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NEW DATA ON THE SKULL OF *PINACOSAURUS GRANGERI* (ANKYLOSAURIA)

(Plates VI-VII)

Abstract. — The skull of a young individual of *Pinacosaurus grangeri* GILMORE from the Upper Cretaceous sandstone of Bayn Dzak in the Gobi Desert, Mongolia, has been preliminarily described. Tabulars, postfrontals, ossified conchae, septum nasi and three pairs of nasal openings were found in the described skull. A postcranial skeleton associated with the skull will be described in another paper.

INTRODUCTION

Armoured dinosaurs were found by the Polish-Mongolian Palaeontological Expeditions in two regions of Gobi Desert: in the Nemegt Basin (MARYAŃSKA, 1970) in the Uppermost Cretaceous sandstone and at Bayn Dzak in the Upper Cretaceous sandstone (recognized as Coniacian or Santonian by KIELAN-JAWOROWSKA (1970) on the basis of multituberculate fauna). The present paper is a preliminary report on ankylosaurid remains found by the Polish-Mongolian Expedition in 1964 at Bayn Dzak. The collection from this locality consists of an almost complete skeleton with an excellently preserved skull (Z. Pal. No. MgD-II/1), as well as several skeletal fragments of another specimen, including a pelvic girdle, hind limbs and a tail (Z.Pal. No. MgD-II/9). Those two specimens come from stratigraphic horizon, designated by GRADZIŃSKI *et al.* (1968/69, pp. 70—71, Text-fig. 30) by number „2". Skulls of multituberculate and eutherian mammals, described by KIELAN-JAWOROWSKA (1968/69 and 1970) were also taken from this horizon. On the map of locality Bayn Dzak (see GRADZIŃSKI *et al.*, 1968/69, Text fig. 29), the skeleton Z. Pal. No. MgD-II/1 is designated by numeral 5, and the skeleton Z. Pal. No. MgD-II/9 — by numeral 6.

In 1923, an incomplete ankylosaurid skull, described by GILMORE (1933) as *Pinacosaurus grangeri*, was found in Bayn Dzak referred to in American literature as Shabarakh Usu (BERKEY & MORRIS, 1927; ANDREWS, 1932) by members of the Central Asiatic Expeditions of the American Museum of Natural History. The type specimen is housed in the American Museum of Natural History (A. M. N. H. No. 6523).

Other remains of ankylosaurid dinosaurs, described by MALEYEV (1952, 1954) as *Syrmosaurus viminicaudus*, were found in the same locality by the Soviet Palaeontological Expedition. The type specimen of *S. viminicaudus* consists of an almost complete postcranial skeleton without a skull (P. IN. No. 614).

The specimen Z. Pal. No. MgD-II/1 consists of an almost complete skull associated with a postcranial skeleton. This skull is beyond any doubt conspecific with *Pinacosaurus grangeri* GILMORE, while the postcranial skeleton is identical with that of *Syrmosaurus viminicaudus* MALEYEV. This indicates that *S. viminicaudus* MALEYEV is a junior synonym of *P. grangeri* GILMORE. Of the remaining two forms, assigned by MALEYEV to the genus *Syrmosaurus*, *Syrmosaurus* sp. from Ulan Oshih (MALEYEV, 1954) belongs — as shown by ROZHDESTVENSKY (1955) — to the genus *Psittacosaurus*. The third species referred to the genus *Syrmosaurus*, i.e. *S. disparoserratus* (MALEYEV, 1952, 1954) from Sheeregheen Gashoon is not congeneric with *Pinacosaurus* (there are essential differences in the structure of teeth) and, in the present state of our knowledge on the ankylosaurids of Mongolia, does not belong to any known genus. There are no grounds for maintaining the family Syrmosauridae, as proposed by MALEYEV (1952, 1954). *Pinacosaurus grangeri* (= *Syrmosaurus viminicaudus*) is a typical representative of the family Nodosauridae (= Ankylosauridae) and subfamily Ankylosaurinae.

