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Zástupci rodu Paracyclas Hall, 1843 z českého siluru (Pelecypoda)

The Silurian Representatives of the Genus Paracyclas Hall, 1843 from Bohemia (Pelecypoda)

(Došlo 21. VII. 1960)
(Presented on July 21, 1960)

V průběhu námi prováděné revise Barrandových rodů českých silurských mlžů *(Pelecypoda)* věnovali jsme pozornost i rodu *Vevoda* Barrande, 1881. Tento rod, jehož genolektotypem je podle stanovení B. Růžičky a F. Prantla (1960) druh *V. bohemicus* Barr., byl v Barrandienu v původním Barrandově pojetí zastoupen celkem 5 druhy. Tyto, jako většina Barrandových forem vůbec, byly jím však pouze vyobrazeny bez jakékoliv diagnosy nebo slovního popisu. Uvedená vyobrazení těchto forem však podle našeho názoru silně upomínala již svým celkovým habitem na rod *Paracyclas* Hall, 1843. Rovněž tak při předběžném studiu jedinců z českého siluru, které J. Barrande (1881) přiřadil sám k zmíněnému Hallovu rodu, nezjistili jsme podstatnější rozdíly mezi nimi. Podrobné zpracování obou souborů prokázalo, že valná většina těchto forem je rodově shodná, a že proto rod *Vevoda* Barrande, 1881, je jen mladším subjektivním synonymem rodového jména *Paracyclas* Hall, 1843, *emend.* Růžička a Prantl, 1959.

Z Barrandem stanovených silurských zástupců rodu *Paracyclas* a *Vevoda* v jeho původním pojetí, považujeme za systematicky oprávněné pouze 3 druhy, a to *Paracyclas bohemica* Barr., *P. insignis* Barr. a *P. expectans* Barr., do jejichž synonymiky připisujeme druhy ostatní.

Názor F. Frecha (1891), který se domníval, že výše uvedené formy náležejí do okruhu rodu *Isocardia* Barrande, 1881 (= *Jahnia* Růžička a Prantl, 1960, non *Isocardia* Lamarck, 1789) projevil se proto jako mylný.

Introduction

The aim of the present work was the revision of forms placed by J. Barrande (1881) to his genus *Vevoda.* As known, J. Barrande figured these forms without accompanying them by a verbal description. As genolectotype, which was not originally determined, *Vevoda expectans* was designated by B. Růžička and F. Prantl (1960). However, the figures of the original material strongly suggested the genus *Paracyclas* Hall, 1843. Also a preliminary study of the forms considered by J. Barrande (1881) as members of the mentioned Hall's genus showed that there are no essential differences between these forms and those ranged by Barrande to his genus *Vevoda.*

Therefore, we decided to study both samples of Barrande's forms together. Here should be noted that the specimens of *Isocardia* Barrande, 1881 (= *Jahnia* Růžička—Prantl, 1960, non *Isocardia* Lamarck, 1789) are not congeneric with the above mentioned forms, as was wrongly supposed by Frech (1891, p. 249—250).

The following comparison of single important morphological features (cited from Barrande's remarks in the VI. volume of his *Système Silurien du Centre de la Bohême*) shows that neither J. Barrande (1881) could find any significant generic differences between the specimens which he placed to *Paracyclas* and those placed to *Vevoda.*

Paracyclas Hall, 1843	*Vevoda* Barrande, 1881
Barrande (1881), vol. VI, p. 138—139	Barrande (1881), vol. VI, p. 166—167
Outline	
"Le contour s'écarte peu de la forme circulaire, mais nous distinguons cependant, parmi nos spécimens, la forme longue et la forme large ..... très faiblement inéquitalérales'	*..."oscillant entre une forme subcirculaire et une forme subelliptique, peu éloignée de la première." ..."faiblement inéquilatérales" ...*
Beaks	
..."peu saillants" ...	*..."faiblement développés, arrondis et ne se projettent pas sensiblement au-delà de la charnière."*
Convexity	
..."leur bombement est très peu prononcé"" ...	*..."leur bombement est à peu près regulier dans les 2 sens."*

Surface sculpture

...“stries concentriques grupées par zones. Les stries longitudinales ne s'observent que très rarement.”	*“Les zones et stries concentriques prédominent, mais elles sont fréquemment croisées par des stries longitudinales, qui forment un réseau plus ou moins marqué.”*

Neither a detailed study of Barrande's syntypes did bring such results as to enable the differentiation of both genera. Here should be noted that the hinge character, muscle scars and pallial line were not observed on any specimen.

The only distinctive feature seemed to be the radial sculpture, which appeared more expressed in *Vevoda* than in forms placed by J. Barrande to *Paracyclas.* This feature seemed to be very important as J. Hall (1843) in his original diagnosis of *Paracyclas* did not mention even the indications of a radial sculpture. However, our subsequent detailed study showed that the radial sculpture does not appear on the surface of the valves and belongs therefore to some of the inner layers of the valve matter. Its distinctness depends consequently on the degree of solution of the valve during the fossilisation.

Finally, L. Beushausen (1895) found indications of radial sculpture in some forms which he placed to the genus *Paracyclas* Hall, but did not try to explain it. In the description of *Paracyclas proavia* Goldf. (op. cit. p. 169) he states: *„Die Skulptur besteht aus sehr zahlreichen, etwas blättrigen, unregelmässigen, verschieden starken, zu Bündeln vereinigten Anwachsstreifen. Auf den Steinkernen bemerkt man jedoch nur entfernter stehende unregelmässige grobe Runzeln und Furchen neben einer undeutlichen bündelförmigen Radialstreifung.“* In the description of *P. antiqua* Goldf. (op. cit. p. 174) he refers: *„Auf Steinkernen beobachtet man zuweilen radial gestellte Körnchenreihen auf den Anwachsrunzeln, welche wohl der Radialstreifung auf den Steinkernen von P. proavia entsprechen.“*

From all that was cited above it is evident that the genus *Vevoda* should not be retained as an independent well-founded genus until a hinge apparatus quite different from that of *Paracyclas* is found in the forms ranged to *Vevoda,* and therefore it should be considered a younger subjective synonym of the genus *Paracyclas* Hall, 1843.

Material

The material under study consists of isolated, mostly incomplete right and left valves, among which only few specimens are postmortally deformed. No specimen with both valves has been found.

A list of all Barrande's syntypes demoted with our numbers in the column “studied type” is given below. For the sake of simplification these numbers are used in all following descriptions and remarks.

