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Namurské foraminifery z ostravsko-karvinského revíru
Namurian Foraminifera from the Ostrava-Karviná Coal District

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V letech 1954—56 byla provedena mikrofaunistická prospekce v ostravských vrstvách. Zpracováno bylo 1470 vzorků. Získán byl paleontologický materiál ze všech pater s marinní faunou až na Štúrovo patro.

V této práci podáváme popis nalezených foraminifer. Nejspodnější nálezy pochází podle materiálu získaného mikrofaunistickou prospekcí v dolech z nadloží sloje Enna. Další nálezy pocházejí z pater slojí Barbora, Koksová, Jindřich, a z Gaeblerova patra, které je jak na druhy, tak na jedince foraminifer nejbohatší.

Rozšíření foraminifer je velmi nestejnoměrné a některé druhy se objevují jen v kryptolumachellách. Proto mohou být objeveny jen náhodou. V budoucnosti je možno očekávat vzhledem k těmto okolnostem nálezy dalších druhů, nebo aspoň lépe zachovaných a vyvinutých jedinců. Z tohoto důvodu zpracovali jsme taxionomicky jen formy, jejichž charakteristiku bylo možno bezpečně stanovit. U ostatních byla ponechána *nomenclatura aperta.*

Ustanoven byl nový rod *Čepekia* n o v. g e n. (genoholotyp *Čepekia čepeki* n o v. s p e c.) z čeledi *Endothyridae.* Popsány byly čtyři nové specie: *Čepekia čepeki* n o v. s p e c. z čeledi *Endothyridae, Hemigordius přibyli* n o v. s p e c. a *Apterrinella augustai* n o v. s p e c. z čeledi *Ophthalmidiidae* a *Tetrataxis němejci* n o v. s p e c. z čeledi *Trochamminidae.*

Pro vrstvy patřící nepochybně k namuru A zdá se být stratigraficky cenným druh *Apterrinella augustai* n o v. s p e c. Pro Gaeblerovo patro, které se od ostatních pater značně faunisticky liší a patří snad již k nejspodnější části namuru B, zdají se být stratigraficky cennými druhy *Čepekia čepeki* n o v. s p e c. a *Tetrataxis němejci* n o v. s p e c., jakož i zástupci lagenid, kteří nebyli nalezeni v žádném spodnějším patře.

Zástupci čeledí *Astrorhizidae* a *Hyperamminidae* byli nalezeni v ostravsko-karvinském revíru až dosud jen v patrech sloje Enna. Jsou to nejspodnější patra, v kterých byly až dosud nalezeny foraminifery při mikrofaunistické prospekci v dolech.

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Microbiostratigraphical prospection was carried out in the Ostrava beds of the Ostrava-Karviná coal district. The Ostrava beds are divided from base to top into four zones: the Petřkovice zone, the Hrušov zone, the Jaklovec zone and the Poruba zone.

The lowermost finds of foraminifera come from the fossiliferous bands overlying the Enna seam and terminating the Hrušov zone. In the Jaklovec zone foraminifera were found in the Barbora faunal bands, which terminate the Jaklovec zone according to the delimitation of boundaries of the individual zones. In the Poruba zone foraminifera were found in the bands of seams Koksová, Jindřich and in the Gaebler band, where they are most abundant.

All the fossiliferous bands mentioned above belong to the Namurian A. Only the Gaebler band might represent the lowermost part of the Namurian B. This band considerably differs in fauna from the lower fossiliferous bands.

The foraminiferal distribution is very unequal and some species appear only in cryptolumachels. Therefore, they can be discovered only by chance. Considering these facts, recoveries of further species or at least of better developed and preserved specimens may be expected in the future. For this reason, we have taxionomically worked out only those forms the characteristic of which can be reliably determined. As to the other forms, *nomenclatura aperta* has been used.

Fam. *ASTRORHIZIDAE*

In the Enna marine-fauna bands a single fragment of a test was found which can be assigned to the genus *Rhabdammina*.

Fam. *HYPERAMMINIDAE*

Hyperammina sp.

Pl. XLII, fig. 1

In the Enna marine-fauna bands fragments of tests occasionally occur. They are of very fine arenaceous material with much cement, so that the surface is smooth and semilustrous. The walls were originally medium firm and are sometimes slightly deformed. Neither a complete specimen nor any remnants of earlier portions of the tests to serve for the description of the species have been found as yet.

The presence of *Hyperammina* in the bands of the Enna seam seems to be of local stratigraphical significance, as the remains of this genus have not as yet been found in any other fossiliferous band.

Fam. *ENDOTHYRIDAE*

Čepekia nov. gen.

Genotype, here designated, the species *Čepekia čepeki* nov. sp.

Derivatio nominis: In honour of Ing. Dr. Ladislav Čepek, who deserves great credit for the research of the Carboniferous and for the development of micropaleontology in Czechoslovakia.

Stratum typicum: Gaebler's band, the Poruba zone in the Upper Silesian Carboniferous foredeep, Namurian A (less probably the lowermost part of the Namurian B).

Locus typicus: Orlová, mine Žofie, 7th gallery, 1st div., the roof of the nameless twin-seam underlying the Prokop seam.

Diagnosis: Tests nearly planispiral. Deviations from the median plane small, only in the later coils. A small number of long, moderately bent chambers in a whorl. Wall consisting of three different layers: (1) black, opaque, (2) grey, translucent, calcitic, (3) yellowish, translucent, calcitic. Aperture simple.

Description: The test is similarly developed on both sides and only transversal sections show slight but characteristic deviations of individual coils from the median plane. Those deviations have no regular character. They only appear in the later building stages. The earlier growth stages are planispiral.

The cross sections of the representatives of the genotype reveal that even the inner spaces of the chambers often slightly shift in either direction from the supposed median plane. The thickness of the walls is therefore variable. In some places of the inner walls projections appear which are reminiscent of imperfect secondary septa. The intercameral septa are thick, with an archlike widening at the roof and at the base. The chambers are strongly elongated, often greatly variable in length in one and the same coil and only moderately bent. The outline of the test becomes increasingly angular with the decreasing number of chambers to each coil. The apertural portion of the latest chamber often projects above the whorl. The aperture is simple, elliptical, moderately distant from the spiral suture. It represents the somewhat narrowed end of the cavity of the latest chamber.

The wall structure is complex. The black opaque substance of the spiral suture is especially conspicuous on the median section. It is similar to the tectum of fusulinids. The tectum is conspicuously developed only in that portion of the spiral suture which is covered by the chambers of the later coil. In the peripheral portion of the test (in the continuation of the spiral suture) the tectum is represented only by isolated scattered grains of the dark substance. From the spiral suture the tectum passes to the lateral sides of the chambers and from there into the building material which fills up the sutures between the coils.

Adjacent to the tectum is a minute layer of grey, translucent, (probably non porous) calcitic substance reminscent of the protheca in fusulinids. In the intercameral sutural depressions this substance is accumulated in so great an amount that these depressions are only very slight.

The entire inner portions of the chamber walls are formed of a continuous layer of a yellowish translucent (probably non porous) calcitic substance which is reminiscent of the epitheca in fusulinids. This layer is usually more developed at the roof than at the base of the cameral cavity. In some places, but rarely, it greatly thickens also at the base and in the lower third of the walls and forms projections reminiscent of secondary septa. In other places it thins so strongly that the cameral cavity lies nearly directly on the tectum of the spiral suture.

Remarks and relations: The genus *Čepekia* nov. gen. is most interesting from the evolutionary point of view. The three-layered

structure of walls indicates the affinity with the representatives of the family *Fusulinidae*. The structure proper of the test shows that the genus *Čepekia* belongs to the family *Endothyridae*. The closest related taxionomic units are the genera *Plectogyra* and *Endothyra*. The walls of *Plectogyra* are composed of three or four layers and in this respect the genus *Plectogyra* remarkably resembles the new genus. However, it differs from it most distinctly in not having the earlier building stages planispiral as is the case in *Čepekia* n o v. g e n. By the planispiral arrangement of the earlier chambers *Čepekia* n o v. g e n. resembles the genus *Endothyra*, which, however, according to E. J. Z e l l e r (1950), is planispirally coiled in all whorls. *Endothyra* has also a much simpler structure of walls.

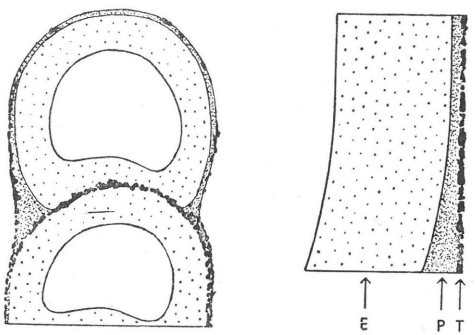

Fig. 1. Schematic demonstration of wall structure of tests in the genus *Čepekia* n o v. g e n. T—tectum; P—protheca; E—epitheca.

The genus *Endothyra appears* as early as the Devonian; *Čepekia* and *Plectogyra* not until the Carboniferous. From the biogenetical point of view the tests of *Čepekia* are more archaic in structure than those of *Plectogyra*.

