

A NEW SCORPION
FROM THE UPPER CARBONIFEROUS
OF SIBERIA

By

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Abstract: The scorpion, probably of Stephanian age, was found in a drill-core from the Kemerov Region of the Kuznetsky Basin. The new species might belong to the Carboniferous genus *Cyclophthalmus* Corda described from Czechoslovakia. The specimen shows eurypterid features in the structure of the basal plate of the pectines.

The scorpion described in the present paper was found by Mr. KORSÁK in a core from a drill hole Nr. 3, depth 71 m, from the Tomjusinsky District of the Kemerov Region in the Kuznetsky Basin, U.S.S.R. The fossil occurs in a dark argillite of probably early Stephanian age.

The preservation is good. The scorpion is exposed lying on its back (pl. I). However, the ventral sclerites are to a large extent dislocated or removed exposing the impression of the dorsal surface.

Cyclophthalmus (?) *sibiricus* n.sp.

Plate and explanatory drawings.

H o l o t y p e. No 638/1 of the collection of Palaeontological Institute, Academy of Science, U.S.S.R. The holotype is the only specimen known.

D i a g n o s i s. Scorpion of moderate size, median eye lobe heart-shaped situated near anterior border of prosoma. Pedipalp with slender and straight fingers. Sternum-operculum pear-shaped with posterior notch. Only last pair of coxae abuts against sternum-operculum. Basal plate of pectines with narrow median lobe. Ventral plates of mesosoma well rounded but not bilobed. Metasoma slightly longer than mesosoma.

Description. The body has the typical scorpionid form with a length of 32,5 mm. A median eye lobe (ocular tubercle) is the only preserved portion of the dorsal surface of the prosoma. The eye lobe is heart-shaped with narrow lateral rims. Elliptical ocelli are faintly indicated as suggested in the drawing (fig. 1, c). A distinct line (*border* in fig. 1, b) might represent the lateral margin of the prosoma near the postlateral angle. The line resembles the lateral margins of the tergites.

Remains of the six pairs of prosomal appendages are preserved. The lateral outline of the left chelicera is suggested in front of the median eye lobe. Both pedipalps are present, the right one being the better preserved. A less distinct coxa is succeeded by a short trochanter, a longer prefemur with a row of tubercles, and a femur. These segments are not much broader than the corresponding ones of the walking legs. The hand (tibia) with the fingers (tibia pars and tarsus) are narrow. The fingers are straight, the movable one (?) with a narrow ridge along the biting margin, possibly representing a row of denticles. The proximal portions of four pairs of walking legs are preserved. The thickness of the segments suggests that the legs were powerful. The coxa of the last right walking leg (VI) abuts against the pear-shaped combined sternum-operculum. The exact boundary is not well exposed. The long prefemur of the hind leg reaches as far as to the middle of the fifth tergite. Only the basal portion of the femur is preserved.

The sternum is either not preserved or forms part of the pear-shaped structure interpreted below as a combination of sternum-operculum.

The mesosoma is well exposed. On the left side (right in photograph) the pleural membrane is drawn out because of the oblique compression of the specimen. On the other side the lateral borders of the tergite are either not preserved or covered by the last walking leg. The length of mesosoma is 12,5 mm with a maximum width of 6,5 mm. The impressions of the six tergites with their intersegmental membranes are well preserved. Each tergite has a concave anterior border and a convex posterior. The lateral borders of the tergites are slightly convex, not converging forwards except the first one. The tergites increase in length backwards to the fifth which probably has about the same length as the sixth. The seventh or last mesosomal tergite forms part of a more narrow sclerotized ring with a trapezoid outline. The length of the first tergite is 0,7 mm, of the fifth 1,4 mm.

The mesosomal appendages forming the operculum, the comb organs and the four ventral abdominal plates ("sternites") are partly preserved. A pear-shaped plate-like structure occurs between the coxae of the last walking legs. The plate has a median posterior notch and a median furrow in front of it. These structures evidently mark the two halves of the operculum. In front another median furrow is present which, however, does not continue into the median furrow running forward from the notch. The anterior median furrow changes its course and runs more or less parallel to the lateral border of the pear-shaped plate. The structures resemble those described by FRITSCH (1904 text-fig. 85 and pl. 8 fig. 3) in *Cyclophthalmus senior* CORDA. The specimen was reexamined by PETRUNKEVITCH (1953 p. 9 fig. 24) who found the pear-shaped plate to be composed of a triangular sternum in front and a bilobed operculum behind. Judging from the drawings by FRITSCH the border between the presumed sternum and operculum is very indistinct. Possibly the operculum was pushed forward so that it partly covered the sternum. The same might have been the case in the present specimen. The anterior and to some extent the lateral portions of the plate might belong to the sternum and the rest to the operculum.