Barrande's designation		Locality	Stud. type №
Paracyclas bohemica,	Vol. VI, pl. 67, fig. III, 1—4	Lochkov	*1*
- „ -	Vol. VI, pl. 67, fig. III, 5—8	Lochkov	*2*
- „ -	Vol. VI, pl. 67, fig. III, 9—10	Lochkov	*3*
- „ -	Vol. VI, pl. 67, fig. III, 11—15	Dvorce	*4*
- „ -	Vol. VI, pl. 67, fig. III, 16—18	Lochkov	*5*
- „ -	Vol. VI, pl. 129, fig. 1—3	Lochkov	*6*
- „ -	Vol. VI, pl. 129, fig. 4—6	Lochkov	*7*
- „ -	Vol. VI, pl. 129, fig. 7—9	Lochkov	*8*
- „ -	Vol. VI, pl. 129, fig. 10—12	Lochkov	*9*
- „ -	Vol. VI, pl. 129, fig. 13—15	Lochkov	*10*
- „ -	Vol. VI, pl. 129, fig. 16—18	Lochkov	*11*
Paracyclas infausta,	Vol. VI, pl. 254, fig. III, 14—15	Lochkov	*12*
Paracyclas amica,	Vol. VI, pl. 100, fig. 4—6	Lochkov	*13*
Paracyclas major,	Vol. VI, pl. 268, fig. 27—29	Chuchle	*14*
Paracyclas metis,	Vol. VI, pl. 296, fig. 21—24	Dvorce	*15*
- „ -	Vol. VI, pl. 296, fig. 25—27	Dvorce	*16*
Vevoda insignis,	Vol. VI, pl. 5, fig. 1—4	Dvorce	*17*
- „ -	Vol. VI, pl. 8, fig. 4	Dvorce	*18*
- „ -	Vol. VI, pl. 8, fig. 7—8	Chuchle	*19*
- „ -	Vol. VI, pl. 9, fig. 3—4	Dvorce	*20*
Vevoda expectans,	Vol. VI, pl. 13, fig. 1—4	Dvorce	*21*
- „ -	Vol. VI, pl. 13, fig. 5—7	Dvorce	*22*
- „ -	Vol. VI, pl. 13, fig. 8—9	Dvorce	*23*
- „ -	Vol. VI, pl, 13, fig. 10—11	Dvorce	*24*
- „ -	Vol. VI, pl. 13, fig. 12—13	Dvorce	*25*
- „ -	Vol. VI, pl. 290, fig. 9—11	Dvorce	*26*
- „ -	Vol. VI, pl. 290, fig. 12—15	Dvorce	*27*
- „ -	Vol. VI, pl. 290, fig. 16—18	Dvorce	*28*
- „ -	Vol. VI, pl. 290, fig. 19—21	Dvorce	*29*
Vevoda crassus,	Vol. VI, pl. 14, fig. 7—9	Dvorce	*30*
Vevoda pusillus,	Vol. VI, pl. 290, fig. 5—6	Dvorce	*31*
Vevoda contrastans,	Vol. VI, pl. 290, fig. 8.	Dvorce	*32*

After a revision the syntypes *9, 18, 19, 20, 30, 31* and *32* weve excluded from the study. In our opinion they do not fall within the range of the genus *Paracyclas* H a l l, partly according to their external habitus, especially, however, according to a pronounced radial surface sculpture. Therefore, they will not be dealt with in the present paper any more.

The character of the surface sculpture in relation to fossilization

As mentioned above our forms are preserved as casts in which different layers of the valve matter are fossilized. This has caused, of course, different structure of the surface sculpture.

First of all there are specimens whith the shell nearly smooth (e. g. stud. type *29*). From these forms there can be distinguished specimens which show only in places faint, flat, concentric, imbricating plates of different width, which in places of imbricating form round, more or less prominent ridges. (This type of sculpture appears in the type *25.*) In other specimens the growth plates are visible on the entire surface of the valve. In this case they become narrow to threadlike in the proximity of the dorsal line (stud. type *24*). In addition, fine concentric striae are visible on the growth plates in some of the studied specimens.

Besides concentric elements more or less distinct radial elements are present in some of our forms. These are in some cases fine and visible only in places (e. g. stud. type *6*), in others they are coarser and visible on the whole surface of the valve (e. g. the type *17*).

The valve matter is preserved only in fragments situated in different parts of the valves, in types *11, 14, 16, 17, 22, 25, 26, 28, 29.* Its surface sculpture consists of faint, not well defined, flat or slightly convex concentric plates, which bear more or less numerous, acutely defined striae.

The umbonal part shows often the same type of the surface sculpture as the valve body. In some forms, however, the concentric plates are in the umbonal portion less distinct than on the valve body (e. g. stud. type *13*), or the umbonal part is quite smooth (type *2*). In other cases the concentric plates are in the umbonal portion more expressed than on the valve body, which is most distinct in the type *16.* The concentric plates are in these cases relatively broad and prominent and concentric ridges are especially distinct.

On the basis of the fact that various layers of the valve matter with different structure are fossilized in our specimens, we suppose that the valve matter was relatively thick. Here should be noted that this feature suggests that the described forms lived in a littoral or shallow neritic zone and their shells were postmortally transported to the deeper parts of the Silurian basin of Central Bohemia. This opinion is further verified by the fact that only isolated (mostly right) valves are found.

Outline of the valve

The outline of the forms under study is of *lucinoid type* with either the height or the length of the valve prevailing, or both parameters being nearly the same. A more precise reconstruction of the shape of the valve could not have been made in all studied specimens owing to the poor preservation of the outline in the majority of them and owing to the growth plates not being visible on the entire surface of the valve. Therefore we were not able to use biometrical methods in this work.

Descriptive part

Paracyclas H a l l, 1843, emend. R ů ž i č k a — P r a n t l, 1958..

Genotype: Paracyclas eliptica H a l l, Geol. Surv. N. Y., Rep. Fourth Dist, 1843.
Locus stratumque typicum: Corniferous Limestone, Lower Devonian, USA.

Paracyclas bohemica B a r r a n d e, 1881.

1881 — *Paracyclas bohemica,* B a r r., vol. VI, pl. 67, fig. III, 1—18; ibidem pl. 129, fig. 1—9, 13—18; n o n pl. 129, fig. 10—12.
1881 — *Paracyclas infausta* B a r r., vol. VI, pl. 254, fig. III, 14—15.
1881 — *Paracyclas amica* B a r r., vol. VI, pl. 100, fig. 4—6.
Locus typicus: Lochkov.
Stratum typicum: Kopanina Limestones — $e\beta_1$ (Budňanian).
Lectotype: Here designated form (right valve) figured by J. B a r r a n d e (1881) on pl. 67, fig. III, 9—10 (stud. type *3*).