Č e p e k i a č e p e k i nov. spec.

H o l o t y p e, here designated, pl. XLII, fig. 2ab.

P a r a t y p e s: A number of specimens and the specimens figured on pl. XLII as figs. 3ab, 4, 5ab, 6, 7, 8, 9.

D e r i v a t i o n o m i n i s: In honour of the geologist Ing. Dr. L a d. Č e p e k, who deserves great merit for the research of the Carboniferous and for the development of micropaleontology in Czechoslovakia.

S t r a t u m t y p i c u m: Gaebler's band, zone Poruba, Namurian A (less probably the lowermost part of the Namurian B).

L o c u s t y p i c u s: Orlová, mine Žofie, 7th gallery, 1st div., the roof of the nameless twin-seam underlying the Prokop seam.

D i a g n ó s i s: The planispiral portion consists of 1.5 to 2.5 whorls. Three or four slightly bent chambers (sometimes even a portion of the fifth) in a whorl. Outline triangular, quadrangular to angularly circular according to the number of chambers in the last whorl. Chambers of the distal end somewhat inflated. Aperture elliptical. Walls of variable thickness, in some places with slight transversal swellings on the inner surface.

S i z e: The longest diameter of the test varies from 0.3 mm. to 0.6 mm. The diameter of the majority of well-developed specimens slightly varies at about 0.5 mm.

D e s c r i p t i o n: The deviations from the normal coiling of the later whorls are small, yet they are well visible in transversal sections. These deviations show no trace of any regularity. The inner cavity of the chambers often shifts in either direction. Its section is considerably variable in form. It can be circular, elliptical, often highly crescentic. The thickness of the wall is variable. The inner wall shows numerous swellings, projections and folds.

Tests usually of 3 to 5 whorls. The spiral suture is moderately depressed but on the surface of the test it is traceable at best in the last two whorls. Between the earlier coils it is usually covered by a secondary deposit produced during the growth of the later whorls. Intercameral sutures, too, tend to be only slightly depressed. Some of them are quite distinct, others (also in the same whorl) are nearly indistinct. Their course is usually traceable at best in the last two whorls.

The surface of the test is moderately rough. The central portion is slightly depressed in some specimens, in many others being as thick as the peripheral portion.

The outline of the test is extremely variable because of the inconstant number of the chambers in one whorl and because of their considerable length and only moderate bend. The latest coils most often have four or almost five chambers and the outline is quadrangular to angularly circular. In a small number of specimens there are only three chambers in the last whorl and the outline of the test is usually triangular. The end of the latest chamber sometimes projects more or less above the periphery of the test, which is due to the slight bend of the chambers. The distal parts of the chambers are variously inflated according to how much the proximal end of the preceding chamber projects above the periphery of the test.

The aperture is simple, elliptical, narrowed by the inner thickening of the wall.

R e m a r k s a n d r e l a t i o n s: Only a single species of the monotypic genus *Čepekia* n o v. g e n. has ben found for the present. The mode in which the test coils and the tendency to a more complex structure of the inner spaces of chambers clearly distinguish the representatives of the genus *Čepekia* from the representatives of the related genus *Plectogyra*.

O c c u r r e n c e: The new species has been found so far only in the Gaebler band in the Poruba zone of the Upper Silesian Carboniferous foredeep.

Fam. *MILIOLIDAE*

The representatives of this family were found in the Barbora marine-fauna bands (the Jakovlec zone) and in the Gaebler band (the Poruba zone). It is surprising that only abnormally minute tests have been found which contrast with the disproportionately larger tests of other foraminifers.

We expect that in the course of time it will be possible to find some more suitable material for studying the family *Miliolidae* and therefore we

only state for the present that a considerable proportion of the miliolids of the Barbora and Gaebler bands are reminiscent of the species *Agathammina pusilla* (Geinitz), and a small number of the specimens of the Gaebler band show the characters of the species *Eosigmoilina explicata* Gamelina. It is worth mentioning that *Eosigmoilina explicata* Gamelina was described from the lower part of the Baškirian series in the Doněc Basin. This series represents the lower Westfalian, and Namurian C, perhaps also Namurian B. It may be possible that the Gaebler band belongs to the lowermost part of the Namurian B.

Fam. *OPHTHALMIDIIDAE*

Gen. *Hemigordius* Schubert, 1908

Hemigordius přibyli nov. spec.

Holotype, here designated, pl. XLII, fig. 10abc.

Paratypes: A number of specimens and the specimens figured on pl. XLIII as figs. 1-10.

Derivatio nominis: In honour of the paleontologist Dr. A. Přibyl, who deserves credit for the faunistic research of the Ostrava-Karviná coal district.

Locus typicus: Orlová, mine Žofie, 7th gallery, 2nd div., cross-cut 720, close above the nameless twin-seam underlying the Prokop seam.

Stratum typicum: Gaebler's band, zone Poruba, Namurian A (less probably the lowermost part of the Namurian B).

Diagnosis: Test calcareous, imperforate. Deviations in coiling from the median plane frequent in the earlier growth stages, rare in the later ones. Cavity in some places slightly contracted by fine oblique folds, in other places somewhat widened. Aperture simple, elongated, formed by the open end of the tube. Apertural face stands obliquely to the spiral suture. There is a tendency to the production of a callus above the earlier whorls.

Dimensions: The diameter of the specimens found fluctuates between the values of 0.13-0.33 mm. The thickness of the wall 9 μ with a diameter of 0.3 mm.

Description: The test consists of a proloculum and of a coiled tube widening gradually (but not quite regularly). The cross section of the tube varies in form. It is often circular to elliptical in the earlier whorls. In the places where the whorls are more closely spaced, the cross section is angular, more or less rectangular. In the later coils, the cross section of the tube is often highly crescentic. The cavity of the tube is in some places slightly contracted by folds running more or less obliquely over the inner side of the wall. This phenomenon is best observable on the pyritic casts of the tubes. On the external walls of the tubes the contractions are only rarely visible.

The cavity of the tube suddenly widens in some few cases but soon resumes its normal diameter. Those widenings do not appear regularly and distinctly enough to warrant speaking about a definite division of the tube into individual chambers. The deviations from the median plane of coiling are frequent. They are more frequent and greater in the earlier growth

stages than in the later ones. There is, however, no boundary to clearly separate the earlier and less regularly coiled portion from the later one. In the lateral view only the suture between the last whorl and the rest of the tube is visible on well preserved specimens. It is usually slightly depressed, sometimes (but only locally) deeply impressed in the form of elongated scars. The rest of the tube is most often covered on both sides by a callus without any distinct structure. The thickness of the callus varies greatly. The structure of the callus can be studied only in some corroded specimens which often show that the callus consists of individual lamellae formed by the individual coils. In addition to the specimens with the central part inflated, also quite flat (usually immature) specimens are found.

The apertural face stand obliquely to the spiral suture so that the aperture is elongated, elliptical. It is very probable that the situation and arrangement of the folds on the inner walls of the tube correspond to the situation and arrangement of the aperture of the growing test at the individual growth stages since the elongation of the aperture and the obliquity of the apertural face of the tube are as variable as the obliquity of the folds on the inner wall of the tube.

Remarks and relations: The species described differs from *Hemigordius schlumbergeri* (Howchin, 1895) in the lamination of the thickenings not being visible externally (except for the specimens with corroded surface). A further difference consists in transversal wrinkles which sometimes appear in the specimens of *Hemigordius přibyli* nov. spec. Even the profiles of the tube are somewhat different, which is chiefly due to a slighter embracement of the coils in the species *Hemigordius schlumbergeri.*

Hemigordius přibyli nov. spec. remarkably differs from *H. liratus* Cushman et Waters, 1928, by the rounded periphery of the test (absence of a keel) and by smaller size.

H. přibyli nov. spec. differs distinctly from *H. carbonarius* (Steinmann, 1880) by its thicker test.

The new species differs from *H. regularis* Plummer, 1930, by a greater irregularity in the coiling of the later portions, by the callus above the central part of the test and probably also by a smaller number of coils.

The new species differs from *H. harltoni* Cushman et Waters, 1928, in the less regular coiling of the later portions, by the elongate aperture, smaller size and to a certain extent also by the transversal wrinkles on the external surface of the tube. It, however, resembles this species in those portions of the test where the spiral suture is indicated by elongated scars.

The new species differs distinctly from *H. harltoni germanica* Liebus, 1932, which is known only from thin sections, by the less rounded periphery of the test and not so closely spaced coils. Even the strong tendency to the secondary thickening of the central portion of the test distinguishes the majority of the specimens of the new species from the holotype of Liebus' subspecies.

H. přibyli nov. spec. resembles remarkably both in the irregularity of coiling and in size the species *H. calcarea* Cushman et Waters, 1928, but it differs from it in the elongate aperture (*H. calcarea* has accord-

ing to the description a semicircular aperture). The well developed specimens of the new species differ from *H. calcarea* in the ratio between the diameter of the tube in the last whorl and the diameter of the test. Even the wrinkles sometimes appearing on the surface of the tube probably distinguish the species described from *H. calcarea.*

The new species differs from *H. simplex* Reitlinger, 1950, which is known only from thin sections, in the not so closely spaced coils, in the much less depressed suture between the last whorl and the rest of the test and therefore also in the more regularly spread callus on the surface of the test. *H. simplex* is larger (0.45 mm.) than the new species.

