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PRELIMINARY NOTE ON A CROCODILIAN FROM THE UPPER CRETACEOUS OF MONGOLIA

(Plates V-VI)

Abstract. - A new genus and species *Gobiosuchus kielanae* assigned to the new family Gobiosuchidae, tentatively within Protosuchia, is erected for a small Upper Cretaceous crocodilian from Bayn Dzak, Mongolia. It is characterized a. o. by the primitive structure of the palate and well developed antorbital fenestra.

INTRODUCTION

During the Polish-Mongolian Palaeontological Expeditions in 1965 and 1968 (KIELAN-JAWOROWSKA & DOVCHIN, 1968/69; KIELAN-JAWOROWSKA & BARSBOLD, 1972) several crocodilian specimens were found in the Upper Cretaceous deposits, zone of *Protoceratops andrewsi*, in Bayn Dzak, Gobi Desert, Mongolia. They come from the site Volcano (GRADZIŃSKI *et al.*, 1968/69, Fig. 29) where they were collected together with lizard and mammal remains. The material consists of four skulls, one almost complete, 3 less complete, as well as of two postcranial skeletons. These specimens may represent two different species of *Gobiosuchus* n. gen. of which one — *G. kielanae* n. sp. is there established and diagnosed; a more detailed study of the entire material will be published at a later date.

A specimen of a crocodilian being an incomplete, distorted skull with the mandible, was described from the same deposits and locality by MOOK (1924) as *Shamosuchus djadochtaensis* MOOK, 1924. In spite of the poor state of preservation of the latter specimen, it can be stated that it differs very clearly from *Gobiosuchus kielanae* n. gen., n. sp., in lacking the antorbital fenestra and showing the choanae shifted more posteriorly. The eusuchian affinity for *S. djadochtaensis* was suggested at first by MOOK (1924) and more recently by KÄLIN (1955). However, at a later date, MOOK (1934) assigned it to the family Goniopholidae (Mesosuchia), this systematic position being accepted also by KONZHUKOWA (1964) and KUHN (1968).

The material described in the present paper is housed in the Palaeozoological Institute of the Polish Academy of Sciences in Warsaw, for which the abbreviation Z. Pal. is used.

The present author gratefully acknowledges the valuable remarks of dr. dr. P. ROBINSON (University College, London), L. P. TATARINOV and A. K. ROZHDESTVENSKY (Palaeontological Institute, Academy of Sciences, USSR, Moscow).

SYSTEMATICS

Family GOBIOSUCHIDAE n. fam.

The family is monotypic and includes so far only one genus *Gobiosuchus* n. gen. and one species *G. kielanae* n. sp.

Diagnosis — as for the species.

Genus **GOBIOSUCHUS** n. gen.

Derivation of the name: found in Gobi Desert.
Type species: Gobiosuchus kielanae n. sp.

Gobiosuchus kielanae n. sp.

(Pls. V, VI, Text-fig. 1)

Type specimen: Skull and disarticulated skeleton (Z.Pal.No.MgR-II/67); Pls. V, VI.
Type horizon: Upper Cretaceous, Djadokhta Formation, zone of *Protoceratops andrewsi* GRANGER & GREGORY.
Type locality: Bayn Dzak (Volcano), Gobi Desert, Mongolian People's Republic.
Derivation of the name: in honour of Prof. ZOFIA KIELAN-JAWOROWSKA (Palaeozoological Institute, Polish Academy of Sciences, Warsaw).

Dimensions — see Table 1.

Table 1

Gobiosuchus kielanae n. gen., n. sp.
(measurements in mm)

	Z.Pal.No. MgR-II/67	MgR-II/68
Length of skull	65	—
Posterior width of skull	34	—
Length of ischium (estim.)	12	—
Proximal width of ischium	3.5	—
Diameter of acetabulum	4	—
Length of coracoid	—	11
Distal width of coracoid	—	7
Length of scapula	—	14

Diagnosis. — Small crocodilian, skull pneumatized, cranial table flat, snout short, orbits in lateral position, postorbital bar semidepressed, antorbital fenestra present, supratemporal fenestra closed, external nares separated by nasals, quadrate strongly inclined, palatines not taking part in formation of secondary palate, maxillae meeting each other ventrally in front of choanae; three premaxillary and eighteen maxillary teeth, mandible without external man-

dibular fenestra and with poorly developed retroarticular process; coracoid short; limbs long and slender; whole body, including at least the proximal parts of limbs, encased in bony armor; cranial table and scutes sculptured.

