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GOYOCEPHALE LATTIMOREI GEN. ET SP. N., A NEW FLAT-HEADED
PACHYCEPHALOSAUR (ORNITHISCHIA, DINOSAURIA) FROM THE
UPPER CRETACEOUS OF MONGOLIA

PERLE, A., MARYAŃSKA, T. and OSMÓLSKA, H.: *Goyocephale lattimorei* gen. et sp.n., a new flat-headed pachycephalosaur (Ornithischia, Dinosauria) from the Upper Cretaceous of Mongolia. Acta Palaeont. Polonica, 27, 1-4, 115-127, December 1982. Issued January 1983.

A new representative of the pachycephalosaur family Homalocephalidae Dong is described, which comes from the Upper Cretaceous deposits of the Gobi Desert, Mongolian People's Republic. It is more primitive and probably stratigraphically older than *Homalocephale calathocercos* known from the Upper Cretaceous Nemegt Formation of the Gobi Desert. The diagnosis of *H. calathocercos* is revised.

Key words: dinosaurs, Ornithischia, Pachycephalosauria, Cretaceous, Mongolia.

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INTRODUCTION

In 1977, an incomplete skeleton was collected by the senior author at the locality Boro Khovil 10 km west of Dzamyn Khond (60 km west of Bulgan Somon and south of the Arts Bogd Ull Mountain) in the southern Gobi Desert, Mongolia. The precise age of the red sandstone deposits at Boro Khovil is still undetermined. It is probable that they are not older than the Djadokhta Formation, judging from the mutual relations of the Boro Khovil beds and the sediments of the Djadokhta Formation exposed in the vicinity. This material supplements our knowledge of the flat-headed pachycephalosaur family Homalocephalidae Dong, 1978. Dong assigned to this family: *Yaverlandia* Galton, 1971, *Wannanosaurus* Hou, 1977, *Micropachycephalosaurius* Dong, 1978 in addition to the nominative genus *Homalocephale* Maryńska et Osmólska, 1974. The Homalocephali-

dae are characterized by the flat skull roof and the relatively large supratemporal fenestrae. The new genus described here displays these characters. The Homalocephalidae presently known are small to medium sized dinosaurs ranging from about 60 cm to 150 cm (total length), that are known so far only from the Eurasian continent. They display anatomical characters that distinguish them from the Pachycephalosauridae, thus we accept Dong's opinion that the family constitutes a natural, separate unit within the suborder Pachycephalosauria Maryańska et Osmólska, 1974.

Wall and Galton 1979 considered the separate subordinal status for pachycephalosaurs not justified. We intend to reconsider the problem in a future paper.

In addition to the flat-headed pachycephalosaurs, the dome-headed members of the family Pachycephalosauridae Sternberg, 1945 (*sensu* Dong 1978) also occur in the Asian Upper Cretaceous. These include "*Stegoceras*" *bexelli* Bohlin, 1953, *Tylocephale* Maryańska et Osmólska, 1974, *Prenocephale* Maryańska et Osmólska, 1974. We considered (Maryańska and Osmólska 1974) that members of the family Pachycephalosauridae were characterized by well pronounced heterodonty (presence of caniniform premaxillary teeth except for *Stegoceras* in which these are not caniniform). It is now known that heterodonty was also present in the homalocephalid here described *Goyocephale lattimorei* gen. et. sp. n.

Abbreviations used: GI SPS — Geological Institute, Academy of Sciences of the Mongolian People's Republic, Ulan Bator; ZPAL — Institute of Paleobiology, Polish Academy of Science, Warszawa.

The material here described is stored in the Laboratory of Stratigraphy and Paleontology, Geological Institute, Academy of Sciences of the Mongolian People's Republic, Ulan Bator.

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SYSTEMATICS

Suborder **Pachycephalosauria** Maryańska et Osmólska, 1974

Family **Homalocephalidae** Dong, 1978 nom.corr. (= Homalocephaleridae Dong, 1978)

Genus *Homalocephale* Maryańska et Osmólska, 1974

Homalocephale calathocercos Maryańska et Osmólska, 1974

(pl. 42: 13)

Holotype: GI SPS 100/1201 (= GI SPS 100/51 in Maryańska and Osmólska 1974: 56).