From *H. discoideus* (Brazhnikova et Polievska, 1948) in the conception of Reitlinger, 1950, the new species differs in the not so closely spaced coils, so that the profiles of the cavity are generally high (in *H. discoideus* they are generally low and elongated; the high ones appear quite rarely in some portions of the coil). Otherwise the new species greatly resembles this species both in the form of the callus and in size. The original description and picture are not at our disposal, but according to Reitlinger's remarks the afore-mentioned differences remain valid also in comparison with the holotype.

Occurrence: *Hemigordius přibyli* nov. spec. is the most frequent foraminifer in the Jaklovec and Poruba zones in the Upper Silesian foredeep. It begin to appear already in the Hrušov zone in the Enna marine-fauna bands (Namurian A). Its latest occurrence is known from the Gaebler band (Namurian A, less probably the lowermost Namurian B).

Apterrinella sp.

Pl. XLIII, fig. 11

A remainder of an S-shaped undivided tube was found in a claystone fragment. The object to which the tube was probably attached has not been preserved.

Treated with hydrachloric acid, the tube has dissolved. This suggests that the tube belongs to the genus *Apterrinella.* This genus is known so far only from the Pennsylvanian of America where it is rather abundant in the Cisco. In the Upper Silesian foredeep the remnant described was found in the Gaebler band in the Poruba zone (Namurian A, less probably the lowermost part of the Namurian B) in the Žofie mine, 7th gallery, 1st div. Hence, the fragment described is somewhat earlier than the representatives of the genus *Apterrinella* from the Cisco.

Apterrinella augustai nov. spec.

Holotype, here designated, pl. XLIII, fig. 12.

Paratypes: A number of specimens.

Derivatio nominis: In honour of the paleontologist Prof. Dr. J. Augusta, who deserves merit for the research of the Carboniferous.

Locus typicus: Orlová, mine Václav, 4th gallery, North-East cross-cut, 30 cm. above the seam underlying the Ivan seam.

Stratum typicum: The Jindřich band, the Poruba zone, Namurian A.

Diagnosis: Very slowly widening tubular test attached to gastropod shells, rarely to pelecypod valves. It is mostly straight or moderately

bent. It is true that the tube also produces loops, but that is not the rule either in earlier growth stages or in later ones. The building material consists of sorted fine grains with much cement. It must have been flexible originally. The surface is slightly rough. The central portion usually warps and sinks after the death of the animal.

Dimensions: The tube attains a width of 0.2 mm. at the proximal end of the test of adult specimens. The length of the tube is variable.

Remarks and relations: The wall of fossil specimens is usually more or less depressed especially in the axial portion. Therefore, the margins of the tube often project above the central, depressed portion of the wall or above the irregularily limited depressions, in this portion of the wall. The tubes are typically brown in colour; and only exceptionally discoloured. They are usually attached throughout their lengths to the external surfaces of shells, only rarely to the internal sides, from which they pass to the external surfaces already in the early growth stages. The edges of the attachment of the tube to the shell are most often straight, rarely and only in same places crenate. The earlier portions of the tube are usually so much disintegrated that the structure of the embryonal part of the test cannot be reliably determined. For a long time it had been impossible to determine the character of the cement due to the strong silicificaion of the fossils. Only in the Barbora band a specimen was found the building material of which has still preserved a slight content of lime. This implies that the cement of shells was originally calcareous.

Apterrinella augustai nov. spec. most resembles the species *Apterrinella grahamensis* (Harlton) but differs from it remarkably in the depressed central portion of the tube.

Occurrence: *Apterrinella augustai* nov. spec. is abundant only in layers with abundant gastropods. Its occurrence is independent of the abundance of pelecypods, to the valves of which it is attached only exceptionally. It is interesting that *Apterrinella augustai* nov. spec. has not been found in the Gaebler band (Namurian A, less probably the lowermost part of the Namurian B), which is rich in gastropods. Even the other fauna of Gaebler's band differs considerably from the faunas of the lower fossiliferous bands, which definitely belong to the Namurian A.

The lowermost occurrence of *Apterrinella augustai* nov. spec. has as yet been ascertained in the Barbora band (the uppermost part of the Jaklovec zone in the new more accurate delimitation). Further recoveries are from the Poruba zone. In this zone *Apterrinella augustai* nov. spec. was found in the Koksová marine-fauna band (very rarely) and in the Jindřich band (in great abundance), from which the holotype comes. All the afore-mentioned marine-fauna bands belong to the Namurian A.

Fam. *TROCHAMMINIDAE*

Genus *Tetrataxis* (Ehrenberg) Möller, 1879

The genus *Tetrataxis* evidently got its name from the typical phenomenon: from the arrangement of the chambers by fours in a whorl. There are, however, two deviations from this basic building scheme. One of them

is a reduction, the other, an increase in the number of chambers in the later whorls.

It has not been ascertained for the present whether the reduction in the number of chambers in the later whorls appears already in the earliest representatives of the genus *Tetrataxis*. Ehrenberg most probably did not observe such a reduction in the specimens of *T. conica* (Ehrenberg) Möller, 1879, (judging from the name of *Tetrataxis*). Ehrenberg's figure clearly shows four chambers in the last whorl. The first thorough description of *T. conica* is by V. Möller, 1879 (pp. 71-73, pl. 2, fig. 3a-g; pl. 7, fig. 1 and 2; text-fig. 30), who possessed the material of the typical beds, the Lower Carboniferous limestones from the Tula district, as well as the material of younger beds. Möller states (p. 72) that some representatives of *T. conica* have only three chambers in a whorl. From his report, however, is not evident whether that is a general phenomenon.

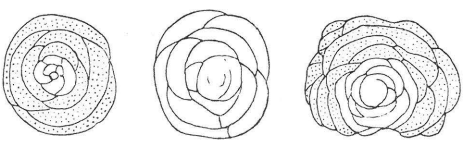

Fig. 2. Various modes of structure of tests in representatives of the genus *Tetrataxis*. Four-chambered whorls are left white. The whorls with a smaller or a greater number of chambers are dotted. 1—*Tetrataxis* sp. ind. (*T. "corona"*; Galloway and Ryniker, 1930, pl. 7, fig. 5a). 2—*Tetrataxis* sp. ind. (*T. "corona"*; Cushman and Waters, 1930, pl. 7, fig. 8). 3—*T. (Polytaxis) multiloculata* (Cushman and Ryniker, 1927, pl. 27, fig. 6a).

Hence, it is possible that Möller observed this phenomenon only in those specimens that he had obtained from the younger beds. Therefore, we must take into account the possibility of the existence of an evolutionary branch accomplishing the simplification of the test by the reduction of the number of chambers in later whorls. However, we do not possess reliable proof and so we must place even the forms with a reduced number of chambers in the later whorls into the genus *Tetrataxis*.

The other deviation from the basic building scheme consists in the increase in the number of chambers in the later whorls. Forms with such whorls, appearing in the Upper Carboniferous, are placed by J. A. Cushman and J. A. Waters, 1928, into the separate genus *Polytaxis*. The strong increase in the number of chambers in later coils is very conspicuous in a certain number of species (*T. laheei* Cushman et Waters, 1928, *T. multiloculata* Cushman et Waters, 1927, *T. maxima* Schellwien, 1898, *T. maxima depressa* Schellwien, 1898, and *T. vaccula* Roth et Skinner, 1930). In other species the increase in the number of chambers in later whorls is less conspicuous (*T. concava* Galloway et Ryniker, 1930). In some species the increase in the number of chambers in later coils is quite inconspicuous and inconstant. So e. g. the holotype of *T. scutella* Cushman et Waters, 1927, could be assigned to the genus *Polytaxis* with regard to the five chambers in the latest whorl. Similar forms from the Cisco are placed by Cushman and Waters, 1930, into the

same species. They, however, show a reduction in the number of chambers in later whorls.

Although a number of species and subspecies have already been described, the relations between the inner structure of the test and the number of chambers in later whorls have not as yet been elucidated. A number of species and subspecies are described either by thin sections or by the external aspect only so that it is impossible to detect the correlation between the external and the internal structure of the test. If only a thin section of a specimen is figured, the internal structure of the test is demonstrated but not the number of chambers in individual whorls. The ventral views of specimens demonstrate the relations between the internal and the external structure of the test to a certain extent. Even in the case when the sutures are not well visible, the number of chambers in the last whorl is usually easily determinable on the ventral side of the test by the number of lobelike processes of chambers (by chamberlets), extending to the centre. In fact each chamber produces only a single lobelike process. The presence or absence of a free central cavity is usually evident on the ventral sides of individual tests from the size of the ventral portions of the chambers and from the length of their lobelike processes (chamberlets). If the processes reach the centre or cover it, the free central cavity is not produced. If they do not reach the centre, the axial portion of the test is occupied by a free central cavity, communicating with the exterior.