Remarks. — *Gobiosuchus kielanae* n. gen. n. sp. shows numerous characters which were so far noticed only in the most primitive representatives of Crocodilia — Protosuchia and Archaeosuchia (according to SILL, 1967 or Stegomosuchidae according to WALKER, 1968). Therefore, in spite of the long stratigraphic gap covering the whole Jurassic and most of Cretaceous, it seems more reasonable to assign *Gobiosuchus* n. gen. (and Gobiosuchidae n. fam.) to one of these suborders, as a relict representative, than to the more modern Mesosuchia.

Among these primitive characters should be mentioned the presence of antorbital fenestrae, and that the nasals reach very far forwards, separating the external nares without the participation of the premaxillae in the formation of internal bridge. Premaxillae meet each other dorsally only at the very tip of the snout.

Quite unusual for the Crocodilia is the construction of the palate, very thecodont-like. It could be investigated in two specimens, and these show that the maxillae are connected mesially by a suture and that posteriorly to them are two large openings, separated sagittaly by a bony wall constructed from the vomers. Posteriorly, and in the connection with the vomerine internarial wall, there is a bridge formed by the narrow, anterior palatal processes of the pterygoids, and flanked laterally by the palatines. A striking feature of the base of the skull is the fact that the basisphenoid/parasphenoid is visible in ventral view. In eusuchians the more anterior part of the braincase is hidden by the pterygoids, which meet one another posteriorly. In mesosuchians there is a partial covering of this region by the pterygoids. These relationships are of course connected with the stage of development of the secondary palate.

If the pair of postmaxillary openings is interpreted as the choanae, which seems to be the only possibility, then their position is more primitive than that found in the Mesosuchia. On the other hand it does not resemble the pseudosuchian pattern, the mesially connected maxillae being already an advanced specialization found in the palate of some phytosaurs e. g. in *Proterochampsa* REIG, 1959 (?), *Machaeroprosopus adamensis* CAMP, 1930. As there are evidently no other openings posterior to these postmaxillary ones, so the latter seem to constitute the only possible openings for the choanae. Unfortunately, the position of choanae in the earliest representatives of Crocodilia — Protosuchia is unknown, but theoretically it is very probable that it resembled that found in the thecodonts.

It should be also mentioned that the orbits in *Gobiosuchus kielanae* n. sp. face laterally as is the case in many other archosaurs, but rarely in crocodilians. The pectoral girdle is also rather primitive having the coracoid shorter than it is in the modern crocodiles.

According to what was stated above, it is not possible to assign *Gobiosuchus* to any known family of Mesosuchia, and this is why the present author suggests the erection of a new family Gobiosuchidae, which should be tentatively placed within the suborder Protosuchia.

The material of *Gobiosuchus* n. gen. (may be represented by two species) from Bayn Dzak contains, among others, two complete skulls and the large fragments of two others. Besides, according to Dr. T. MARYAŃSKA's (Museum of the Earth, Polish Academy of Sciences, Warsaw) personal communication, in the Regional Museum in Dalan Dzadgad, Southern Gobi, Mongolian People's Republic, there is housed an almost complete specimen lacking the skull, coming from the same locality. All these specimens are small, and what is rather striking, almost about of the same size (length of skulls being 65— 80 mm).

The small size, comparatively well visible sutures, the posterior portions of the squamosals protruding behind the quadrates (and the posterior angles of the mandible as well), the short

snout and the orbits facing laterally — all these features may rise objections whether the specimens in question represent the adult animals. As MOOK's (1921), KÄLIN's (1933), KRAMER's & MEDEM's (1955) and JOFFE's (1967) investigations had proved, all the above mentioned characters may be regarded as the juvenile ones. However, two of these features (the lateral orbits and the short snout) are characteristic not only for young, but also the primitive crocodilians.