Revised diagnosis.—Supratemporal fenestra rounded, interfenestral bridge broad, equal about the transverse width of supratemporal fenestra. Interfrontal and frontoparietal sutures distinct. Infratemporal fenestra broad anteroposteriorly and high dorsoventrally. Orbit large and nearly round. Dorsal part of quadrate deflected posteriorly. Occiput moderately concave, deepened at the centre. Foramen magnum relatively large, about one seventh of width of the occiput. Occipital condyle large. Ventral maxillary edge bowed laterally along its posterior portion. Cranial roof roughly ornamented. Sacrum including 6 coalesced vertebrae. Preacetabular process of ilium with gently convex dorsal surface; medial iliac flange long anteroposteriorly; postacetabular process curved downwards in lateral view.

Stratigraphic and geographic range.—Nemegt Formation, Upper Cretaceous, Nemegt, Nemegt Basin, Gobi Desert, Mongolia.

Genus *Goyocephale* nov.

Type species: *Goyocephale lattimorei* sp. n.; genus monotypic.

Derivation of the name: Goyo (mong.)—decorated, elegant; cephalo (gr.)—head.

Diagnosis, geographic and stratigraphic range as for the type species.

Goyocephale lattimorei sp. n.

(pls. 41, 42: 1—12, 43—45)

Holotype: GI SPS 100/1501, disarticulated skeleton including complete skull roof, damaged occiput (fragments of parietals, squamosals and exoccipitals), basicranial region (basioccipital with condyle and fragmentary basisphenoid), left postorbital bar, fragments of quadrates and of jugals, premaxillae and maxillae with dentition, mandibles with dentition, atlas intercentrum, 2 spinal processes of dorsals, sacrum with fragments of neural arches, a nearly complete series of 32 caudal centra (7 posterior ones with fragmentary arches preserved), ilia with damaged acetabular regions, left humerus, fragmentary left ulna and radius, fragments of indeterminate phalanges, sterna, distal part of left tibia, proximal part of left (?) fibula, two left distal tarsals, proximal and distal parts of left metatarsals II, III, IV, distal end of right metatarsal IV, left pedal digit IV (lacking phalanx IV—4), phalanx IV—2 of right pes, left phalanx II—1, unguals of left pedal digits II and III, numerous caudal tendons, fragments of thoracic ribs and indeterminate skeletal remains. Figured on pls. 41, 42: 1—12, 43—45.

Type horizon: Upper Cretaceous, red sandstones; no precise age determination.

Type locality: Boro Khovil, 10 km west of Dzamyn Khond, South Gobi Desert, Mongolia.

Derivation of the name: named in honour of the eminent American mongolist Prof. Owen Lattimore.

Diagnosis.—Supratemporal fenestra longitudinally oval, interfenestral bridge narrow, about one third of the transverse width of supratemporal fenestra. Occiput weakly concave with relatively small occipital condyle. Ventral maxillary edge weakly arched laterally along its posterior portion. Medial portion of cranial roof indistinctly ornamented. Four weakly coossified vertebrae included into sacrum. Dorsal surface of preacetabular process of ilium flat, bent angularly along medial and lateral margins; medial iliac flange short anteroposteriorly; postacetabular process straight and subrectangular in lateral view.

Material. — Only the holotype known.

Dimensions (in mm):

Length of skull (tip of premaxilla — upper end of quadrate)	230 estim.
greatest width of skull roof	135
antorbital length of skull	86 estim.
postorbital length of skull	80 estim.
length of humerus	92
proximal width of humerus	28
distal width of humerus	21
length of sacrum (4 vertebrae!)	105 estim.
length of ilium	230 estim.
distal width of tibia	64

Description. — *The skull.* The cranial roof is tablelike, somewhat depressed about the centre and narrowed just anterior to the postorbitals. The portions of the parietal that bound the supratemporal fenestra anteriorly and medially are narrow. The interfrontal and frontoparietal sutures are distinct (fig. 1A). The occipital region is weakly concave with a relatively small occipital condyle that is formed mainly by the basioccipital. Of the basisphenoid, the basal tubera, basisphenoid tubera and pituitary fossa are preserved, which do not seem to display any difference from those of other pachycephalosaurs. The neurocranium as a whole is comparatively short anteroposteriorly. As can be judged from the surrounding bones preserved, the infratemporal fenestra was narrow. The anterior end of the nasal is covered with prominent, pointed tubers. Medially, the roof is weakly ornamented. A strong nodelike ornamentation is developed along the posterior margin of the squamosals. The anterior portion of the premaxilla is comparatively long and shallow, in lateral view. The lower margin of the external narial opening is longer than the posterior margin is high. The upper edge of the premaxilla, which contacts the nasal, is straight and extends horizontally. In palatal view, the premaxillae contact each other along their entire lengths; the same is true for premaxillary processes of the maxillae. Heterodonty is pronounced, the premaxillary teeth being caniniform.