In 1932, bone remains described by YOUNG (1935) as *Pinacosaurus ninghsiensis* were found by the Chinese-Swedish Expedition in Upper Cretaceous sediments NW of Ninghsia. The structure of both the teeth and the remaining fragments of the postcranial skeleton indicates that *Pinacosaurus ninghsiensis* should also be considered as a synonym of *P. grangeri*. The differences between *P. grangeri* and *P. ninghsiensis*, cited by YOUNG (1935, p. 24) are either unimportant, e.g. those in the dimensions of teeth, or represent misinterpretations resulting from the incompleteness of the material. A presumed difference in the orientation of the convex surface of the tooth crowns in the upper and lower jaws was considered by YOUNG as significant on a specific level. The teeth of the upper jaw in *P. grangeri* (GILMORE, 1933, p. 8) are convex on the inside, whereas, according to YOUNG (1935, pp. 6, 24), in *P. ninghsiensis* this convexity is observed on the outside. As is clear from Text-fig. 1, YOUNG (1935, p. 6) mistook the inner side of the illustrated jaw fragment for the outer side (which is evidenced by the appearance of replacing teeth on the lingual and not labial side). The lesser asymmetry of teeth in *P. grangeri* relative to those of *P. ninghsiensis*, as shown by YOUNG, resulted from comparing only two teeth. In *P. grangeri* we may, in fact, observe a considerable variability in the asymmetry of the teeth along the jaw, which greatly exceeds the differences described by YOUNG. A remark of LAPPARENT & LAVOCAT (1955) questioning the assignment of the specimen described by YOUNG to the genus *Pinacosaurus*, resulted from the erroneous legends given by YOUNG (1935) for his Text-fig. 15 and Pl. III, Fig. 1. Beyond any doubt, both illustrations represent typical *Pinacosaurus* ilium and not an „?ischium" as stated by YOUNG.

In addition to the above mentioned specimens, small, very fragmented remains of armoured dinosaurs, described by BOHLIN (1953), are among the materials which were collected by the Chinese-Swedish expeditions. The establishment (BOHLIN, 1953) of four new geneia *(Heishansaurus pachycephalus*, *Peishansaurus philemys*, *Sauroplites spiniger* and *Stegosauroides excavatus)*, based on much fragmentary materials, arouses certain doubts. The validity of these taxa and some problems referred to above will be discussed by the present writer in next paper, in which the skull and postcranial skeleton of *Pinacosaurus grangeri* will be discussed in details. The present paper gives only a preliminary account of the structure of the skull of *P. grangeri*.

Abbreviations:

Z. Pal. — Palaeozoological Institute, Polish Academy of Sciences, Warsaw.
A. M. N. H. — American Museum of Natural History, New York.
N. M. C. — National Museum of Canada, Ottawa.
P. IN. — Palaeontological Institute, U. S. S. R. Academy of Sciences, Moscow.

ACKNOWLEDGEMENTS

I wish to express my deep gratitude to Prof. Z. KIELAN-JAWOROWSKA (Palaeozoological Institute, Polish Academy of Sciences) for her valuable advices during the preparation of the paper. I should especially like to thank Dr. DALE A. RUSSELL (National Museum of Natural Sciences, Ottawa) for reviewing of the manuscript and many instructive suggestions. I am also indebted to Dr. THOMAS PARSONS (Department of Zoology, University of Toronto) and Mr. WALTER P. COOMBS (American Museum of Natural History) for helpful remarks and for forwarding literature (unavailable to me in Poland). Thanks are also due to Dr. A. K. ROZHDESTVENSKY (Palaeontological Institute of USSR Academy of Sciences, Moscow) for many discussions on the structure of armoured dinosaurs. Finally, I extent my thanks to Mrs. M. MAŁACHOWSKA-KLEIBER (Museum of the Earth, Polish Academy of Sciences) for taking the photographs.

DESCRIPTIONS

Family NODOSAURIDAE MARSH, 1890 (= ANKYLOSAURIDAE BROWN, 1908)

Subfamily ANKYLOSAURINAE NOPCSA, 1929

Genus **PINACOSAURUS** GILMORE, 1933

Synonym **SYRMOSAURUS** MALEYEV, 1952

Pinacosaurus grangeri GILMORE, 1933

(Pls. VI, VII)

1933. *Pinacosaurus grangeri* n. sp.; C. W. GILMORE, Two new dinosaurians..., pp. 3-9.
1935. *Pinacosaurus ninghsiensis* n. sp.; C. C. YOUNG, On a new nodosaurid..., pp. 5-28, Pls. 1-3.
1952. *Syrmosaurus viminocaudus* n. sp.; E. A. MALEYEV, Novoe semejstvo..., pp. 131-134.
1954. *Syrmosaurus viminicaudus* MALEYEV; E. A. MALEYEV, Pancyrnye dinozavry..., pp. 147-161.

Material. — Specimen Z. Pal. No. MgD-II/1, found in the Upper Cretaceous sandstone of Bayn Dzak, consisting of an incomplete postcranial skeleton and well preserved skull. The specimen was embedded in a loose sandstone and sand which was easily removed, allowing the skull to be prepared without any major difficulties. It was found that almost the entire braincase was destroyed, with the exception of a few detached fragments. The left stapes is preserved, but in a location anterior to its position in life. The lower jaws are well preserved, with exception of the ventrolateral part of the right ramus. The dentition of both upper and lower jaws is almost complete. Nearly all of the cranial sutures are clearly visible, which together with relatively small dimensions of the skull (as compared with the type of *P. grangeri* GILMORE, 1933) and large orbits, may be taken as evidence of the individual's immaturity.

