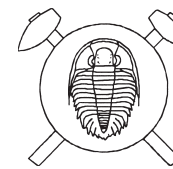


***Asturicystis havliceki* sp. nov. (Echinodermata, Homostealea)  
from the Middle Cambrian of Bohemia  
(Barrandian area, Czech Republic)**



***Asturicystis havliceki* sp. nov. (ostnokožci, Homostealea)  
ze středního kambria Čech (Barrandien, Česká republika)**

(2 text-figs, 1 plate)

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The new species *Asturicystis havliceki* sp. nov. from the Middle Cambrian Jince Formation of the Příbram-Jince Basin is proposed to commemorate the importance of Dr. Vladimír Havlíček's research for the recognition of the Barrandian Lower Palaeozoic.

**Key words:** Echinodermata, Carpoidea, Cineta, *Asturicystis*, Middle Cambrian, Barrandian area, Czech Republic

### Introduction

In the Barrandian area, two genera and two species of this class have been established. Both taxa (*Trochocystites bohemicus* Barrande, 1887 and *Trochocystoides parvus* Jaekel 1918) occur in Middle Cambrian Skryje Shales (lithofacies of Jince Formation in the Skryje-Týřovice area). In Jince Formation of the Příbram-Jince Basin, only sporadic finds of isolated thecal plates, assignable to the class Cineta, have been documented (Kordule 1979 a.o.). Excavations of the water system between the village of Jince and the Vystrkov Hill in early 1980s and also the continuous collecting at different localities, namely in the wider vicinity of the Rejkovice village, provided comparatively well preserved material of a new form described here as *Asturicystis havliceki* sp. nov.

Representatives of the class Cineta Jaekel, 1918 have been established in north Africa (Morocco), south-western Europe (Spain – Asturias, Léon, Sierra de la Demanda, Celtiberia; France – Montagne Noire; Italy – Sardinia), central Europe (Germany – Frankenwald, Bohemia – Barrandian area), and western Europe (British Isles – South Wales) (for the most recent review see Ubaghs, 1967, Friedrich, 1993, 1995, and Sdzuy, 1993). All the occurrences are confined to the Middle Cambrian sediments assigned usually to the Acado-Baltic Province of Sdzuy (1972).

### Occurrence

*Asturicystis havliceki* sp. nov. has been recovered from lower part of the *Eccaparadoxides pusillus* Zone in three geographically different localities:

Locality number 7 (in Fatka – Kordule 1992). On this locality, the following taxa occur:  
trilobites – *Eccaparadoxides pusillus* (Barrande, 1846), *Acadaparoxydes* cf. *sirokyi* Šnajdr, 1986, *Ellipsoceph-*

*alus vetustus* Pompeckj, 1895, *Conocoryphe* cf. *cirina* Šnajdr, 1982, *Litavkaspis rejkovicense* Fatka et al., 1987, *Solenopleurina* cf. *tyrovicensis* Růžička, 1938, *Acadagnostus* cf. *fallax* (Linnarsson, 1869), brachiopods – *Westonia bohémica* (Koliha 1921), *Glyptacrotrothele bohémica* (Barrande 1879).

Locality number 11 – “Ve žlutých” (in Fatka – Kordule 1992):