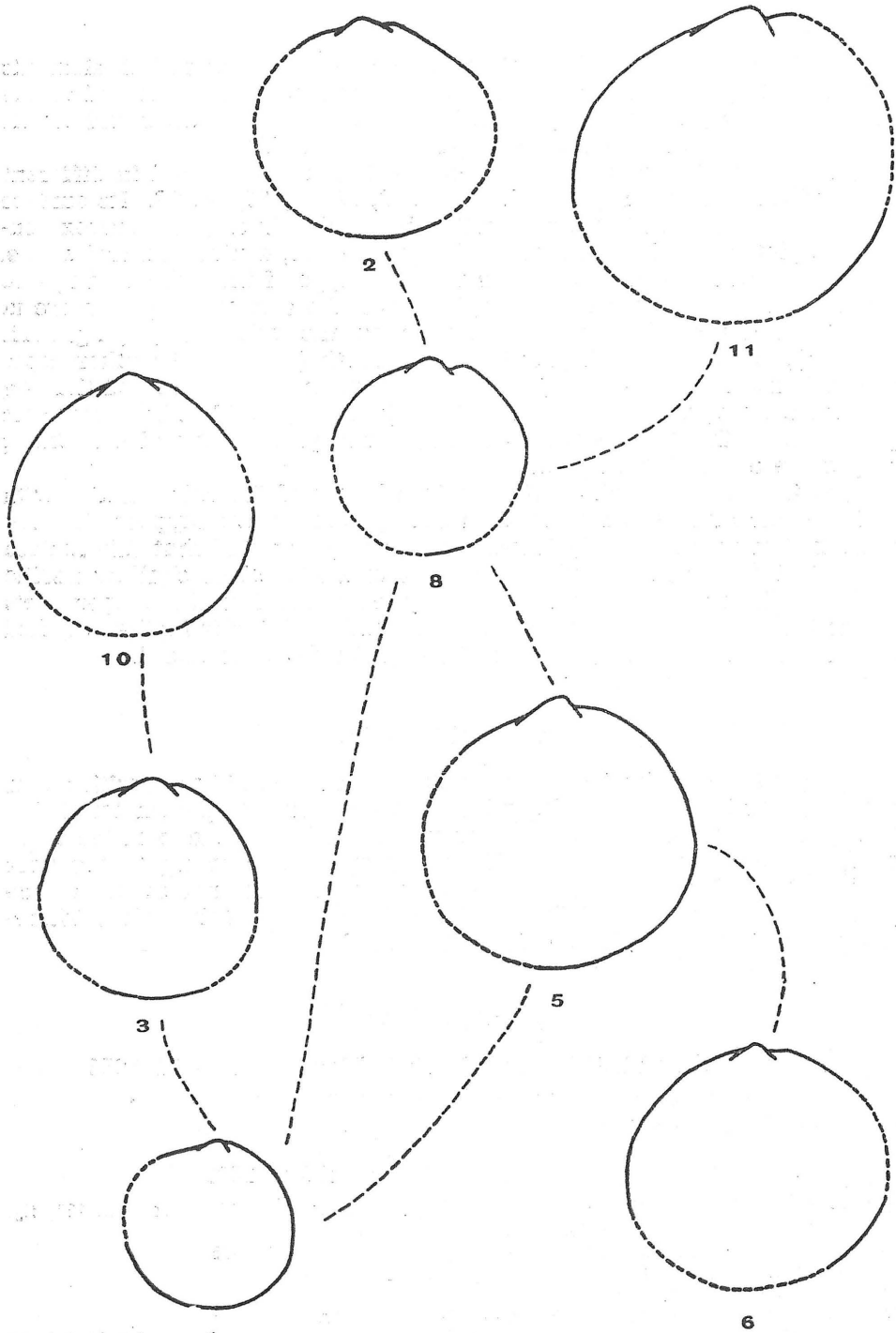


Fig. 1 — Forms are denoted by numbers of our studied types.

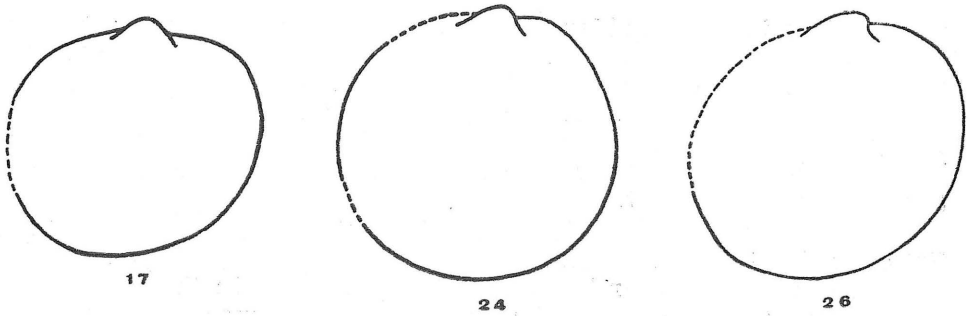


Fig. 2 — Forms are denoted by numbers of our studied types.

M a t e r i a l: Barrande's syntypes of this species are 1 left and 11 right valves of different size, our types *1—8* and *10—13.* No other material was at our disposal.

H y p o d i g m: The above mentioned species is represented by forms of medium size, none of which has the outline entirely preserved. Nevertheless in eight specimens it was possible to reconstruct the outline according to the distinct growth lines. As can be seen from the fig. 1 the outline of the forms under study is considerably variable. Besides a subcircular type also forms with longer height than length or such in which length is longer than height occur in our sample. In all forms, however, the dorsal line is very short. The majority of our forms are not postmortally deformed. The type *13* which is slightly laterally compressed and the type *12,* which is strongly laterally compressed, are the only exceptions.

The specimens are preserved as casts bearing the impressions of various layers of the valve matter. This state naturally affects also the hight of convexity, which is not always the same in forms of the same size. When arranging our forms from the least convex specimen to the most convex form the following series is obtained: *1, 3, 8, 2, 6, 7, 4, 5, 10, 11.* The minimum height of convexity is about 7 mm, in the last but one member of the series it is 12 mm, and in the last member, which is strongly convex it is about 18 mm. In this form, however, no other significant differences can be found which would justify its exclusion from the range of the above mentioned species.

The beaks are for the most part slightly convex, moderately prosogyrate, rarely orthogyrate, in the oldest portion pointed, incurved, not elevated above the valve surface and only slightly raised above the hinge line. In some cases they are more expressed, which is influenced by the type of fossilization. According to the salience of the beaks a series can be arranged, the first member of which has the least prominent beak. It consists of the following types: *4, 2, 11, 1, 6, 3, 13, 5, 10, 7, 8.*

A characteristic common feature of all specimens is to a certain degree a relatively short and abrupt part of the anterior side of the valve. This feature emphasizes morphologically the anterior side of the umbonal portion. The narrowing of the anterior side of the valve appears in all

growth lines in their sudden narrowing, thinning and abrupt bending towards the dorsal line. Owing to the free margin being preserved so poorly that it is not possible in all cases to follow at least approximately the line of maximum convexity, the position of the point of maximum convexity cannot be precisely fixed. There can be only stated that this point lies generally in the anterior side of the valve, approximately in the upper third of the valve height.

The surface sculpture of the casts consists of more or less distinct, flat or moderately concave, imbricating concentric ribs, which are relatively narrow and more or less ridgelike protruding. In the central part of the valve 4—5 ribs occur per 5 mm in smaller specimens, in larger ones 2,5—3 ribs. A characteristic feature of the concentric elements is their irregularity, which increases in the course towards the lower margin. In some cases even finer, tiny concentric ribs occur on the flat ribs, their number varying from 1—5 per rib.

Radial ribs are very little distinct on casts. They are fine, morphologically inconspicuous, threadlike, concave anteriorly. Approximately 3—4 radial ribs occur per 5 mm. Here should be noted that the radial ribs are of only one type.

The shell matter, which is preserved only in fragments, bears on the surface only flat plates which show various number of concentric striae.

The hinge character, muscle scars and pallial line were not observed.

Lectotype: A specimen representing approximately the mean type of the sample, with the outline only slightly damaged was selected as lectotype.

It is a right moderately convex valve with the height slightly longer than length. Dorsal margin is very short, beak small, slightly prosogyrate, moderately prominent. The sculpture consists of rather smoothed, exclusively concentric elements.

Remarks and Relations: The type *9* originally placed by J. Barrande to the above mentioned species was excluded from its range. According to the character of its dorsal margin and the beak it cannot be considered conspecific with this species, neither congeneric with *Paracyclas.* On the contrary, the form designated by Barrande *Paracyclas amica* (our type *13*) and specimen named by Barrande *Paracyclas infausta* (our type *12*) is considered conspecific with *P. bohemica.* As mentioned above, both last mentioned specimens are laterally deformed, the first less, the second more. Nevertheless we believe that our placing of these forms to the above described species is fully justified on the basis of the character of the beak and typically narrow, abrupt anterior part of the valve. The type *12* is the only left valve of the described species which we know. Owing to its deformation, however, we do not give any further description of it.

The types *4* and *7* are placed to this species with certain doubts, as in the first case the upper parts of the outline and the oldest part of the beak are wanting, in the second especially the anterior side of the valve. These specimens are left within the range of *P. bohemica* because they stand nearest to it by all features which are observable.

P. bohemica cannot be in our opinion identified with any other species of the genus *Paracyclas.*

P. bohemica differs from *P. insignis* mainly in the following features: shorter dorsal line (in *P. insignis* it is distinctly longer), shorter anterior side of the valve (the anterior side is much longer in *P. insignis*) and smaller, less conspicuous beak (in *P. insignis* it is strong and prominent).

The above described species differs from *P. expectans* in shorter dorsal line (in *P. expectans* it is always somewhat longer), in smaller, quite differently situated beak (in *P. expectans* the beak is more strongly developed, more prosogyrate and less emphasized by the anterior slope of the umbonal portion).

Distribution and Occurence: Kopanina Limestones, $e\beta_1$ (Budňanian), Lochkov, Dvorce (= Prague 4, Podolí), the quarry of the former cement works.

Paracyclas insignis (Barrande, 1881).

