

teristics of the Bohemian Middle Cambrian strata – those of the Buchava locality at Skryje: “The rocks contain common ichnofossils of the rather shallow-water *Cruziana* Ichnofacies: frequent epi- and intrastratal, planar or oblique burrows mostly ranged with *Fodichnia* (feeding structures) and *Pascichnia* (grazing traces) made by deposit feeders. Even complex burrow systems of *Teichichnus* and/or *Phycodes* have been found.”

MIKULÁŠ (1994a, b) published two brief preliminary reports on the ichnological content of the Barrandian Middle Cambrian. The reports originated during the fieldwork pointing to the completion of the present paper.

CHLUPÁČ and MIKULÁŠ (1995) described a new, complex feeding trace *Amanitichnus omittus* from the locality Buchava. Contemporaneously with presentation of this paper, a study of remarkable ichnofossils obtained by the activity of fellow fossil collectors has been published (MIKULÁŠ, KORDULE, and SZABAD 1996).

#### 4. Rock exposures of the Central Bohemian Middle Cambrian and their ichnological content

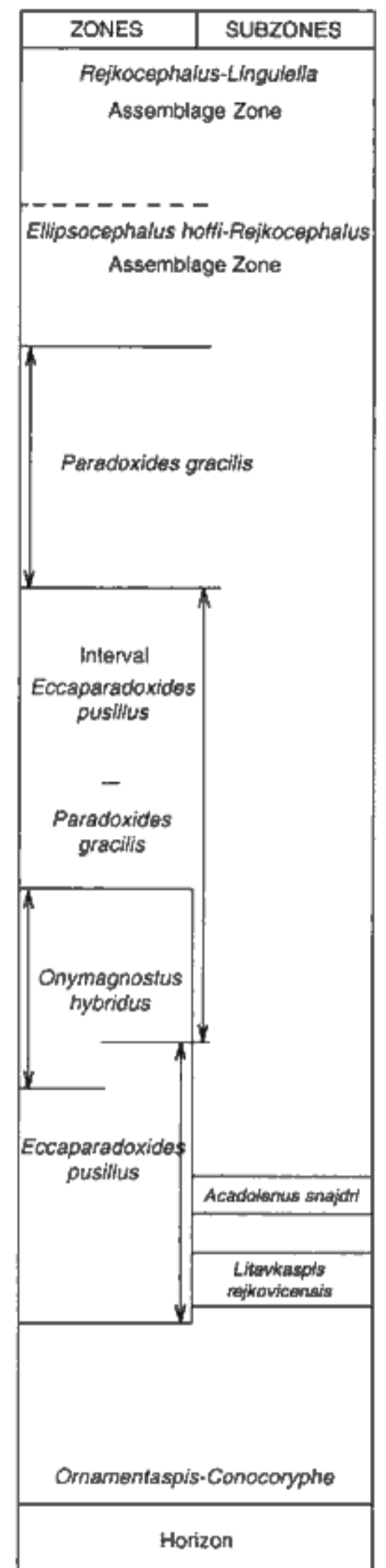
Area of the Central Bohemian Middle Cambrian is highly afforested, showing thereby a lack of natural outcrops. However, the long-lasting geological research coupled with activity of fossil collectors have gone away with this insufficiency. At present, many minute artificial outcrops, made just for collecting purposes, exist.

The most comprehensive list of fossil localities in the Central Bohemian Middle Cambrian was published by ŠNAJDR (1958); in this work, references to description of localities of older workers, namely POMPECKJ (1896), KETTNER (1923), KUŠTA (1884), and HAVLÍČEK et ŠNAJDR (1951) were also given. Several localities described by ŠNAJDR (1958) have been studied biostratigraphically in more detail later, and many new outcrops were done (e.g., FATKA et al. 1992, FATKA-KORDULE 1992, CHLUPÁČ 1993).

I have had to decide which of the existing outcrops have to be studied roughly and which of them are worth a detailed study. The first criterion was the expected importance for a general characteristics of the Central Bohemian Cambrian (e.g., conjunction with previous biostratigraphical research, completeness of the exposed profile); the second criterion consisted in a frequency of finds of trace fossils, in a way of their preservation, in a chance to obtain unique material for systematic descriptions. The field work was limited to 1993–1995. It is evident, that this research could not provide as representative material as it is in a disposal for most groups of body fossils (which have been collected by numerous fellow and professional workers for a very long time). However, I believe that the present paper will initiate the collectors of fossils to pay attention also to the traces and to help consequently to the future ichnological research.