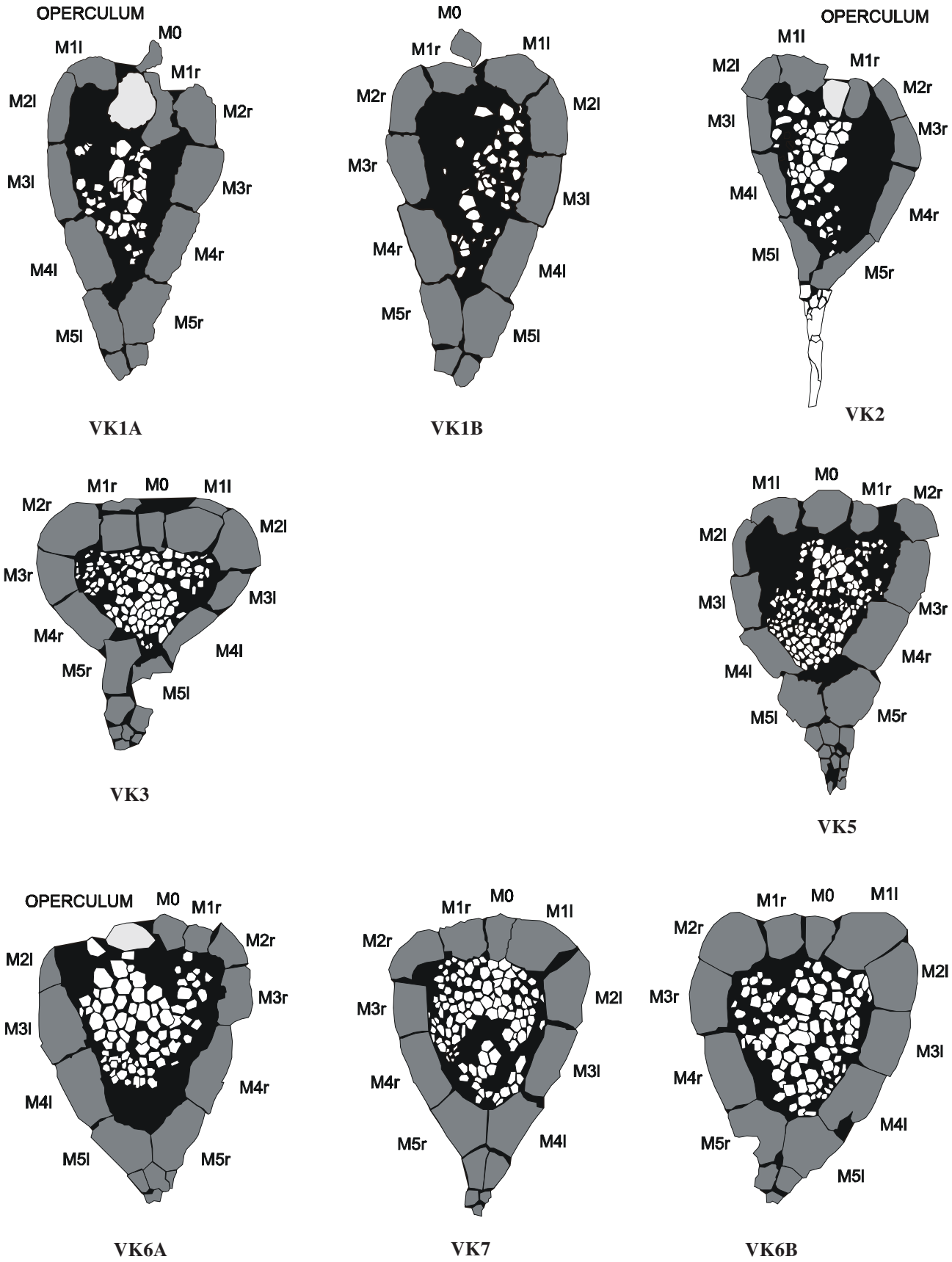
trilobites – *Eccaparadoxides pusillus* (Barrande, 1846), *Acadolenus snajdri* Fatka – Kordule, 1981, *Conocoryphe* cf. *cirina* Šnajdr, 1982, *Conocoryphe havliceki* (Šnajdr, 1957), *Ctenocephalus coronatus* (Barrande, 1846), *Skreiaspis spinosus* (Jahn, 1895), *Ellipsocephalus vetustus* Pompeckj, 1895, *Lobocephalina emmrichi* (Barrande, 1846), *Ptychopariodes* sp., *Ptychoparia* sp. nov., echinoderms – *Ceratocystis* cf. *perneri* Jaekel, 1901, molluscs – *Hyolithes* sp. A, *Hyolithes* sp. B., *Helcionella* sp., brachiopods – *Bohemiella romingeri* (Barrande 1848).