Between the premaxillary and maxillary teeth there is a large diastema. The alveolar margin of the maxilla is almost straight, being only slightly bent laterally close to its end. There are 15 maxillary teeth preserved but the number might be greater by one or two.

The mandible. Both lower jaws are present but disarticulated. The mandibular ramus is shallow, slightly sigmoidal in ventral view, and has a long retroarticular process. The coronoid process is insignificantly elevated above the upper margin of the jaw. The jaw is flat and broad ventrally for more than a half of its posterior length. The tooth row (with 18 teeth) reaches the anterior end of the dentary, where a surface is present for contact with the opposite dentary. Although its anterior and posterior extremities are broken the splenial is long and narrow; the coronoid is fragmentary but small. The articular is well developed and extends anteriorly to the middle of the mandibular fossa. The dorsal portion of the comparatively long retroarticular process is vertical while the lower region develops a horizontal wing laterally. The glenoid fossa is shallow and opens laterally and medially. Ornamentation covers the lateral and ventral surface of the angular.

Dentition. There were three caniniform teeth in the premaxilla, but the first one, the smallest judging from the size of alveola, is lacking in our specimen. They are slightly curved posteriorly. The crowns are distinctly marked off the roots by their swollen bases. Each tooth bears posteriorly a crenellated edge along one third of

its apical portion; the number of serrations per 1 mm amounts to 6. The third caniniform tooth is the strongest and is almost as long as the depth of the tooth-bearing portion of the premaxilla. The second premaxillary tooth has a trace of a vertical wear facet posteromedially.

The crowns of maxillary teeth are low. The labial side of the tooth, with only a slightly thickened base, is concave dorsoventrally and has a weak central ridge. Anteriorly and posteriorly to that ridge there are several smaller ridges, but not all of them reach the crown base. The number of these ridges cannot be determined for sure. The posterior edge of the crown is serrated. The maxillary teeth are strongly worn on the lingual side, the plane of wear being at an acute angle to the sagittal plane of the tooth. The cutting ventral margin of each worn tooth is straight.

The first mandibular tooth is much larger than the successive ones and it differs from them in being caniniform. It is larger than any of the caniniform premaxillary teeth. The crown of this mandibular caniniform tooth is polygonal rather than round in cross section. It bears posteriorly a sharp ridge, which is denticulated along the entire length of the crown. The denticles are not pointed and they diminish in size toward the root; there are 4–6 denticles per 1 mm. Other mandibular teeth are closely arranged, have subtriangular crowns with pointed tips. A well marked medial ridge is present on the labial side of the crown which is concave dorsoventrally. Anterior and posterior to that ridge there are several minor longitudinal ridges. The lingual side of the crown is convex dorsoventrally and anteroposteriorly and its base is thickened. On each side of the strong central ridge there are several minor ridges, the number of which depends on the tooth position within the tooth row. Not all the minor ridges reach the base of the crown. The anterior and posterior edges of the crown are deeply serrated. The wear surface on the labial side is almost parallel to the sagittal plane of the tooth.

G. lattimorei is the only known homalocephalid in which the mutual relations between the upper and lower dentition could be seen. The deep pit present within the diastema between the premaxillary and maxillary teeth received the large caniniform first mandibular tooth. The third premaxillary caniniform extended lateral to the anterior tip of the dentary. The position of the two anterior premaxillary caniniforms in regard to the predentary cannot be determined as this bone is not preserved in our specimen.

Postcranial skeleton. The vertebral column as preserved lacks the cervicals (except atlas intercentrum) and dorsals. The sacrum includes only 4 weakly coossified vertebrae with fragments of ribs and neural arches preserved. Only a portion of the first sacral vertebra is preserved and the first sacral rib is lacking. The second sacral rib originates between the first and the second sacral centra; only its proximal end is preserved, which is very robust and seems to have a lateroposterior orientation. The centrum of the second sacral is ventrally ridged. The ridge of the third sacral is still more pronounced and bears posteriorly a groove along its crest. The proximal end of the third sacral rib originates between the second and the third sacral centra and also extends lateroposteriorly; its distal portion is not preserved. The fourth sacral centrum is the broadest and has a rounded ventral ridge. The fourth sacral rib contacts the centrum of the fourth sacral along more than half its length, whereas only a small fraction of this rib adheres to the third sacral vertebra. This rib is complete and its length is slightly more than the combined length of the third and fourth sacral centra; it is oriented laterally and attaches to the ilium just anterior to the medial iliac flange.