1881 — *Vevoda insignis* Barr., vol. VI, pl. 5, fig. 1—4; non pl. 8, fig. 4, 7—9; non pl. 9, fig. 3—4.
1881 — *Paracyclas metis* Barr., vol. VI, pl. 296, fig. 21—27.
1881 — *Paracyslas major* Barr., vol. VI, pl. 268, fig. 27—29.
1881 — *Vevoda expectans* Barr., vol. VI, pl. 13, fig. 10—11; ibid. pl. 290, fig. 9—11; non pl. 13, fig. 1—9, 12—13; non pl. 290, fig. 12—21.
Locus typicus: Dvorce.
Stratum typicum: Kopanina Limestones, $e\beta_1$ (Budňanian).
Lectotype: Here designated form (right valve) figured by J. Barrande (1881) on pl. 5, fig. 1—4 (stud. type *17*).

Material: The documentary material consists of 6 right valves of different size, according to our designation types *14, 15, 16, 17, 24, 26.* No other specimen was at our disposal.

Hypodigm: The species is represented by medium-sized to large forms. The outline could be reconstructed according to the growth lines only in three specimens. As is evident from the fig. 2, the outline is subcircular to subelliptical, the longer axis of the ellipse passing in the extreme case (type *14*) nearly through the anterior and posterior extreme point.

None of our specimens is postmortally deformed. They are preserved as casts bearing impressions of various layers of the valve matter. In this case, however, the state of preservation does not affect the height of convexity, which increases proportionally with the size. In the smallest specimens it is about 12 mm, in the largest 16 mm.

Beaks are for the most part conspicuous, strong, convex, bluntly pointed, incurved and more or less prosogyrate. They are distinctly raised above the dorsal line and their pointed oldest part touches the dorsal line. Only in one case (type *24*), the oldest portion of the beak lies above the dorsal line, which in this case is due to the mode of fossilization.

The surface of the valves is more or less evenly convex. The anterior slope of the umbonal portion is more expressed, however, this is not due

to the sheerness of the anterior side of the valve but to the higher convexity of the umbonal portion. The anterior side of the valve lacks an expressed slope and is always relatively large. The position of the highest point of convexity cannot be stated owing to the mentioned poor preservation of the outlines. It can be supposed, however, that this point lies higher than the boundary of the upper and middle third of the valve height.

The surface sculpture is rather smoothed off. It consists of relatively large, flat, imbricating, rather irregularly spaced ribs. According to the degree of fossilization the places of imbricating of the ribs are either moderately protruding or nearly smooth, or coarsely marked by a ridge, which is due to the younger rib lying much lower than the preceding one. This type of imbricating of the ribs is especially distinct in the umbonal portion of the valve. In the central part of the valve of the smallest specimen 7 ribs occur per 10 mm, in larger forms 3 ribs. Radial ribs are distinct nearly in all specimens. They are coarse, morphologically inconspicuous and close. In the central part of the valve 10—13 ribs occur per 10 mm. Concentric plates bear sometimes few fine concentric ribs, which are as expressed as the radial ribs.

A reticulate structure arises by the intersection of both elements. Radial ribs are always of one type.

The valve matter, insofar it could be observed in fragments, bears only flat, unprominent concentric ribs covered by irregular, threadlike, acute striae. The hinge character, muscles scars and pallial line were not observed.

Lectotype: A specimen with a relatively well preserved outline, which represents to a certain degree the mean type of the sample, was selected as lectotype. It is a right, rather convex valve of subcircular shape, with the dorsal margin of medium length. The beak is very conspicuous well vaulted, in the oldest part pointed, distinctly prosogyrate. The surface sculpture consists of concentric elements which are very prominent in the umbonal portion of the valve, and radial elements, distinct nearly on the whole surface of the valve except for the umbonal portion. The valve matter is preserved only near the anterior margin of the valve. Its surface sculpture consists of flat, ill defined concentric ribs bearing very acute, irregularly spaced striae.

Remarks and Relations: The syntypes *18, 19, 20,* originally placed by J. Barrande to this species, were excluded from its range. According to the shape of the valve and the general character of the surface sculpture these specimens are not congeneric with *Paracyclas* and in our opinion they even belong to different genera. On the other hand the species designated *P. major* (type *14*), *P. metis* (types *15* and *16*) and *Vevoda expectans* (types *24* and *26*) are ranged to the above described species as they form with the remaining already mentioned species a natural assemblage of the same genus.

P. insignis cannot be in our opinion identified with any other species known to us.

The differences between *P. insignis* and *P. bohemica* were sufficiently discussed under the remarks of the last mentioned species and therefore we refer to them.

The difference between *P. insignis* and *P. expectans* consists mainly in the more convex valves with more inflated umbonal portion and stronger, more expressed beaks in *P. insignis.* The valves of *P. expectans* are on the contrary low convex, the umbonal portion is slightly convex and beaks are unprominent.

Distribution and Occurrence: Kopanina Limestones, $e\beta_1$ (Budňanian); Dvorce (= Praha 4-Podolí), the quarry of the former cement works; Velká Chuchle.

Paracyclas expectans (Barrande, 1881).

1881 — *Vevoda expectans* Barr., vol. VI, pl. 13, fig. 1—9, 12—13; ibid. pl. 290, fig. 12—21; non pl. 13, fig. 10—11; non pl. 290, fig. 9—11.

Locus typicus: Dvorce.

Stratum typicum: Kopanina Limestones, $e\beta_1$ (Budňanian).

Lectotype: Here designated form (right valve) figured by J. Barrande (1881) on pl. 13, fig. 12—13 (our type *25*).

Material: The documentary material consists of 7 right valves of various size, according to our designation types *21, 22, 23, 25, 27, 28, 29.* No other material was at our disposal.

Hypodigm: The species is represented by medium-sized to large valves with the margins for the most part strongly damaged. The outline could be reliably reconstructed only in the lectotype. It is subcircular with greater length than height. As can be judged according to the growth lines this ratio seems to be maintained also in the remaining forms of our collection. This appears very conspicuously in the types 22 and 23. The dorsal line, insofar it is preserved, is of medium length.

The majority of our specimens are not postmortally deformed. Only on the type *22* a slighter deformation in the posterior part of the valve, adjacent to the umbonal portion, can be observed.

All speciments are preserved as casts which bear impressions of various layers of the valve matter. This state affects the height of convexity so that the latter is not the same in specimens of the same size. The smallest height of convexity is about 8 mm, the greatest 12 mm. Beaks are for the most part small, slightly convex, bluntly pointed, in the oldest part incurved, more or less prosogyrate, not elevated above the surface of the valve. They are never raised above the dorsal line and their oldest part does not touch it, which is in our opinion partly due to the state of fossilization. On the whole the valves are evenly moderately convex, the anterior umbonal portion being only slightly emphasized by a shallow depression in the anterior side of the valve. Owing to the poor state of preservation of our specimens the highest point of convexity cannot be fixed. In the lectotype, however, it lies nearly in the midpoint of the valve height.

The surface sculpture of the casts is considerably smoothed off. It consists of relatively broad, flat, imbricating, irregularly spaced ribs. The places of imbricating of the ribs are according to the degree of fossilization either moderately protruding, nearly smooth, or coarsely marked by rounded ridges. This type of concentric sculpture is especially distinct in the type *22*. In the central part of the valve approximately 2,5 ribs occur per 10 mm. Radial ribs are more or less visible nearly in all specimens. They are faint, finer in smaller specimens, stronger in larger forms. In the central part of the valve in smaller specimens the radial ribs average 12 per 10 mm, in larger forms about 6. The concentric plates bear in addition finer concentric ribs so that a more or less regular reticulation arises by the intersection of both elements of the surface sculpture, especially distinct in the types *21* and *27*. Radial ribs are always of one type.

The valve matter is preserved only in fragments (best of all in the type *22*). It bears only flat concentric ribs covered by close, somewhat irregularly spaced, threadlike, acutely protruding striae.

The character of the hinge, muscle scars and pallial line was not observed.