A very remarkable free central cavity appears in the representatives of *T. gibba* Möller, 1879. According to Möller's description and depiction (p. 73, pl. 2, fig. 4c) the aperture is fourlobate (i. e. the chamberlets of the four latest chambers of the latest whorl extend into the proximity of the ventral-side centre and make the aperture fourlobate). Consequently, the latest coil is quite clearly formed by four chambers.

There is a variable number of chambers in whorls in the representatives of *T. conica,* according to the description and depictions by Möller (1879, pp. 71-73, pl. 2, fig. 3a-g; pl. 7, fig. 1). The last whorl of one of the specimens figured (pl. 2, fig. 3f) is composed of four and a half chambers. The lobelike processes of the chambers show that the specimen has a free central cavity. The last whorl of another specimen figured on the same plate (fig. 3g) consists of four chambers. Even this specimen has a free central cavity as indicated by the position of the lobelike processes of the chambers. The free central cavity is proved in the representatives of *T. conica* by the thin section on plate 7, fig. 1. Möller states that individuals with a reduced number of chambers (with three chambers in a whorl) also appear. Such individuals, however, are not depicted. It is not certain whether they belong to *T. conica* and whether they possess a free central cavity.

Forms with a strongly increased number of chambers in the later whorls, assigned to the genus *Polytaxis,* incline to a strong flattening of the test and their central cavity is usually very wide open. (See e. g. *T. maxima* Schellwien, 1898, pl. 24, figs. 5a, 9a, 10a.)

What is the case with forms with a reduced number of chambers in later whorls? One of these forms which J. J. Galloway and Ch. Ryniker (1930, pl. 3, fig. 5a-c) referred to *T. "corona"* has, according to

fig. 5c, a free open central cavity. *Tetrataxis němejci* n o v. s p e c., which shows a similar reduction in the number of chambers in the last whorl, has no open central cavity.

Numerous thin sections of the representatives of the genus *Tetrataxis* published show that in forms with well developed central cavities these cavities only rarely reach as far as the earliest chambers. This phenomenon, of course, could be due to the fact that the thin sections for the most part do not pass exactly through the axis of the test.

From the afore-mentioned observations follows: four-chambered whorls appear in the earlier growth stages. In the later ones they appear only sometimes. The number of chambers in the later whorls often decreases or increases. Some statements of various authors suggest that the number of chambers in later coils may be maintained or slightly reduced, or may slightly increase in different individuals of one and the same species (of the earliest ones?). The strong increase in the number of chambers is characteristic and conspicuous for well developed specimens of certain species. There is, however, no clear boundary between the group of those species and the remaining species of the genus *Tetrataxis*. The boundary between the species that maintain four-chambered whorls throughout the ontogenesis, and the species in which a reduction in the number of chambers occurs is even more indistinct.

The forms preserving four-chambered whorls throughout the ontogenesis have either broad or very narrow central cavities. Whether any such forms appear without any central cavity whatever has not yet been reliably proved. The forms with a reduced number of chambers sometimes have a well developed open central cavity, at other times they do not. Forms with a strongly increased number of chambers in the later whorls usually have a wide open central cavity.

If the processes of chambers (the chamberlets) extend on the ventral side over the centre of the base, the free central cavity disappears and instead of it a labyrinthic space divided by the walls of chamberlets and chambers arises. The spaces of chamberlets sometimes communicate with the intercameral spaces arising because the walls of chambers do not closely adhere to each other throughout their lengths. Such a type of the intercameral structure of the test is clearly shown in *T. millspaensis* C u s h m a n et W a t e r s, 1928, p. 50, pl. 7, figs. 5-6. *Tetrataxis němejci* n o v. s p e c. also belongs to this type. Both the species show a reduction in the number of chambers in the later whorls.

In forms with four-chambered whorls this type of internal structure has not yet been ascertained. The inner space of each chamber is connected with the space of the respective chamberlet. The space of the chamberlet opens on both sides of its base directly into the central cavity of the test. Some representatives of *T. conica,* however, closely approach the type with the labyrinthic internal structure of the test (see M ö l l e r, 1879, pl. 7, fig. 1).

In forms with a strongly increased number of chambers in the later whorls the labyrinthic type of the internal parts of the tests has not yet been ascertained, or it is limited only to the peripheral portion of the central cavity (see S c h e l l w i e n, 1898, pl. 24, fig. 5a).

The internal space of the chambers of the typical representatives of the genus *Tetrataxis* is free, not labyrinthic. The irregularly labyrinthic chambers occur in forms which were by S c h u b e r t, 1920, referred to the genus *Ruditaxis*. They considerably differ from the representatives of the genus *Tetrataxis*. The chambers of other forms isomorphic with the genus *Tetrataxis* are divided by secondary septa into chamberlets arranged in one or more rows. Those forms belong to the genus *Valvulinella* S c h u b e r t, 1907, a representative of which is "*Valvulina youngi*" B r a d y, 1876 (p. 86, pl. 4, figs. 4, 8, 9).

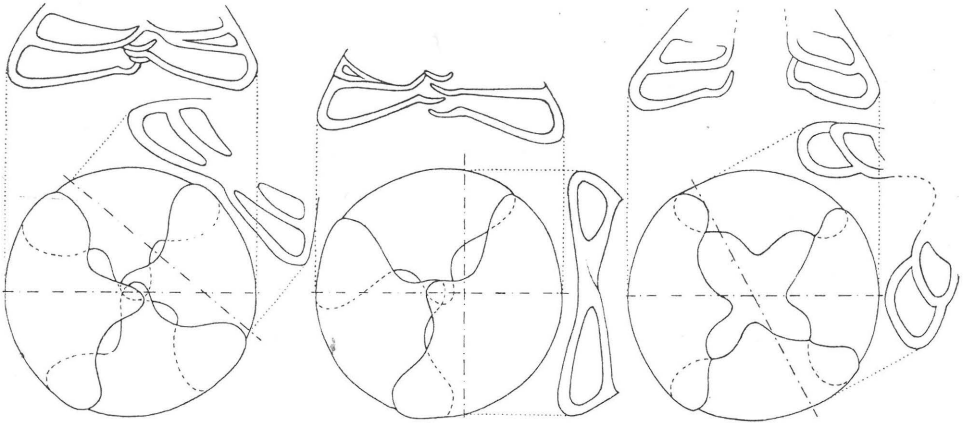

Fig. 3. Diagram showing a questionable value of thin sections across tests of the genus *Tetrataxis* for description and identification of species.

The afore-mentioned remarks show that for the time being the laws of evolution of the relations between the internal and the external structure of the test are not known. Very early species, such as *T. conica,* may very probably not only maintain but also decrease or increase the number of chambers in the latest whorls. They may have either a broad or a very narrowed free central cavity which is surrounded by the semilabyrinthic part of the test. It is possible that in later species the maintenance or reduction or increase in the number of chambers combines with the free, the labyrinthic or the semilabyrinthic cavity. Therefore, the division of the genus *Tetrataxis* in genera or subgenera on the basis of the number of chambers or of the internal structure is not desirable for the time being because it could rather obscure than elucidate the phylogeny of the tetrataxid forms.

For the present both the external and the internal structure of the test have been described only in the case of five (!) forms. The majority of forms are described either only by the external aspect (often without the ventral view of the test, on which alone is possible to ascertain reliably the number of chambers in the last whorl) or by thin sections without any reconstruction. The list of all forms follows:

T. angusta V i s s a r i o n o v a, 1948, p. 193, pl. 8, fig. 6, 7 (by the thin section).
T. concava G a l l o w a y et R y n i k e r, 1930, p. 18, pl. 3, fig. 6 a-c (by the dorsal, lateral and ventral views).