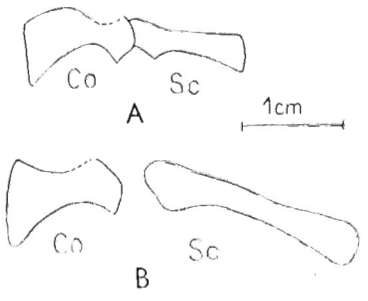

Fig. 1

Gobiosuchus kielanae n. gen., n. sp. (Z. Pal. No. Mg R-II/68), Scapulocoracoid; *A* - before separation, *B* - after separation, *Co* — coracoid, *Sc* — scapula.

This fact, combined with the undoubtedly primitive position of the choanae and the structure of the scapulocoracoid make that these features cannot be for sure considered as the juvenile ones. As well, the mutual relation between the length of the squamosals from one side and that of the quadrates and mandible from the other, does not speak at all in favour of the adolescence of *Gobiosuchus kielanae* n. gen., n. sp. The backwards protrusion of the squamosals is here caused by their unusual posterior overgrowth. This in the consequence results in the deeply concave outline of the posterior margin of the cranial table, the feature very typical for adult crocodiles.

When the small size of the specimens is concerned, it is not very probable that it is due to their being young. Usually the lightly ossified young vertebrates have a lesser chance to be preserved in the fossil state and thus they are found more rarely than the adult ones. In our case, there are only the small specimens which were found. Moreover, if they were juvenile animals, it may be expected that they are represented by the different growth stages, while in fact they are all of almost the same size.

The most convincing evidence, that the specimens in question represent the adult animals, seems to be the complete closure of the upper temporal fenestrae, never observed in any young crocodile, but reported in some adult ones.

ADDENDUM

When this paper was in page proof, the author received a reprint of Gasparini's work (1971) dealing with the Patagonian Upper Cretaceous notosuchids. The new reconstruction of the skull of *Notosuchus terrestris* WOODWARD, 1896 (l. c., pl. IIIB) presented by Gasparini demonstrates a striking resemblance to *Gobiosuchus kielanae* n. gen., n. sp. But there is a difference in the position of the internal nares in both species. These in *Notosuchus terrestris*

represent the more advanced stage, being located farther backwards, according to Gasparini's interpretation. This position of the choanae is also typical for mesosuchians. *Gobiosuchus kielanae* displays several common features in the structure of its skull with the representatives of the infraorder Notosuchia GASPARINI, 1971, e. g. the short snout and the presence of the antorbital fenestra, and were not the choanae located so far anteriorly, it should be assigned to the Notosuchia. However, no representative of this suborder was ever recovered outside the South American continent.

GASPARINI (1971, p. 96) suggests that the mesosuchian stage of the secondary palate might have been achieved by the independent phylogenetical lines of the crocodilians. Her conclusion is very convincing.