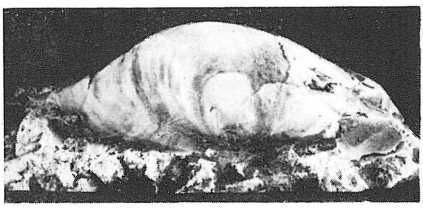
Lectotype: A specimen with the outline best preserved, which is at the same time the largest form of our sample, was selected as lectotype. It is a right, moderately convex valve of subcircular shape. Beak is inconspicuous, faintly convex, prosogyrate, central. The anterior slope of the umbonal portion is somewhat emphasized by a shallow depression of the anterior side of the valve. The surface sculpture is considerably smoothed off and the cast is therefore nearly smooth. Only in the proximity of the free margin flat, inconspicuous, rather irregular concentric ribs are visible, intersected by faint, broad, continuous radial ribs. The valve matter is not preserved even in fragments.

Remarks and Relations: The types *24* and *26* were excluded from the range of the above described species as they belong in fact to *Paracyclas insignis*. In our opinion *P. expectans* cannot be identified with any other species of the genus *Paracyclas* known to us. The differences between this species and others described in the present paper were sufficiently discussed under the remarks of these species.

Distribution and Occurence: Kopanina Limestones, $e\beta_1$ (Budňanian), Dvorce.

Conclusion

As becomes evident from the present work, the genus *Vevoda* established by J. Barrande (1881) is considered as not well founded and the forms originally ranged to this genus are placed to *Paracyclas* Hall, 1843. Consequently the genus *Vevoda* Barrande, 1881 is in our conception a younger subjective synonym of the genus *Paracyclas* Hall, 1843. Within this genus only three species could be distinguished among Barrande's silurian forms, namely: *P. bohemica, P. insignis* and *P. expectans*. The majority of the remaining Barrande's species were placed as



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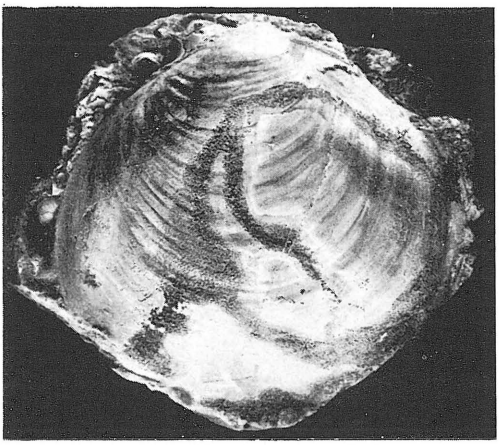

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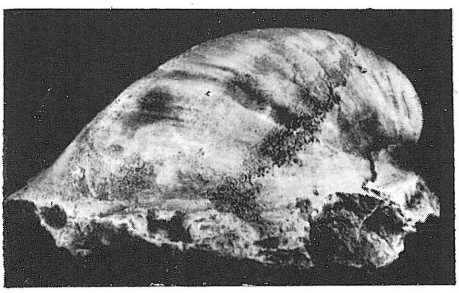

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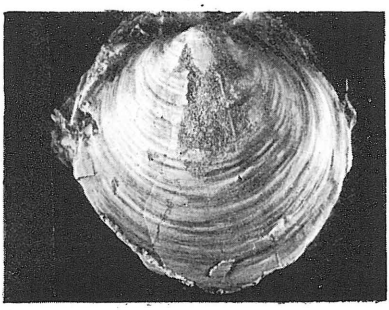

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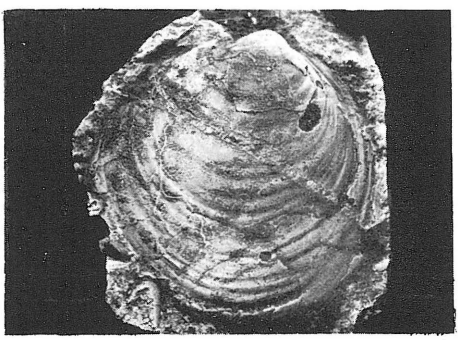

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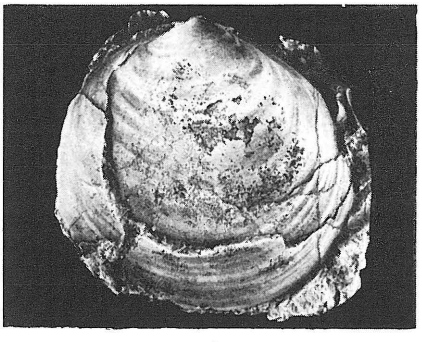

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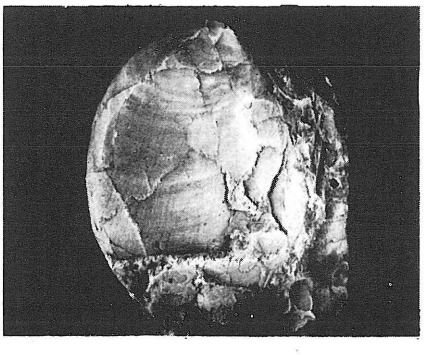

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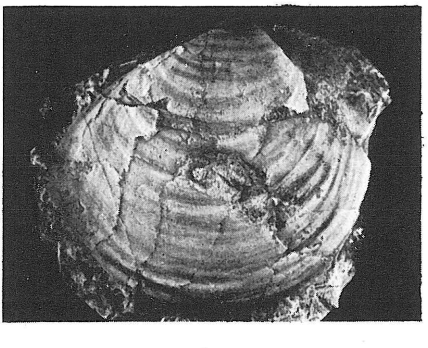

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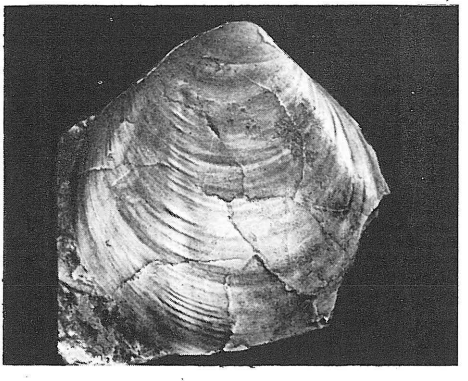

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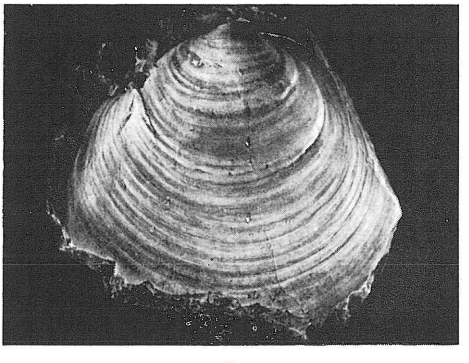

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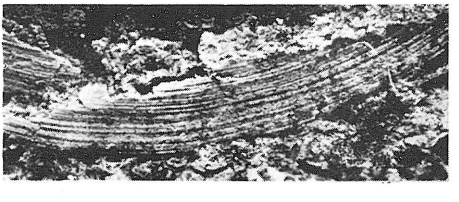

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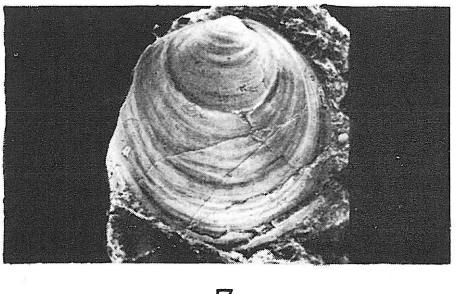

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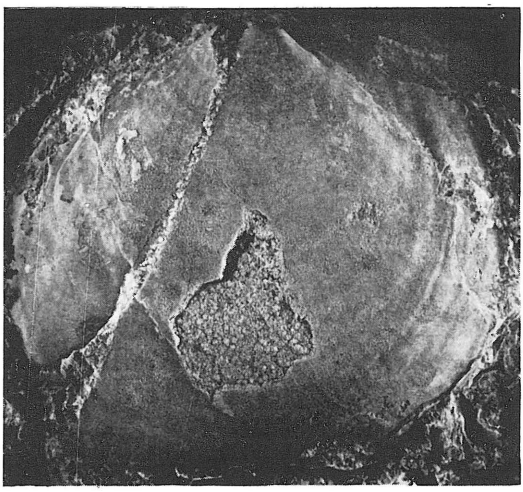

