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Geology of the Palaeozoic rocks in the vicinity of the Mokrá Cement Factory quarries (Moravian Karst)

Geologie paleozoika v okolí lomů mokerské cementárny (Moravský kras)

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Abstract: Biostratigraphical studies combined with evaluation of borehole material and regional structural synthesis have enabled the geological history of the Mokrá area to be elucidated in detail. The area is divided into structural blocks each of which has had a profound influence on sedimentation and tectonics from early Famennian times to Viséan times; prior to Famennian times, during the Devonian, the whole area behaved, geologically, as an entity. Vertical tectonic movements controlled the facies development and thickness of the succession on a basement formed by the Brno Pluton. Hot, mineralized solutions rose along faults active during the sedimentary depositional process.

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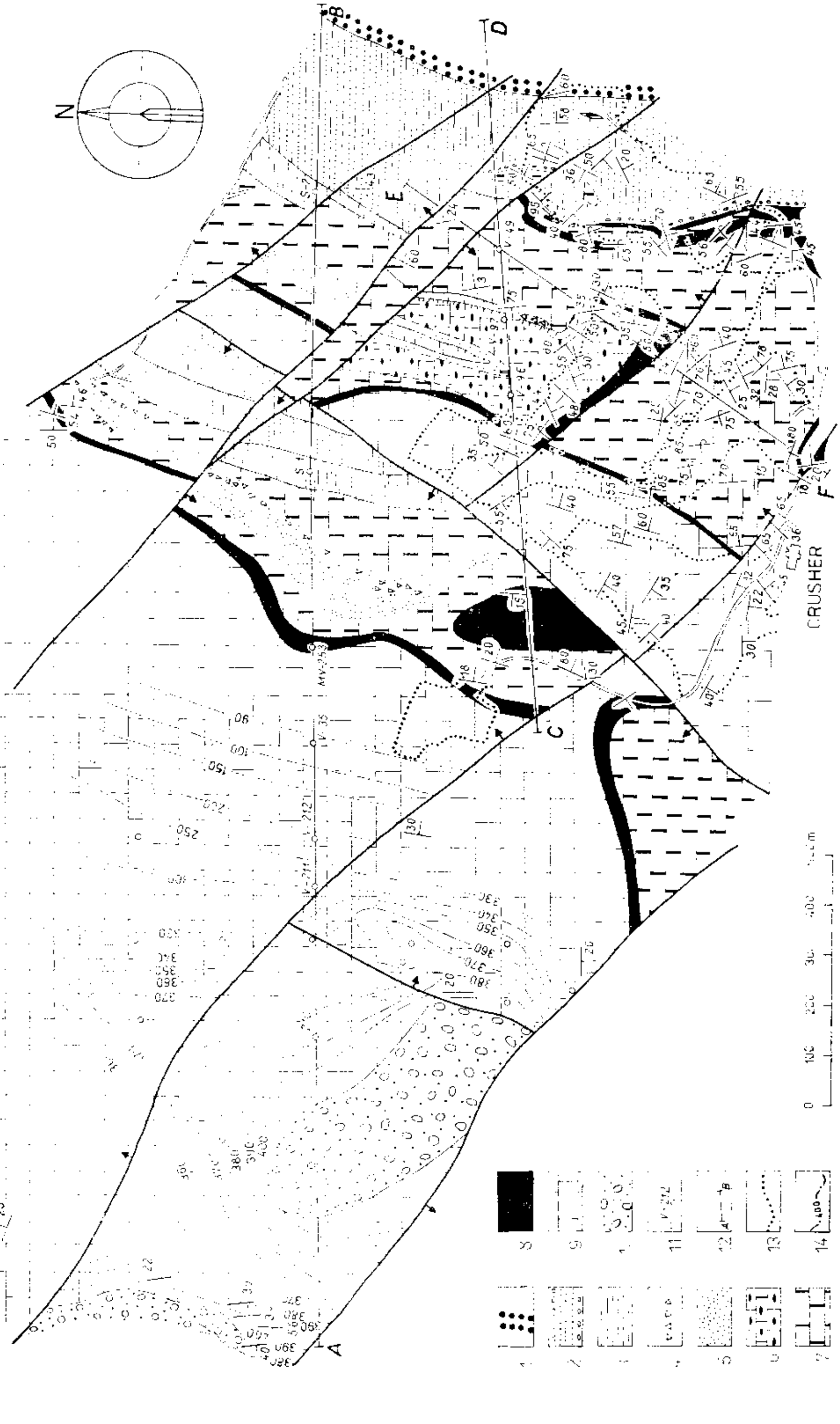
Introduction

The complex geologic history and structure of the surroundings of the Mokrá Cement Factory were studied in 1977—181 as assistance to the quarrying industry. In addition to detailed investigations of the quarry faces and geological mapping of the district, boreholes of the former Nerudný průzkum Brno and Geologický průzkum, n. e., Ostrava, závod Brno, were examined.