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PLATES

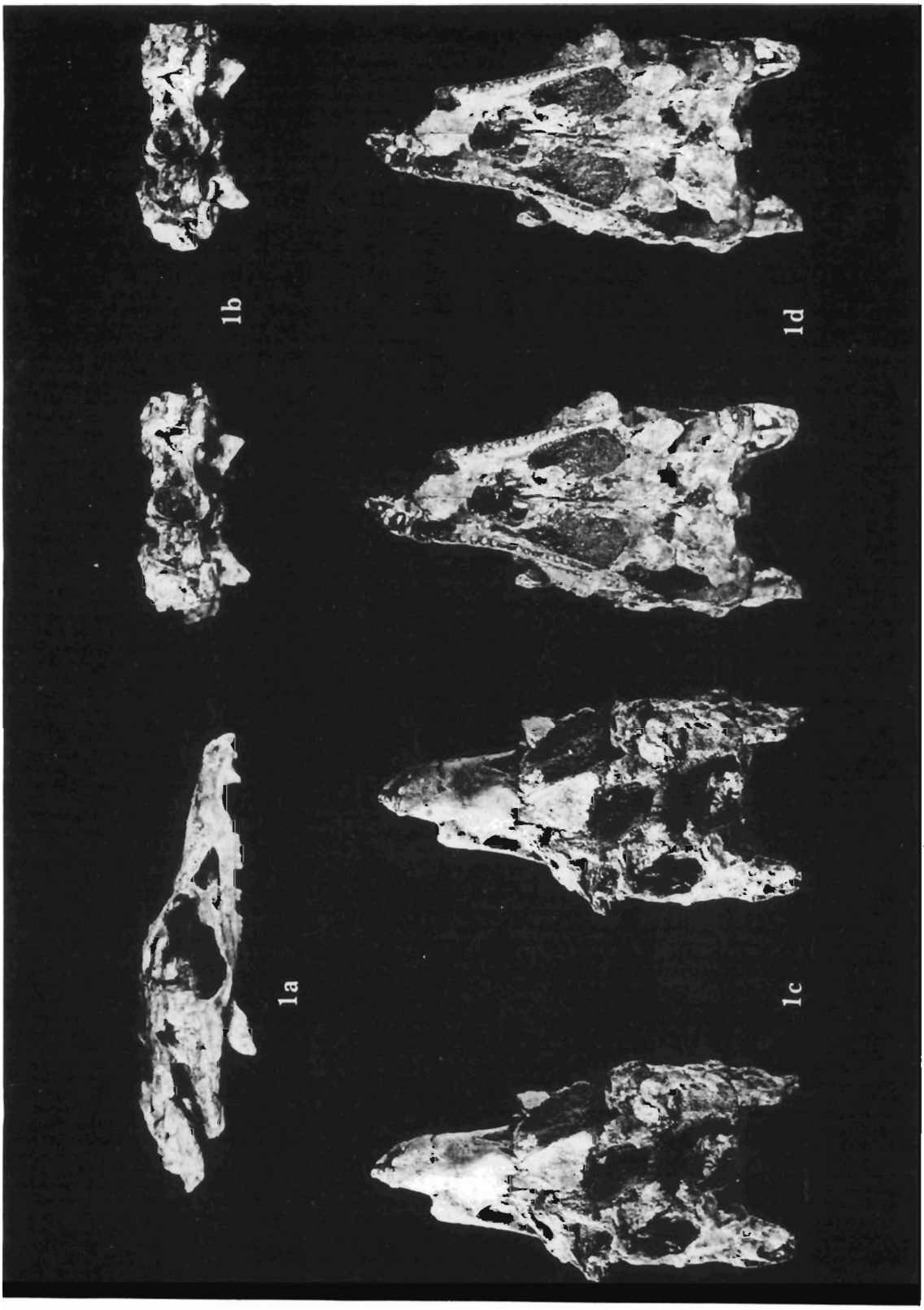
Palaeontologia Polonica, No. 27, 1972

H. OSMÓLSKA: PRELIMINARY NOTE ON A CROCODILIAN

PLATE V

Fig. 1*a*. Lateral view of the skull of the type specimen Z.Pal.No.MgR-II/67; × 1.
Fig. 1*b*. Stereophotograph of the same specimen, occipital view; × 1.
Fig. 1*c*. Stereophotograph of the same specimen, dorsal view; × 1.
Fig. 1*d*. Stereophotograph of the same specimen, palatal view; × 1.