T. conica (Ehrenberg) Möller, 1879, pp. 71-73, pl. 2, fig. 3a-g; pl 7, figs. 1, 2; text fig. 30 (by the thin sections, by dorsal, lateral and ventral views).
T. conica gibba Möller, 1879, p. 73, pl. 2, fig. 4; pl. 7, fig. 3 (by the thin section, by the lateral and ventral views).
T. conica lata Spandel, 1901, p. 186, text fig. 6a, b (by the thin sections).
T. corona Cushman et Waters, 1928, p. 65, pl. 8, fig. 10a, b (by the dorsal and the lateral view).
T. corona pauperata Warthin, 1930, p. 26, pl. 1, fig. 20a, b (by the dorsal and the lateral view).
T. cumulosa Lee, 1937, p. 69, pl. 1, fig. 5 (by the thin section).
T. dentata Vissarionova, 1948, pp. 191-192, pl. 8, fig. 3 (by the thin section).
T. dentata magna Vissarionova, 1948, p. 192, pl. 8 (by the thin section).
T. eominima Rauzer-Černousová, 1948, pp. 12-13, pl. 3, fig. 10, 11 (by the thin section).
T. eominima elata Reitlinger, 1949, p. 164, fig. 13 (by the thin section).
T. exilis (Vissarionova), 1948, p. 194, pl. 8, fig. 12-16 (by the thin sections).
T. (Polytaxis) laheei Cushman et Waters, 1928, p. 54, pl. 7, fig. 7 (by the dorsal view).
T. linea Ozawa, 1925 (= *Turrispira* Reitlinger).
T. maxima Schellwien, 1898, p. 274, pl. 24, fig. 5-10 (by the thin sections, lateral and dorsal views).
T. maxima depressa Schellwien, 1898, p. 275, pl. 24, fig. 11 (by the dorsal and lateral view).
T. media Vissarionova, 1948, p. 190, pl. 8, fig. 1, 2, (by the thin section).
T. millspaensis Cushman et Waters, 1928, p. 50, pl. 7, fig. 5-6 (by the thin section, dorsal and lateral view).
T. minima Lee et Chen, 1930, p. 92, pl. 3, fig. 6 (by the thin section).
T. (Polytaxis) multiloculata Cushman et Waters sp., 1927, p. 153, pl. 27, fig 6 (by the dorsal and lateral view).
T. minima latispiralis Reitlinger, 1950, p. 71, pl. 15, fig. 2 (by the thin section).
T. minima mosquensis Reitlinger, 1950, p. 72, pl. 15, fig. 9 (by the thin section).
T. numerabilis Reitlinger, 1950, pp. 74-75, pl. 15, fig. 3-4 (by the thin section).
T. pagodaformis Lee, 1937, p. 68, pl. 1, fig. 6 (by the thin section).
T. palaeotrochus (Ehrenberg), 1854, p. 25, pl. 37, (10 A), fig. 1-4 (by the lateral and ventral? view).
T. palaeotrochus compressa (Brady), 1876, p. 85, pl. 4, fig. 5 (by the lateral and ventral view).
T. paraconica Reitlinger, 1950, p. 75, pl. 15, fig. 1 (by the thin section).
T. paraminima Vissarionova, 1948, pp. 192-193, pl. 8, fig. 5 (by the thin section).
T. parviconica Lee et Chen, 1930, p. 93, pl. 3, fig. 3, 5 (by the thin sections).
T. planispiralis Reitlinger, 1950, pp. 73-74, pl. 15, fig. 8 (by the thin section).
T. planolocula Lee et Chen, 1930, p. 94, pl. 3, fig. 7 (by the thin section).
T. schellwieni Ozawa, 1925, p. 9, pl. 2, fig. 2a (by the thin section).
T. scutella Cushman et Waters, 1928, p. 65, pl. 8, fig. 9 (by the dorsal and the lateral view).
T. turboides Pratje, 1923 (= *Turrispirillina*?).
T. vaccula Roth et Skinner, 1930, p. 337, pl. 29, fig. 5-7 (by the thin section and dorsal views).
T. decurrens (Brady), 1876, p. 87, pl. 3, figs. 17, 18 (by the lateral and dorsal views).

Tetrataxis němejci nov. spec.

Holotype, here designated, pl. XLIV, fig. 1abc.

Paratypes: A number of specimens and the specimens figured (pl. XLIV, figs. 2abc, 3; text fig. 4).

Derivatio nominis: In honour of the fytopaleontologist Prof. Dr. F. Němejc, who deserves merit for the research of Carboniferous.

Stratum typicum: Gaebler's band, zone Poruba, Namurian A (less probably the lowermost part of the Namurian B).

Locus typicus: Mine Žofie, 7th gallery, 1st div., the roof of a nameless twin-seam underlying the Prokop seam.

Diagnosis: Test conical, composed of 5-6 whorls. Apical angle about 90°. The earlier whorls always formed by four chambers, the later ones by three, the last (in adult specimens) by almost three chambers (the third incomplete). The ventral side moderately depressed, without a distinct aperture, with lobelike chamberlets (processes) of the crescentic chambers. Those processes extend beyond the centre of the ventral side. The spaces of the chamberlets form together with intercameral spaces a labyrinthic space inside the test.

Dimensions: The diameter of the base of the tests of the specimens found varies from 0.48 mm. to 0.67 mm. The diameter of the base of the test of the holotype is 0.64 mm.

Description: The test is conical with straight or (rarely) quite moderately concave sides (the slight concavity appears only close below

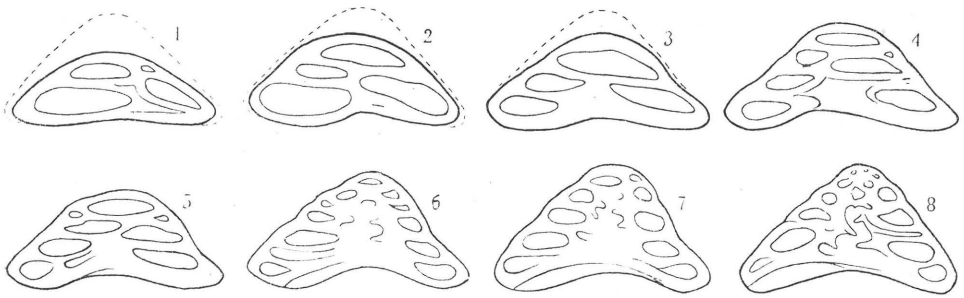

Fig. 4. Series of sections across a specimen of the *Tetrataxis němejci* n o v. s p e c. Sections are not accurately parallel.

the apex and between the penultimate and the last whorl). The later whorls are very moderately inflated, the spiral and intercameral sutures faintly depressed. The earlier whorls and sutures are usually not visible. The arrangement of the individual chambers is usually not quite distinct and can be examined only after submerging the specimen into melted paraffine. The earlier growth stages are always built up by four chambers. Towards the end of growth of the individual, however, the size of the chambers is remarkably increased and the individual whorls are formed only by three chambers, in quite adult specimens only by two chambers and a part of the third. The ventral side is moderately depressed. Towards the centre each chamber projects in a lobelike process (chamberlet), which terminates close behind the centre of the ventral side so that it slightly overlaps the centre. The later processes usually overlap the earlier ones in the following way: the youngest overlaps its nearest in age only very slightly and the greater the distance in age the more they overlap so that the process of the oldest chamber of the respective whorl is often covered to a great extent. The processes of the chambers of earlier whorls are usually entirely hidden under the processes of the chambers of the latest whorl. As the chamberlets are elongated and their axes cross, free spaces are left in the centre of the test between the chamberlets. These spaces extend in places even

between the individual chambers. This produces a labyrinthic space inside the test, connected with the individual chamberlets and chambers by considerable large slits. The wall of the test is calcareous, in the specimens studied, recrystalized. The surface is slightly rough.

Remarks and relations: *Tetrataxis němejci* nov. spec. belongs to the group of forms which show a reduction in the number of chambers in the later whorls. In this respect it diametrically differs from the forms which can be assigned to the subgenus *Polytaxis* on the basis of the increased number of chambers in the later whorls (*T. laheei* Cushman et Waters, 1928, *T. multiloculata* Cushman et Waters, 1927, *T. maxima* Schellwien, 1898, *T. maxima depressa* Schellwien, 1898 and *T. vaccula* Roth et Skinner, 1930). *T. němejci* nov. spec. differs from the holotype *T. scutella* Cushman et Waters, 1928, by the reduction in the number of chambers (which, however, appears in forms from the Cisco, assigned also to *T. scutella* by Cushman et Waters, 1930). *T. němejci* nov. spec. differs from all species assigned by different authors to *T. scutella* Cushman et Waters in the straight conical test. It differs from *T. concava* Galloway et Ryniker in the reduction in the number of chambers and in its higher and regularly conical test.

Tetrataxis němejci nov. spec. ranks by its tendency to the reduction in the number of chambers in the later whorls with the group of the species *T. corona* Cushman et Waters, 1928, *T. corona pauperata* Warthin, 1930, and *T. millspaensis* Cushman et Waters, 1928. It differs from *T. corona* distinctly by the regularly conical, disproportionately higher test. It differs distinctly from *T. corona pauperata* (the holotype of which is figured only in the ventral and the dorsal view) in its ventral side. The chambers on the ventral side of *T. němejci* nov. spec. are usually more regularly arranged and each of them extends quite regularly into a chamberlet reaching at least as far as the centre. This does not occur in *T. corona pauperata.* The new species differs distinctly from *T. millspaensis* by the lower test. Both the species, however, have a labyrinthic interior. *T. němejci* nov. spec. differs from *T. conica* (Ehrenber) Möller, 1898, and *T. gibba* Möller, 1898, in the fact that the processes of the chambers (the chamberlets) extend on the ventral side at least to the centre, while in *T. conica* and *T. gibba* they do not reach the centre. The new species differs from *T. decurrens* (Brady), 1876, by its disproportionately higher test.

T. palaeotrochus (Ehrenberg) is considered by Möller, 1879, to be identical with *T. conica. T. palaeotrochus compressa* (Brady), 1876, is considered by Möller to be deformed specimens of *T. conica,* which is doubtless right.

