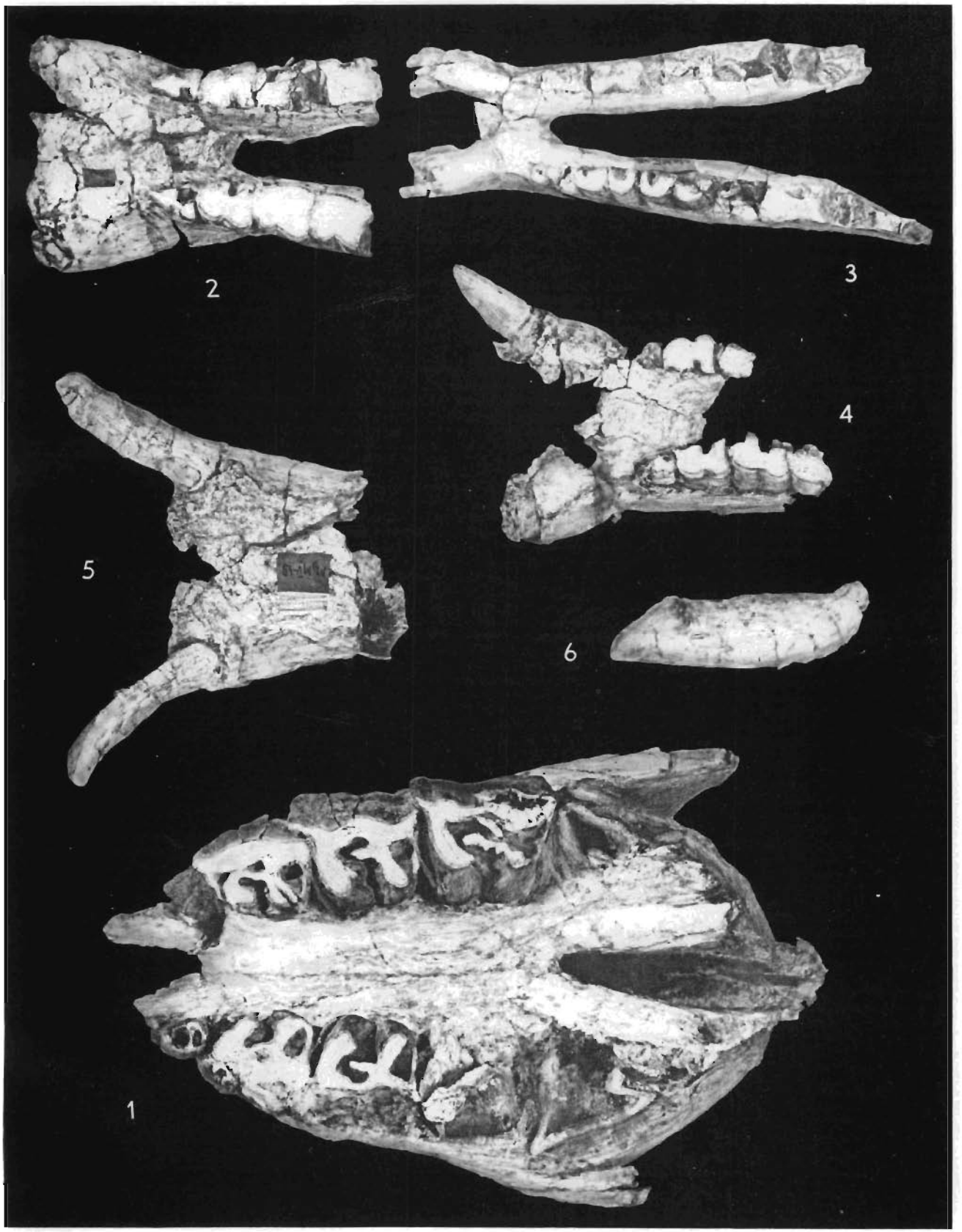
PLATE XXV

Fig. 1. Visceral part of a skull of a juvenile individual, occlusal view (Z. Pal. No. MgM-V/19); ca. × 0.5.
Fig. 2. Anterior part of a mandible, occlusal view (Z. Pal. No. MgM-V/46); ca. × 0.3.
Fig. 3. Mandible of a juvenile individual without vertical parts of the rami, occlusal view (Z. Pal. No. MgM-V/45); ca. × 0.3.
Fig. 4. Anterior part of a mandible, occlusal view (Z. Pal. No. MgM-V/47); ca. × 0.3.
Fig. 6. Lower incisor I_2, medial view (Z. Pal. No. MgM-V/60); ca. × 0.3.

Fig. 5. Symphysis mandibulae, dorsal view (Z. Pal. No. MgM-V/49); ca. × 0.3.

Lower Pliocene, Altan Teli, Western Mongolia

Photo: *L. Luszczewska*



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