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A NEW CRETACEOUS SCINCOMORPH LIZARD FROM MONGOLIA

(Plates 26—28)

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The primitive Upper Cretaceous scincomorph lizard *Slavoia darevskii* gen. n., sp. n. from three localities of Southern Mongolia: Khulsan, Nemegt (Barun Goyot Formation), and Khermeen Tsav II (red beds of Khermeen Tsav) is described. The skull morphology, reduction of the size of the orbits, palate structure, construction of the pectoral girdle (particularly interclavicle) suggest a semi-fossorial mode of life. The material consists of 46 skulls, 6 associated with postcranial skeletons, 3 of which are almost complete. Variation of skull size connected with ontogenetic development and possibly with sexual dimorphism is observed.

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Key words: Lizards, Scincomorpha, Upper Cretaceous, Mongolia.

NOWA SCYNKOMORFOWA JASZCZURKA Z KREDY MONGOLII

Streszczenie. — W pracy podany jest opis prymitywnej górno-kredowej scynkomorfowej jaszczurki *Slavoia darevskii* gen. n., sp. n. z trzech stanowisk południowej Mongolii: Chulsan, Nemegt (Formacja Barun Gojot) i Chermin Caw II (czerwone warstwy z Chermin Caw). Wiek formacji Barun Gojot i czerwonych warstw Chermin Caw II jest (?) środkowo-kampański. Morfologia czaszki, redukcja oczodołów, budowa podniebienia, konstrukcja pasa barkowego, szczególnie międzyobojczyka sugerują podziemny tryb życia opisanej jaszczurki. Materiał zawiera 46 czaszek, 6 znalezionych ze szkieletami pozaczaszkowymi, z których 3 są prawie kompletne. Zmienność wielkości czaszek wiąże się z rozwojem indywidualnym, a także zapewne z dymorfizmem płciowym.

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INTRODUCTION

The present paper contains the description of a new, small lizard *Slavoia darevskii* gen. n., sp. n.. The new species, characterized among others by a reduction of the size of the orbits, by special structure in palate and by shortened limbs, is regarded as a primitive member of the infraorder Scincomorpha Camp, 1923. The material consists of 46 skulls, 6 of which are

associated with postcranial skeletons (3 nearly complete) from the localities of Khulsan and Nemegt (Barun Goyot Formation of ?middle Campanian age)[1] and from the locality of Khermeen Tsav II (red beds of Khermeen Tsav II) regarded as a stratigraphic equivalent of the Barun Goyot Formation.

The studies of the brain case structure of the new species require further preparation and the brain case will be described in a forthcoming publication. The described materials are housed in the Institute of Paleobiology, Polish Academy of Sciences in Warsaw, abbreviated as ZPAL. The text figures were made by the author, the photographs by Mrs G. PODBIELSKA. I wish to express my sincere gratitude to Prof. RICHARD ESTES (San Diego State University, San Diego), Prof. MARIAN MŁYNARSKI (Institute of Systematic and Experimental Zoology, Polish Academy of Sciences, Cracow), and to Dr. MAGDALENA BORSUK-BIAŁYNICKA (Institute of Paleobiology, Polish Academy of Sciences, Warsaw) for reading the manuscript and for comments.

DESCRIPTION

Order **Sauria** MacCARTNEY, 1802
Infraorder **Scincomorpha** CAMP, 1923
Genus *Slavoia* gen. n.

Type species: *Slavoia darevskii* sp. n.. The only species known.
Derivation of the name: *Slavoia* — from the second name of my late brother — SŁAWOJ.

Generic and specific diagnosis: Small, quadrupedal lizard with mesokinetic, compact skull and somewhat reduced limbs. Nasals not in contact with prefrontals. Frontals very wide and short. Maxillary-frontal contact present. Parietal foramen very small to absent. Orbits much reduced in size, tear-shaped. Prefrontal-postfrontal contact present. Postfrontal and postorbital not fused. Jugal club-shaped, reaching the squamosal. Posterior jugal process very small or absent. „Hockey-stick"-like squamosal without dorsal process. Supratemporal fossa small but larger than orbit, pointed posteriorly. Teeth homodont, cylindric, sharp, without compression and sculpture, widely spaced. Tooth implantation pleurodont, tooth replacement successive. Most frequently 5 teeth in both premaxillae, 7—8 in maxilla and 9—10 in mandible. Lacrimal small, not fused with prefrontal; wholly inside orbit. Vomers without teeth. Palatines „scroll" like, apposed antero-medially and sutured with vomers. Suborbital fenestra very small. Meckelian groove widely open in front of splenial. 7 cervical and 26 presacral, procoelous vertebrae. Interclavicle cruciform with very wide lateral wings and strong transverse crest. Clavicle thin, long, slightly widened and notched medially. Coracoid much expanded and scapula reduced. Limbs complete, not specialized but reduced in length.

Slavoia darevskii sp. n.
(pls. 26—28; figs. 1—3)

Holotype: ZPAL MgR-I/8 — skull with nearly complete postcranial skeleton (pl. 26; fig. 2A—B, 3D).
Type horizon and locality: Upper Cretaceous, (?) middle Campanian, Barun Goyot Formation — Khulsan; Gobi Desert, Mongolian People's Republic.
Derivation of the name: *darevskii* — from the name of my friend Prof. I. S. DAREVSKI from Leningrad.

[1] The ages of the Barun Goyot formation and of the red beds of Khermeen Tsav given herein follow Gradziński *et al.* (1977). However, recently Karczewska and Ziembińska-Tworzydło (1983) claimed on paleobotanical evidence that the Nemegt Formation which overlies conformably the Barun Goyot Formation is not younger than the equivalent of the Early Campanian stage. It follows that the Barun Goyot Formation (and the red beds of Khermeen Tsav) may be of ?late Santonian age. These estimates should be regarded as tentative.

Geographical and stratigraphical range: Khulsan, Nemegt and Khermeen Tsav II; all in southern regions of the Gobi Desert in Mongolia, (?) middle Campanian.

Measurements. — See tables 1 and 2.

Material. — **1.** Khulsan, Barun Goyot Formation: ZPAL MgR-I/8 — (holotype — see above); ZPAL MgR-I/9 — skull with postcranial skeleton; ZPAL MgR-I/10 — skull; ZPAL MgR-I/11 — skull; ZPAL MgR-I/93 — skull; ZPAL MgR-I/94 — skull with anterior cervicals; ZPAL MgR-I/95 — skull; ZPAL MgR-I/96 — skull; ZPAL MgR-I/97 — skull; ZPAL MgR-I/98 — skull; ZPAL MgR-I/99 — skull with anterior part of vertebral column; ZPAL MgR-I/100 — skull; ZPAL MgR-I/101 — skull ZPAL MgR-I/102 — skull; ZPAL MgR-I/103 — skull; ZPAL MgR-I/104 — skull; ZPAL MgR-I/105 — skull; ZPAL MgR-I/106 — skull with pectoral girdle; ZPAL MgR-I/107 — skull; ZPAL MgR-I/108 — skull fragments; ZPAL MgR-I/109 — skull; ZPAL MgR-I/110 — skull fragment; ZPAL MgR-I/111 — skull fragments; ZPAL MgR-I/112 — lower jaw; ZPAL MgR-I/113 — skull; ZPAL MgR-I/114 — skull fragments; ZPAL MgR-I/115 — lower jaw fragments; ZPAL MgR-I/116 — skull fragments; ZPAL MgR-I/117 — lower jaw fragment. **2.** Nemegt, Barun Goyot Formation: ZPAL MgR-I/1 — skull; ZPAL MgR-I/2 — skull fragment; ZPAL MgR-I/3 — skull fragment; ZPAL MgR-I/4 — skull fragments; ZPAL MgR-I/5 — skull; ZPAL MgR-I/6 — skull fragments; ZPAL MgR-I/7 — skull fragments. **3.** Khermeen Tsav II, red beds of Khermeen Tsav: ZPAL MgR-III/73 — skull; ZPAL MgR-III/74 — lower jaw fragment; ZPAL MgR-III/75 — skull fragments; ZPAL MgR-III/76 — skull with pectoral girdle and cervicals; ZPAL MgR-III/77 — skull and cervicals; ZPAL MgR-III/78 — skull; ZPAL MgR-III/79 — skull and anterior part of postcranial skeleton; ZPAL MgR-III/80 — skull with pectoral and partly preserved pelvic girdle; ZPAL MgR-III/81 — skull; ZPAL MgR-III/82 — skull with pectoral girdle and cervicals.