The two first caudals were found articulated with the sacrum. However, the first is much more weakly joined to the last (fourth) sacral than the sacrals are

between each other, and the neural arches of these caudals have free zygapophyses. The articular surfaces of the zygapophyses of the two first caudals are grooved (the tongue-and-groove articulation). The ribs of these caudals are sutured to the short transverse processes of the neural arch. The centra of first three caudals are somewhat flattened laterally and are keeled ventrally; the centra of posterior caudals are flat ventrally.

The humerus is slightly bowed. Its proximal and distal ends are expanded almost in the same plane. The proximal articular head slightly extends beyond the dorsal face of the humerus. The ventral face bears a comparatively deep, rounded depression just below the proximal articular surface. The deltopectoral crest is thick but projects weakly. The distal end of the humerus shows weakly separated condyles and a poorly developed olecranon fossa. The preserved proximal part of the *ulna* shows that the olecranon process was very low.

The ilium has the typical pachycephalosaur shape, with the thin preacetabular process developed in the horizontal plane, the postacetabular process in the vertical plane, and a wide, horizontal flange extending inward from the superior border of the postacetabular portion of the ilium.

In dorsal aspect, the preacetabular process strongly deviates laterally. Its dorsal surface is flat, bent sharply downward along the medial and lateral margins. The medial flange of the ilium is short anteroposteriorly and relatively wide in the transverse direction. Anterior to the medial flange, at the upper medial margin of the ilium, there are two depressions for articulation with the third and fourth sacral ribs. The postacetabular process is somewhat bowed inward at the distal end. Due to the shortness of the medial flange, the postacetabular process appears long. In lateral view, the upper border of the ilium is almost straight and the postacetabular process is subrectangular.

The tibia, as preserved, is typical for pachycephalosaurs. In the specimen studied there are no proximal tarsals attached to it.

Two distal tarsals are preserved which cup the proximal ends of metatarsals II, III, and IV. Distal tarsal 1 is small, roughly semilunar, and covers metatarsal II and a small fraction of metatarsal III. Distal tarsal 2 is subquadrate and covers metatarsal III, half of metatarsal IV and medially a portion of distal tarsal 1. There is an anteroposterior ridge on its ventral side separating the surfaces for contact with metatarsals III and IV.

The metatarsus as preserved, includes three metatarsals—II, III, and IV of which only proximal and distal ends are preserved. The proximal articular ends of the metatarsals form a subtriangular articular surface for a contact with the tarsus. The apex of this triangle is directed laterally. The proximal extremity of the metatarsus is concave on the plantar side. There is a round depression extended on metatarsals III and IV. Metatarsal II is flattened lateromedially across its proximal end, and the longitudinal axis of the articular surface extends anteroposteriorly. The distal articular surface of this metatarsal is subquadrate, emarginated posteriorly, the medial condyle extends posteroproximally into a sharp ridge. The distal articular surface of metatarsal III has medial condyle larger than the lateral one; the fossae ligamentosae are shallow. The proximal surface of metatarsal IV, which is the thickest, is subtriangular, while the distal surface is subtrapezoidal, and weakly emarginated posteriorly.

The pedal phalanges preserved are robust with well developed ginglymoid articular surfaces. The pedal unguals are asymmetrical, triangular but not recurved, being flat on the plantar side. That of the third toe is the largest, and those of the second and fourth toes are subequal in length.

The caudal tendons are typical of pachycephalosaurs.

COMPARISONS AND DISCUSSION

The specimen of *Goyocephale lattimorei* gen. et sp. n. is almost the same size as the specimens of *Homalocephale calathocercos* and *Prenocephale prenes* described by us (Maryańska and Osmólska 1974) from the Nemegt Fm. of the Gobi Desert. Comparing the skull of *G. lattimorei* with the preserved portion of the skull in *H. calathocercos* it can be stated that the former differs from the latter in: the larger and elongated supratemporal fenestra, the narrower interfenestral bridge, the narrower portions of parietals that bound anteriorly the supratemporal fenestrae, the less concave occiput with the smaller occipital condyle, the shallower neurocranium, the narrower infratemporal fenestra, and the anteroposteriorly narrower mandibular condyle of the quadrate. The medial part of the cranial roof in *G. lattimorei* is slightly depressed along the frontals and posterior part of the nasals, and it was probably the same in *H. calathocercos*. In *G. lattimorei* this portion of the skull roof, as well as the interfenestral bridge, are weakly ornamented. At least the posterior portion of the frontals and the interfenestral bridge are very rough in *H. calathocercos*. The nodes along the posterior margin of the skull are more strongly pronounced in *G. lattimorei*.

