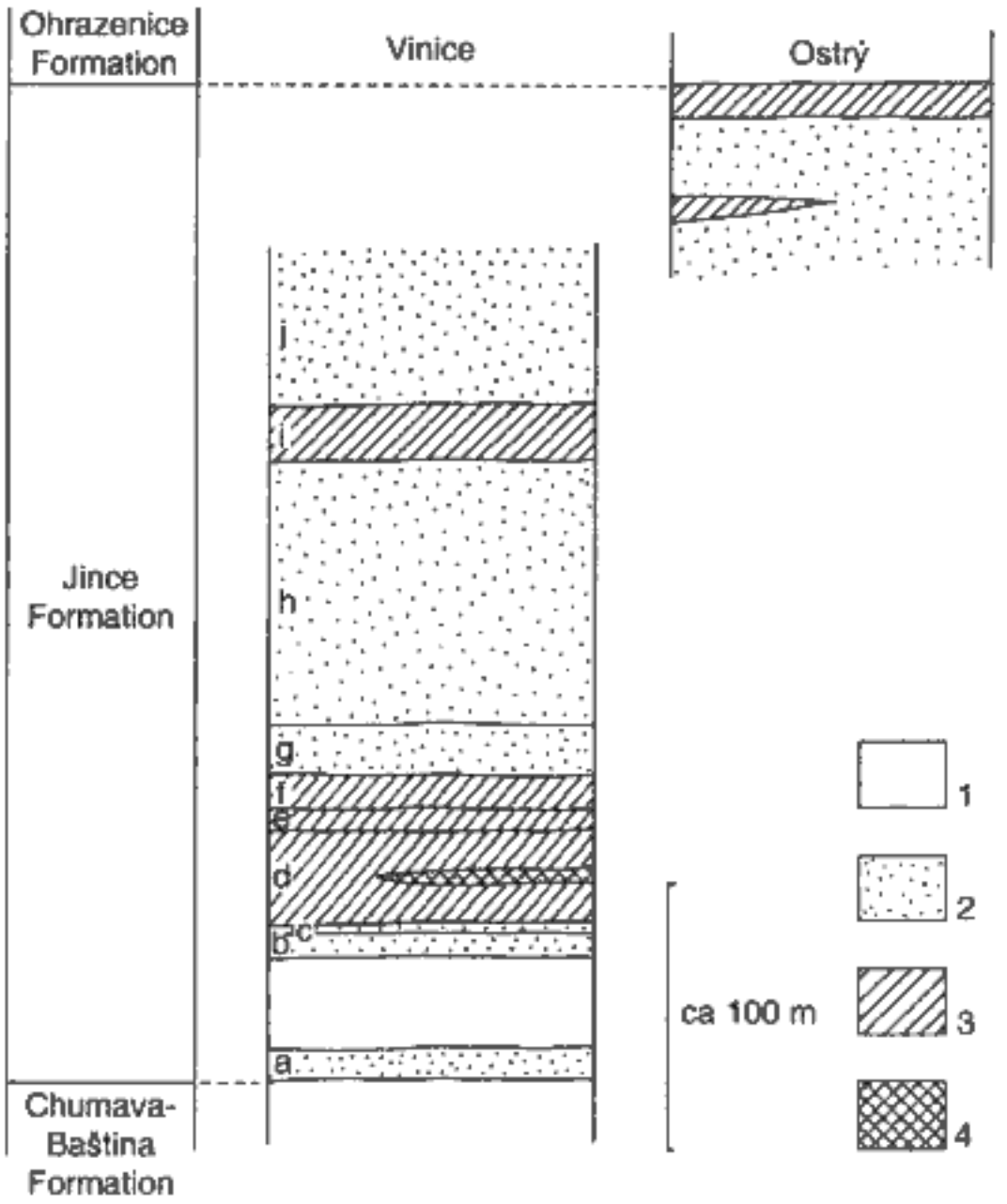
In the Central Bohemian region, the marine transgression in the beginning of the Middle Cambrian enabled a development of simple, later even highly diversified benthic assemblages demonstrated by the ichnofossils. Regression of the sea at the end of the Middle Cambrian led to a decrease of the diversity again. The deepest part of the Middle Cambrian sea in the region is characterised by the *Cruziana* Ichnofacies; margins of the sea fall to the *Skolithos* Ichnofacies. This ichnofacies is limited to the earliest and the latest period of the sedimentation in the central part of the basin (e.g., Vinice and Vystrkov localities) or, near the geographical margin of the transgression, all the preserved sequence is characterised by the *Skolithos* assemblages (e.g., Medový Újezd).