Specimens numbered ZPAL MgR-I/3—8, 9, 93—96, 99, 103—105, 108, 112, 114, 117, ZPAL MgR-III/73—76, 78—82 belong to small individuals, and ZPAL MgR-I/2, 11, 97, 98, 100, 102, 106, 109, 111 and ZPAL MgR-III/77 to large ones, and specimens ZPAL MgR-I/10, 101, 107 are intermediate in size. Specimens ZPAL MgR-I/1, 110, 113, 115 and 116 are uncertain.

Description. — Skull (fig. 1). *Median roof bones.* Premaxillae paired only in young individuals, but more frequently fused ventrally; in all adult dorsal process paired, long, extending slightly posterior to the external nares, separating the anterior parts of nasals. The external nares are small, oval and almost terminally situated. The nasals are always paired, large, wide, unsculptured, rectangular in outline; they surround the external nares posteriorly and articulate with maxillae laterally. The nasals do not meet with the prefrontals. The suture between nasals and maxillae is straight. Frontals are very wide and rather short, as a rule paired with straight suture in young individuals, but partly fused in old ones. They articulate with nasals anteromedially, with maxillae and prefrontals laterally, and partly with postfrontals as well as with parietal posteriorly. The suture between nasals and frontals is slightly interdigitating. A few pits are sometimes present symmetrically placed on both sides of the sagittal suture. The frontals do not border the orbits. The suture between the frontals and parietal is irregularly indented. The mesokinetic hinge joint between both skull segments is distinct. The frontals have small lateral descending processes which do not meet medioventrally beneath of the olfactory duct. The posteromedial surface of frontals and anteromedian parts of the parietal are slightly sculptured (particularly in the parietal foramen region). The parietal is single, but in young individuals a weak sagittal suture in the anterior part of the bone is visible. A very small parietal foramen occurs in the central part of the parietal in young individuals whereas in most adults it gradually disappears. The parietal has two crest-like ventral protuberances articulating with two rod-like epipterygoids. The posterior parietal processes are wide, and curve sharply, about halfway along their length, to the posterior. The posterior crests, places of neck muscles insertions are distinctly developed. The median part of the parietal is in some specimens deeply notched posteriorly. The posterior surface of the parietal is smooth.

Orbital region. The orbit is bordered by prefrontal and maxilla from the front, the postfrontal and postorbital from the back, and by the jugal from below. The orbit is small, reduced in size, tear-shaped, narrowing anteriorly, smaller than the supratemporal fossa. The orbit is situated more or less in a halfway of skull length and its axis being more anterolaterally directed. The prefrontal is triangular, widely sutured with the frontal mediodorsally by the straight suture, with the postfrontal from the back and over the orbit, with maxilla anteriorly,