In *Wannanosaurus yansiensis* Hou, 1977 (Hou 1977: pl. 1: 1) the supratemporal fenestra is larger, the frontal is more ornamented posteriorly and the posterior part of the squamosal is less ornamented. The sutures on the portion of skull roof preserved in *Micropachycephalosaurus hongtuyanensis* Dong, 1978 are obliterated, while these in *G. lattimorei* are distinctly visible. The skulls of two Chinese homalocephalids are smaller, nevertheless they probably represent the adult individuals, judging from the obliterated sutures on the skull roofs.

The presence of caniniform teeth in the premaxilla and mandible in *G. lattimorei* suggests that such teeth might have been present in *H. calathocercos*, and in other homalocephalids. The mandible of *G. lattimorei* as compared with this of *W. yansiensis* is relatively shallower, has more convex ventral margin in lateral view, the prealveolar part of the dentary is shorter, the retroarticular process is longer, the posterodorsal border of the surangular is much less inclined, and the jaw is much shallower in the region of the coronoid.

In the mandible of *G. lattimorei* the first mandibular tooth is very large and caniniform. The first mandibular tooth is also caniniform in *Wannanosaurus* (Hou 1977: fig. 1), but is relatively much smaller than in *G. lattimorei*; its relation to the maxilla is unknown.

The discovery of the strong mandibular caniniform tooth in *G. lattimorei* that fits into the pit within the upper jaw diastema makes more probable our earlier suggestion (Maryańska and Osmólska 1974: 54) that such tooth was also present in *P. prenes*; in that species the mandible is

not known, but the mentioned diastema occurs on the junction premaxilla/maxilla. Thus, this character occurs both in the homalocephalid and pachycephalosaurid genera.

The new homalocephalid *G. lattimorei* has a pelvis with the typical pachycephalosaurian ilium. This pelvis, as in other pachycephalosaurs, is extremely broad for a bipedal dinosaur. In comparison with the pelvis of *H. calathocercos*, (in which the most complete sacropelvic region is known up to now), that of *G. lattimorei* has fewer sacral vertebrae (4), which are but weakly joined with each other. The second sacral rib preserved in *G. lattimorei* is massive and lateroposteriorly directed. This rib in *H. calathocercos* contacts the anterior peduncle of the ischium, so perhaps this was also the case with the second sacral rib in *G. lattimorei*. The third sacral rib in *G. lattimorei* differs in its orientation to that of *H. calathocercos*, being directed posteriorly instead of anteriorly as it is in *H. calathocercos*. In the latter species, this rib contacts also the anterior peduncle of the ischium as does the second rib, while in *G. lattimorei* the third sacral rib certainly contacted the upper border of the ilium, because there is an articular surface for this rib preserved on the ilium. The fourth sacral rib is in both species laterally directed and massive. In *H. calathocercos* this rib is extended vertically contacting the ilium by its dorsal portion and the posterior peduncle of the ischium by its ventral portion. In contrast, in *G. lattimorei* this rib contacts only the ilium, posterior to the contact with the third rib and just anterior to the medial flange of the ilium. The fifth sacral rib in *H. calathocercos* is directed anteriorly and contacts upper border of the ilium just posterior to the fourth rib. In *G. lattimorei*, there is no fifth sacral, and the rib of the first caudal (which is an equivalent of the fifth sacral rib of *H. calathocercos*) is quite differently developed and directed lateroposteriorly. Thus, in *H. calathocercos* the fourth and fifth sacral ribs contact the upper iliac border whereas in *G. lattimorei* the third and fourth ones make the contact. The incompletely preserved pelvis of *G. lattimorei* does not provide any information on the contacts of the sacral ribs with the ischium, as the latter, as well as the pubis are missing.

The ilium of the species described here differs from the ilium of *H. calathocercos* in that the dorsal surface of the preacetabular process is flat centrally and sharply bent along the medial and lateral border. The dorsal surface of this process is evenly and gently convex in *H. calathocercos* and the sharp lateral and medial bending along its edges is not pronounced in this species. As typical for all pachycephalosaurs, medial flange of the ilium of *G. lattimorei* is expanded medially to the same extent as in *H. calathocercos*, but is shorter anteroposteriorly. Its shortness causes the postacetabular process of the ilium to appear longer. The postacetabular process, as seen laterally, is different from that of *H. calathocercos* in being subrectangular with a straight ventral margin, while in the latter

species it is arched downwards. Another homalocephalid with a fragmentary sacrum and ilium is *Micropachycephalosaurus hongtuyanensis* Dong. The sacrum of this species is however too badly preserved to be compared. Ilium of *M. hongtuyanensis* has a similar dorsal outline as that of *G. lattimorei*, but its postacetabular process is not subrectangular and the preacetabular process is longer (fig. 1B—D).