Locality number 12 – “Potůček” (in Fatka – Kordule 1992):

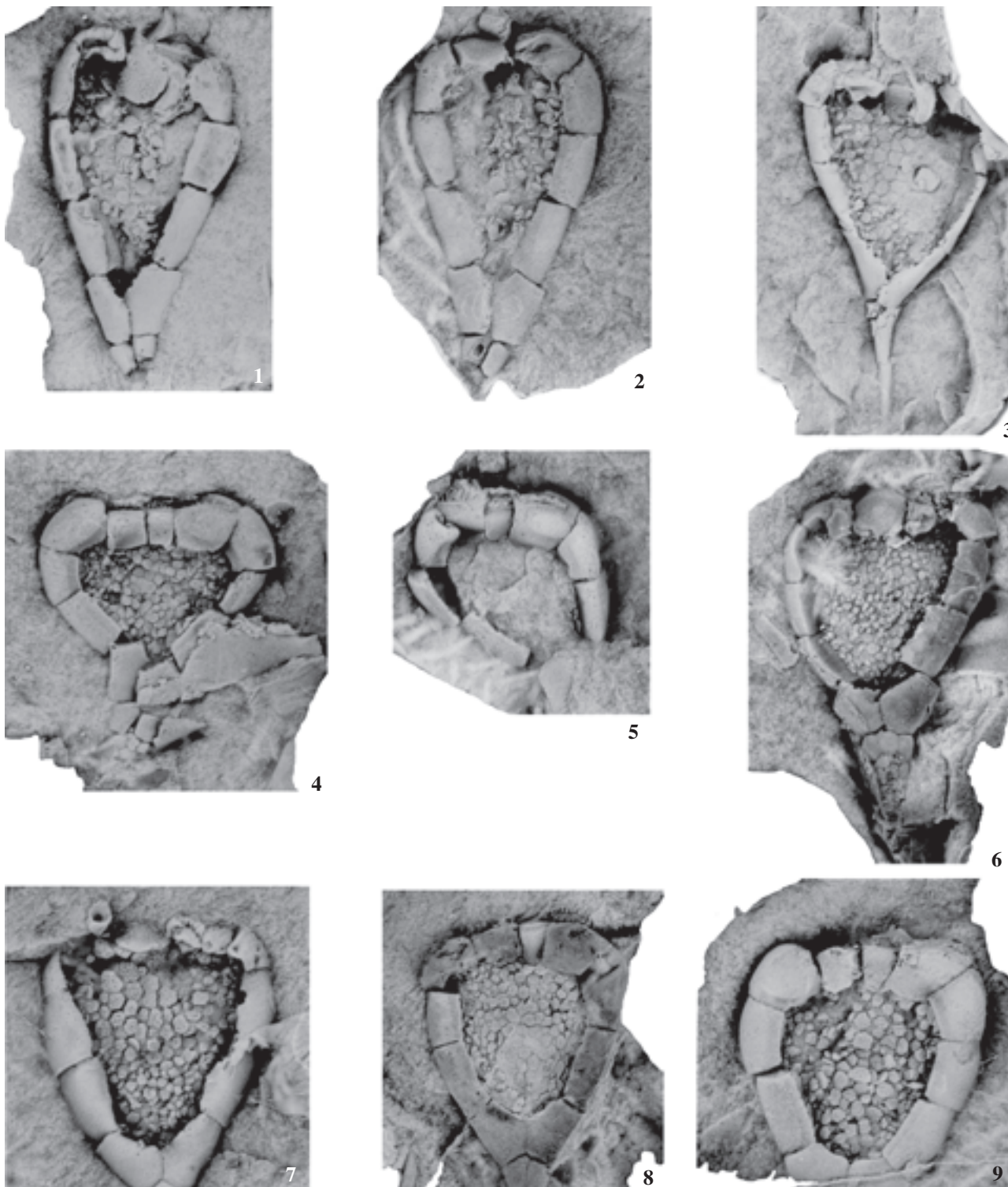
trilobites – *Eccaparadoxides pusillus* (Barrande, 1846), *Acadaparoxydes* cf. *sirokyi* Šnajdr, 1986, *Rejkocephalus knizeki* Kordule, 1990, *Hydrocephalus mandiki* Kordule, 1990, *Litavkaspis rejkovicense* Fatka et al., 1987, *Conocoryphe* cf. *cirina* Šnajdr, 1982, *Skreiaspis spinosus* (Jahn, 1895), *Solenopleurina* cf. *tyrovicensis* Růžička, 1938, *Ptychopariodes* sp., *Ellipsocephalus vetustus* Pompeckj, 1895, *Germaropyge* sp. nov., *Acadagnostus* cf. *fallax* (Linnarsson, 1869), *Phalacroma bibullatum* (Barrande, 1846), echinoderms – *Ceratocystis* cf. *perneri* Jaekel, 1901, *Etoctenocystis* sp., *Ctenocystis* sp., *Stromatocystites* sp., molluscs – *Hyolithes* sp. A, *Hyolithes* sp. B., trace fossils – *Rejkovicichnus necrofilus* Mikuláš et al., 1996.