The remaining forms of the genus *Tetrataxis* were described only by thin sections. Before we try to compare them with the new species, let us first recall the value of the features used for the identification of species. Conspicuously different pictures are given by the sections across one and the same specimen if the sections deviate more or less from the planes determined by the axis of the test (i. e. by the apex of the test and the centre of the ventral side) or if they run parallel to that axis at a greater or smaller distance from it. The height of the section, the apical angle, the rounding

of the apex, the number of whorls, and the relative size, shape and the number of cameral spaces as well as the character of the intercameral space change with the rate of inclination of the section and/or with its distance from the vertical axis of the test. However, even the sections passing through the axis of the test can give very different pictures in the case of one and the same specimen, especially as to the number of chambers. Less variable pictures are given by the sections of the forms which maintain strictly four chambers in each whorl. Strongly variable pictures are given by the sections across the forms which possess some whorls formed by almost five chambers.

The afore-mentioned remarks show that thin sections most often allow only a comparison of the shapes of the test bases as well as a comparison of more conspicuous differences in the heights and internal structures of the tests.

Tetrataxis němejci n o v. s p e c. differs from *T. media* V i s s a r i o n o v a, 1948, by the less depressed base of the test and by its more regularly conical test. *T. dentata* V i s s a r i o n o v a, 1948, differs distinctly from the new species in the stair-like profile of the sides of the test. *T. dentata magna* V i s s a r i o n o v a, 1948, in which the stair-like profile is not so remarkable, differs from the new species in the convex ventral side of the test. *T. němejci* n o v. s p e c. greatly resembles *T. paraminima* V i s s a r i o n o v a, 1948, but differs from it in the more regularly depressed base of the test, in the greater number of whorls and therefore also in the more complex labyrinth inside the test. The new species has a disproportionately lower test than *T. angusta* V i s s a r i o n o v a, 1948. The new species differs in the absence of a free cavity in the axial portion of the test from *T. exilis* (V i s s a r i o n o v a), 1948. The new species is very similar to *T. eominima* R a u z e r - Č e r n o u s o v a, 1948, but differs from it by the more complex labyrinthic interior of the test. From *T. paraconica* R e i t l i n g e r, 1950, the new species differs distinctly by its lower test. By the same feature it also differs from other forms described by R e i t l i n g e r in 1950: it differs from *T. numerabilis, T. angusta serpukhovensis* and *T. minima mosquensis.* By the same feature it also differs from *T. pagodaformis* L e e, 1937, and *T. schellwieni* O z a w a, 1925 (which has unlike the new species a flat base of the test). The new species is very similar to *T. minima latispiralis* R e i t l i n g e r, 1950, but differs from it by disproportionately thicker walls of the chambers. *T. planispiralis* R e i t l i n g e r, 1950, differs distinctly from the new species by the flat test. *T. němejci* n o v. s p e c. differs from *T. eominima elata* R e i t l i n g e r, 1949, by its lower test and the complex labyrinthic interior. *T. conica lata* S p a n d e l, 1901, differs from the new species by the spacious central cavity. The new species differs from *T. minima* L e e et C h e n, 1920, by its higher test and the complex labyrinthic interior. In the labyrinthic interior of the test and in size the new species considerably resembles *T. cumulosa* L e e, 1937, but differs from it in the depressed base of the test. In *T. parviconica* L e e et C h e n, 1930, and *T. planolocula* L e e et C h e n, 1930, the central depression of the ventral side often reaches as far as half the height of the test and in this respect both the species differ remarkably from the new species with the moderately depressed base.

Occurrence: *Tetrataxis němejci* nov. spec. has been found so far only in the Žofie mine in a single sample from the Gaebler band in the Poruba zone (Namurian A, less probably the lowermost part of the Namurian B). Together with this species many remains of crinoids, trilobites, tentaculites, gastropods, ostracods, etc. have been found. Of foraminifers it is accompanied by *Hemigordius přibyli* nov. spec. and the other forms here described except for the species *Apterrinella augustai* nov. spec. and the representatives of families *Astrorhizidae* and *Hyperamminidae.*

Fam. *PLACOPSILINIDAE*

Placopsilina sp.

Only three specimens have been found of a species which can be temporarily assigned to the genus *Placopsilina.* One of the three specimens has been preserved as the type specimen (pl. XLIV, f. 4), another two have been destroyed by etching and cutting in the course of the research. The wall is calcareous but the material is in such a state as not to allow, even after cutting, a reliable determination whether the wall has been produced by the secretion of the organism, or cemented from calcareous grains by calcareous cement as is usually the case in many placopsilinids. The individual larger and smaller chambers are usually so closely spaced that their outline is polygonal. Any spiral initial stage has not been positively ascertained. Nor has any linear arrangement of the chambers at least in the later stages been observed (as it is e. g. in the case of the Pennsylvanian species *P. ciscoensis* Cushman et Waters, 1930, which of all placopsilinids most resembles the species found). The species found resembles the Silurian species *P. prisca* Terquem, 1881, in the arrangement of chambers, but differs from it by the remarkably less elongated chambers. It differs from the Permo-Carboniferous species *P. tenuitesta* Chapman et Howchin, 1905, in its arrangement of chambers in one layer. According to all features, the specimens described represent a new species but the material is not sufficient for its establishment. The representatives of *Placopsilina* have so far been found only in the Gaebler band in the Poruba zone (Namurian A, less probably the lowermost part of the Namurian B) in the Žofie mine, 7th gallery, 1st division.

Fam. *LAGENIDAE*

Of the representatives of this family only one fragment of a single specimen (pl. XLIV, fig. 5) has been found which does not permit even the generic determination. The surface sculpture of the test is reminiscent of the structure of the tests in the genus *Kyphopyxa.* Unfortunately, the earliest part is not preserved. This representative no doubt belongs to the subfamily *Nodosariinae,* however, it need not be a member of any known genus of this subfamily. The fragment was found in the Gaebler band in Poruba zone (Namurian A, less probably the lowermost part of the Namurian B) in the Žofie mine, 7th gallery, 1st div.

CONCLUSION

A new genus *Čepekia* n o v. g e n. (genoholotype *Čepekia čepeki* n o v. s p e c.) from the family *Endothyridae* has been established. Four new species have been described: *Čepekia čepeki* n o v. s p e c. .from the family *Endothyridae, Hemigordius přibyli* n o v. s p e c, and *Apterrinella augustai* n o v. s p e c., both from the family *Ophthalmidiidae,* and *Tetrataxis němejci* n o v. s p e c. from the family *Trochaminidae.* With seven form nomenclatura aperta has been used (? *Rhabdammina* s p., *Hyperammina* s p., *Agathammina* c f. *pusilla* G e i n i t z s p., *Ecosigmoilina* c f. *explicata* G a m e l i n a, *Apterrinella* s p., *Placopsilina* s p., a f f. *Kyphopyxa* s p e c. i n d.).

Apterrinella augustai n o v. s p e c. seems to be stratigraphically valuable for the beds definitely belonging to the Namurian A. For the Gaebler band, which considerably differs in fauna from the remaining fossiliferous bands and may possibly belong to the lowermost Namurian B, the species *Čepekia čepeki* n o v. s p e c. and *Tetrataxis němejci* n o v. s p e c. as well as the representatives of lagenids which have not been found in any other fossiliferous band seem to be stratigraphically valuable. The representatives of the families *Astrorhizidae* and *Hyperamminidae* have been found so far only in the Enna bands in the Ostrava-Karviná coal district. Those are the lowermost fossiliferous bands in which foraminifers were found in the course of the microfaunistic prospection in the mines.

Prague, March 15, 1957

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EXPLANATION OF THE PLATES

Plate XLII

Fig. 1 — *Hyperammina* s p. Locality: Mine Zárubek, 10th gallery, side cross-cut No. 4, The Enna marine-fauna band.
Fig. 2ab — *Čepekia čepeki* n o v. g e n. n o v. s p e c., holotype. Locality: Mine Žofie, 7th gallery, 1st div., 20 m. below seam Prokop. Gaebler's band.
Figs. 3ab, 4, 5ab, 6, 7 — *Čepekia čepeki* n o v. g e n. n o v. s p e c., paratypes. Locality: Mine Žofie, 7th gallery, 1st div., 20 m. below seam Prokop. Gaebler's band.
Fig. 8 — *Čepekia čepeki* n o v. g e n. n o v. s p e c., median section. Locality: Mine Žofie, 7th gallery, 1st div., 20 m. below seam Prokop. Gaebler's band.