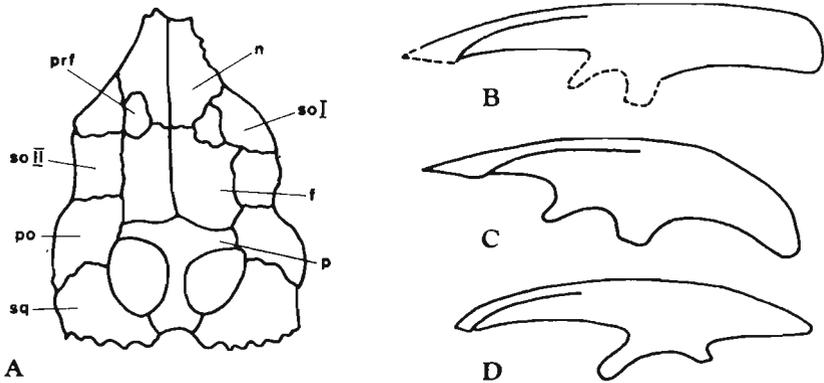


Fig. 1. A Schematic drawing of skull roof in *G. lattimorei* gen. et sp. n.: *f* frontal, *n* nasal, *p* parietal, *po* postorbital, *prf* prefrontal, *so I* and *so II* supraorbitals I and II, *sq* squamosal; B schematic drawing of ilium (lateral view) in *G. lattimorei* as compared with that in *H. calathocercos* Maryańska et Osmólska (C) and *M. hongtuyanensis* Dong (D). Not to scale. A and B original, C after Maryańska and Osmólska 1974, D after Dong 1978.

The pelvis of *G. lattimorei* as a whole is broader than that in *H. calathocercos* and it widens forward by means of the lateral deviation of the preacetabular processes. Due to the presence of only four sacral vertebrae, the relations of ilium length to that of the sacrum are very different in *G. lattimorei* and *H. calathocercos*. In the latter species, the ilium extends only slightly beyond the sacrum, both anteriorly and posteriorly, while in *G. lattimorei* it extends far beyond the sacrum posteriorly.

The two vertebrae posterior to the fourth sacral in *G. lattimorei* are considered here as the first two caudals, because they are not fused at the centra and display free zygapophyses. The grooved articular surfaces of these zygapophyses (including the prezygapophysis of the first caudal) prohibited any lateral movement in this part of the vertebral column. This indicates that these two caudals had functioned to some extent as the sacral vertebrae. From other pachycephalosaur caudals these two "sacralized" ones differ in the presence of grooved zygapophyses and by the short diapophyses to which caudal ribs are sutured. The grooved zygapophyses in pachycephalosaurs were until now known only in the dorsal vertebrae. A diapophysis—rib complex, similar to that on the first two caudals in *G. lattimorei*, is present on the sixth sacral in *H. calathocercos*.

The sternum of *G. lattimorei*, is similar to that of *H. calathocereos* but the lateral margin of its shaft is more strongly curved posterolaterally. The humerus of *G. lattimorei* may be compared with that of another member of the Homalocephalidae, *Wannanosaurus yansiensis*, and in the latter species it is more bowed.

Both the cranial and postcranial characters of *G. lattimorei*, especially the large supratemporal fenestra and short sacrum, indicate that this species was more primitive than *H. calathocercos*. This may suggest an older stratigraphic position of the deposits, from which *G. lattimorei* was recovered, in regard to the Nemegt Formation which yielded *H. calathocercos*.

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GOYOCEPHALE LATTIMOREI GEN. ET SP. N., NOWY PŁASKOGŁOWY
PACHYCEFALOZAUUR (ORNITHISCHIA, DINOSAURIA) Z GÓRNEJ KREDY
MONGOLII

Streszczenie

Opisano nowy rodzaj i gatunek dinozaura grubogłowego (Pachycephalosauria)—*Goyocephale lattimorei*, który został zaliczony do rodziny Homalocephalidae Dong, 1978. Materiał pochodzi z górno kredowych osadów odsłoniętych na pustyni Gobi w

Mongolskiej Republice Ludowej, w regionie somonu Bułgan. Obejmuje on niekompletną czaszkę z żuchwą i niekompletny szkielet pozaczaszkowy jednego osobnika (holotyp). Budowa sklepienia czaszki oraz miednicy wskazują, że *G. lattimorei* jest prymitywniejszym przedstawicielem Homalocephalidae niż wcześniej opisany (Maryańska i Osmólska 1974) *Homalocephale calathocercos* z górnokredowej formacji Nemegt. Wiek stratygraficzny osadów nie jest dotychczas dokładnie ustalony; prymitywność budowy szkieletu *G. lattimorei* może wskazywać, że wiek ten jest starszy niż wiek formacji Nemegt.