Fig. 1 *Asturicystis havliceki* sp. nov. Schematic drawing showing the thecal morphology and plate designation. Magnification and disposition of specimens corresponds to those given for the Plate 1.



O. Fatka – V. Kordule: *Asturicystis havliceki* sp. nov. (Echinodermata, Homostelea) from the Middle Cambrian of Bohemia (Barrandian area, Czech Republic) (Pl. I)



*Asturicystis havliceki* sp. nov. (Figs 1–7, 9)

1 – upper surface of the specimen VK1 A, x5.5

2 – lower surface of the specimen VK 1 B, x5.5

3 – upper surface of the specimen VK 2, x5

4 – lower surface of the specimen VK 3, x5

5 – lower surface of the specimen VK 4, x5.5

6 – upper surface of the specimen VK 5 (holotype), x5.5

7 – upper surface of the specimen VK 6 A, x5.5

9 – lower surface of the specimen VK 6 B, x5

*Asturicystis* cf. *havliceki* sp. nov. (Fig. 8)

8 – lower surface of the specimen VK 3, x5

Latex casts coated with ammonium chloride. Photos by J. Slavičková. Material is deposited in collections of the Czech Geological Survey Prague under designation VK1–VK7.

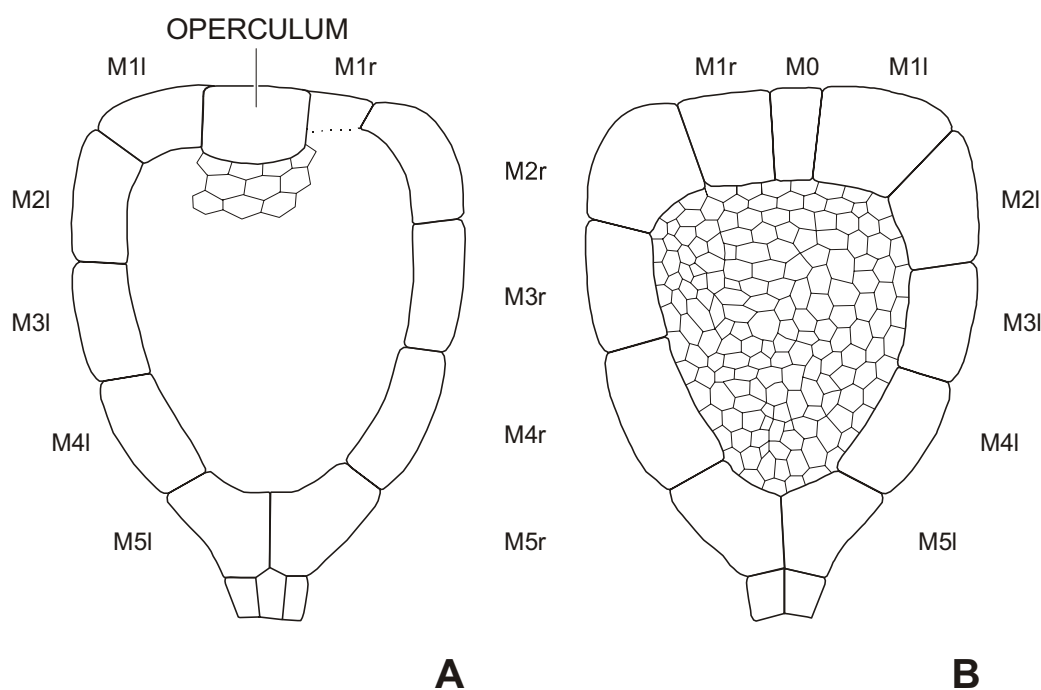


Fig. 2 Reconstruction of *Asturicystis havliceki* sp. nov. according to several specimens; A – upper (superior) surface; B – lower (inferior) surface; x10.

For review of fossils see Šnajdr (1958), Fatka – Kordule (1981, 1992), Fatka *et al.* (1987, in press), Kordule (1979, 1996), Mergl – Šlehoferová (1990), Mikuláš (2001), Mikuláš *et al.* (1996).

### Systematic palaeontology

Phylum Echinodermata Klein, 1734  
Class Cincta Jaekel, 1918  
Family Gyrocystidae Jaekel, 1918

### *Asturicystis* Sdzuy, 1993

Type species: *Asturicystis jaekeli* Sdzuy, 1993; Spain, Leon, Middle Cambrian, Leonian.

### *Asturicystis havliceki* sp. nov.

Figs 1, 2; Pl. I, Figs 1–7, 9

1979 *Trochocystites bohemicus*; Kordule, p. 224.  
1992 *Decacystis* sp. nov.; Fatka – Kordule, p. 50, 51,  