Previous work was concerned only with some of the problems (Conil et al. 1971, Dvořák et al. 1976). The complexity of the geologic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development is also evidenced by the geological setting of the southwestern surrounding areas (D v o ř á k 1967). Much biostratigraphical work was necessary to deduce the paleogeography and tectonics (O. Friáková — conodonts; J. Hladil — corals; J. Kalvoda — foraminifers). Sedimentology was studied by Z. Kukal, tectonics by J. Dvořák, who is also the compiler of the synthesis of all the observations (incl. plates). The geological evaluation of boreholes S-1 and S-2 was published separately (D v o ř á k et al. 1985).

Stratigraphy

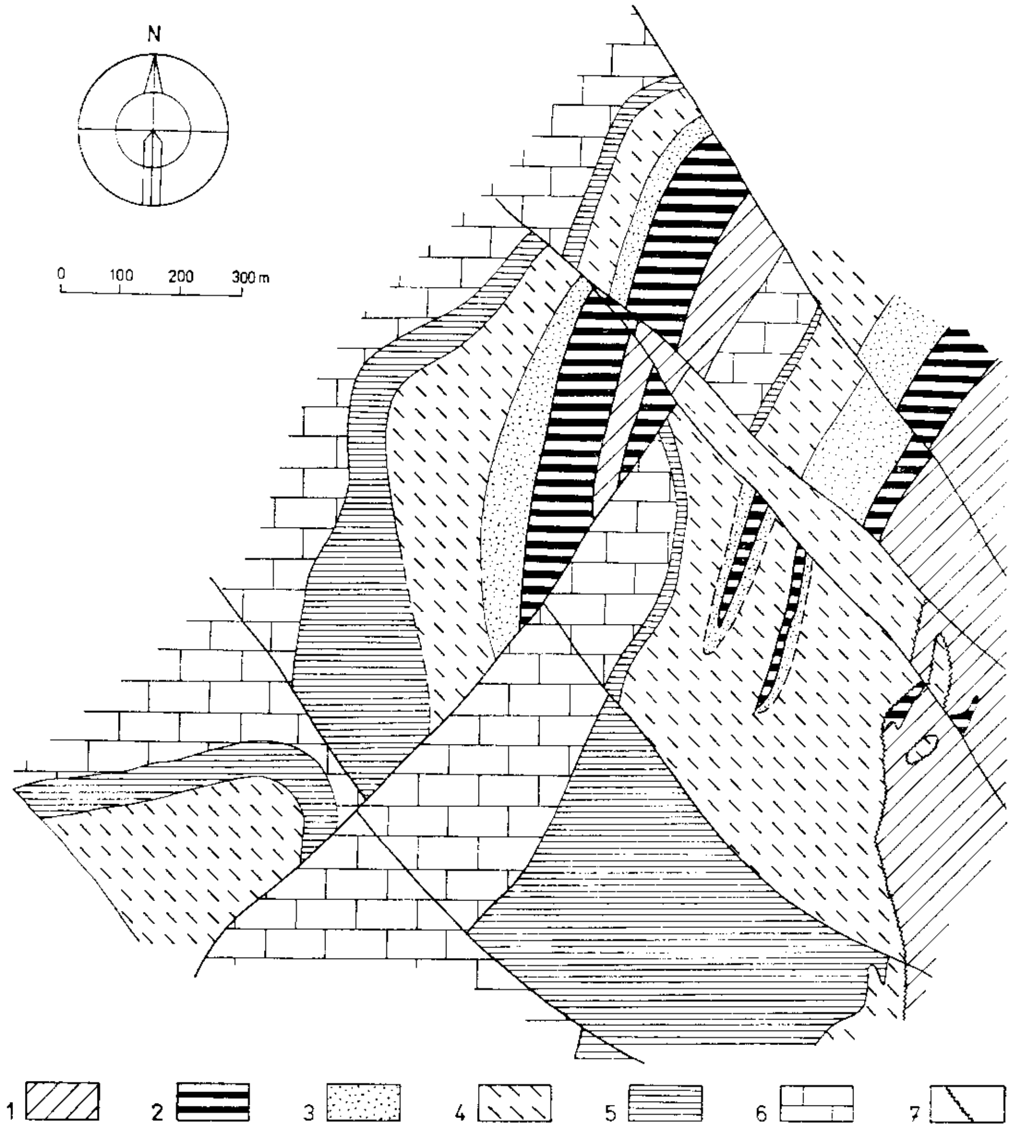
The investigated area has been divided on the basis of previous studies into six blocks (A—F, see Fig. 1 and 3 and Tab. 1). Because the development of individual blocks shows no marked differences up to the time of deposition of the Křtiny Limestone, the respective geologic history is presented together.