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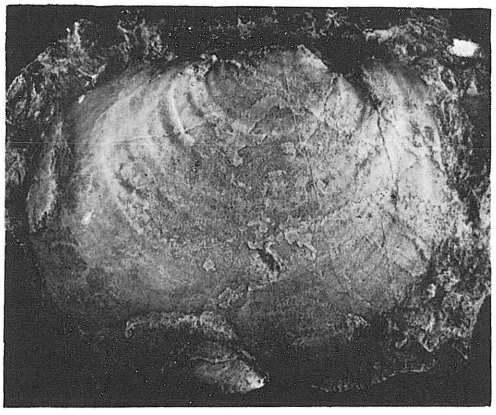

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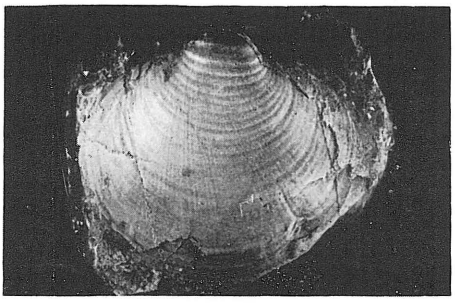

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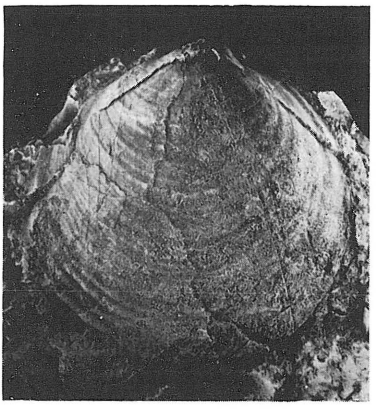

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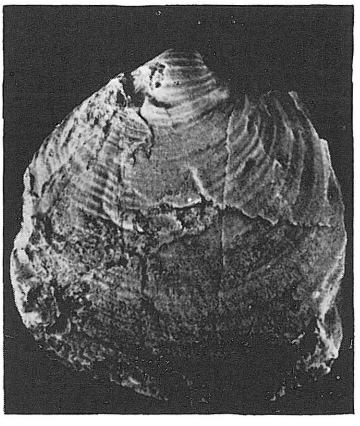

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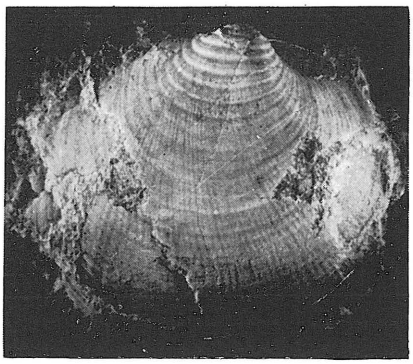

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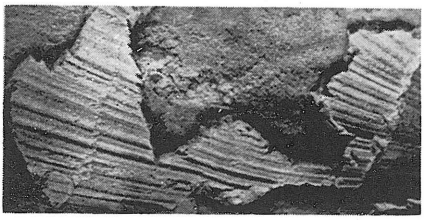

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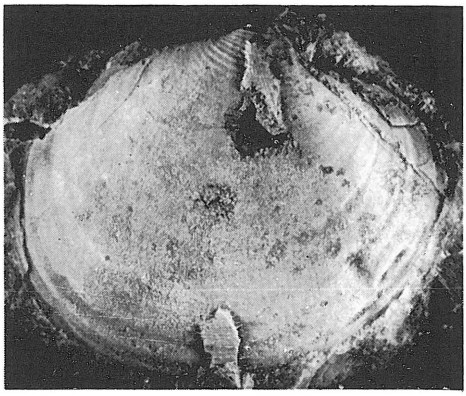

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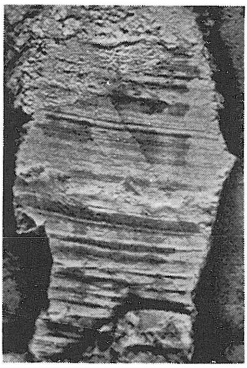

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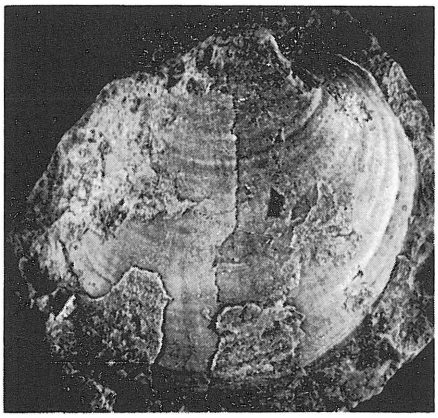

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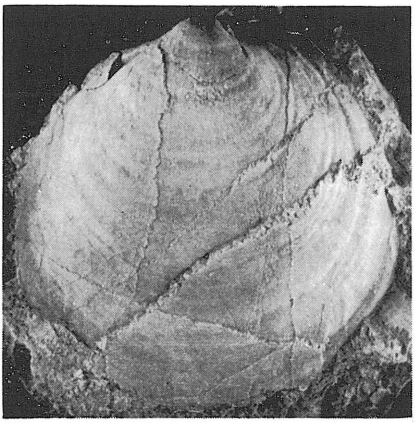

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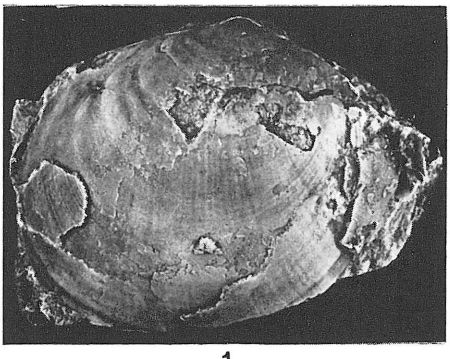

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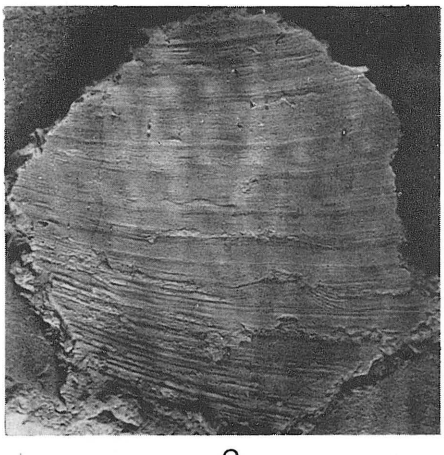

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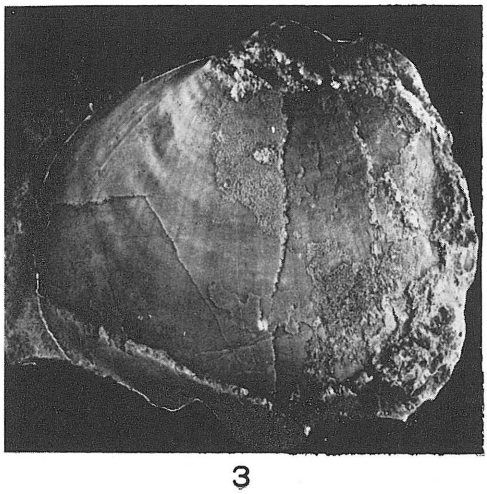

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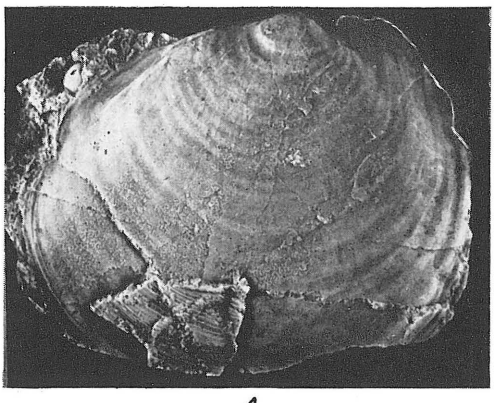