Measurements of the skull (in mm):

Maximum length	185
Maximum width	210
Maximum width of dorsal surface (posterior to orbits)	203
Width across centre of orbits	177
Maximum width of orbit	45
Width at posterior edge of external nares	90
Width between ends of paroccipital processes	100
Length of lower jaw	135
Maximum depth of lower jaw	40

Description. — Skull massive, equilaterally triangular in dorsal outline. Cranial roof (Pl. VI, Fig. 1*a*) almost flat with shallow depression at the level of fronto-parietal suture and gentle elevation of nasals at level of lacrimal. All sutures of cranial roof clearly visible in both dorsal and ventral views. Most outer surfaces smooth, with marks of vascular impressions. Rugose surfaces occur in some parts of premaxillae, postfrontals and supraorbitals.

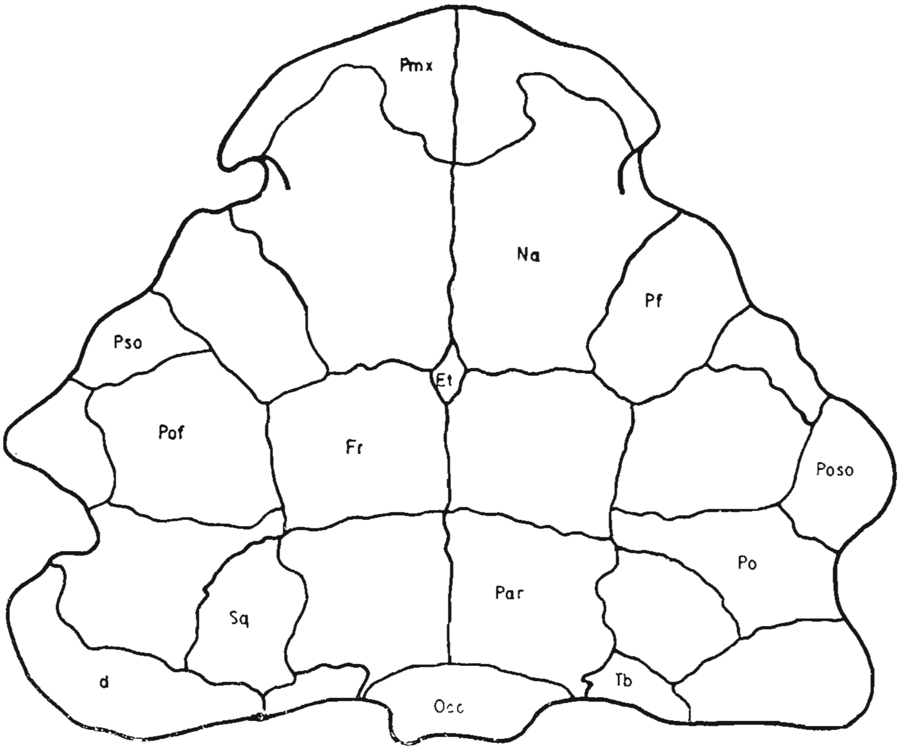

Fig. 1

The skull of *Pinacosaurus grangeri* Gilmore (Z. Pal. No. MgD-II/1) in dorsal view; *d* — dermal armour plate, *Et* — ethmoideum, *Fr* — frontal, *Na* — nasal, *Occ* — occipital condyle, *Par* — parietal, *Pf* — prefrontal, *Pmx* — premaxilla, *Po* — postorbital, *Pof* — postfrontal, *Poso* — postsupraorbital, *Pso* — presupraorbital, *Sq* — squamosal, *Tb* — tabular.

In connection with a well developed edentulous premaxillae, the nasals and frontals are displaced towards the posterior part of the skull. Three pairs of nasal openings are situated on the side of the skull within the borders of premaxillae (Pl. VII, Fig. 1*c*). A pair of irregularly shaped openings, situated directly beneath the cranial roof, have the largest lumen. Another pair of openings, separated from the former by a distinct bony bridge and situated nearer to the anterior part of the snout, are oval in shape. The third, most ventral and lateral pair is almost round and has markedly concave walls. The two upper pairs of openings, which are separated from each other by a very thin and fragile sheet of bone, extend from the bridge separating these openings externally, to a well preserved nasal septum. The cavity with which the middle pair of openings communicates, is limited by the above referred sheet (?septomaxilla), by the nasal septum along the midline, and ventrally by the premaxilla. The third, ventrally situated pair of openings also communicates with this cavity. The nasal septum is developed lateroventrally in the form of a thin sheet of bone and dorsally passes into a massive, vertical septum which thins to an edge at the level of the frontal. This septum is perforated dorsally by two openings which connect the right and left nasal cavity. A small, non-paired ossification, visible on the outer side of cranial roof and situated between the nasals and frontals, corresponds, to the dorso-posterior part of the massive median septum (?ethmoideum).