Besides my own finds from the localities described be-

2. Biostratigraphical scheme of the Jince Formation (FATKA and KORDULE 1992).



low, I have had also older collections from other localities at a disposal (e.g., the Jince – Za hřbitovem locality in the B. Bouček’s collection). The sites where I have not made my own field research, are not stated in the following text.

#### 4.1. Příbram-Jince area

##### 1. Vinice

Small or larger, both natural and artificial outcrops, on the right (eastern) bank of the Litavka Brook, opposite to the

town of Jince. The Jince Formation is represented therein by almost complete exposed succession of strata. The beds are inclined ca. 30° to NW. The description below continues from the oldest to the youngest layers.

a) Sandstones and greywackes having one richly fossiliferous layer (trilobites *Ornamentaspis* and *Placoparia*, inarticulate brachiopods). They lie above a prominent bed of coarse-grained conglomerate which represents the top of the Chumava-Baština Formation. The fossiliferous layers represent probably a base of the Middle Cambrian (FATKA et al. 1992). Sparse bioturbation was observed both in fossiliferous and non-fossiliferous layers: *Planolites* isp., *Monomorphichnus* isp., *Cruziana* isp. and *Diplocraterion* isp. Weathered micaceous siltstones to fine-grained sandstones several metres below the horizon with fauna are lithologically identical with the material obtained from a heap of temporary trench at Vystrkov (locality 2a) and which provided numerous finds of *Psammichnites gigas*.

Several tens of metres thick sequence of greywackes alternating with well-lithified sandstones overlie the fossiliferous layers. No body- and trace fossils were found there.

b) Minute artificial outcrops in silty shales of the subzone *Litavkaspis rejkovicensis* and immediately overlying violet shales with echinoderm fauna. Bioturbation is poorly observable, and only *Planolites* isp. was ascertained.

c) First larger outcrops in the typical "Jince Shale". Greyish-brown shales of the *Acadolenus snajdri* Biozone. Ichnofossils *Daedalus* isp. and *Planolites* isp. are relatively frequent, *Helminthopsis* isp. has rarely been found.

d) *Eccaparadoxides pusillus* Zone – natural rock exposures and artificial outcrops joined with larger debris, roughly opposite to a solitary house on the left bank of the Litavka Brook. In shales (mostly the silty shales), bioturbation appears to be weak or none, but where the shales contain thin intercalations of yellow sandstones, numerous ichnofossils (*Planolites* cf. *montanus*, *Daedalus* isp., *Teichichnus*, *Helminthopsis*, *Skolithos rotundus*, *Skolithos* isp.) are observable.

e) Immediately overlying, fine-grained shales containing a trilobite *Phalagnostus*. Biostratigraphically they belong to a base of the Interval Zone between *E. pusillus* and *P. gracilis*. Bioturbation is poorly observable and rare; *Planolites* isp. and *Helminthopsis* isp. were determined.

f) Greyish-green clay shales containing in places numerous fossils of agnostid trilobites. These shales provided

clusters of skeletal remains interpretable as coprolites, but no observable bioturbation. *Planolites* cf. *montanus* was found along sporadic, thin sandstone or greywacke lenses which provided a material contrasting in colour from the shale.

g) The foregoing sequence was suddenly discontinued by a coming of rhythmical possibly storm sedimentation (alternating of shales and sandstones with numerous flute marks on soles. *Planolites beverleyensis*, preserved often in convex hyporelief, is common.

h) Large natural outcrops showing a small pseudokarst cave in front of a footbridge over the Litavka Brook. Hard silty shales and greywackes with very rare fauna and sparse bioturbation (*Planolites* isp., *Teichichnus* isp.) are concerned.

i) Uppermost layers of the above-mentioned Interval Zone. Grey siltstones, shales and fine-grained greywackes. Ichnofossils *Teichichnus rectus* and *Daedalus* isp. are very frequent, a find of *Rusophycus* isp. is solitary.