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EXPLANATION OF THE PLATES 41—45

Plate 41

Goyocephale lattimorei gen. et sp. n.

Upper Cretaceous, Boro Khovil, Gobi Desert, Mongolia GI SPS 100/1501

1. Skull roof; *a* dorsal view, *b* ventral view: fragments of brain case and occiput visible.
2. Basioccipital-basisphenoid complex; *a* posterior view, *b* dorsal view, *c* ventral view.
3. Premaxillae and maxillae; *a* dorsal view, *b* ventral view.

All $\times 1/2$

1*b*, 2*c*, 3*a*, 3*b* illuminated from below.

Plate 42

Goyocephale lattimorei gen. et sp. n.

Upper Cretaceous, Boro Khovil, Gobi Desert, Mongolia GI SPS 100/1501

1. Occiput lacking central portion.
2. Basioccipital-basisphenoid complex, right lateral view; same fragment as pl. 41: 2.
3. Fragmentary right jugal, lateral view.
4. Fragmentary left jugal, medial view.
5. Premaxilla and fragmentary maxilla with dentitions, left lateral view: note the third caniniforme premaxillary tooth and diastema; same fragment as pl. 41: 3.
6. Second left premaxillary tooth; *a* lingual view: note the wear facet along the crown, *b* labial view.
7. Second right premaxillary tooth; *a* lingual view, *b* posterior view: note the crenellate edge running centrally along the crown.
8. A maxillary tooth; *a* lingual view: note wear facet occupying almost entire surface of the crown, *b* labial view.

9. First right mandibular tooth; *a* lingual view, *b* same view enlarged: note crenelation on posterior edge, *c* posterior view, *d* same view enlarged: note crenelation.
10. A worn mandibular tooth; *a* lingual view, *b* labial view: wear facet outlined.
11. An unworn mandibular tooth, lingual view.
12. Skull in dorsal view, slightly inclined forward and downward; compare with 13.

Homalocephale calathocercos Maryańska et Osmólska

Upper Cretaceous, Nemegt Formation, Nemegt, Gobi Desert, Mongolia
GI SPS 100/1201

13. Fragmentary skull in dorsal view, same position as 12.
1—5×1/2, 9*a*, 9*c* ×2, 9*b*, 9*d* ×6, 12, 13×1/4.

Plate 43

Goyocephale lattimorei gen. et sp. n.

Upper Cretaceous, Boro Khovil, Gobi Desert, Mongolia GI SPS 100/1501

1. Lower jaw; *a* ventral view, *b* left mandible, dorsal view, *c* same mandible, lateral view, *d* same mandible, medial view, *e* right mandible, lateral view, *f* same mandible, medial view.
2. Left sternal bone, dorsal view.
3. Right sternal bone, ventral view.
4. Left humerus; *a* dorsal view, *b* lateral view, *c* ventral view, *d* medial view.
5. Left ulna, proximal part; *a* lateral view, *b* ventral view.
6. A thoracal rib, lateral view of proximal portion.
7. A thoracal rib, posterior view.
8. Fragments of two caudal tendons.

All ×1/2

1*b* illuminated from lower right.

Plate 44

Goyocephale lattimorei gen. et sp. n.

Upper Cretaceous, Boro Khovil, Gobi Desert, Mongolia GI SPS 100/1501

1. Sacrum lacking anterior portion of *S*₁ and neural arches, with two anterior caudals, fragmentary sacral and caudal ribs attached; dorsal view.
2. Left ilium, dorsal view.
3. Right ilium, dorsal view.
4. Left metatarsus; *a* dorsal view of proximal portion, *b* dorsal view of distal ends of metatarsals II, III, IV (from the left), *c* ventral view of proximal portion, *d* ventral view of distal ends of metatarsals II, III, IV (from the right), *e* proximal articular surface of the metatarsus.
5. Distal tarsals 1 and 2; *a* surface for proximal tarsals, *b* surface for metatarsus.
6. Left phalanx II—1; *a* dorsal view, *b* ventral view.
7. Left pedal digit IV, lacking phalanx IV—4 and ungual; *a* dorsal view, *b* ventral view.

8. Left pedal unguals II, III, IV; *a* dorsal view, *b* ventral view.
All $\times 1/2$
1 illuminated from below, 6a, 7a, 8a — from right side.

