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## THE UPPER SILURIAN CYATHASPID *ARCHEGONASPIS* FROM THE EAST BALTIC

*Archegonaspis* is one of the oldest representatives of the family Cyathaspididae (Heterostraci). The occurrences of this cyathaspid are not very frequent. It has been found in Gotland, England, Germany and Poland (in the latter two areas in erratics); a more recent find comes from Vaigach Island (see Denison, 1964; Новицкая, 1970). Most of the *Archegonaspis* finds are known from the Lower or Middle Ludlovian rocks, with the exception of a specimen reported from the Early Devonian of England (see White, 1958). The taxonomic position of this specimen, as well as *Archegonaspis ludensis* (Salter) from the Ludlovian of the same region is, however, not firmly established.

In the present paper, the *Archegonaspis* remains from the Ludlovian and lowermost Downtonian of the East Baltic area (Estonia, Latvia and Kaliningrad Region) are described for the first time. The remains come from bore-cores. They are represented by some specimens of the anterior portion of dorsal shield and several small fragments.

The specimens with indexes Pi are housed at the Geological Museum of the Estonian Academy of Sciences.

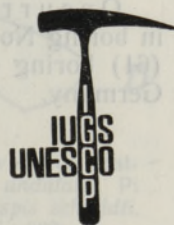
I am much indebted to colleague V. Karatajute-Talimaa, Lithuanian Institute of Geology, Vilnius, for the specimen of *Archegonaspis* (coll. No. 25-022) from Kaliningrad Region.

### Description

*Archegonaspis* Jaekel, 1927

Type-species. *Cyathaspis (Pteraspis) integer* Kunth, 1872.

Diagnosis. The dorsal shield is elliptical. The maximum length of the dorsal shield is 38—47 mm, width ratio 0.59—0.64, orbital ratio 0.15—0.19, pineal ratio 0.22—0.31, postbranchial ratio 0.27. There is no median rostral process; preorbital processes are well developed, postbranchial lobes are weak. The posterior edge of the shield is nearly transverse, sometimes with a small postero-median process. EpitEGA and postrostral field are distinct. There may be a primordial area on the central epitEgum. The ridge pattern is transverse on the rostral, elliptical on the central epitEgum, and longitudinal on the lateral epitEga. There are 4—6 dentine ridges per mm. On the ventral shield the pattern



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is longitudinal, with an anterior area of fanned ridges. (Abridged after Новицкая, 1970.)

**Occurrence.** Late Silurian, Ludlovian of North Germany, Poland, Gotland, England (?), Latvia, Kaliningrad Region and Vaigach Island. In the Estonian Silurian section, *Archegonaspis* has been found in the Paadla Stage, Ludlow, and at the base of the Kuressaare Stage (lowermost Downtonian).

*Archegonaspis schmidti* (Geinitz), 1884

**Type.** Dorsal shield, 38 mm long; Rostock University Museum; glacial erratic of the Graptolithengestein, Early Ludlovian.

**Diagnosis.** The ornamentation consists of dentine ridges which are of uniform size and moderately convex. They continue almost without interruption on the whole length of the rostral epitegum.

**Occurrence.** Upper Silurian, Lower Ludlovian, Birštonas Beds in boring No. 1 (depth 1535 m), Kaliningrad Region; Ludlovian in Edole (61) boring (depth 597.3 m), Latvia; Lower Ludlovian erratics of North Germany.