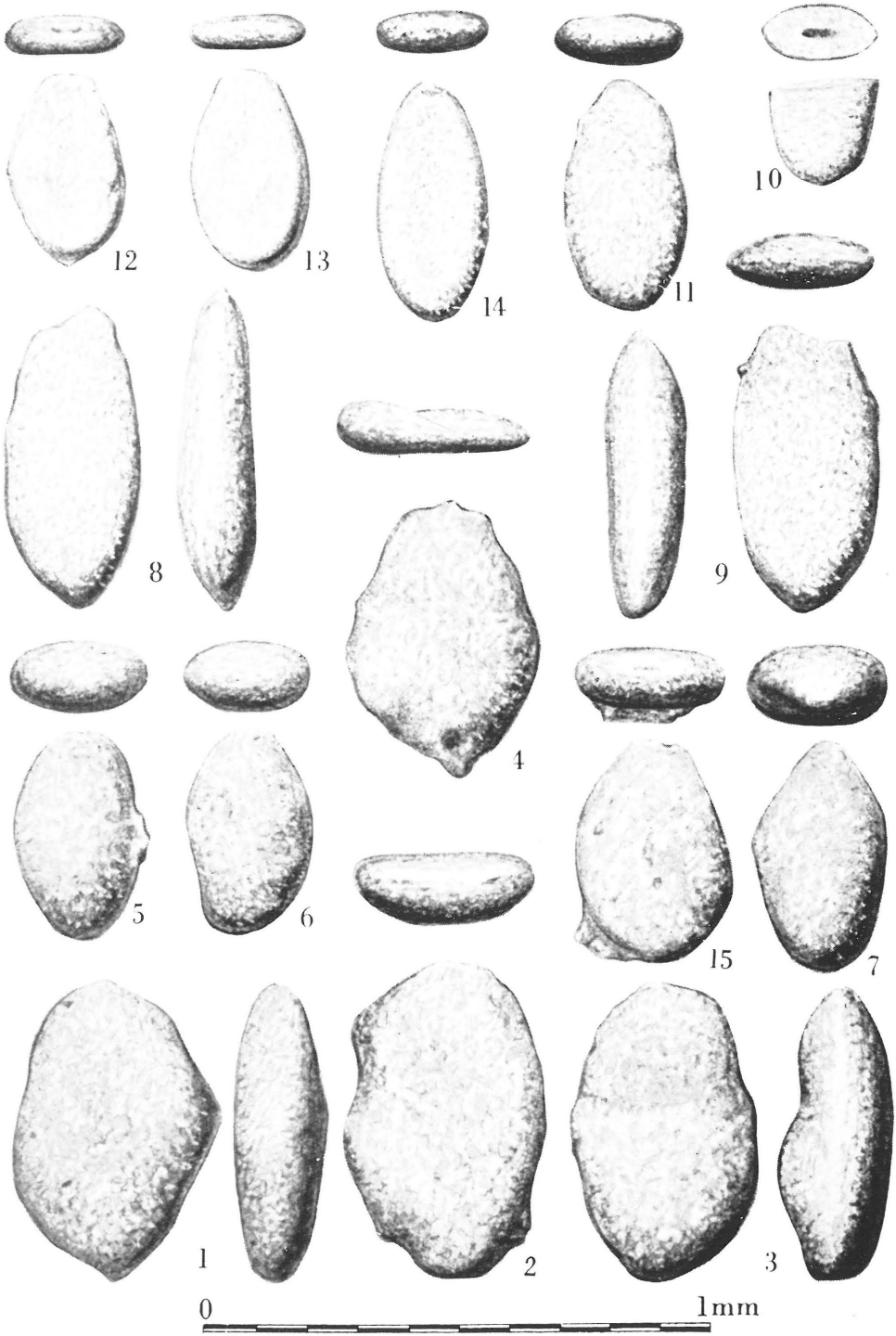
Fig. 9 — *Čepekia čepeki* n o v. g e n. n o v. s p e c., a series of radial sections. Locality: Mine Žofie, 7th gallery, 1st div., 20 m. below seam Prokop. Gaebler's band.
Fig. 10abc — *Hemigordius přibyli* n o v. s p e c., holotype. Locality: Mine Žofie, cross-cut 720, base of Gaebler's band.

Plate XLIII

Figs. 1abc, 2ab, 2c — *Hemigordius přibyli* n o v. s p e c., paratypes. (1abc—specimen with corroded surface; 2c—sections across the specimen on fig. 2ab.) Locality: Mine Žofie, cross-cut 503, 18-20 m. below seam Prokop. Gaebler's band.
Figs. 3ab, 4ab — *Hemigordius přibyli* n o v. s p e c., paratypes. Locality: Mine Žofie, cross-cut 720, the base of Gaebler's band.
Figs. 5, 6 — *Hemigordius přibyli* n o v. s p e c. Pyritic casts of cavities. Locality: Mine Žofie, cross-cut 720, 15 cm. above the base of Gaebler's band.
Figs. 7, 8 — *Hemigordius přibyli* n o v. s p e c. Median sections (thickness of the wall 9 μ with a test diameter of 0.3 mm. Locality: Mine Žofie, cross-cut 720, 15 cm. above the base of Gaebler's band.
Figs. 9, 9b — *Hemigordius přibyli* n o v. s p e c. (9b—pyritic infilling of cavity after dissolving the test of the specimen on fig. 9). Locality: Mine Žofie, cross-cut 720, 15 cm. above the base of Gaebler's band.
Fig. 10 — *Hemigordius přibyli* n o v. s p e c. Gross section. Locality: Mine Žofie, 7th gallery, 1st div., Gaebler's band, 20 m. below seam Prokop.
Fig. 11 — *Apterrinella* s p. Locality: Mine Žofie, 7th gallery, 1st div., Gaebler's band, 20 m. below seam Prokop.
Fig. 12 — *Apterrinella augustai* n o v. s p e c., holotype. Locality: Mine Václav, N.E. cross-cut, about 30 cm. above the nameless thin seam underlying seam Ivan.