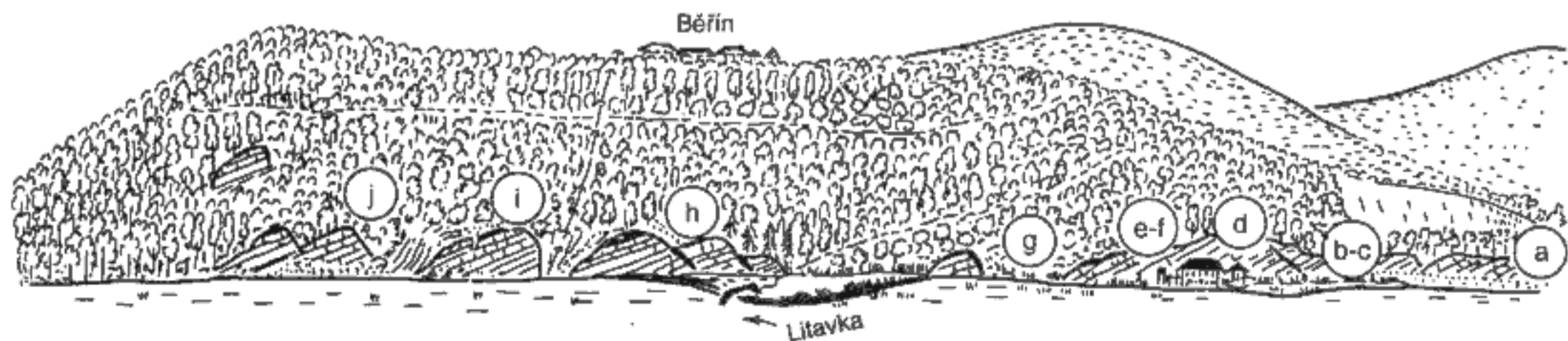
j) Collectors pits in the upper part of the slope, exposing greyish-green shales of the *P. gracilis* Zone. Ichnofossils *Palaeophycus tubularis*, *Teichichnus rectus*, *Daedalus* isp. and *Planolites* div. isp. are frequent.

Uppermost layers of the Jince Formation are poorly exposed at Vinice at present. For a completeness of the profile of the Jince Formation in the Litavka Valley, the same layers (i.e. top of the Jince Fm.) were studied in detail at the locality Ostrý.

## 2. Vystrkov

Numerous small or large, both artificial and natural exposures lying E, S or SW from top of the Vystrkov Hill (541 m). Some outcrops studied in past are extinct now (e.g., drain trench from Velcí to Jince in 70s') and only being and extinct outcrops altogether represent almost complete profile of the Jince Formation. Palaeontologically, these exposures are among the richest fossil sites of the Central Bohemian Cambrian.

a) Dump, at present mostly overgrowing by forest, made very probably in 70s' from the material dug up during the work on the above-mentioned drain. The dump is 550 m SE from the top of Vystrkov. Flags of reddish-brown and yellowish-brown, mostly fine-grained polymictic sandstones to siltstones and subgreywackes weathered to very



3. The locality Vinice at Jince. Individual studied layers are marked (see the text). Adapted after CHLUPÁČ (1993).

porous light rock (originally carbonatic?). Thickness of the beds is up to 20 cm. Rocks of comparable composition have been ascertained at the Vinice locality several metres below the horizon with *Ornamentaspis*; other Bohemian Cambrian localities have not yielded similar material so far. Inarticulate brachiopods are the only ascertained fauna. Bioturbation is very common in places: mass occurrence of *Psammichnites gigas*, less frequent are *Teichichnus rectus* and *Planolites beverleyensis*.

b) Upper (SW) margin of enclosed area of asphalt-wrapping works, 700 m ESE from the Vystřkov top. Greyish-green shales with thin intercalations and rapidly tapering lenses of reddish-brown (originally carbonatic?) sandstone. *Eccaparadoxides pusillus* Zone. Numerous ripples, groove marks, and ichnofossils *?Monomorphichnus* isp. (convex hyporeliefs) and *?Chondrites* isp. (full reliefs in shales) were found there.

c) Lower margin of the above-mentioned asphalt works. Large collectors pits expose shales of *E. pusillus* Zone. Several layers of fine-grained, hard, almost white sandstone are present within the shales. Their lower bedding planes yielded well-preserved hyporeliefs of mechanic sedimentary structures whose are usually infrequent in Bohemian Middle Cambrian rocks (Pl. XVI, fig. 1). Unfortunately, only a poor ichnoassemblage (*Monomorphichnus* isp. and *Planolites* isp.) has been found among these hyporeliefs so far.

d) Steep SW slope of the Vystřkov Hill showing natural rock exposures and collectors pits in the uppermost part of the Jince Fm. (*Ellipsocephalus hoffi* Zone). Greyish-green shales, showing increasing share of greywacke and fine-grained sandstone slabs upwards. Lower bedding planes of greywackes and sandstones often preserve ripple marks and trace fossils in convex hyporeliefs: *Planolites* isp., basal parts of *?Diplocraterion* isp., and *?Skolithos* isp. The shales contain frequent *Teichichnus rectus*, *Daedalus* isp. and *Planolites* isp.