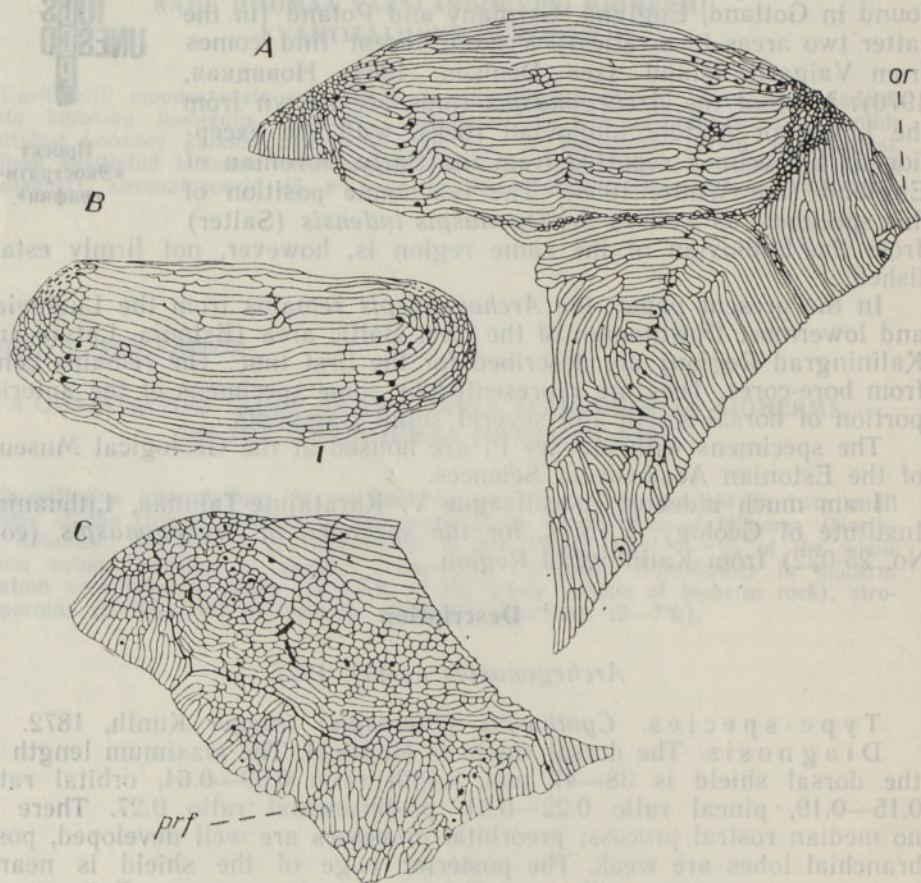


Fig. 1. A, B — *Archegonaspis schmidti*; C — *Archegonaspis* sp. A, pattern of dentine ridges on anterior part of dorsal shield. A — Pi 5027; B — 25—022; C — Pi 5028,  $\times 4\frac{1}{2}$ . or — orbit; prf — postrostral field.

Description. The specimens Pi 5027 and 25-022 (Fig. 1, A, B; Plate, Figs 1, 2) are the anterior portions of dorsal shield. These shields are arched dorsally (Fig. 2, B, C). Their anterior borders are smoothly convex. The rostral borders are folded, forming the maxillary brim (Plate, Fig. 5). The length of this brim in Pi 5027 is 1.7 mm, breadth 11 mm. Median rostral process is absent (Fig. 2, B, C), preorbital processes are relatively well developed. Orbital length in Pi 5027 is 5 mm, orbital width 19 mm. The thickness of the shield is 0.6 mm. The dorsal shield in *A. schmidti* is divided into distinct epitega by sutures and ridge pattern (Fig. 1, A). The postrostral field is not clearly developed. There are grooves with denticulate ridges between the epitega. In Pi 5027, on the right side, this groove changes into a ridge of 2 mm in length. The surface of the shield is covered with round-crested dentine ridges of uniform size. The maxillary brim is covered with 8 transverse dentine ridges anteriorly and denticles posteriorly (Plate, Fig. 5). There is a band of ridges parallel to the limits of the epitega on the central epitegum (Fig. 1, A); some ridges run from the pineal region anteriorly and laterally (4.5 per mm). On the lateral epitegum the ridges (6 per mm) curve over the orbital notch and converge with transverse rostral ridges anteriorly on the preorbital process. Here the ridges are denticulate. Posteriorly they run parallel to the ridges of the lateral part of central epitegum.

The sensory line canals terminate with pores. The pores of the supra-orbital canal and a single pore of the medial dorsal canal are visible (Fig. 3, A, B).

#### *Archegonaspis* sp. A

Pi 5028 (Fig. 1, C; Plate, Fig. 3) is the anterior part of dorsal shield of a cyathaspid from the Upper Silurian (Ludlovian), Edole (61) boring (depth 594.1 m), Latvia. Its anterior border is almost straight. The rostral border is folded downwards, forming the maxillary brim (Plate, Fig. 6) that is shorter than in *Archegonaspis schmidti* (Plate, Fig. 5). Median rostral process is absent in both forms (Fig. 2, B-D). The rostra of *Archegonaspis* species can be compared with the rostrum of *Tolypelepis undulata* Pander (Fig. 2, A; Plate, Fig. 4). It also lacks a median rostral process, but the maxillary brim is not developed, the anterior margin being somewhat thickened. Orbital length of *Archegonaspis* sp. A is 4 mm, orbital width 17 mm. The thickness of the shield is greater than in *A. schmidti*, being 0.7–0.8 mm. The epitega are not

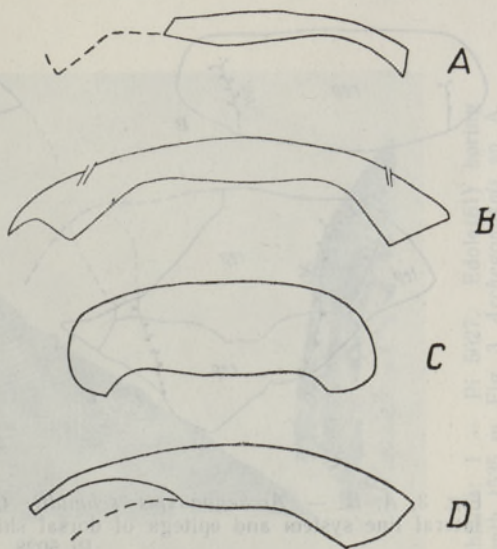


Fig. 2. An outline drawing of rostrum. A — *Tolypelepis undulata*, Pi 5000; B, C — *Archegonaspis schmidti*, B — Pi 5027, C — 25-022; D — *Archegonaspis* sp. A, Pi 5028, X3.