Photo: M. Czarnocka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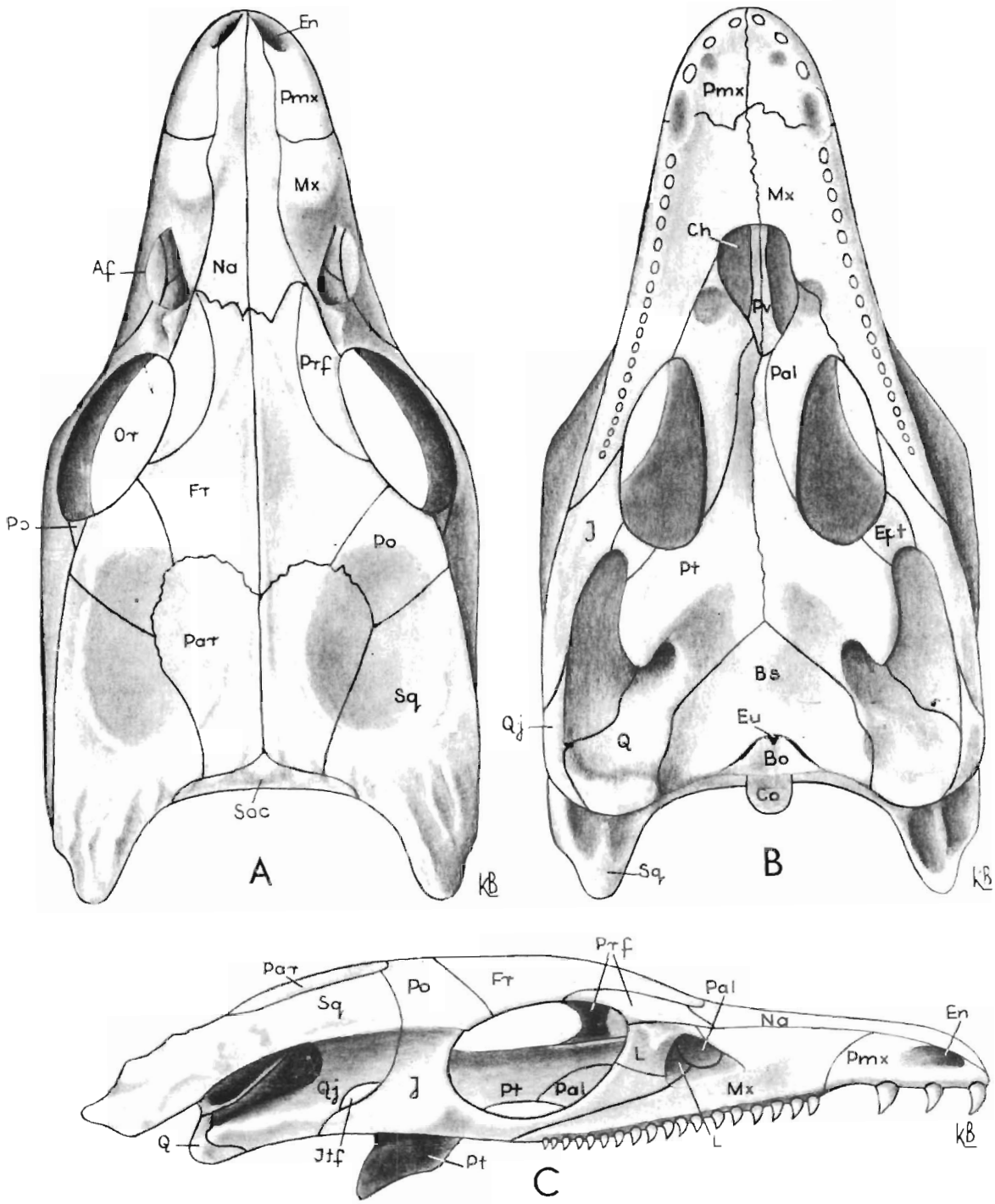
H. OSMÓLSKA: PRELIMINARY NOTE ON A CROCODILIAN

PLATE VI

Reconstruction of the skull of *G. kielanae* (Z.Pal.No.MgR-II/67), holotype, × 2.5. *A* — dorsal view, *B* — palatal view, *C* — lateral view. Abbreviations: *af* — antorbital fenestra, *bo* — basioccipital, *bs* — basisphenoid, *ch* — choana, *co* — condyle, *en* — external naris, *ept* — ectopterygoid, *eu* — eustachian opening, *fr* — frontal, *itf* — infratemporal fenestra, *j* — jugal, *l* — lacrimal, *mx* — maxilla, *n* — nasal, *or* — orbital, *pal* — palatine, *par* — parietal, *pmx* — premaxilla, *po* — postorbital, *prf* — prefrontal, *pt* — pterygoid, *pv* — vomer, *q* — quadrate, *qj* — quadratojugal, *soc* — supraoccipital, *sq* — squamosal.

Drawing: K. Budzyńska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