Plate XLIV

Fig. 1abc — *Tetrataxis němejci* n o v. s p e c., holotype. Locality: Mine Žofie, 7th gallery, 1st div., 20 m. below seam Prokop. Gaebler's band.
Figs. 2abc, 3 — *Tetrataxis němejci* n o v. s p e c., paratypes (3—specimen with top broken away). Locality: Mine Žofie, 7th gallery, 1st div., 20 m. below seam Prokop. Gaebler's band.
Fig. 4 — *Placopsilina* s p. Locality: Mine Žofie, 7th gallery, 1st div., 20 m. below seam Prokop. Gaebler's band.
Fig. 5 — a f f. *Kyphopyxa* s p e c. i n d. Locality: Mine Žofie, 7th gallery, 1st div., 20 m. below seam Prokop. Gaebler's band.
Fig. 6ab — *Agathammina* c f. *pusilla* (G e i n i t z). Highly magnified. Locality: Mine Václav, 6th gallery, cross-cut 3, Ø 320 m. The Barbora band.
Figs. 7, 8 — *Eosigmoilina* c f. *explicata* G a m e l i n a (corroded specimens filled up with pyrite). Highly magnified. Locality: Mine Žofie, 7th gallery, 1st div., main cross-cut 700. Gaebler's band.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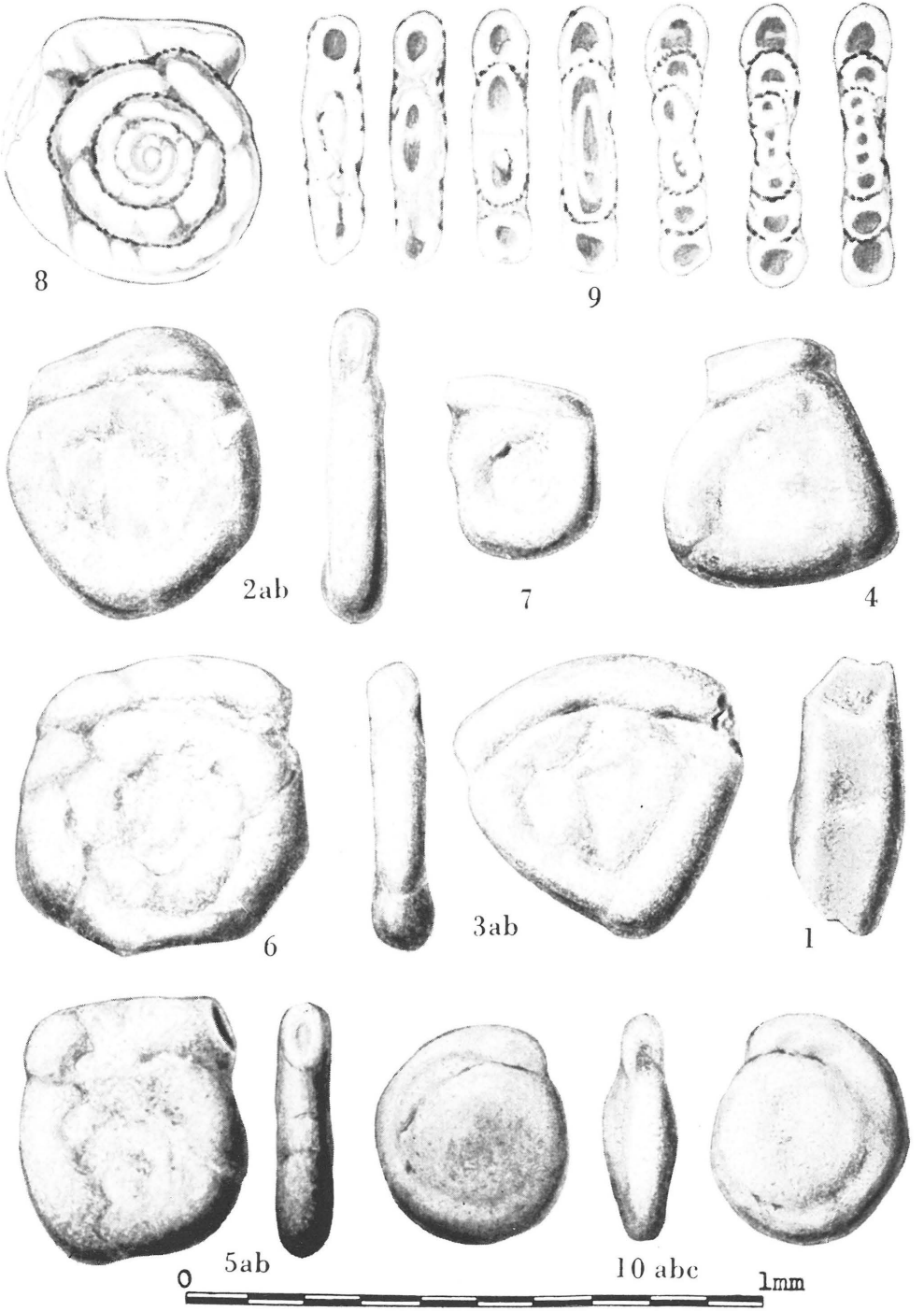
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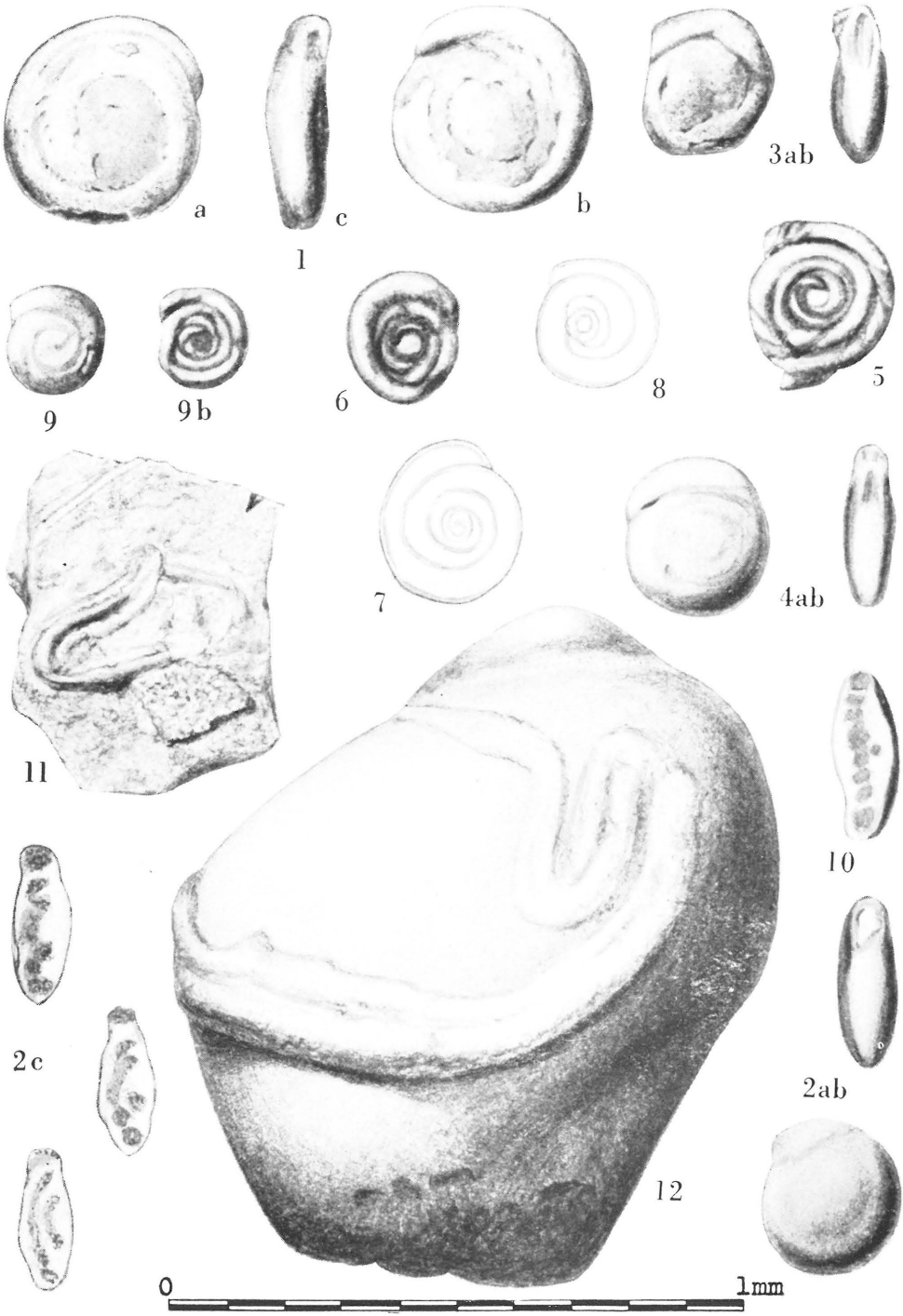
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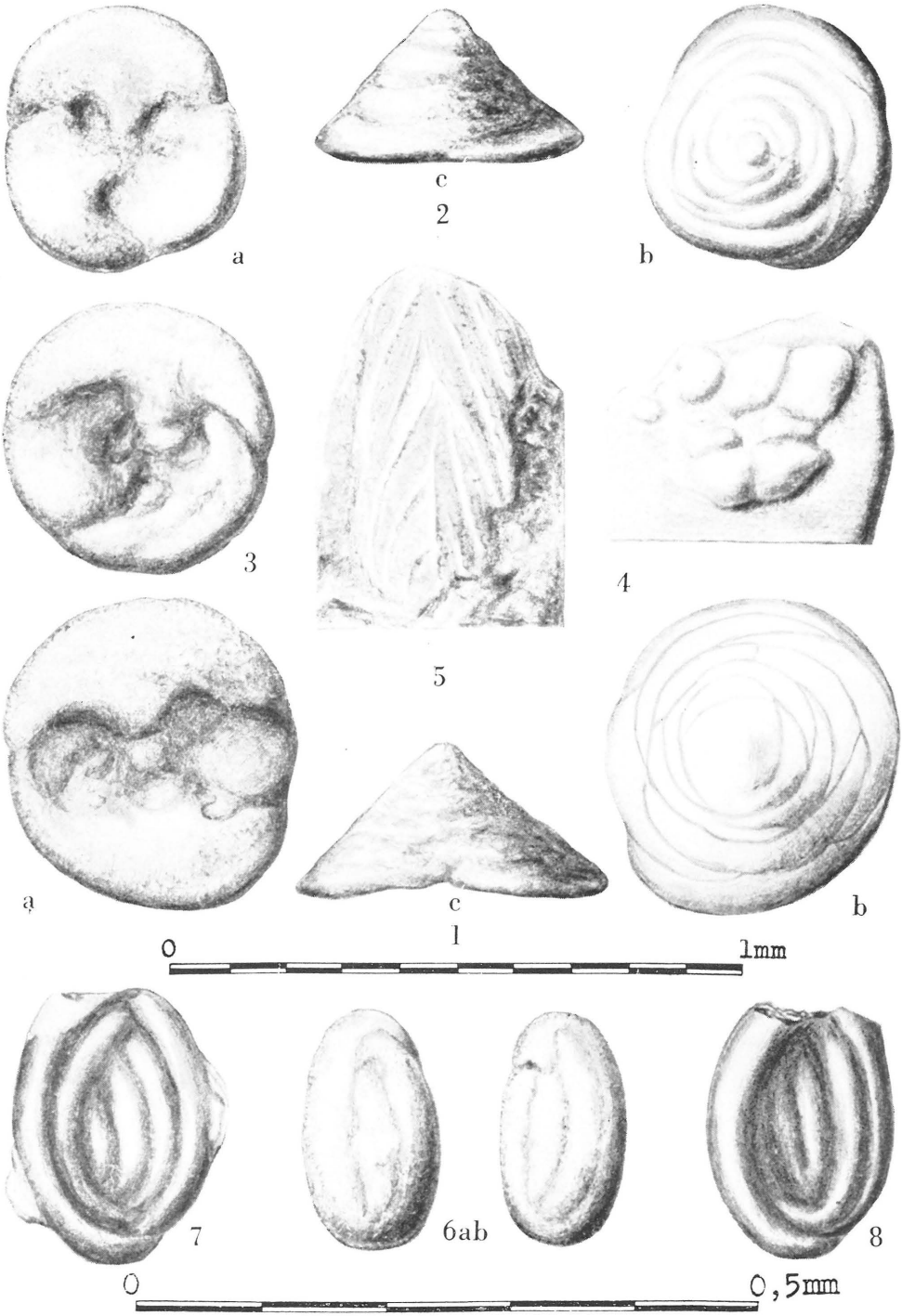
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