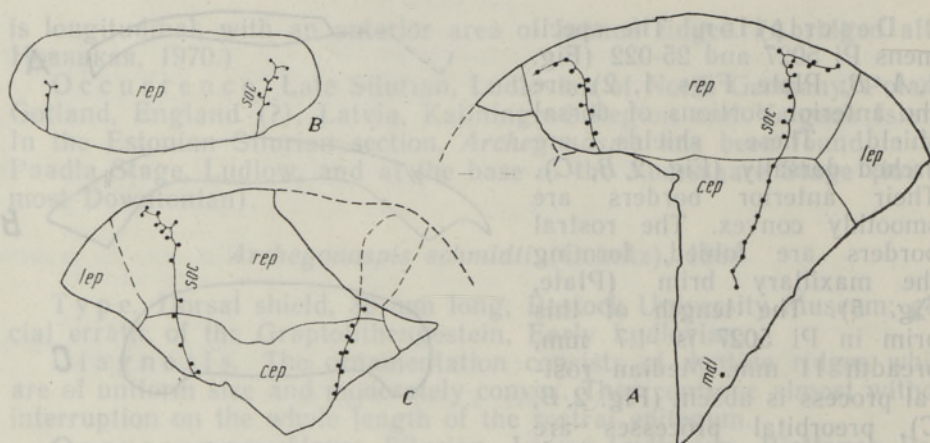


Fig. 3, A, B — *Archegonaspis schmidti*, C — *Archegonaspis* sp. A, canals of lateral line system and epitega of dorsal shield. A — Pi 5027; B — 25-022; C — Pi 5028,  $\times 3$ .

cep — central epitegum; lep — lateral epitegum; mdl — pore of medial dorsal sensory canal; rep — rostral epitegum; soc — pores of supraorbital canal; continuous line shows the supposed course of supraorbital canals.

so clearly developed as in Pi 5027. The postrostral field (Fig. 1, C) is distinct. The ridges of the postrostral field radiate fan-wise from the pineal region. The dentine ridges differ from those in *A. schmidti* in being divided into short lengths. The specimen is coarser-ridged (4 per mm on the rostrum) than *A. schmidti* (5 per mm on the rostrum). The laterally curved pores of supraorbital canal (Fig. 3, C) are placed similarly to those in a specimen of *A. schmidti*.

#### *Archegonaspis* sp. B

There are some fragments of *Archegonaspis* found in the Paadla Stage, Uduvere Beds and in the Kuressaare Stage, Tahula Beds of Estonia (in Kingissepa and Ohesaare borings at the depth of 3.60—18.10 and 93.21—98.80 m, respectively). The ornamentation of these fragments consists of dentine ridges of uniform size, with flat or rounded crests. The coarseness of ridges is very variable. Commonly there are 4—6 ridges per mm, but there also occur 9 ridges per mm.

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Figs 1—2. *Archegonaspis schmidti* (Geinitz), anterior parts of dorsal shields: 1 — Pi 5027, Edole(61) boring (Latvia), depth 597.3 m; 2 — 25—022, boring No. 1 (Kaliningrad Region), depth 1535 m. Fig. 3. *Archegonaspis* sp. A, anterior part of dorsal shield, Pi 5028, Edole (61) boring (Latvia), depth 594.1 m. Figs 4—6. Ventral view of rostra: 4 *Tolypelepis undulata* Pander, Pi 5000, Ruhnu boring, depth 176.2 m; 5 — *Archegonaspis schmidti* (Geinitz), Pi 5027, Edole(61) boring (Latvia), depth 597.3 m; 6 — *Archegonaspis* sp. A, Pi 5028, Edole(61) boring (Latvia), depth 594.1 m,  $\times 6$ .



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ÜLEMSILURI TSÜATASPIID *ARCHEGONASPIS* IDA-BALTIKUMIS

Artiklis kirjeldatakse tsüataspide *Archegonaspis schmidti* ja *Archegonaspis* sp. A dorsaalkilbi eesmist osa. *Archegonaspis*'e leiud Ida-Baltikumi silurist on esmakordsed. Nende hulka kuuluvad ka väikesed fragmendid, mis pärinevad Eestist paadla lademe uduvere kihtidest ja kuressaare lademe tahula kihtidest (*Archegonaspis* sp. B).

Тийу МЯРСС

ЦИАТАСПИД *ARCHEGONASPIS* ИЗ ВЕРХНЕГО СИЛУРА  
ВОСТОЧНОЙ ПРИБАЛТИКИ

Описываются передние части дорсальных щитов *Archegonaspis schmidti* и *Archegonaspis* sp. A из Латвии и Калининградской области. Эти остатки *Archegonaspis*, как и фрагменты из удуреских слоев паадлаского горизонта и тахуласких слоев курессаарского горизонта Эстонии (*Archegonaspis* sp. B), обнаружены в Восточной Прибалтике впервые.