### 3. Koníček

Collectors' pits, ca. 400 m of the edge of the Koníček Hill. Both the stratigraphical level and the rock composition of the outcrop correspond to the Vystřkov d) locality. The following ichnofossils have been ascertained: *Planolites* cf. *beverleyensis* (BILLINGS, 1862), *Planolites* cf. *montanus* RICHTER, 1937, *Teichichnus rectus* SEILACHER, 1955, *Teichichnus multiplex* isp. nov., *Daedalus* isp., *Skolithos* isp., "*Thalassinoides*" isp. (irregular subsurface net structures), *?Cochlichnus* cf. *C. anguineus* HITCHCOCK, 1858, *?Palaeophycus* cf. *P. sulcatus* (MILLER and DYER, 1878), *?coprolites* (unrecognized ichnogenera), fodinichnion igen. et isp. indet. and unrecognizable bioturbate texture (ichnofabric indices 1–3 after DROSER and BOTTIER 1986).

### 4. Jince – Ovčín

a) Fields between the former sheep-fold and the holt on a left bank of Litavka, ca. 500 m NW from the cleaning water station at Jince. The soil skeleton contains there micaceous siltstones grey to violet-grey in colour, yielding ichnofossils *Teichichnus rectus* and *Daedalus* isp.

b) Small collectors' pits close to a former mill race, at the lower margin of the above-mentioned holt; approximately at the same distance from the cleaning water station as the 4a) locality. Light greyish-green micaceous siltstones with common trilobite remains fossilized by limonite (*E. pusillus* Zone). Trace fossils *Taenidium* isp., *Daedalus* isp., and *Planolites* cf. *montanus* have been ascertained.

### 5. Felbabka – Potůček

Three collectors' shafts (several metres deep) were made in the beginning of 90s' 800 m ESE from the place where the highway from Jince reaches the margin of the village of Felbabka. Exposed rocks consist mostly of fine-grained, silty to clayey shales, greyish-green to violet in colour. Trilobite fauna places them to the *Litavkaspis rejkovicensis* Subzone. The shafts are filled up at present and only minute debris in places of heaps yield a limited possibility of study.

a) The first shaft was situated close to the margin of the holt between Felbabka and Rejkovice. The only ichnofossil, *Teichichnus rectus*, was found there.

b, c) The remaining two shafts, made several tens of metres NW from the first one, yielded large amount of ichnofossils, namely *Rejkovicichnus necrofilus* MIKULAŠ et al., *Planolites* cf. *montanus* and *Teichichnus* isp.

### 6. Rejkovice

Numerous artificial (e.g., railway cutting) and natural (outer bank of Litavka) exposures between the railway station at Rejkovice and highway bridge crossing the brook at the northern margin of the village. Length of the outcrop complex is ca. 500 m. Upper layers of the Jince Formation are exposed.

a) Minute natural outcrops several metres above the railway body, in a forest, ca. 200 m from the station. Micaceous silty to clay shales. *Bergaueria perata*, *Planolites montanus*, *Teichichnus rectus*, *Skolithos rotundus*, and *?Skolithos* isp. have been found.

b) Deep railway cutting coupled with two hardly accessible buttresses cut-off by the cutting, near the highway bridge. Silty to clay shales, commonly showing intercalations of greywackes and sandstones. Inarticulate brachiopods showing biogenic deformation of shells (i.e. fodinichnion igen. et isp. indet.), *Skolithos rotundus*, *Planolites* div. isp., *Teichichnus rectus*, and *Daedalus* isp. have been found.

## 7. Ostrý

Steep eastern slope of the Ostrý Hill at Rejkovice. Instructive natural outcrops of the uppermost layers of the Jince Formation (*E. hoffi* Zone). Shales alternate with several centimetres to several decimetres thick layers of greywackes and sandstones. Suddenly, a thick layer of coarse-grained conglomerate appears, representing base of the Ohrazenice Formation. Intensity of bioturbation in the uppermost layers of the Jince Formation is considerable: *Planolites* preserved as convex hyporeliefs often covers the bedding planes. Irregular boxworks ("*Thalassinoides*" isp.) are also common. Cross-section of vertical tunnels can be attributed to *?Diplocraterion* isp.