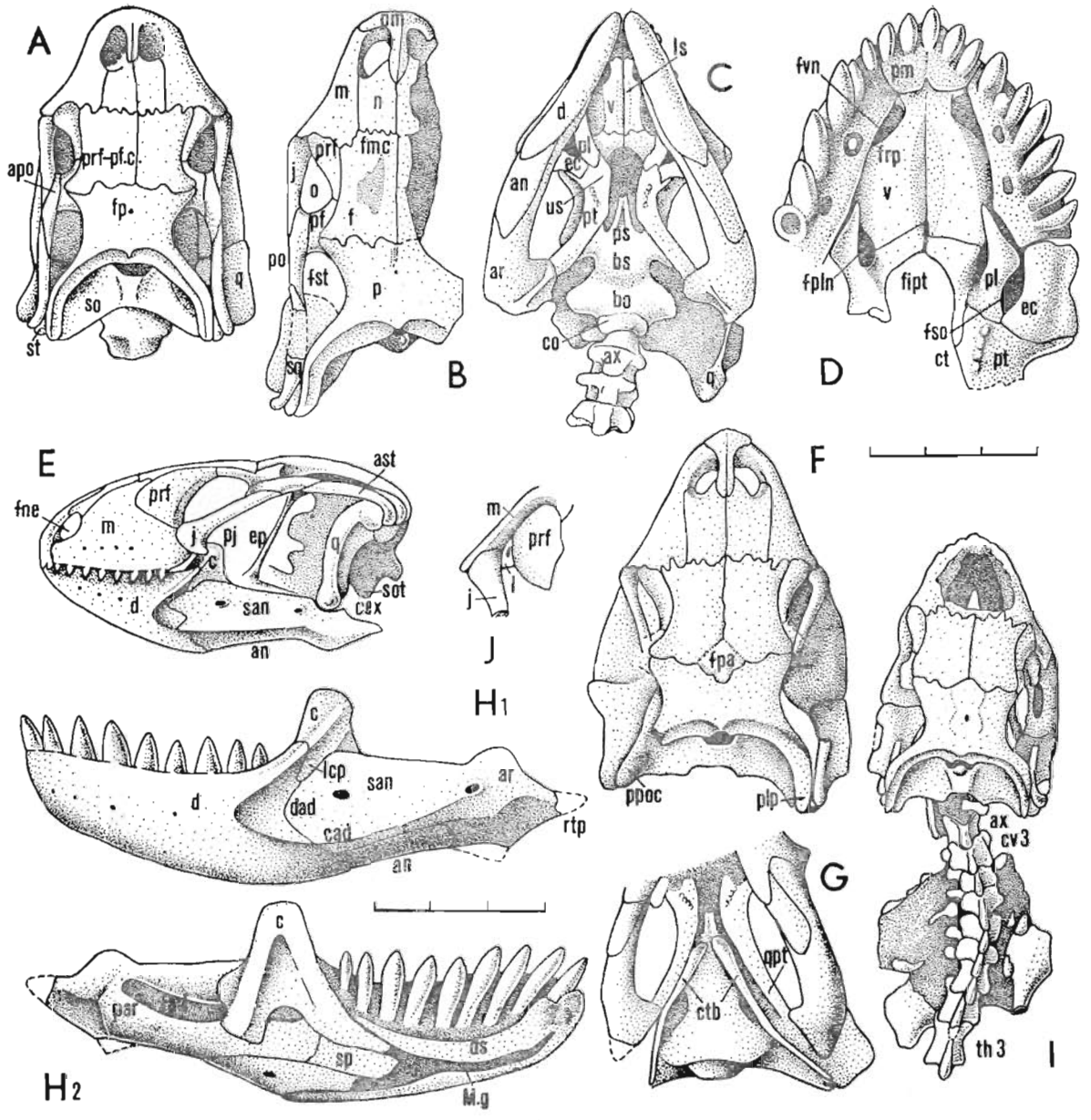

Fig. 1

Slavoia darevskii gen. n., sp. n. — Skull, lower jaw, palatal region and cervical section of vertebral column. *A* — Skull with parietal foramen, dorsal view; ZPAL MgR-I/106, large form; × 3.2 *B* — Skull with small parietal foramen, dorsal view; ZPAL MgR-III/73, small form; × 5. *C* — Skull, first three cervicals and shagreen teeth are preserved, ventral view; ZPAL MgR-III/77, large form; × 3.5. *D* — Skull, anterior section of palatal region, ventral view; ZPAL MgR-I/108, small form; scale 3 mm. *E* — Skull, partly restored, lateral view; ZPAL MgR-III/77, large form; × 3.5. *F* — Skull without parietal foramen, dorsal view; ZPAL MgR-III/78, small form; × 4.2. *G* — Posterior skull fragment with (?) ceratobranchials, ventral view; ZPAL MgR-III/80, small form; × 3.2. *H* — Lower jaw: *1* — outer view, *2* — inner view; ZPAL MgR-I/108, small form; scale 3 mm. *I* — Skull with cervical section and two first thoracics, dorsal view; ZPAL MgR-III/82, small form; × 2.7. *J* — Antero-internal floor of the orbit (scheme), about × 6.

Abbreviations: Skull — *apo* — postorbital arch, *ast* — supratemporal arch, *bo* — basioccipital, *bs* — basisphenoid, *cex* — external quadrate conch, *co* — occipital condyle, *ct* — shagreen teeth, *ctb* — ceratobranchial, *ec* — ectopterygoid, *ep* — epipterygoid, *f* — frontal, *fipt* — interpterygoid fossa, *fmc* — fronto-maxillary contact, *fne* — external narial foramen, *fp* — parietal foramen, *fpa* — parietal foramen area, *fpln* — palato-narial fossa, *frp* — resorptional pits, *fso* — suborbital fenestra, *fst* — supratemporal fossa, *fvn* — vomero-nasal foramen, *j* — jugal, *l* — lacrimal, *ls* — longitudinal sulcus, *m* — maxilla, *n* — nasal, *o* — orbit, *p* — parietal, *pd* — dorsal premaxillary process, *pf* — postfrontal, *pj* — jugal process, *pl* — palatine, *plp* — postero-lateral parietal process, *pm* — premaxilla, *po* — postorbital, *ppoc* — paroccipital process, *prf* — prefrontal, *prf-pf.* c. — prefronto-postfrontal contact, *ps* — parasphenoid, *pt* — pterygoid, *q* — quadrate, *qpt* — quadrato-pterygoid process, *so* — supraoccipital, *sot* — sphenoccipital tubercle, *sq* — squamosal, *st* — supratemporal, *us* — upper scroll of palate, *v* — vomer. Lower jaw: *an* — angular, *ar* — articular, *c* — coronoid, *cad* — adductor crest, *d* — dentary, *dad* — adductor depression, *ds* — dentary sulcus, *fad* — adductor fossa, *lcp* — labial coronoid process, *M. g.* — Meckelian groove, *par* — prearticular, *rtp* — retroarticular process, *san* — supraangular, *sp* — splenial. Other abbreviations see figs. 2 and 3.

and with the jugal laterally. The maxillary-prefrontal suture is arched anteriorly. Prefrontal, maxilla and jugal form the antero-internal floor of the orbit (fig. 1 J). The postfrontal is a flat X-shaped bone. Along with the postorbital it forms a complete postorbital arch. The median processes clasp the antero-lateral edge of the parietal and postero-lateral edge of the frontal. This suture, as indicated by a distinct inflexion in the fronto-parietal suture is, in most specimens, probably movable. Both lateral processes, smaller than the median ones, are sutured with the postorbital. The jugal borders completely the orbit from the ventro-lateral side. It contacts the maxilla anteriorly and extends posteriorly to the postorbital. It is rod-like, short, with an anterior expansion. A small posterior process is visible in a few specimens (fig. 1 E). The postorbital closes the postorbital arch laterally, connects the jugal anterolaterally and squamosal posterolaterally.

Temporal region (fig. 1). All bones of this region are complete except of the supratemporal bone which is sometimes fused with the posterior process of the parietal in adults. The postfrontal and the postorbital form the anterior margin of the supratemporal fossa. The postfrontal is not posteriorly expanded and not fused with the lateral margin of the parietal. The postorbital is elongated, joins the jugal anteriorly, and is slightly obliquely sutured with the squamosal posteriorly. The postorbito-squamosal bar is more or less parallel to the long axis of the skull. The squamosal is long, thin with a curved posterior end („hockey-stick" shaped bone; ROBINSON, 1967: 399). This bone articulates by its bowed tip with the notch of the head of the quadrate. At the same time it joins the posterior process of the parietal. The squamosal does not contact the jugal. The supratemporal is a small squamous bone separated in young individuals, but fused with the posterior process of parietal in adults. The supratemporal fossa is relatively large, tear-shaped, narrowing backwards. It is not overlapped by any separated dermal ossifications or increased bones of the temporal region.

Maxillary region (fig. 1). The maxillae are rather high and short. The anterior maxillary ends articulate with premaxillae and border the external nares anterodorsally. The maxillae are not in direct contact with vomers. The postero-dorsal maxillar process is sutured with antero-lateral process of the frontal. Maxilla articulates also by a straight and rather long suture with nasal dorsally and with prefrontal and jugal posteriorly. Dental groove contains 8 rather widely spaced teeth. Teeth are high, cylindric, sharp, without sculpture. There are no traces of dermal ossifications on the external surface of maxilla. There are some 3—4 nutrient foramina over the dental margin. The tooth implantation is pleurodont and replacement of teeth successive. Very small resorptional pits at the bases of teeth are sometimes visible. The number of teeth in premaxilla and maxilla does not exceed 10. The lacrimal is very small, lies wholly inside orbit. The lacrimal foramen occurs in the antero-internal floor of the orbit (fig. 1 J).

Articular region (fig. 1 A, E). The quadrate has an elongated trunk and strongly developed head. The medial articular facet for the posterior process of parietal on internal side of the cephalic condyle is well marked. The external conch is well developed with a strong tympanic crest. The posterior process of the quadrate head is inclined downward. The distal condyles come into the paired articular facets of the articular. A small supratemporal is also in contact with the quadrate head. There is a distinct connection between the quadrate head and distal end of paroccipital process. The rod-like epipterygoids join the ventral crest-like protuberances of the parietal with the pterygoids.

Occipital region. The supraoccipital has a distinct sagittal cusp or knob that enters into the posterior notch of parietal; the metakinetic hinge joint in this place is probably limited. Well developed paroccipital processes articulate with the posterior processes of parietal and the supratemporals. A foramen magnum is large and occipital condyle rather distinctly tripartite.