1996 *Decacystis* sp. nov.; Kordule, p. 37, 39, 40, 43, 45.

Holotype: The specimen on Pl. I, Fig. 6, deposited in the collections of the Czech Geological Survey in Prague under the designation VK5.

Type horizon: lower part of the Jince Formation, *Eccaparadoxides pusillus* Zone, *Litavkaspis rejkovicensis* Subzone.

Type locality: Rejkovice „Potůček“, Příbram-Jince Basin of the Barrandian area.

Name: After the late Dr. Vladimír Havlíček, CSc.

Material: Ten well preserved specimens.

Diagnosis: Eleven marginalia in cinctus (M5l–M5r), subtriangular theca widest in the anterior-most part.

Description: Theca flat, widest in the anterior third. Cinctus with eleven marginalia. Lower surface of theca is flat, robust marginalia without swellings (*tumuli* sensu Sdzuy, 1993), small infracentralia numerous (about 150 in number), tetragonal to hexagonal in outline, thecal sutures straight, narrow and shallow. External surface of marginalia and centralia smooth.

Upper surface of the theca slightly vaulted. In two almost complete specimens, the upper surface comprises so numerous supracentralia, that it would be impossible to dispose them within the given cinctus in an unvaulted plane (Pl. I, Figs 6 and 7). Outer surface of marginalia arched, smoothly continuing into the vaulted field composed by supracentralia. Surface of marginalia smooth, external surface of supracentralia granulated.

Food grooves are imperfectly known. The two specimens VK3 and VK4 (Pl. I, Figs 4 and 5) show, that the relatively narrow food grooves extended from the mouth opening over the anterior of M1l, M0, M1r and most probably did not reach M2r. The state of preservation excludes more detailed observation of the labrum morphology.

Operculum subpentagonal in outline, showing the same width in both anterior and posterior portions. Both external and internal surfaces of operculum are smooth.