## 8. Písky

Greyish-green shales of *P. gracilis* Zone, exposed by a dug hole in 1994, ca. 300 metres SE from the top of the Písky Hill. The ichnoassemblage is poor, only *Planolites* isp. with numerous bioclasts (disarticulated skeletons of trilobites and echinoderms), *?coprolites* and *Taenidium* isp. were found.

## 9. Medový Újezd

The palaeogeographically important locality shows the transgression of the uppermost layers of the Jince Formation on the Proterozoic and the transgression of the Ordovician on the Cambrian rocks (ŠNAJDR 1958, CHLUPÁČ 1993). The Jince Formation is composed of shales alternating with greywacke and sandstone layers. Style of bioturbation is comparable with the Ostrý locality (*Planolites* and irregular boxworks of "*Thalassinoides*" isp.).

## 4.2. Skryje area

### 10. Kamenná hůrka

Hill ca. 1000 m west from the crossing of highways at Týřovice, showing large collectors' pits and minute old quarries at the top. Exposed rocks belong to the Mileč Conglomerate, i.e. the basal member of the Cambrian in the Skryje area. Well bedded fine-grained to coarse-grained, mostly quartzose conglomerates are concerned; the uppermost exposed layer consists of fine-grained conglomerates to sandstones alternating rhythmically with clay shales. A classical palaeontological locality (see CHLUPÁČ 1993), but only ichnofossils found there are sole finds of *Monocraterion* isp. from the rhythmical sequence and rare hyporeliefs cf. *Planolites* isp.

### 11. Pod trním

Large collectors' pit situated in the uppermost part of steep slope, inclined to NNW, forming left side of the Karáskovský Brook Valley. The pit lies ca. 450 m from inflow of the brook to the Berounka River. Lower layers of the Skryje Shale are exposed. The collectors spoil mostly a sandstone layer with common trilobite fauna but without apparent bioturbation. Layers below the sandstone are formed by hard micaceous shales with thin beds or laminae of sandstones. They yielded finds of *?Monomorphichnus* isp. and *Diplichnites* isp. About 50 m N of the locality, a specimen of *Gyrolithes* isp. was found in the fine-grained shale.

### 12. Mouth of the Karáskova rokle Gorge

Small natural outcrops above weekend cottages near the inflow of the Karáskovský Brook to Berounka. Mostly silty to clay shales of the Skryje Member; a solitary slaty layer yielded *?Diplichnites* isp.

### 13. Luh

Group of large collectors' pits covering a large part of the NNE slope of the Berounka Valley above the bridge at the Luh hamlet. Classical palaeontological locality (e.g., CHLUPÁČ 1993), formed by monotonous silty to clay Skryje Shales. There seems to be a limited preservational potential for most of the biogenic structures but *Planolites* isp., *Palaeophycus tubularis* and exceptional find of *Thalassinoides* cf. *suevicus* have been ascertained.

### 14. Slapnice – camp

900 m SSE from inflow of the Zbirožský Brook to Berounka, a deep narrow gorge is running upwards to NE, close to a cottage camp "Na Slapnici". In its lower part, the gorge exposes sandstones of the Mileč Member without apparent bioturbation. In its middle part, there is a sharp bend above which the Týřovice Sandstone with brachiopod and trilobite fauna occur. They are thinly laminated, without bioturbation. Further succession of strata is probably tectonically divided from the Týřovice Member. There are several tens of metres of hard, slaty Skryje Shale showing rhythmical alternation of grain size. Lower bedding planes yielded numerous flute marks, possible *?Monomorphichnus* isp. and a sole find of *Dimorphichnus* isp. (isp. nov.).

### 15. Dlouhá hora

Exposures on a steep slope (mostly in narrow rills) between the above-mentioned camp "Na Slapnici" and another

camp called "Tiba"; distance between both the camps is ca. 800 m. The Skryje Shale shows the same rock composition as at the previous locality. *Planolites* isp. and *Monomorphichnus* isp. were ascertained there. In the collection of B. Bouček, a find of *Diplichnites* isp. with the location to Dlouhá hora is present.