Palatal region (fig. 1 C—D). The tooth number on both premaxillae is always unpaired and

does not exceed 5. Sometimes a median tooth is slightly larger than the lateral ones. Vomers are rather wide and short meeting each other on the sagittal line. They articulate with premaxillae anteriorly, laterally with maxillae by maxillary process of palatines, and surround the internal nares from the medial side. Longitudinal delicate grooves are observed on vomers. Vomers are completely toothless and never in contact with pterygoids. Palatines are „scroll-like" (see GREER, 1970: 157) and form a rudimentary secondary palate. The maxillary processes of palatines extend downward to the maxillae, whereas the anterior processes extend upwards to vomers with a distinct change in elevation of the two palatal areas. Palatines articulate with vomers anteromedially but they do not meet one another posteromedially. The interpterygoid vacuity is wide and long, comes into the anterior part of palatal region but does not reach vomers. The ectopterygoid is a small square bone between the maxilla and pterygoid. A small suborbital fenestra occurs between the ectopterygoid, maxilla and palatine (infraorbital vacuity; HOFFSTETTER, 1949: 56—57). In some specimens this fenestra is bordered only by the ectopterygoid and palatine, the maxilla being eliminated by the ectopterygoid. The pterygoid is strongly anteroposteriorly elongated with well developed posterior process. The anterior or palatal process is articulated by indented and overlapping suture with the palatine and ectopterygoid anterolaterally. The pterygoid is also flexibly articulated with the basipterygoid process and with the quadrate by means of vertically arranged quadrate process of the pterygoid. Sometimes in central part of pterygoid shagreen-like teeth (3 or 4 in number) are visible.

Basal region (fig. 1G). The parasphenoid is not preserved. A small projection in front of the basisphenoid (processus cultriformis) indicates that this element was present. Basisphenoid

Table 1

Slavoia darevskii gen. n., sp. n.
Measurements of skulls in mm

Locality	ZPAL Cat. Nos.	Length	Width	Locality	ZPAL Cat. Nos.	Length	Width
Nemegt	MgR-I/4	ca 11.0	—	Khulsan	MgR-I/107	12.0	ca 7.5
Nemegt	MgR-I/3	ca 12.0	—	Khulsan	MgR-I/109	ca 12.0	—
Nemegt	MgR-I/7	12.5	—	Khulsan	MgR-I/8	13.0	8.0
Nemegt	MgR-I/1	ca 14.0	—	Khulsan	MgR-I/106	14.0	8.5
Nemegt	MgR-I/11	ca 14.5	—	Khulsan	MgR-I/102	ca 15.5	ca 9.0
Khulsan	MgR-I/94	ca 9.0	ca 6.0	Khermeen Tsav	MgR-III/75	ca 11.0	—
Khulsan	MgR-I/96	10.0	ca 6.5	Khermeen Tsav	MgR-III/76	ca 12.0	ca 8.0
Khulsan	MgR-I/9	ca 10.0	ca 7.0	Khermeen Tsav	MgR-III/82	ca 12.0	ca 8.0
Khulsan	MgR-I/103	ca 10.0	ca 7.5	Khermeen Tsav	MgR-III/73	12.5	7.5
Khulsan	MgR-I/99	10.0	8.0	Khermeen Tsav	MgR-III/78	12.5	ca 7.5
Khulsan	MgR-I/110	ca 10.5	—	Khermeen Tsav	MgR-III/79	ca 13.0	—
Khulsan	MgR-I/93	11.0	8.0	Khermeen Tsav	MgR-III/81	13.0	8.5
Khulsan	MgR-I/113	ca 11.0	—	Khermeen Tsav	MgR-III/77	ca 15.0	ca 9.0
Khulsan	MgR-I/10	11.5	—	Khermeen Tsav	MgR-III/80	15.0	9.5

is wide, with strong, anteroposteriorly expanded basipterygoid processes and permanently fused to the basioccipital. The latter bone is wider than the basisphenoid and has rather medium sized sphenoccipital tubercles. Ceratobranchial bones sometimes occur (pl. 28: E_2 and figs. 1 G — *ctb*, 3 A_2).

Lower jaw (fig. 1 H). The mandible contains seven elements, of which the articular and prearticular are always fused and the supraangular is sometimes fused with the articular. The coronoid is rather high with a distinct external crest and small labial process which enters between the dentary and supraangular. The anterior internal process is strong and contacts the dentary anteriorly and splenial ventrally, whereas the postero-internal one is slightly smaller than the anterior and joins the supraangular and prearticular posteriorly and ventrally. There is a distinct concavity between both internal processes, in which the pterygo-ectopterygoid or so called palato-coronoid projection is inserted. The dentary is rather short, narrowing anteriorly and deepening posteriorly. It contacts the coronoid, supraangular and angular. The dental groove bears a series of 8 to 10 pleurodont and homodont teeth. Teeth are high, cylindric with sharp tips, without sculpture. All lower teeth are widely spaced and like the upper ones, slightly inclined anteriorly. About 1/3 of their height is visible over the dental parapet. The tooth replacement is successive. Very small resorptional pits at the tooth bases sometimes occur. The various growth stages of teeth and the lack of some teeth in the series indicate that the teeth replaced in Zahnreihen (EDMUND, 1960, 1969), and tooth replacement was graduate. The symphysis is weakly developed. The Meckelian groove widely opens in front of the splenial. This latter bone is situated between coronoid, prearticular and angular (fig. 1 H_2). On the external side of the dentary a distinctly arched adductor crest is developed. It extends backwards and along the suture between the supraangular and angular bones, and surrounds a prominent adductor concavity. The supraangular is elongated anteroposteriorly, sometimes fused with the articular. There are two small openings on the external surface of supraangular — anterior, situated just by the suture with the dentary, and the posterior one near the articular bone. On the internal side a short and narrow mandibular groove is present (adductor fossa; ROMER, 1968: 199). The angular is long and equilateral, well exposed externally. It comes deeply into to Meckelian groove and articulates with the splenial and prearticular. The articular is permanently fused with the prearticular and sometimes with supraangular. The retroarticular process is short, wide, triangular and narrowing backwards. The double articular facets for the quadrate condyles are well developed. The pre-and postcoronoid sections in all studied mandibles are more or less of the same length.

Postcranial skeleton. *Vertebral column* (pls. 26—27; 28 H—I, and figs. 1 C, I; 2—3). The vertebral column is not completely preserved. The best preserved specimen ZPAL MgR-I/8 (holotype) has 41 vertebrae only. The complete series of vertebrae includes probably 55. The cervical section has 7 vertebrae. These are, except, for atlas and axis, distinctly shorter than the thoracic and have long neural spines directed backwards. Cervical hypocentra are separate and intervertebrally situated. Diapophyses or synapophyses of three posterior cervicals are well developed. The trunk section consists of 16 thoracics and probably 3 lumbars (total number of presacrals is 26). They differ from cervicals in having longer centra, shorter and lower neural spines, and weaker hypocentra in anterior part of the thorax. The three lumbar vertebrae are devoid of ribs. The sacral section contains 2 firmly attached vertebrae, but with unfused to each other, conspicuous „costal" or transverse processes. The proximal part of the caudal section includes most often 8 or 9 vertebrae. The long transverse processes are in the first five or six vertebrae anteriorly directed. The full number of caudals is unknown — possibly 30. In the proximal section of the tail the fracture septae are not observed, but it is possible that they were present in the distal one. Cervical ribs of third and fourth vertebrae are sharp and thin. The ribs of the fifth to seventh cervicals are longer than anterior ones (formula 2.2.3; see GASC and HOFFSTETTER, 1969). The anterior eight thoracics have longer and slightly thicker ribs