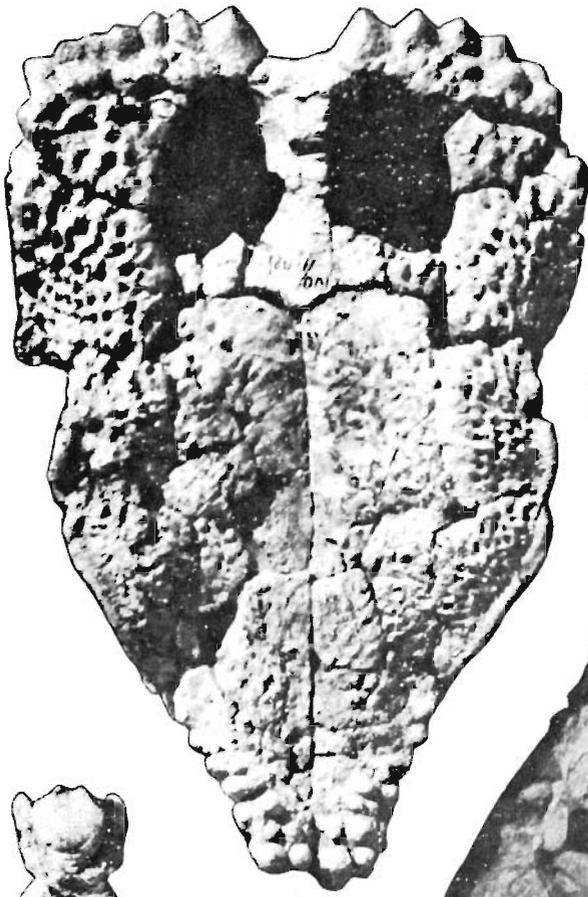
Plate 45

Goyocephale lattimorei gen. et sp. n.

Upper Cretaceous, Boro Khovil, Gobi Desert, Mongolia GI SPS 100/1501

1. Atlas intercentrum; *a* dorsal view, *b* ventral view.
2. Centrum of *a* dorsal, left lateral view.
3. Continuous series of caudals, left lateral view; *a* and *b* more anterior caudals, tendons not preserved, *c* and *d* with tendons partly preserved.
4. Sacrum lacking anterior portion of S_1 and neural arches, with two anterior caudals, fragmentary sacral and caudal ribs attached; ventral view.
5. Right ilium, ventral view.
6. Left ilium, ventral view.
7. Distal portion of left tibia, anterior view.

All $\times 1/2$



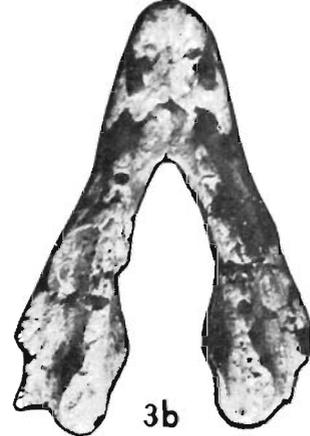
1a



2a



2c



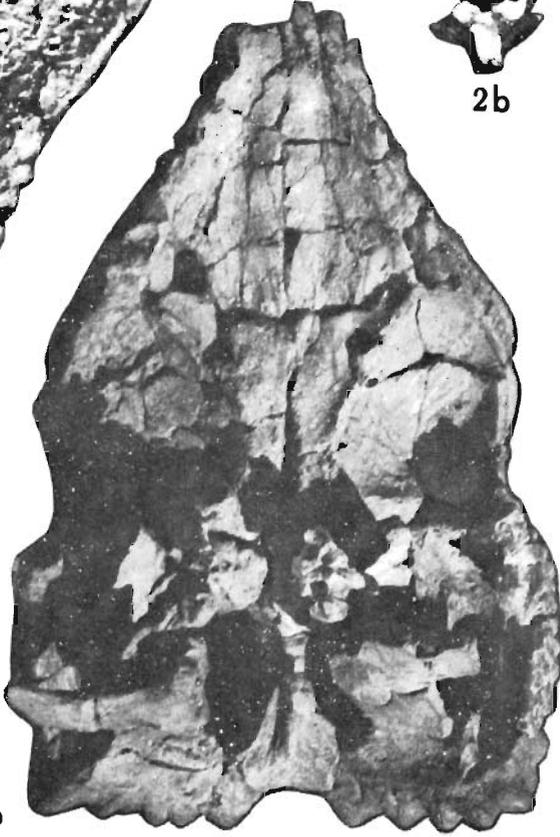
3b



3a



2b



1b