## 16. Dubinky

Complex of exposures, both natural and artificial (cut of a narrow road, collectors' pits) on NW slope of the Dubinky Hill (489 m) near Skryje. The locality is often but incorrectly called "Dlouhá hora".

a) An instructive outcrop in the Skryje Shale is immediately above the "Tiba" camp. The rock walls up to several metres of height are composed of silty shales most often intercalating with greywackes or subgreywackes in cm-dm layers. Thicker greywacke beds often show ripples in soles (Pl. XVI, fig. 2, 4) and bioturbation (*Planolites* isp.); other elements of the ichnoassemblage are *Diplocraterion* isp., *Skolithos* isp., "*Thalassinoides*" isp., *Megagraption* isp. and *Thalassinoides* cf. *foedus*.

b) Upper layers of the Skryje Shale (silty to clayey greyish-green shales with carbonatic concretions and common fossils are exposed by a cutting of the touring road from Skryje to the "Jezírka" site. There is no preservation potential for hyporelief traces; full reliefs of *Palaeophycus tubularis*, *P. sulcatus*, and *Cochlichnus* isp. were found. Where the rare thin intercalations of reddish-brown carbonatic sandstones are present, relatively intense bioturbation (ichnofabric index = 2–3) is usually recognizable.

c) Minute collectors' pits in various places several tens to hundreds of metres above the touring road. Upper layers of the Skryje Shale are exposed there; they are very fine-grained, without any recognizable bioturbation.

## 17. Jezírka

Profile on the left bank of the Zbirožský Brook, between the "Tiba" camp and a narrow gorge in Upper Cambrian volcanites and a small lake called "Jezírka". The locality shows a profile similar to the previous locality; it is schematically shown on Fig. 4.

a) Small, old overgrown quarry exposing a tectonic con-

tact of the Upper Cambrian volcanites and the lower part of the Skryje Shale (Pl. I, fig. 3). The rhythmical succession is comparable to the lowermost layers of the previous locality; ripples and ripple bedding, and hyporeliefs of *Planolites* isp. are very common.

b) Variable alternation of greywackes, siltstones and shales. Conspicuous lamination of some layers is only sparsely affected by bioturbate textures. Hyporeliefs on soles of the beds show physical sedimentary textures and *Monomorphichnus* isp.

c) Larger natural rock exposures in slaty siltstones to claystones; subgreywacke beds are less often. There are common ripples (Pl. I, fig. 1–2), and bioturbation is strong in places. Trace fossils *Diplocraterion* isp., *Palaeophycus* isp., *Planolites* isp., *Daedalus* isp., *Teichichnus* isp., *Cochlichnus* isp., and "*Thalassinoides*" isp. have been ascertained.

d) Clay shales rich in fauna (trilobites, hyolite genus *Maxillites*) and infrequent full reliefs of ichnofossils *Teichichnus rectus*, *Palaeophycus* isp., *coprolites*.

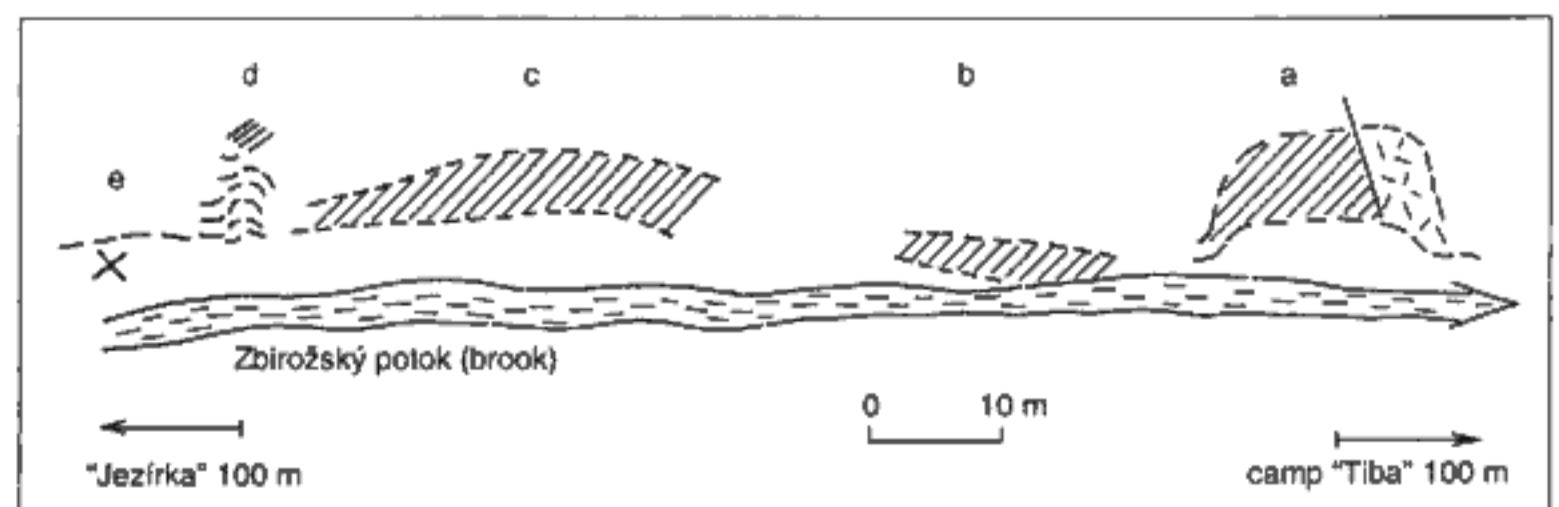
e) Temporary exposure of soil skeleton below an uprooted tree consisting of silty shales, which yielded a trilobite *Agraulos ceticephalus* (BARR.) and trace fossil *Diplichnites* isp.