7. Intensity of bioturbation

Measurement of intensity of bioturbation was introduced by works of REINECK (1967) and later in numerous papers by BOTTJER and DROSER (e.g., 1991). The above-mentioned authors proposed to use the semiquantitatively based *ichnofabric index*. The attitude of TAYLOR and GOLDRING (1993) is slightly different: they proposed a descriptive *bioturbation index*. Regardless the published exception taken to these indices, there are indisputable profits from it: 1) the indices enable us to describe objectively a degree of visible bioturbation of a certain rock, regardless other interpretations, and 2) the indices put altogether taxonomically determinable traces and morphologically poorly defined bioturbate textures (here in Pl. I, fig. 1; Pl. III, fig. 7; Pl. VII, fig. 1; Pl. XVII, figs. 1–8). I used the ichnofabric index as a supplementary criterion in the study of the ichnoassemblages of the Central Bohemian Early Ordovician (MIKULÁŠ 1994c).

I have attempted to describe the intensity of bioturbation through over the thickness of the Jince Formation. However, it was not fully possible because (1) great thickness of the formation in the area of its optimum development, i.e. several hundred of metres, and (2) the lack of suitable exposures. The best outcrops are at the Vinice locality but even there they do not yield a complete profile; moreover, detailed study in decimetre to centimetre scale of all the profile would require (because of the hardness of the rock and the necessity of making new trenches and pits) many years of the field work. Therefore, I attempted to characterise generally the ten layers only as distinguished in the description of the Vinice locality. Uppermost layers of the Jince Formation, ill-exposed at Vinice at present, have been evaluated in the near Ostrý locality where they are exposed in nice natural outcrops.

Moreover, in the monotonous siltstones and greywackes of the Jince Formation, the bioturbation is mostly invisible, although the bioturbated laminae of material different in colour (e.g., carbonatic sandstone) point to the presence of "hidden" bioturbate textures also in these rocks. Therefore, I attempted to evaluate only those sections of the profile



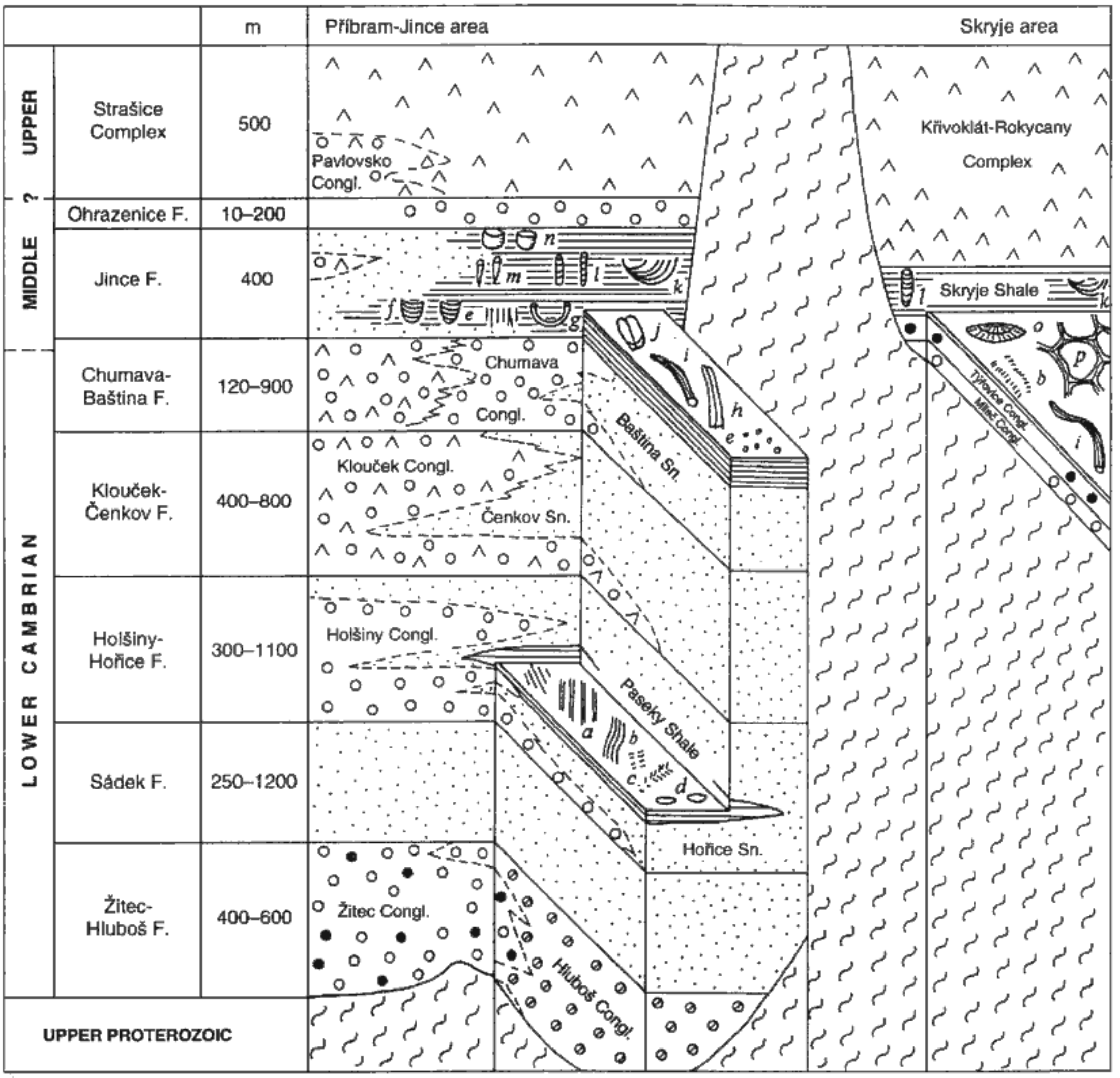
10. Intensity of bioturbation in the profiles at Vinice and Ostrý in the Jince Formation (ichnofabric indices). 1 – i.i = 1; 2 – i.i. = 2; 3 – i.i. = 3; 4 – i.i. = 4. Layers a–j correspond to the designation of individual layers as used in the description of the Vinice locality (see Chapter 4.1).