Paired, shell-shaped ossification, visible through the palatal vacuities, are situated inside the nasal cavities. These bones project from the cranial roof in the maxillo-nasal-lacrimal region, ending as a low ridge at the level of frontals. They are horizontally convex anteriorly, strongly concave distally and depressed ventrally. The medial edge ventrally is inflected and sharp. These ossifications are here interpreted as conchae (an equivalent of mammalian maxilloturbinal).

These bony elements of the internal narial region are covered dorsally by premaxillae and nasals. The nasals are extensively developed and, in dorsal view, form almost a half of the cranial roof. Due to the development of an additional dermal ossification which covers the uppermost nasal opening, the nasal does not contribute to the rim of any narial openings. The naso-frontal suture is very distinct and transversally directed. The suture situated medially between the frontals and the parietals is also very distinct. The frontals are small, subsquare and separated from parietals by a transverse suture. Posteriorly, the parietals are bent downwards at an almost right angle, overhanging an unossified gap between the occipital part and parietals. A prefrontal, postfrontal, postorbital, squamosal and tabular, all suturally distinct, are situated lateral to the nasal, frontal and parietal. The prefrontal bone antero-medially articulates with the nasal, externally with the lacrimal and posteriorly with the postfrontal and frontal. The postfrontal is inserted between the supraorbitals externally, and contacts the postorbital posteriorly and the frontal medially. The postorbital consists of two processes, one horizontal and the other vertical. The horizontal process contacts the postfrontal and frontal medially, and the squamosal and armoured plates (which form posterolateral corners of the skull) — posteriorly. The outer surface of vertical process forms the posterior part of the orbit, and the anterior surface of the vertical process forms the posterior wall of the orbital cavity. The squamosal is situated behind the postorbital, and between the additional dermal ossifications, referred to above, and the parietal. Two processes, which embrace an articular socket for the head of quadrate, are visible ventrally. The prequadratic process abuts against the quadrate, while the shorter postquadratic process is free. The small bones, here considered to be tabulars, are clearly demarcated behind the squamosal and lateral to the external border of the parietals.

In lateral view (Pl. VII, Fig. 1*b*), half of the preorbital part of the skull is formed from the premaxilla which inserted posteriorly between maxilla and nasal. The maxilla is short and massive. Its vertical wing contacts the jugal posteriorly and the lacrimal dorsolaterally. Horizontal arm bears teeth medially. The palatal process is absent. The maxilla articulates posteriorly with ectopterygoid and mediodistally with the palatine. Its anterior part forms the outer rim of the palatal vacuity. The lacrimal is situated above and behind the maxilla within the lateral wall of the skull. A very abbreviated external ala of the lacrimal communicates anteriorly with the nasal, posterodorsally with the supraorbital, and posteroventrally, below the orbit, with the jugal. The inner wing, perpendicular to the outer one, lies in vertical plane and forms the anterior wall of the orbit. The lacrimal foramen is clearly preserved. Two supraorbital ossifications separated from each other by a well marked suture, are situated lateral to the prefrontal, postfrontal and postorbital. They limit the orbits dorsally and form two outwardly projecting „horns". They contact the vertical process of postorbital posteroventrally.

The boundaries of the orbit, formed anteriorly by the lacrimal, dorsally by the supraorbitals and posteriorly by the postorbital, are closed ventrally by a narrow, slender jugal. The posteroventral part of the jugal overlaps a horizontal process of quadratojugal. The quadratojugal is a small bone with two projecting processes. The anterior process is narrow and hooklike and overlaps the jugal over its entire dorsal surface. The posterior process is directed upwards and overlaps the quadrate externally over approximately three-fourths of its length. The massive, vertical quadrate is slightly inclined posterodorsally where it joins the squamosal, and is laterally connected by a squamous suture to quadratojugal. A flattened vertical process projects anteromedially from the middle of the quadrate. It overlaps a posteriorly directed process from the pterygoid. Ventrally the quadrate bears a rectangular surface for articulation with the lower jaw. The squamosal-quadrate articulation is covered occipitally by the paroccipital processes.