## 18. Buchava

Minute old quarries exploited at present by fossil collectors, located at the right of the Zbirožský Brook, above the road from Podmokly to Skryje, ca. 250 m SE from the Podmokelský Mlýn farm. Ichnological content of the locality has been briefly described by CHLUPÁČ and MIKULÁŠ (1995). The following trace fossils have been found: *Gyrolithes* isp., *Palaeophycus tubularis*, *P. sulcatus*, *Palaeohelminthopsis linearis*, *Planolites beverleyensis*, *Thalassinoides* cf. *foedus*, *Helminthopsis* isp., *Megagraption* isp., *Amanitichnus omittus*, *Daedalus* isp., *Teichichnus rectus*, *Monomorphichnus* isp., *Bergaueria* isp., "*Spirodesmos*" isp., *Skolithos* isp., *Diplocraterion* isp., *coprolites* and *Cochlichnus* cf. *C. anguineus*.

## 19. Biskoupky

Large debris and small collectors' pits ca. 800 m from the church at Biskoupky, on a steep slope of the unnamed



4. Schematized profile at the locality Jezírka at Skryje. Individual studied layers are marked (see the text).

brook valley inclined to WSW. Clayey to silty shales with distinctive greywacke to subgreywacke layers in places. These layers show physical sedimentary structures (ripples and flute marks; see Pl. XVI, fig. 3) in hyporeliefs but trace fossils are rare. Fine-grained layers contain numerous carbonatic concretions, usually several centimetres to several decimetres in diameter, with well-preserved trilobite, brachiopod and echinoderm fauna. Trace fossils *Daedalus* isp., *Palaeophycus sulcatus*, *Teichichnus rectus*, and *?Cochlichnus* isp. have been ascertained at the locality.

## 5. Systematic ichnology

*Amanitichnus* CHLUPÁČ and MIKULÁŠ, 1995

*Amanitichnus omittus* CHLUPÁČ and MIKULÁŠ, 1995

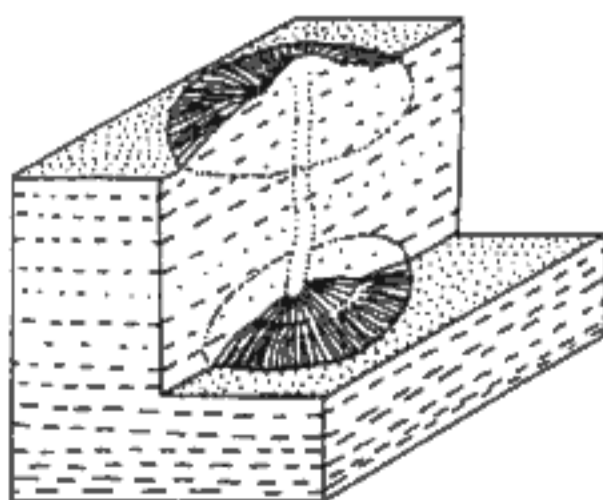
Pl. XV, figs. 1–5; text-fig. 5; ?Pl. XXVI, fig. 5

Material: 22 specimens, commonly several conical structures within the same slab of rock (over 30 conical structures observed) from the locality Buchava.