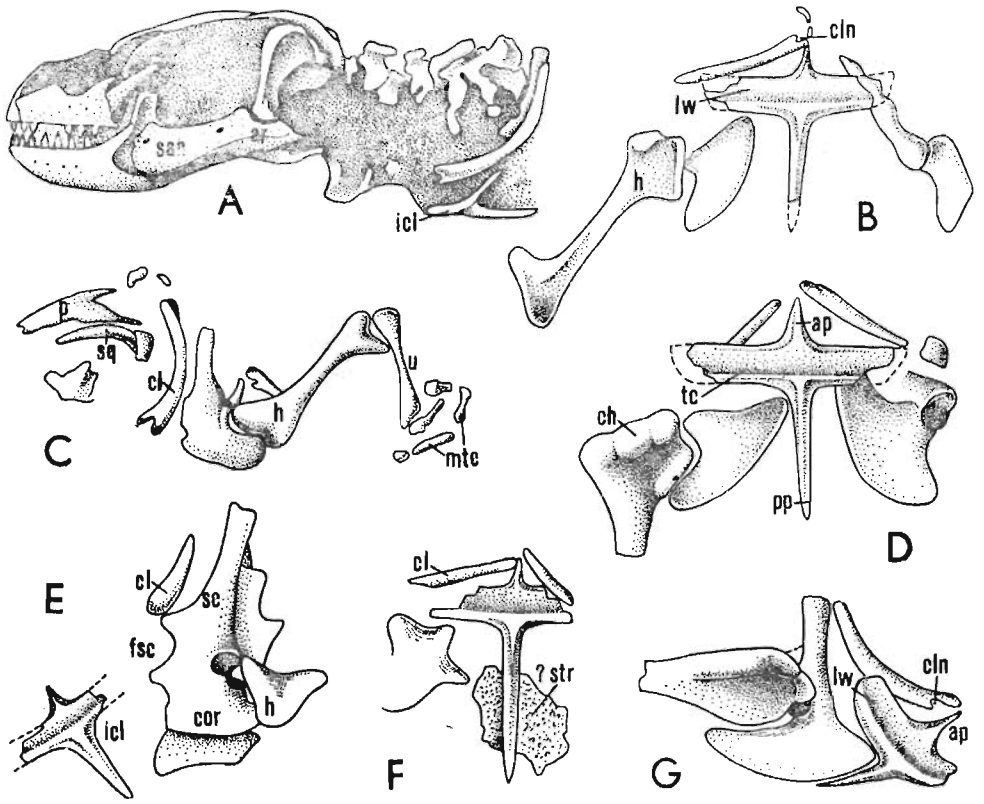

Fig. 2

Slavoia darevskii gen. n., sp. n. Pectoral girdle. *A* — Skull with anterior section of vertebral column, lateral view, holotype; ZPAL MgR-I/8, small form; × 3.5. *B* — Pectoral girdle, ventral view, holotype; ZPAL MgR-I/8, small form; × 4. *C* — Pectoral girdle and left fore limb, lateral view; ZPAL MgR-III/79, small form; × 3. *D* — Pectoral girdle, ventral view; ZPAL MgR-I/106, large form; × 2.5. *E* — Pectoral girdle, scapulo-coracoid complex and interclavicle, latero--ventral view; ZPAL MgR-III/76, small form; × 4. *F* — Interclavicle and ? sternum, ventral view; ZPAL MgR-I/108; small form; × 4. *G* — Pectoral girdle, lateral view; ZPAL MgR-I/106, large form; × 3.5

Abbreviations: *ap* — anterior interclavicular process, *ch* — humeral head, *cl* — clavicle, *cln* — clavicular mesial notch, *cor* — coracoid, *fsc* — scapular fenestra, *icl* — interclavicle, *lw* — lateral wing, *pp* — posterior interclavicular process, *sc* — scapula, *str* — ?sternum, *tc* — transverse crest. Other abbreviations see figs. 1 and 3.

than cervicals. The ribs from ninth to sixteenth thoracics are distinctly shorter. The transverse sacral processes are rather wide but not fused to each other. All vertebrae are procoelous.

Pectoral girdle (fig. 2): The interclavicle is cruciform with very wide and strong lateral wings (*lw*). There is a prominent transverse crest in the posterior part of these wings. The anterior process is rather short, sharply pointed, not divided terminally and directed slightly upwards. The interclavicular shaft is slender long but not longer than the length of both lateral wings together. The clavicle is slender and slightly mesially widened. Sometimes there is a weak marked mesial notch (fig. 2C, E, G — *cln*) which suggests the presence of an original perforation. Both clavicles meet ventrally in midline at the anterior interclavicular process. The distal ends of clavicles are narrow, upwards arched alongside the anterior scapular margin. The sternum was not ossified. The scapula is long and slender with a weak emargination in the scapulo-coracoid suture. The slightly expanded shape of the distal scapular end indicates that the cartilaginous suprascapula was present. The coracoid is huge, wide with a weak notch and a medial crest. The coracoid foramen (*fc*) is small, sometimes visible. The glenoid fossa is wide and deep.

Pelvic girdle (fig. 3C—D). Only a few specimens have the pelvic region completely preserved. The dorsal process of ilium and small obturator foramen are preserved. The acetabulum is

Table 2

Slavoia darevskii gen. n., sp. n.
Lengths of the bones of the postcranial skeleton in mm

Locality	ZPAL Cat. Nos.	Humerus	Ulna	Metacarpals and digits	Fore limb
Khulsan	MgR-I/9	7.5	5.0	ca 3.0	ca 15.5
Khulsan	MgR-I/8	8.0	5.0	ca 3.0	ca 16.0
Khermeen Tsaw	MgR-III/79	8.0	5.0	ca 2.5	ca 15.5

Locality	ZPAL Cat. No.	Femur	Tibia	Metatarsals and digits	Hind limb
Khulsan	MgR-I/8	ca 10.0	8.0	ca 5.0	ca 23.0

well developed, without opening. The ischium and pubis are fragmentarily preserved. At present the detailed analysis of these bones is not possible.

Fore limb (fig. 3C—D). The humerus is delicate, generally simplified in structure. Epiphyses are distinctly widened and turned in relation to each other at an angle of ca. 90°. The ectepicondylar foramen is weakly marked but present. The humerus is slightly longer than the ulna. The ulna is slender, thin with a well developed olecranon. The radius is much shorter than the ulna. The preserved fragments of metacarpus indicate that the manus was not modified or reduced.

Hind limb (fig. 3C). The femur is the longest bone of the hind limb. The trochanter major and epiphyses are in fragments. The distal ends are lacking. The hind limb was somewhat longer and more stout than the fore one. Digital formula is unknown.

Discussion. — The paired nasals and frontals, and single parietal with reduced foramen structure of palatal region („scroll-like" palatines and secondary palate construction; see GREER, 1970: 157), the arrangement of the bones in temporal region, the separated postfrontal and postorbital, structure of pectoral girdle and scapulo-coracoid complex, elongated brain case, the structure of lower jaw as well as possible general tendency to the reduction of both limbs suggest that *Slavoia darevskii* gen. n., sp. n. is a member of the infraorder Scincomorpha CAMP, 1923.

The structure of the shoulder girdle (strong and wide lateral interclavicular wings with much prominent transversal crest, and humerus with wide epiphyses) suggest the existence of strong muscles of the neck and well developed musculature of fore limbs. It is not excluded that *Slavoia* was adapted to the fossorial or semifossorial mode of life. Such mode of life is suggested also by the reduction of size of the orbits, compact construction of the anterior part of the skull, ventrally fused premaxillae, short and high maxillae, shortened dentaries with not numerous, but rather sharp and simple teeth, weakly developed or overgrown parietal foramen, as well as much more compact structure of the brain case than in most terrestrial lizards (see also GUIBÉ 1970: 1009). According to WILD (1973: 36) the fusion of frontals, unpaired parietal, the fusion of vomers and strong premaxillae are indicative features of burrowing mode of life in recent and fossil lizards.