Behind the operculum a transverse plate evidently represents the basal plate of the pectines (segment IX). Photographs of the specimen whitened with ammonium clorite shows interesting morphological details. Near the median line, in front of the plate, two circular areas, possibly with a central spot, are faintly suggested (pl. II, fig. 2, and pl. I, fig. b). They might be identical with the presumed "genital openings" (of segment VIII) suggested by FRITSCH in *Cyclophthalmus senior* CORDA (l.c.).

The basal plate of the pectines has a median, narrow, lanceolate lobe. The distal portion is indistinct but might be seen in pl. II, fig. 2 and pl. I, fig. b. The anterior part of the lobe at least, seems to be divided by a median furrow. The length of the lobe is 1,2 mm. A median lobe has been observed by STØRMER (1963 text-fig. 19 and 32) in *Gigantoscorpio willsi* STØRMER and in *Centromachus euglyptus* (PEACH). The structure seems to be homologous with the median appendage of the IXth segment in *Eurypterus*. Here it forms part of the genital appendage of segment VIII. The common structures suggest a closer relationship between scorpions and eurypterids.

The lateral lobes of the basal plate of the pectines have elliptical

areas with their long axis forming an angle of about 45° with the median line. The elliptical areas have several longitudinal furrows suggesting folds in the integument. The areas probably mark the attachments of the pectines or combs.

The ventral abdominal plates are preserved as impressions on the tergite and intersegmental membrane. The third plate is the best preserved. The transverse plate has well rounded lateral borders and a slightly concave posterior border. The plate is not bilobed with a median notch such as in typical members of the group *Lobosterni*. A transverse furrow in the lateral portion of the plate probably represents a fold rather than a stigma.

The metasoma or tail is preserved in its natural curved position. The four segmental rings and the telson show the outer surface of the sclerites. The surface has numerous wrinkles mostly due to the flattening of the primarily ring-shaped segments. The metasoma has a length of 15 mm, about 1,2 times the length of the mesosoma. The width of the tail is about 2 mm. The three proximal segments have a length of 2,2 mm. The fourth segment is as usual longer than the others measuring 4,5 mm in length. The telson with the powerful spine is not well preserved.

Occurrence. The holotype occurs in a dark argillite, probably from the lower part of the Stephanien, in a drill-core, borehole 3, depth 71 m, from the Tomjusinsky District, Kemerov Region, Kuznetsky Basin, U.S.S.R.

Affinities. A definite generic determination is difficult to make out, mainly because the outline of the prosoma is not preserved. PETRUNKEVITCH's (1955 fig. 40) major classification of fossil scorpions is based chiefly on the position of the posterior coxae in relation to the sternum and operculum. In the superfamily *Isobuthoidea* the coxae abut against the operculum, in the *Cyclophthalmoidea* against the sternum, and in the *Centromachoidea* both the third and fourth coxae (V, VI) are said to abut against the operculum. However, a reexamination of the holotype of *Centromachus euglyptus* (PEACH) indicates that only the last coxae (VI) abut against the operculum in this species (STØRMER 1963 text-fig. 32). This suggests that the genus *Centromachus* might belong to the *Isobuthoidea*.

In the present form only the posterior coxae abut against the sternum-operculum. It is not possible to decide whether the coxae

abut against both the sternum and operculum or only against one of them. Among the Isobuthoidea the genus *Isobuthus* differs from the present genus by having distinctly bilobed ventral abdominal appendages. *Microlabis* (PETRUNKEVITCH 1953, p. 23) has ventral plates with a median ridge. *Palaeobuthus* (PETRUNKEVITCH 1913 p. 53) is not well known, but the ventral plates do not seem to have well rounded postlateral angles. *Pareobuthus* (WILLS 1959 p. 267) has bilobed ventral plates as in *Isobuthus*. *Centromachus*, the only representative of the Centromachoidea, resembles the present form by having a median lanceolate lobe on the basal plate of the pectines (STØRMER 1963 text-fig. 32), but differs by having apparently curved fingers on the pedipalps (PEACH 1883 pl. 22 fig. 3, 3a).

Cyclophthalmus senior CORDA (FRITSCH 1904 text-fig. 85 and pl. 8 fig. 3) resembles the present species in the structures of the sternum-operculum and the basal plate of the pectines. The relations between the coxae and the sternum might also have been the same. For these reasons the present species might possibly belong to this genus. The species differs from *C. senior* CORDA by the heart-shaped eye lobe, the smaller size of the chelicers, and the straight fingers of the pedipalps.

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PLATES I-II

Explanation of plates

The details of plate II are explained in the accompanying drawings (plate I). In the drawing of the whole specimen (*a*) the slight dislocation along the diagonal crack is eliminated. The photographs of the whitened specimen are untouched.

PLATE II

Fig. 1—3. *Cyclophthalmus* (?) *sibiricus* n.sp.

Upper Carboniferous (Stephanien?) of the Tomjusinsky District, Kemerov Region, Kuznetsky Basin, U.S.S.R.

Fig. 1. 5x. Complete specimen.

Fig. 2. 25x. Detail of comb segment.

Fig. 3. Details 12,5x. of eye lobe, sternum-operculum, and comb. segment.

PLATE I