Description: Intrastratal ichnofossils consisting of one or several low and upwards convex conical structures, commonly recurring in different levels within the same bed either in vertical superposition, or gently shifted laterally. The conical structures are covered with fine radial ridges and grooves, commonly slightly curved and/or anastomosing, particularly close to the outer margin of the cone. The outline of individual cones is subcircular or oval, the diameter equals several centimetres. The vertical or oblique distance between recurring cones ranges from few mm up to several cm. The conical structures are connected by narrow central shaft with homogeneous fill. For more detailed description see CHLUPÁČ and MIKULÁŠ (1995).

Remarks: *Amanitichnus* represents a complex burrow system. Assignment to medusoid-like body fossils is not plausible due to the presence of the vertical shaft connecting the cones. *Amanitichnus* may be classified as fodinichnion. It can be considered as an intrastratal analogy of the ichnogenera *Oldhamia*, *Glockerichnus* a.o. The presumed burrower could be a worm-like animal which was able to move within the narrow central shaft connecting the upwards convex conical parts of the system. The fine radial feeding probes might be originated by special organs (e.g. tentacles) either gradually, or abruptly. For detailed comparisons and remarks see CHLUPÁČ and MIKULÁŠ (1995).

Besides the finds from the Buchava locality, a find showing some resemblance to *Amanitichnus* was found at Bis-



5. *Amanitichnus omittus* CHLUPÁČ and MIKULÁŠ, 1995. Schematic block-diagram showing the position of individual cones within the specimen. Natural size. After CHLUPÁČ and MIKULÁŠ (1995). Bar scale = 10 cm.

koupy (Pl. XXVI, fig. 5). It, however, differs in less regular shape and less prominent radial structure.

*Bergaueria* PRANTL, 1946

*Bergaueria perata* PRANTL, 1946

Pl. XXXI, figs. 1–2

Material: Three specimens from the locality Rejkovice a).

Description: Solitary burrows (full reliefs in silty shales) circular in section, perpendicular to bedding planes. Diameter of them is 24–40 mm, depth of known specimens nearly equal as their diameter. Base of burrows is flat. Surface smooth, showing only sparsely visible transverse rugae. Wall lining is absent. The fill corresponds to the surrounding (and also overlying) rock. It is homogeneous, structureless, probably passive.

Remarks: Modern revision of all “plug-shaped” trace fossils including *B. perata* was given by PEMBERTON, FREY and BROMLEY (1988). *Bergaueria* is considered to be a shallow-water trace fossil, probably the domichnion and/or cubichnion of anemones.

*Chondrites* STERNBERG, 1833

?*Chondrites* isp.

Pl. XIII, fig. 1

Material: One doubtful find from the locality Vystřkov b).

Description: Slab of laminated micaceous siltstone to greywacke showing a group of sections of tunnels: rounded of vertical tunnels, elliptical of oblique tunnels. The sections are of two diameters: smaller ones about 1.5 mm, larger ones about 5 mm. Location and orientation of sections suggest that originally the system of passages had a rhizoidal shape.

Remarks: The presumed shape of the system corresponds to the ichnogenus *Chondrites* as described by numerous authors, most extensively by Fu (1991).

*Cochlichnus* HITCHCOCK, 1858

?*Cochlichnus* cf. *C. anguineus* HITCHCOCK, 1858

Pl. XXXVI, figs. 5–7

Material: Four finds from the localities Buchava, Koníček and Biskoupy.

Description: Smooth, 2–4 mm wide, tunnel- or tape-like traces, slightly, more-or-less regularly sinuously curved. Length of individual “waves” about 10 mm.

Remarks: Because of not full regularity of waving, the assignment to *C. anguineus* is questioned (for description of *C. anguineus* see PICKERILL 1981, KSIĄŻKIEWICZ 1977, McCANN-PICKERILL 1988 a.o.). *Cochlichnus* is regarded to be a feeding trace. It was found in sediments of various settings and age, but density is usually low.

coprolites div. igen. et isp.

Pl. XII, fig. 8; Pl. XXXI, figs. 3–7; Pl. XXXIII, fig. 8

Material: About ten specimens from several (mostly richly fossiliferous) localities [Písky, Koníček, Buchava, Jezírka d)].

Description: Bodies of roughly ovoid or elongated, usually 1–5 cm in size, filled with material rich in bioclasts (Pl. XII, fig. 8) or minute oval pellets.