On the occipital surface of the skull (Pl. VII, Fig. 1*a*) a wide, unossified gap separates the parietals from the supraoccipitals and paroccipital processes. The foramen magnum is subround. The occipital condyle of the basioccipital is oval, and its articular surface is directed posteroventrally. Two distinct nodes, formed from the exoccipitals, contact the condyle dorsolaterally. The exoccipitals also form the lateral boundaries of the foramen magnum. The paroccipital processes overlap the quadrates posteriorly. A short nodular process is developed on either side of the dorsal margin of the foramen magnum. This process lies within the exoccipital beneath the supraoccipital contact, and is posteromedially inclined. The supraoccipital contributes to the rim of foramen magnum over very short sector of its dorsal margin. The dorsal edge of this bone is produced into boss along the midline of the skull. A pair of more strongly developed lateral bosses are separated from the former one by indentations. Swellings, which are visible on the ventral side of the parietals, occur opposite these indentations.

Basisphenoid is a very short, rectangular bone which has been partly destroyed, although the left processus pterygoideus remains, in fact, in articulation with pterygoid. The braincase is also destroyed with the exception of detached fragments and the left stapes. The extensively developed pterygoids (Pl. VI, Fig. 1*b*) bear posterolaterally diverging processes, which contact the inner surfaces of the pterygoid wings of the quadrates. Two processes are developed anterolaterally and curve forwards and outwards to unite with ectopterygoids. They from strongly developed „wings", which are also visible in occipital view. Paired lamellar processes which are united with the vomer, are anteromedially directed. The internal nares are bounded anteriorly and laterally by palatines, medially by thin sheets of the paired vomers, and posteriorly by the pterygoids.

The palatine are highly vaulted and articulate with the posterolateral part of the maxilla, the ectopterygoid and, anteriorly, with the vomer. They close the inner nares and limit the large palatal vacuities posteriorly. The palatal vacuites are separated from each other by the vomers. The latter are exceptionally well developed and form a high palatal septum, projecting above the line of teeth. The anterior contact of vomer with the premaxilla is clearly marked, in the form of a vertical suture.

The dermal ossifications, which are developed in the anterior part of the snout, cover the uppermost nasal opening and are coossified with the nasals and premaxillae. Another pair of strongly developed ossicles form the posterolateral „horns" of the skull. These dermal plates, which are coossified with the postorbital, squamosal and tabular, completely cover the lateral temporal openings. A third pair of large dermal plates cover the quadratojugal externally and form ventrolaterally inclined hornlike structures. These plates are sutured to the postorbital anteriorly, and posteriorly to the jugals and the dermal ossicles covering the lateral temporal fenestrae.

The lower jaw consists of the clearly defined predentary, dentary, angular, surangular, articular, prearticular, splenial and coronoid which are generally smooth, although the ventral margin of the angular displays a certain rugosity. The coronoid has a well developed process. The Meckelian canal is covered medially by the splenial. An elongate foramen is present on the internal side of the jaw, below the anterior end of the alveolar margin. The mandibular fossa is wide and deep. A thin shelf of bone extends from the inner side of the surangular towards the prearticular. Below it, the exit of the cutaneous branch of the mandibular nerve (V) piercing the surangular, is clearly visible.

Dentition. The dentition of both the lower and upper jaws is almost completely preserved. The teeth of the maxilla (17 in each alveolar row) are identical with those described by GILMORE (1933). The teeth of the lower jaws (15 or 16 in each alveolar row) are slightly different in shape from those of the upper jaw. The apical denticle is situated symmetrically, while in the maxillary teeth it is slightly shifted posteriorly. This displacement of the apical denticle is particularly apparent on young teeth. Three generations of teeth are clearly visible in the upper jaw.

Discussion. -- The skull of *Pinacosaurus grangeri* here described belongs to a young individual, while the one described by GILMORE (1933, A. M. N. H. No. 6523) belongs to an adult. I have not had the opportunity of examining the skull described by GILMORE, but I was able to study a photograph of this specimen, kindly sent to me by Mr. COOMBS. On the basis of this photograph and a comparison with the skull of *P. grangeri* presently under study, I conclude that the reconstruction of the skull of *P. grangeri* given by GILMORE is not quite accurate. This particularly concerns the length to width proportions of the skull, which were incorporated into the diagnosis of the genus and species: „... skull relatively slender, longer than wide". These proportions may differ in juvenile and adult individuals, but in the case of specimen described by GILMORE such an extreme elongation of the skull results from the distortion and displacement of the bones. Despite the considerable degree of destruction sustained by the skull, GILMORE attracted attention to a peculiarly high number of nasal openings („The premaxillary region presents a most unusual condition in dinosaurian anatomy from the fact that the usual position of the external nares is occupied by two subovate, longitudinal openings of about equal size, placed one above other and separated by a horizontal bar"; GILMORE, 1933, p. 5). We may suppose that GILMORE here speaks of two more ventrally situated pairs of openings. Probably, the third pair was brushed together with the cranial roof.