where the rock composition enables to visualise the bioturbation (e.g., vicinity of lenses and laminae contrasting in colour, and other lithological boundaries). This, of course, is joint with the risk that the change of the sedimentation changed the benthic assemblage producing the traces.

However, the picture of intensity of bioturbation given in this way (Fig. 10) corresponds well with the concept of a single transgressive-regressive cycle represented by the Jince Formation (FATKA 1987). Maximum intensity of the infaunal activity falls to the upper part of the *E. pusillus* Zone and to the lower part of the zone *P. gracilis*. Sparse or none bioturbation was observed in the lower layers of the formation. In the final phase of marine sedimentation in the central part of the Příbram-Jince Basin, simple assemblages persisted showing high density of tracemakers; it disappeared abruptly when the first conglomerate layer of the Ohrazenice Formation appeared.

8. Conclusions

The Middle Cambrian sediments in the Barrandian area are well-known for its unique "*Paradoxides* fauna". The systematic evaluation of its trace fossils show, that the fauna (probably mostly its non-shelly components) was joined also with some unique behavioural patterns which demonstrate in geological record as new or unusual ichnotaxa



11. Schematic block-diagram showing the trace fossil content of the Cambrian of the Barrandian area. 1 – petromictic grey-green conglomerates; 2 – reddish petromictic and oligomictic conglomerates; 3 – conglomerates with volcanic material; 4 – white and grey quartzose conglomerates; 5 – sandstones and greywackes; 6 – siltstones and clayey shales; 7 – effusive volcanites; 8 – Upper Proterozoic siltstones, greywackes, clayey shales, volcanites, pyroclastics, and cherts. Trace fossils: *a – Monomorphichnus*; *b – Diplichnites*; *c – ?Rusophycus*; *d – ?Bergaueria*; *e – Skolithos*; *f, g – Diplocraterion*; *h – Didymaulichnus*; *i – Palaeophycus*; *j – Rusophycus*; *k – Daedalus*; *l – Teichichnus*; *m – Lingulichnus*; *n – Bergaueria*; *o – Amanitichnus*; *p – Thalassinoides*. After MIKULÁŠ (1994).

(*Amanitichnus*, *Rejkovicichnus*, *Skolithos rotundus*, *Palaeohelminthopsis*). Trilobite fauna represents most part of the fossil benthos but it was an unimportant producer of bioturbation in the Barrandian Middle Cambrian; nevertheless, a find of *Dimorphichnus* in the Skryje area is presumed to be a unique example of the locomotion trace of the paradoxid trilobite.

The field work directed to ichnologically representative exposures have fallen partly outside the traditional fossil localities, which is believed to contribute to a complexity of the knowledge of the Barrandian Cambrian.

Ichnofacial characteristics showing the assemblages attributable to the *Skolithos*, *Skolithos-Cruziana* and *Cruziana* Ichnofacies, and development of intensity of bioturbation, are in agreement with the formerly published idea of the transgressive-regressive cycle in the Barrandian Mid-

dle Cambrian, which determined the succession of benthic assemblages and ichnoassemblages. Newly, the outlasting of dense in-faunal population to the final phase of the marine cycle, and the factual absence of bioturbation in most of the lower part of the Jince Formation have been shown.

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