The wide and short rectangular nasals, frontals and parietal, widely open in front of splenial Meckelian groove (a primitive character), lack of dermal ossification, traces of sagittal suture on the premaxilla and parietal and the fronto-maxillary contact, outwardly may suggest some resemblances of *Slavoia* to gekkonoid-like forms. However, the tooth morphology and

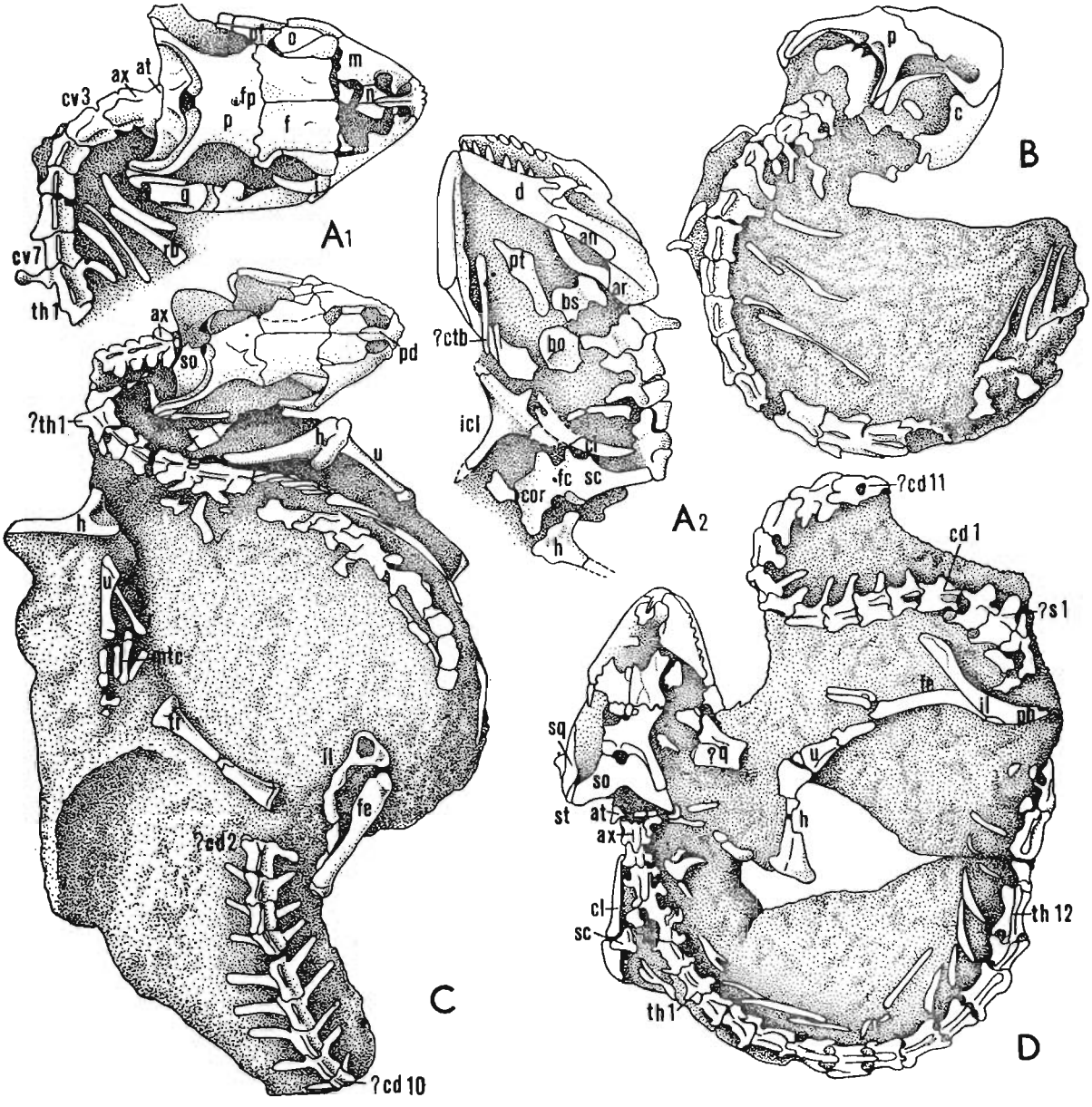

Fig. 3

Slavoia darevskii gen. n., sp. n. Skull and postcranial skeleton. *A* — Skull with cervical section of vertebral column; *1* — dorsal view, *2* — ventral view; ZPAL MgR-III/76, small form; × 3.3. *B* — Skull with postcranial skeleton, dorso-lateral view; ZPAL MgR-I/99, small form; × 3.3 *C* — Skull with nearly complete postcranial skeleton, dorsal view; ZPAL MgR-I/9, small form; × 3. *D* — Skull and postcranial skeleton, dorsal view, holotype; ZPAL MgR-I/8, small form; × 2.5.

Abbreviations: *at* — atlas, *ax* — axis, *Cdl* — caudal vertebra, *cfe* — femoral head, *Cvl* — cervical vertebra, *fc* — coracoid foramen, *fe* — femor, *fi* — fibula, *h* — humerus, *il* — ilium, *mtc* — metacarpal, *pb* — pubis, *ptr* — transverse process, *r* — radius, *rb* — rib, *Sl* — sacral vertebra, *Thl* — thoracic vertebra, *ti* — tibia, *u* — ulna. Other abbreviations see figs. 1 and 2.

tooth replacement, complete postorbital and supratemporal arches, separated postfrontal and postorbital, „hockey-stick" shaped squamosal, the presence of supratemporal and sha-green teeth on the pterygoids, and lateral descending frontal processes not in contact beneath the olfactory tract do not allow to assign this genus to the any member of the infraorder Gekkota CUVIER, 1817.

A comparison of skull and postcranial skeleton of *Slavoia darevskii* with those of the various recent and fossil lizards assigned to the scincomorph groups shows a great resemblances (about 75% or more characters in *Slavoia darevskii* are common with scincomorphan lizards). It is interesting that described here lizard displays some characters similar to macrocephalosaurid and polyglyphanodontid species discovered in the same localities of Mongolia (see SULIMSKI, 1972, 1975, 1978). This concerns also particularly the structure of temporal region, palatal construction and in number of teeth (see *Adamisaurus magnidentatus*; SULIMSKI, 1972, 1978).

The scapulo-coracoid complex in *Slavoia darevskii* shows also resemblances to scincomorphan lizards, in which the scapula is slender, narrow with delicate expansion for the cartilaginous suprascapula and without notches, whereas the coracoid has a small emargination (*ce*). The scapulo-coracoid emargination occurring in the place of scapulo-coracoid suture is also small but visible (*sce*). Similar structures are known also in some gekkonoid (Xantusiidae), iguanoid or in some anguimorphan lizards (HOFFSTETTER, 1964: 299, fig. 4).

In spite of lack of the dermal ossification characteristic of scincomorph lizards, it appears justified to assign *Slavoia darevskii* to Scincomorpha CAMP, 1923. The assignment to any recent or fossil known family of this infraorder is, however, difficult because *Slavoia* is characterized by a mixture characters occurring in various scincomorph families. *S. darevskii* exhibits some resemblances to the representatives of Teiinae and Gymnophtalminae (comp.: Presch 1974, 1980; MacLean 1974). A relationship with the second subfamily seems to be more probable. The differences in skull dimensions (Table 1) may be connected either with ontogenetic development or with sexual dimorphism.