In the general shape of the skull, structure of palate, occipital region and of dentition *P. grangeri* is very similar to *Euoplocephalus* (GILMORE, 1923; NOPCSA, 1929) and *Dyoplosaurus* (PARKS, 1924; GILMORE, 1930).

Certain new elements in the structure of the skull of *Pinacosaurus*, such as the exceptional structure of nasal area and cranial roof, require discussion. In my opinion, the two pairs of openings, situated more dorsally and separated by a bridge of the premaxilla (or, perhaps, by the septomaxilla), are the external nares. The third pair of openings, situated ventrolaterally, probably contained some gland (moistening or greasing the skin around nares). The most dorsal pair directly communicate with the nasal cavity, while the other, more ventrally situated opening leads to a cavity which is separated from the true nasal cavity by a thin sheet of bone (?septomaxilla). The latter cavity may have contained a vomeronasal organ. The above mentioned gland, which is usually situated below and somewhat lateral and ventral to the nasal cavity, seems to have been connected with this region. PARSONS (1959) states, however, that archosaurids were probably devoid of Jacobson's organ.

The preservation of the ossified conchae and nasal septum in *Pinacosaurus* is a phenomenon which is exceptional in fossil Reptilia. These usually cartilaginous elements are not preserved in the fossil state and we can only presume that they occurred in other fossil reptiles, e.g. therapsids (WATSON, 1912). Among the archosaurs, ossified conchae have been described only in *Machaeroprosopus* (CAMP, 1930). The complicated structure of the narial region probably is not a characteristic which is limited to the genus *Pinacosaurus*. Other ankylosaurids seem to be characterized by a strongly developed sense of smell and a complex narial structure. Some suggestions of multiple narial opening may be observed in other ankylosaurid representatives, e.g. an undertemined ankylosaurid (A. M. N. H. No. 5405) and *Edmontonia longiceps* (N. M. C. No. 8531). An indication of morphological complexity in the narial region may also be seen in the description of *Ankylosaurus magniventris* (BROWN, 1908). A noteworthy similarity exists between the structure of the nasal apparatus in *Pinacosaurus grangeri*, that of certain therapsids, including the earliest gorgonopsians — e.g. *Gorgonops*, all therocephalians — e.g. *Akidnoceras* and *Moschorhinus*, cynodonts — e.g. *Cistycynodon* (BRINK, 1953, 1955, 1958, 1960) and even some dinocephalians — e.g. *Titanophoneus* (ORLOV, 1958).

The exceptionally well preserved skull permitted the present writer to establish which bones participate in the structure of the cranial roof of *Pinacosaurus*. Of the dermal armour plates, a complete coossification with the bones of the dermal skull roof is displayed only by those plates, covering the uppermost nasal opening, the plates covering the quadratojugal laterally and those forming the „horns" in the posterolateral corners of the skull, which also cover lateral temporal fenestrae. Characteristically, the superficial dermal bones do not cover the squamosal (as they do in other ankylosaurids). The described skull contains certain bony elements, which are seldom or never found in archosaurs. These are the postfrontal, tabular and well formed bony structures in the nasal region, such as conchae or an ?ethmoidal ossification. The sutures bounding the postfrontal and tabular bones are clearly visible both on the outer and inner surface of the skull roof. The problem of whether or not these bones are the postfrontal and tabular proper or neomorphic elements, remains open to discussion. The postfrontal, found in *Pinacosaurus*, has also been reported in *Stegosaurus* (GILMORE, 1914). ROMER (1956, p. 151) stated: „Lying between the supraorbitals externally and the frontal and postfrontal medially and laterally is an unusual additional element, which has been termed a postfrontal. But there is not positive evidence of a separate postfrontal in any other dinosaur, and this bone is better regarded as neomorph, an additional supraorbital bone filling the gap between the normal skull bones and two supraorbitals forming the new orbital rim". It seems to me, however, that both the postfrontal and tabular in *Pinacosaurus* (as well the postfrontal in *Stegosaurus*) may be regarded as normal and not neomorphic bones of the cranial roof. The postparietal and tabular (elements similar to those in *Pinacosaurus*) have been recognized in a young specimen of *Machaeroprosopus* (CAMP, 1930). It should be emphasized that the skulls of both *Machaeroprosopus* and *Pinacosaurus* belong to young individuals. It is highly probable that in most archosaurs the postfrontal, tabular and postparietal were so strongly coossified with the other bones in an early stage of ontogenetic development that the boundaries of these bones in adults are completely obscured. It is also possible that they are present, among the archosaurs, only in some phytosaurs and some ornithischians.