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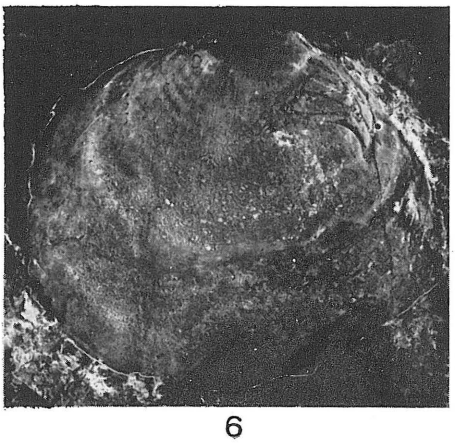

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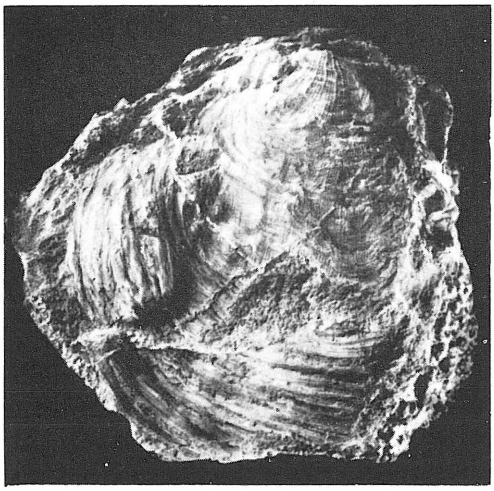

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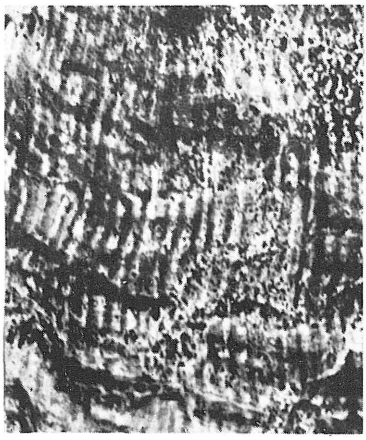

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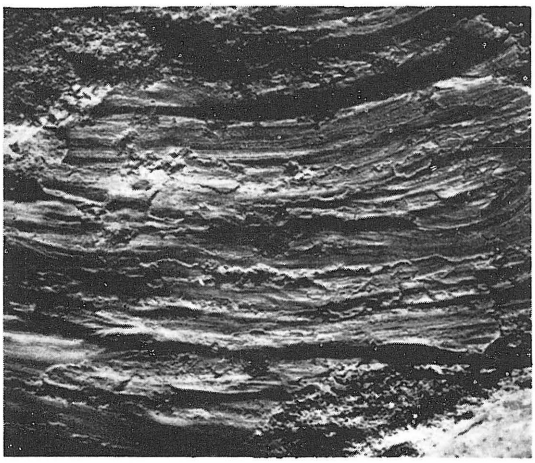

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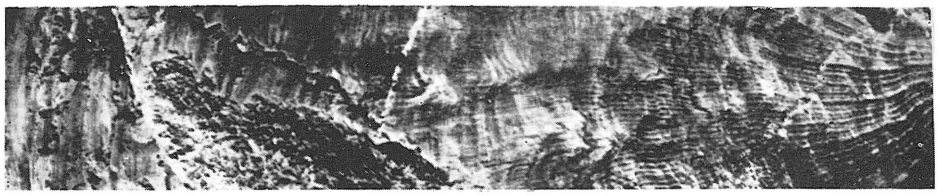

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synonyms in some of the three above mentioned species. The forms designated by J. Barrande as *Vevoda crassus* (our type *30*), *Vevoda pusillus* (our type *31*) and *Vevoda contrastans* (our type *32*) are the only exceptions. In our opinion these forms are not congeneric with *Paracyclas,* as well as our types *18, 19,* and *20,* designated by Barrande *Vevoda insignis,* and the type *8* designated by Barrande *Paracyclas bohemica.* These forms will be dealt with in subsequent revisions, the subject of which will be Barrande's genera *Vlasta, Královna* and *Panenka.*

It is remarkable that the whole studied sample consists of right valves with the exception of one deformed left valve. A complete specimen with both valves is not known. Therefore we suppose that the studied material represents a postmortally deposited faunal assemblage.

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EXPLANATIONS OF PLATES

Plate XXXIX

Fig. 1 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 129, fig. 13—15; stud. type *10*).
Fig. 2 — detto — apical view, × 0,5
Fig. 3 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 67, fig. III, 11—15; stud. type *4*).
Fig. 4 — *Paracyclas bohemia* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 129, fig. 7—9; stud. type *8*).
Fig. 5 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 129, fig. 16—18; stud. type *11*).
Fig. 6 — detto — apical view, × 0,5.
Fig. 7 — detto — posterior view, × 0,5.
Fig. 8 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 67, fig. III, 9—10; stud. type *3*).

Plate XL

Fig. 1 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 67, fig. III, 5—8; stud. type *2*).
Fig. 2 — detto — apical view, × 0,5.
Fig. 3 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 254, fig. III, 14—15; stud. type *12*).
Fig. 4 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 129, fig. 4—6; stud. type *7*).
Fig. 5 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 100, fig. 4—6; stud. type *13*).
Fig. 6 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 129, fig. 1—3; stud. type *6*).
Fig. 7 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 67, fig. III, 1—4; stud. type *1*).
Fig. 8 — detto — detail of the surface sculpture.

Plate XLI.

Fig. 1 — *Paracyclas expectans* (Barrande, 1881), × 0,5 (In Barrande vol. VI, pl. 13, fig. 12—13; stud. type *25*).
Fig. 2 — *Paracyclas expectans* (Barrande, 1881), × 0,5 (In Barrande vol. VI, pl. 13, fig. 8—9; stud. type *23*).
Fig. 3 — *Paracyclas insignis* (Barrande, 1881), × 0,5 (In Barrande vol. VI, pl. 296, fig. 25—27; stud. type *16*).
Fig. 4 — *Paracyclas expectans* (Barrande, 1881), × 0,5 (In Barrande vol. VI, pl. 13, fig. 1—4; stud. type *21*).
Fig. 5 — *Paracyclas bohemica* Barrande, 1881, × 0,5 (In Barrande vol. VI, pl. 67, fig. III, 16—18; stud. type *5*).
Fig. 6 — *Paracyclas insignis* (Barrande, 1881), × 0,5 (In Barrande vol. VI, pl. 296, fig. 21—24; stud. type *15*).

Plate XLII.

Fig. 1 — *Paracyclas insignis* (Barrande, 1881), × 0,5 (In Barrande vol. VI, pl. 5, fig. 1—4; stud. type *17*).
Fig. 2 — detto — apical view, × 0,5.
Fig. 3 — detto — detail of the surface sculpture.
Fig. 4 — *Paracyclas insignis* (Barrande, 1881), × 0,5 (In Barrande vol. VI, pl. 268, fig. 27—29; stud. type *14*).

Fig. 5 — detto — detail of the surface sculpture.
Fig. 6 — *Paracyclas insignis* (B a r r a n d e, 1881), × 0,5 (In Barrande vol. VI, pl. 290, fig. 9—11; stud. type *26*).
Fig. 7 — *Paracyclas insignis* (B a r r a n d e, 1881), × 0,5 (In Barrande vol. VI, pl. 13, fig. 10—11; stud. type *24*).

Plate XLIII.