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EXPLANATIONS OF THE PLATES 26—28

PLATE 26

Slavoia darevskii gen. n., sp. n.

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

Skull with postcranial skeleton, holotype, ZPAL MgR-I/8, x 5.7.

PLATE 27

Slavoia darevskii gen. n., sp. n.

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

1a. Skull with postcranial skeleton, ZPAL MgR-I/9, × 7.5.
1b. Caudal section of the same specimen, × 7.5.

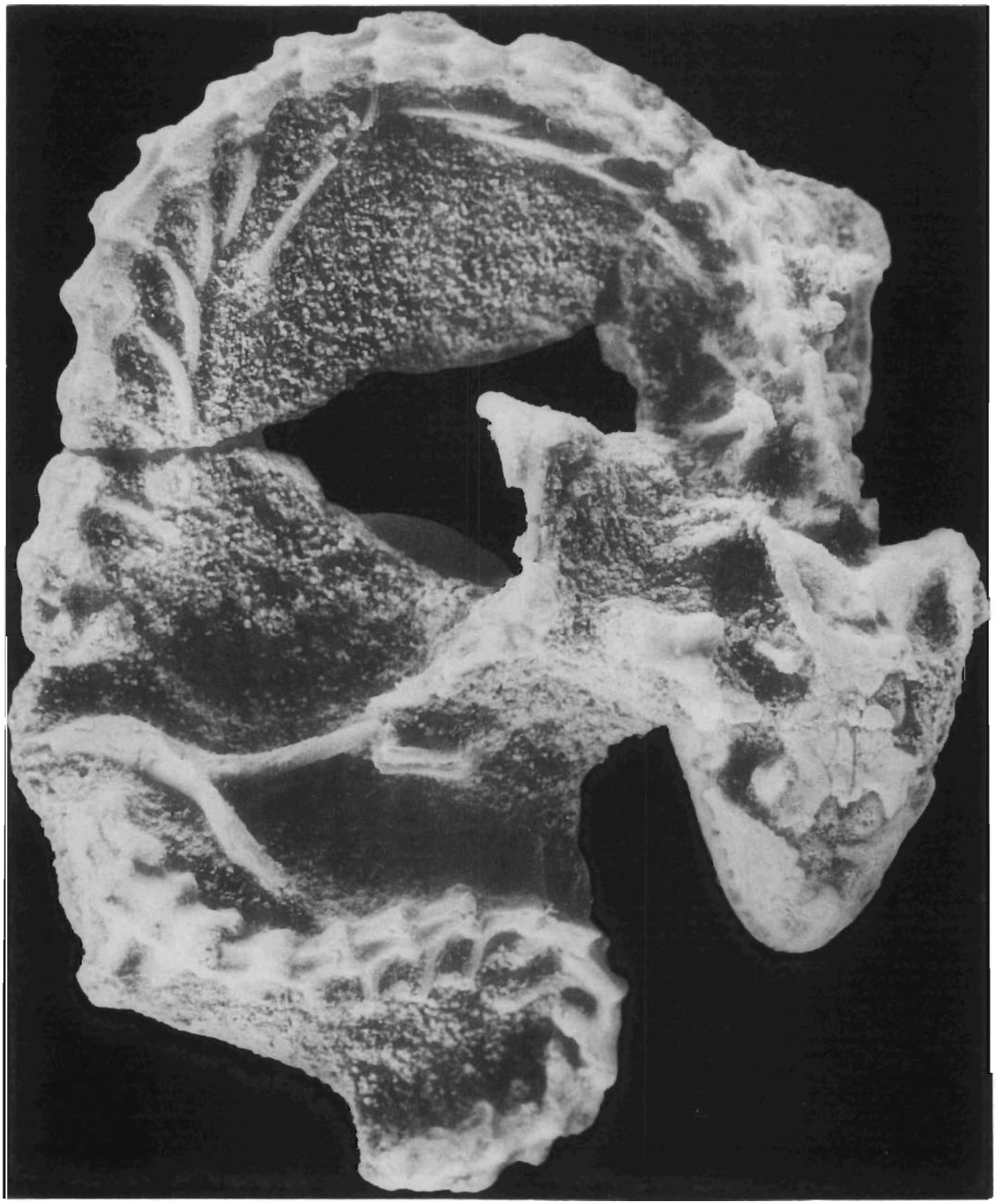
PLATE 28

Slavoia darevskii gen., n., sp. n.

Upper Cretaceous, (figs. 1—5 and 8) red beds of Khermeen Tsav, Khermeen Tsav II, (figs. 6, 7 and 9) Barun Goyot Formation, Khulsan, Gobi Desert, Mongolia

1. Skull, ventral view, ZPAL MgR-III/77, × 3.
2a. Skull with pectoral complex, dorsal view, × 3.
2b. The same, ventral view, ZPAL MgR-III/76, × 3.

3. Skull with parietal foramen area, dorsal view, ZPAL MgR-III/82, × 3.
4. Skull without parietal foramen, dorsal view, ZPAL MgR-III/78, × 3.
5a. Skull with very small parietal foramen, dorsal view, × 3.
5b. The same, ventral view (ceratobranchials are preserved), ZPAL MgR-III/80, × 3.
6. Skull with parietal foramen and well preserved postorbital and supratemporal arches, dorsal view, ZPAL MgR-I/106, × 3.
7. Pectoral girdle (cruciform interclavicle, clavicle, coracoids and proximal part of humerus), ventral view, ZPAL MgR-I/106, × 4.
8. Skull with postcranial skeleton — left fore limb nearly completely preserved, lateral view, ZPAL MgR-III/79, × 3.
9. Skull with postcranial skeleton, dorsal view, ZPAL MgR-I/99, × 3.