Accurate morphology of the porta, anal pyramide, and position of gonopore are recently unknown.

Stele is incompletely known. Similarly as in the type species *A. jaekeli*, one pair of larger sphenoids is situated in the area where cinctus passes into stele. This pair of sphenoids shows a direct suture on the lower surface, while an additional, pentagonal plate (=mesosphenoid) is developed on the upper vaulted surface. The other

specimens retain the same plate pattern also in the more distal portions of the stele.

**D i m e n s i o n s :** Length of cinctus – 8 to 9.5 mm. Width of cinctus – 5 to 6 mm. Length of stele – 3.5 mm.

**D i s c u s s i o n :** Bohemian form differs from the type species *Asturicystis jaekeli* Sdzuy, 1993 by (1) higher number of marginalia (ten in the type species versus eleven in the Bohemian form), (2) different outline of operculum, (3) generally smaller dimensions, (4) vaulted area of upper centralia, and (5) granulated external surface of supracentralia.

The specimen VK7 (Pl. I, Fig. 8) differs by lower number of marginalia in cinctus (M4l versus M5l in all other specimens). Because of limited material of the genus *Asturicystis* the discussed specimen is determined as *Asturicystis* cf. *havliceki* sp. nov.

**R e m a r k s :** Stratigraphic distribution of *Cincta*, as compiled by Sdzuy (1993, p. 190), shows, that the earliest forms of this class appeared in early Middle Cambrian (in the sense of European division of the Cambrian System). Spanish material of ?*Asturicystis* sp. at the Porma locality was recovered from a horizon below the FAD of the trilobite *Badulesia tenera*, a level usually correlated with upper parts of the *Paradoxides oelandicus* Zone of Scandinavia.

All the three Bohemian localities, where *Asturicystis havliceki* sp. nov. occurs, provided a rich fossil assemblage (including polymeroid trilobites, other skeletal fauna and trace fossils), typical for the lower portion of the *Eccaparadoxides pusillus* Zone. Common occurrence of the genus *Acadoparadoxides* associated with the genera *Litavkaspis* and/or *Acadolenus* indicate an early Middle Cambrian age, equivalent to the middle to late Leonian regional Stage (see Fig. 1 in Sdzuy 1995). The age of Leonian is confirmed also by the presence of the acritarch taxa *Cristallinium cambriense* (Slavíková 1968) Vanguetaine 1978, *Eliasum llaniscum* Fombella 1977, *Cymatiosphaera* sp. and the absence of the genus *Timofeevia* Vanguetaine 1978. The first *Timofeevia* together with the *Adara* Fombella 1977 occur at the stratotype section of the Jince Formation about 60 metres higher (Fatka 1989, and unpublished data).

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### ***Asturicystis havliceki* sp. nov. (ostnokožci, Homostelea) ze středního kambria Čech (Barrandien, Česká republika)**

Z jineckého souvrství je nově popsán ostnokožec *Asturicystis havliceki* sp. nov., pojmenovaný podle nedávno zesnulého Dr. Vladimíra Havlíčka, CSc. Tento druh je prvním zástupcem třídy *Cincta* zjištěným v příbramsko-jinecké pánvi, neboť oba dříve známé druhy této třídy (*Trochocystites bohemicus* Barrande, 1887 a *Trochocystoides parvus* Jaekel, 1918) se vyskytují pouze v oblasti skryjsko-týřovického kambria.

Nálezy zástupců třídy *Cincta* Jaekel, 1918 jsou vázány na sedimenty středního kambria severní Afriky (Maroko), jihovýchodní Evropy (Španělsko – León, Sierra de la Demanda, Keltiberie, Francie – Montagne Noire a Itálie – Sardinie), střední Evropy (Německo – Frankenswald a Čechy – Barrandien) a Britských ostrovů (Wales). Prakticky všechny výše uvedené oblasti jsou součástí tzv. akado-baltické provincie ve smyslu Sdzuye (1972).

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