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of the Polish Academy of Sciences
Warszawa, March 1970

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PLATE VI

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Pinacosaurus grangeri GILMORE 47

(see also Plate VII)

Upper Cretaceous, Djadokhta Formation, Bayn Dzak, Gobi Desert, Mongolia (Z. Pal. No. MgD-II/1)

Fig. 1*a*. Dorsal view of the skull; ca. ×0.5.
Fig. 1*b*. Palatal view of the skull; ca. ×0.5.

Photo: M. Malachowska-Kleiber

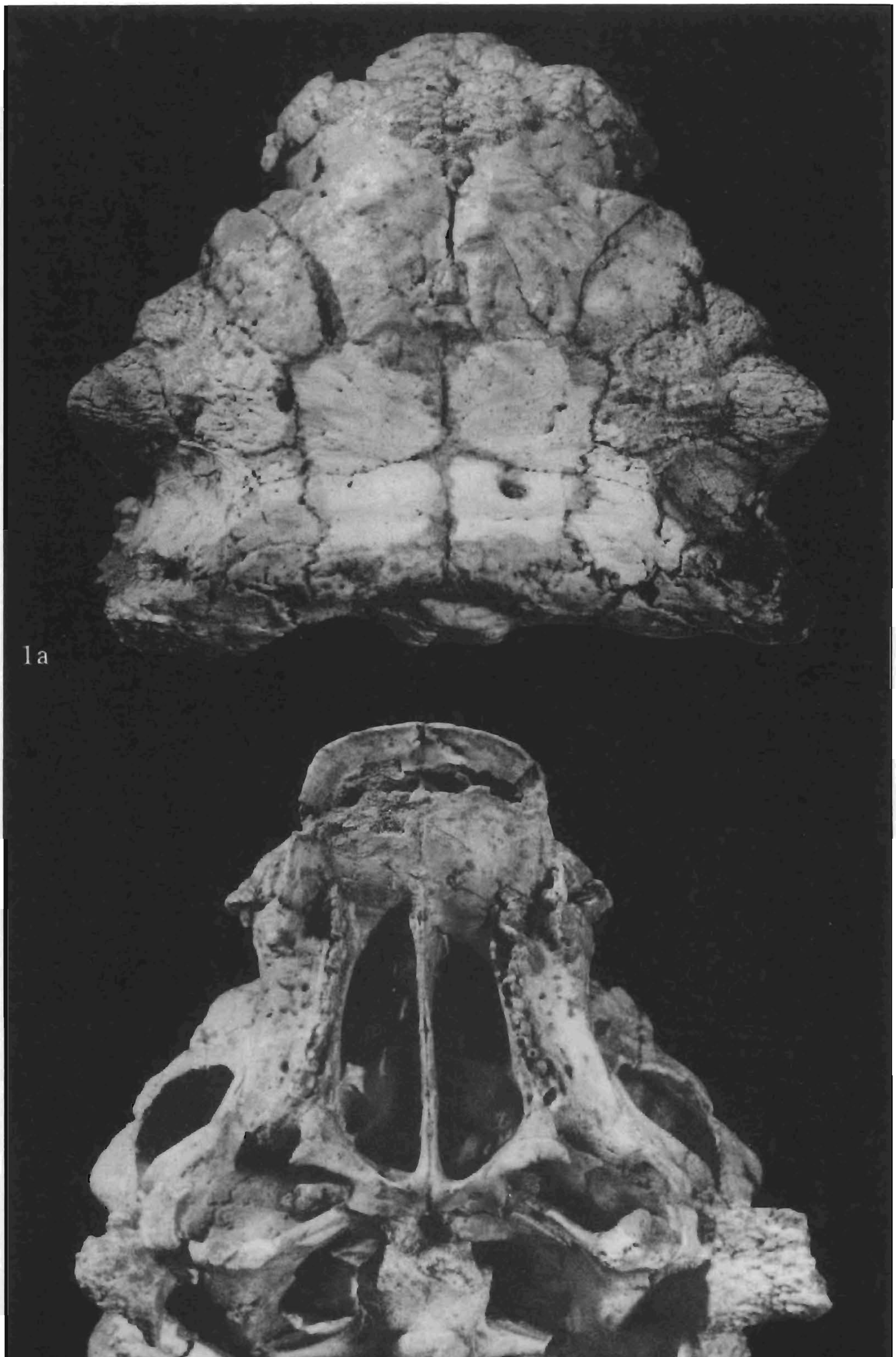