Fig. 1 — *Paracyclas expectans* (B a r r a n d e, 1881), × 0,5 (In Barrande vol. VI, pl. 290, fig. 12—15; stud. type *27*).
Fig. 2 — detto — detail of the surface sculpture.
Fig. 3 — *Paracyclas expectans* (B a r r a n d e, 1881), × 0,5 (In Barrande vol. VI, pl. 290, fig. 19—21; stud. type *29*).
Fig. 4 — *Paracyclas expectans* (B a r r a n d e, 1881), × 0,5 (In Barrande vol. VI, pl. 13, fig. 5—7; stud. type *22*).
Fig. 5 — detto — detail of the surface sculpture.
Fig. 6 — *Paracyclas expectans* (B a r r a n d e, 1881), × 0,5 (In Barrande vol. VI, pl. 290, fig. 16—18; stud. type *28*).

BOHUSLAV RŮŽIČKA & FERDINAND PRANTL

Enigmopteria nov. gen., nový mlž z českého siluru (Pelecypoda)

Enigmopteria nov. gen., New Pelecypod Genus from the Silurian of Bohemia (Pelecypoda)

(Došlo 21. VII. 1960)
(Presented in July 21, 1960)

Při revisi Barrandových mlžů ze středočeského siluru nalezli jsme v dosud nezpracovaném materiálu ve sbírkách Národního musea v Praze velmi zajímavé skulpturní jádro levé misky mlže pectinoidního typu, se zachovanými zbytky původní miskové hmoty. Celkový habitus misky i její význačná povrchová skulptace odlišují tuto formu velmi výrazně od všech dosud stanovených rodů nám známých. Považujeme ji, až s jistými výhradami, za představitele nového rodu i druhu, pro které současně navrhujeme pojmenování *Enigmopteria incerta* n o v. g e n., n o v. s p e c. Podle původního Barrandova označení byla tato zajímavá forma nalezena v Lochkově u Radotína, a pochází z vrstev přídolských — $e\beta_2$ (Budňanien) ve smyslu dnes platné stratigrafické tabulky.

I n t r o d u c t i o n

In the course of the revision of Barrande's pelecypods of the Silurian of Bohemia, which are deposited in the collections of the National Museum in Prague, a new, very interesting sculptural cast of a left valve was found, the unusual surface sculpture of which does not permit the placing of this form in any already known genus or family. Therefore we consider it, although with certain doubts, a representative of a new genus which we designate

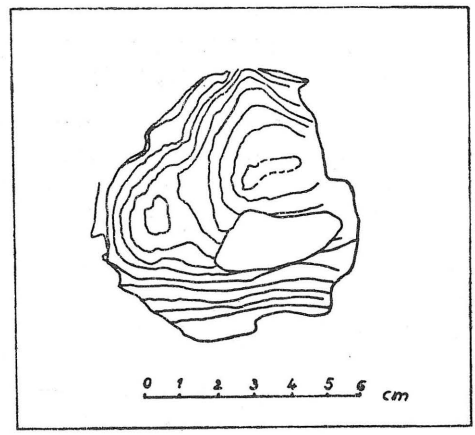
ENIGMOPTERIA N O V. G E N.

Genotype: by monotypy, here established species *Enigmopteria incerta* n o v. s p e c.
Derivatio nominis: The name derived from the Greek words enigma (= *puzzle*) and pteris (= *wing*).
Stratum typicum: Přídolí Limestones, $e\beta_2$, Budňanian.
Locus typicus: Lochkov, Central Bohemia.

D i a g n o s i s: Pelecypod genus with the left valve considerably convex, inequilateral and with conspicuous, irregularly bulbous surface morphology. Beaks probably prosogyrate. The umbonal portion suggests by its habitus pectinoid shells. It bears prominent radial sculpture, which, however, disappears in the proximity of the lower part of the free margin untill it is quite replaced by concentric growth ridges and plates. The anterior as well as the posterior wing probably present. The hinge character, muscle scars, pallial line as well as the shape of the right valve unknown.

Remarks and Relations: This genus does not show any affinities to some already known form, except for the pectinoid character of the surface sculpture. Therefore a more precise determination of the systematical position of our new genus remains open till further notice.

We suppose that the characteristic difference in the surface sculpture of the umbonal portion and that of the rest of the valve is a primary



feature corresponding to the original structure of the valve surface and, consequently, is not a secondary postmortal phenomenon caused by the successive dissolving of various layers of the valve matter and their impression on the scupltural cast in the course of diagenesis. This presumption is verified also by the rests of the original valve matter preserved on the holotype. Besides, there can be observed according to the preserved rests that the valve proper was relatively thin.

Enigmopteria incerta nov. spec.

Holotype: by monotypy, a left valve figured here as fig. 1—5 pl. XLIV.
Derivatio nominis: from the Latin word incertus (= *uncertain*), according to the uncertain systematical position.
Stratum locusque typicus: the same as that of the genus.

Description: Holotype is an incomplete left valve with the greater part of the posterior side, a part of the anterior outline, the lower part of the posterior outline and the oldest portion of the beak broken off. A portion of the central part of the valve is damaged.

The entire outline of the valve is not known owing to the poor state of preservation.

Beak: Although the oldest portion of the beak is broken off there can be supposed, according to the general tendency of the umbonal portion, that the beak was prosogyrate and elevated above the dorsal line. Its position towards the connecting line between the anterior and po-

sterior extreme point cannot be determined owing to the unfavourable preservation. The umbonal portion is rather convex and emphasized by a deeper depression anteriorly and a shallower depression posteriorly. In the posterior part a short portion of the dorsal line is visible. It is straight, suggesting the presence of the posterior wing. The presence of the wanting anterior wing is suggested by the depression in front of the beak. Hinge apparatus, muscle scars and pallial line are not known.

Surface of the valve: The holotype is preserved as sculptural cast with only small rests of the original valve matter preserved especially in the lower part of the valve. The valve surface is morphologically varied, being irregularly bulbous. The accompanying contour map (text—fig. 1) will express the bulbous character of the valve more truthfully than any verbal description.

Surface sculpture is formed by several different elements. In the umbonal portion radial first order ribs, moderately concave anteriorly, predominate, between which somewhat finer second and third order ribs intercalate. The ribs of higher orders set in gradually towards the lower part of the free margin, becoming less expressed, threadlike and close, so that it is impossible to distinguish the individual orders among them. Twenty ribs occur per 5 mm of the width.

Besides this prominent surface sculpture also irregular concentric growth ridges appear in the umbonal portion, which approximately from the middle of the height of the preserved part of the valve gradually oust and finally quite replace the radial costation in the proximity of the lower part of the free margin. The valve matter is preserved only in fragments. It is very thin, its sculpture being formed only by concentric plates and ridges, which are in places swallen, in places more flat and imbricating so that the older elements cover partly the younger ones. The radial sculpture is here not visible.

Remarks and Relations: The vagueness of the systematic relationship of this form has been already pointed out in the discussion of the genus and therefore we refer to it. The prominent bulbous morphology of the valve surface can be in our opinion explained by the supposed sessil mode of life of *Enigmopteria incerta* nov. spec.

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EXPLANATIONS OF PLATE XLIV.

Fig. 1 — *Enigmoptera incerta nov spec.* Holotype. × 0,7.
Fig. 2 — detto, detail of the surface of the umbonal part of the valve.
Fig. 3 — detto, detail of the surface of the central part of the valve.
Fig. 4 — detto, detail of the surface of the lower part of the valve.
Fig. 5 — detto, an enlarged part of the surface of the valve (the umbonal portion on the right).

SBORNÍK NÁRODNÍHO MUSEA V PRAZE — ACTA MUSEI NATIONALIS PRAGAE

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Redaktor:

Člen korespondent ČSAV ALBERT PILÁT, doktor biologických věd.

B. Růžička & F. Prantl: Zástupci rodu Paracyclas Hall, 1843 z českého siluru (Pelecypoda). — The Silurian Representatives of the Genus Paracyclas Hall, 1843 from Bohemia (Pelecypoda).

B. Růžička & F. Prantl: Enigmopteria nov. gen., nový mlž z čes. siluru (Pelecypoda). — Enigmopteria nov. gen., New Pelecypod Genus from the Silurian of Bohemia (Pelecypoda).

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