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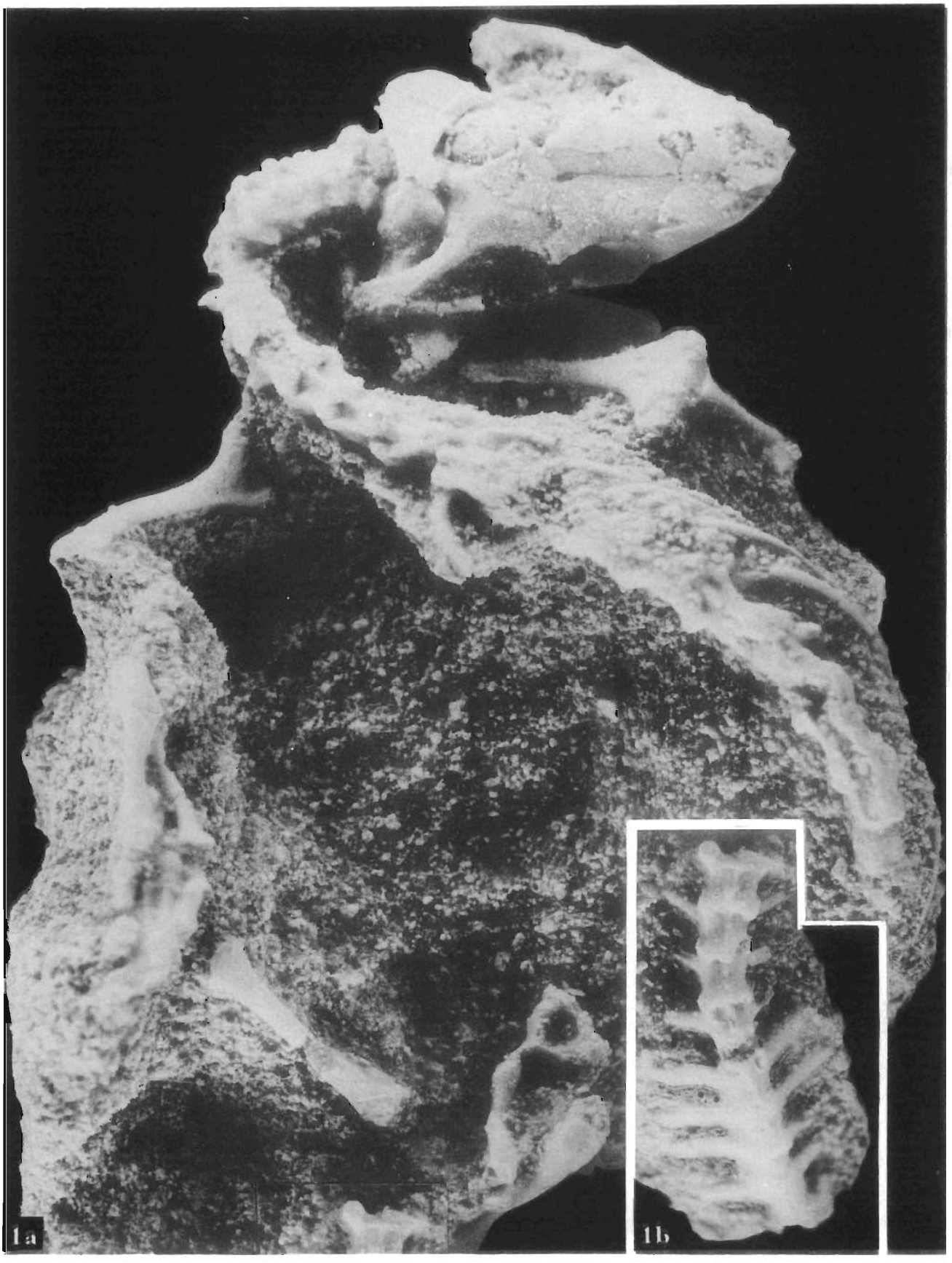

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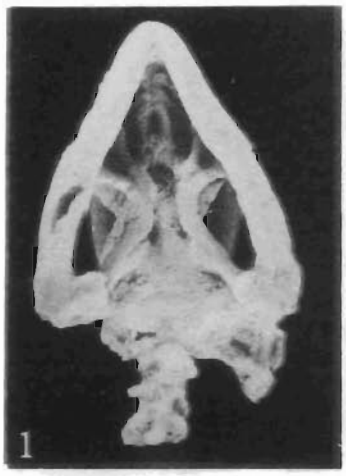
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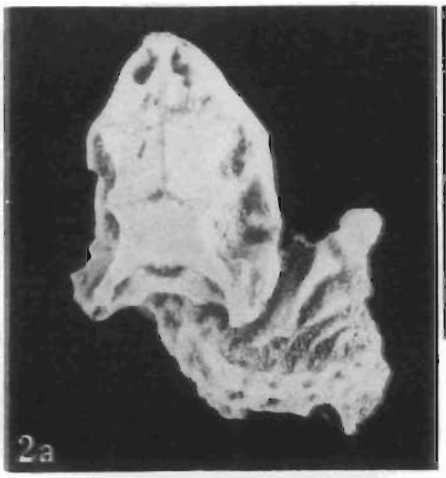
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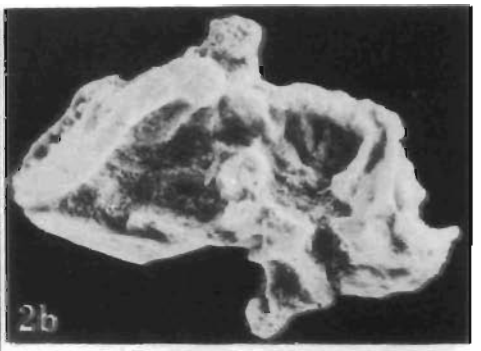
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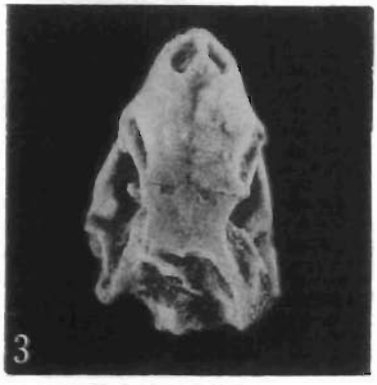
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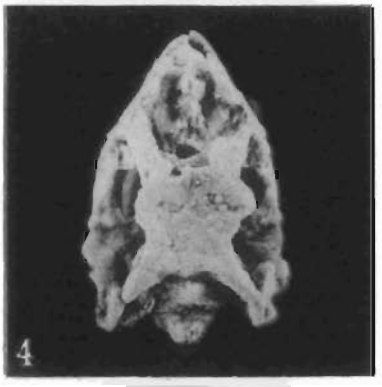
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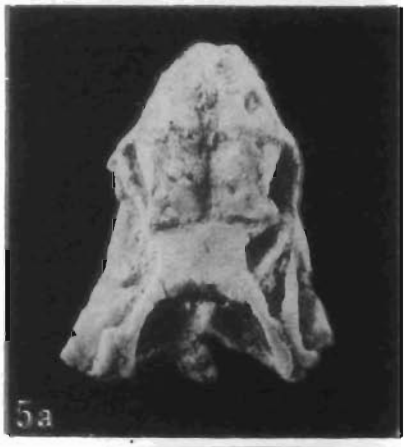
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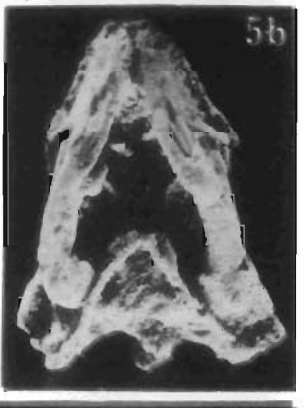
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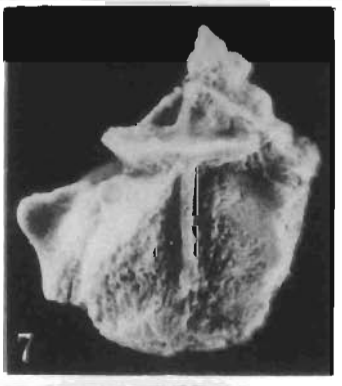
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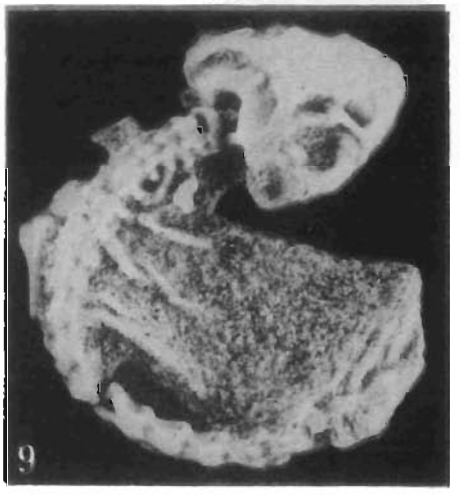
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