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PLATE VII

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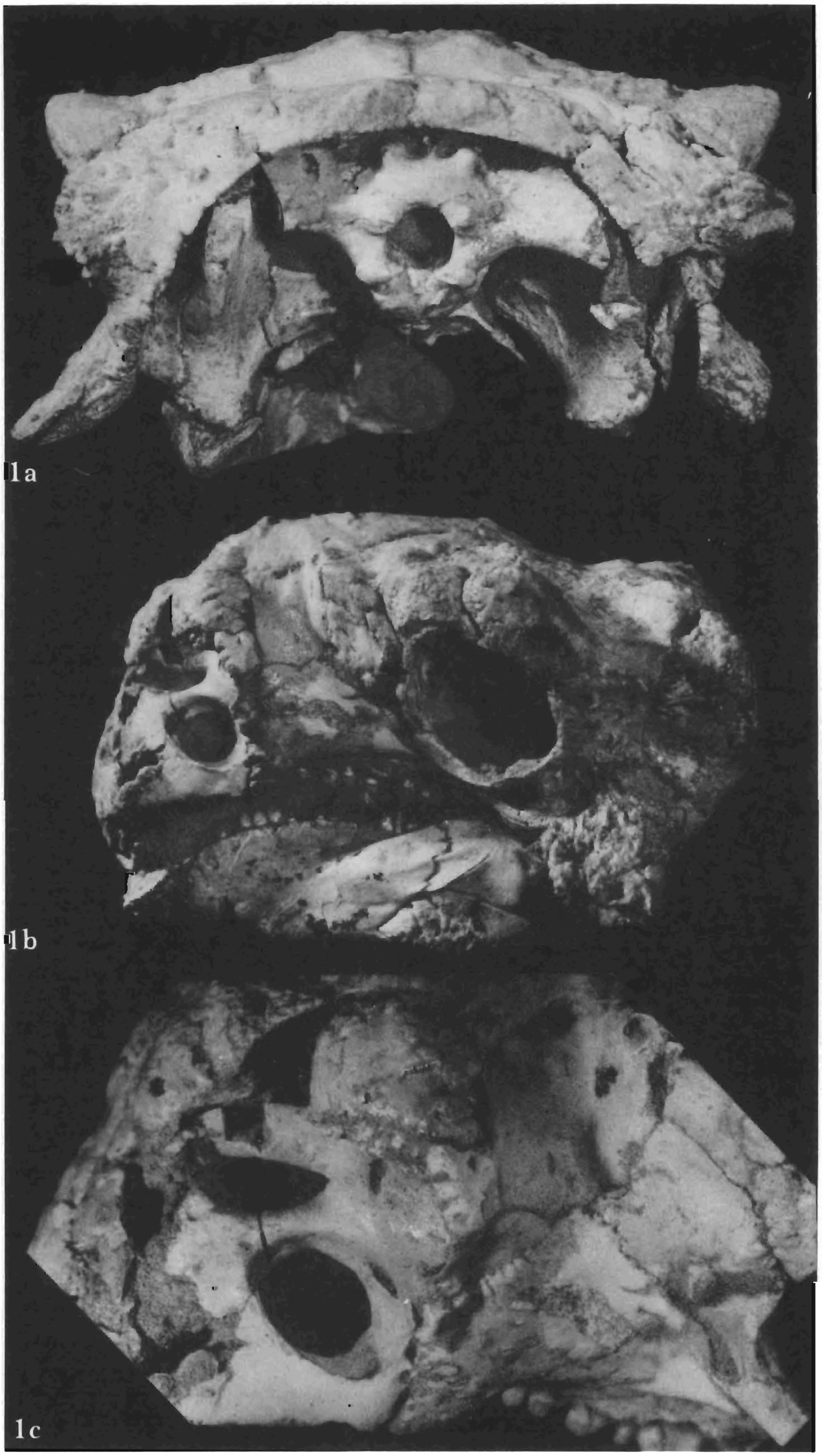
Pinacosaurus grangeri GILMORE 47

(see also Plate VI)

Upper Cretaceous, Djadokhta Formation, Bayn Dzak, Gobi Desert, Mongolia (Z. Pal. No. MgD-II/1)

Fig. 1*a*. Occipital view of the skull; ca. ×0.5.
Fig. 1*b*. Lateral view of the skull; ca. ×0.5.
Fig. 1*c*. Left premaxilla in lateral view, three pairs of nasal openings are visible; ca. ×1.

Photo: M. Małachowska-Kleiber



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