Basal Clastic Formation

The floor rock of the limestone complex consists of pale purple (locally greenish) fine- to coarse-grained arkosic sandstones or subgreywackes; they enclose lensing-out intercalations of fine (mainly quartz) conglomerates with diffuse outlines. They are exposed west of Mokrá ranger's house in the centre of a flat anticline. They were also detected in numerous boreholes, incl. borehole V-35 at a depth of 335.2—347.0 m. Their total thickness is not known but may be estimated at several hundred metres.

The pale purple clastic sediments are overlain by both the Lažánky and Vilémovice Limestones. This is explained by the sea transgression progressing from east to west, or southwest. The age of the clastic sediments is estimated at Lower to Middle Devonian.

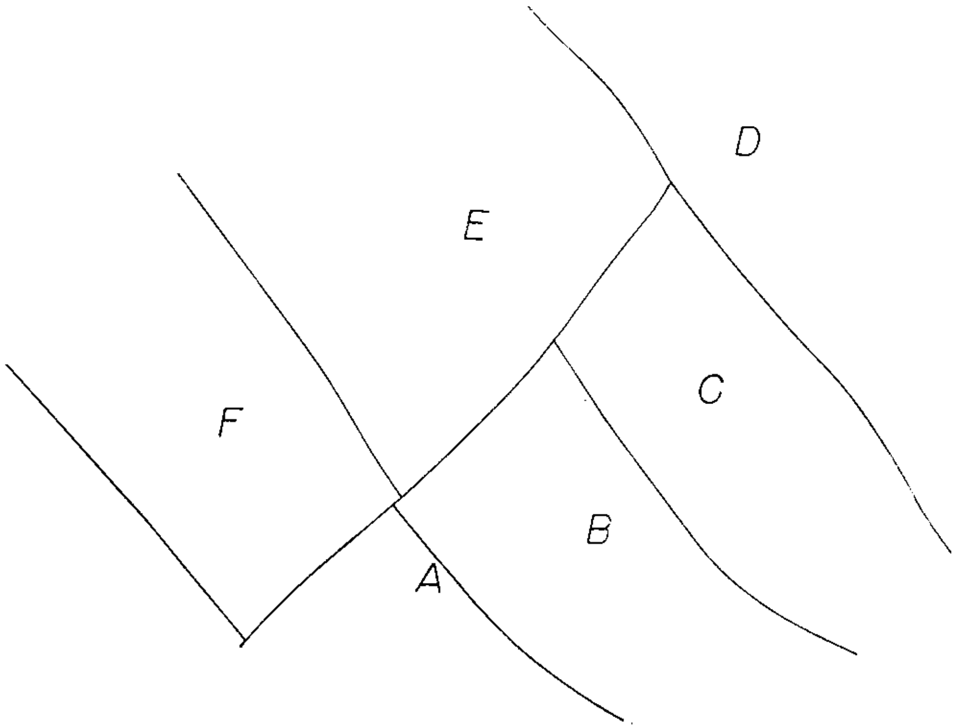
1. Uncovered geological map of the northern surroundings of Mokrá
1 — Račice Conglomerates (Upper Viséan); *2* — Rozstání Formation (lowermost Upper Viséan); *3* — Březina Shales (Lower and Middle Viséan); *4* — limestone breccia (Tournaisian, Viséan); *5* — sandy limestone to sandstone (Upper Tournaisian—Lower Viséan); *6* — black cherty limestone (Middle Tournaisian); *7* — dark grey organodetrital limestone (Middle Famennian—Middle Viséan); (*4—7* — Hády—Říčka Limestones); *8* — Křtiny Limestone (Famennian—Lowermost Viséan); *9* — Vilémovice Limestones (Frasnian—Lower Famennian); *10* — terrestrial clastic formation (Lower to Middle Devonian); *11* — boreholes; *12* — cross sections (fig. 4); *13* — contours of the quarry walls; *14* — isohyps of the boundary between basal clastic sediments and overlying reefal limestones (Lažánky and Vilémovice Limestones) in m above sea level



2. Map of the resolvable biostratigraphic units
1 — Upper Viséan; *2* — Middle Viséan; *3* — Lower Viséan; *4* — Tournaisian; *5* — Famennian; *6* — Frasnian; *7* — interruption of sedimentation

Lažánky Limestone

The Lažánky Limestone has only been recognized in the key borehole V-35, with a thickness of 180 m and overlying the basal clastic sediments (Fig. 14). It represents the oldest marine sediment in the area of the



3. Schematic plan of the resolvable blocks

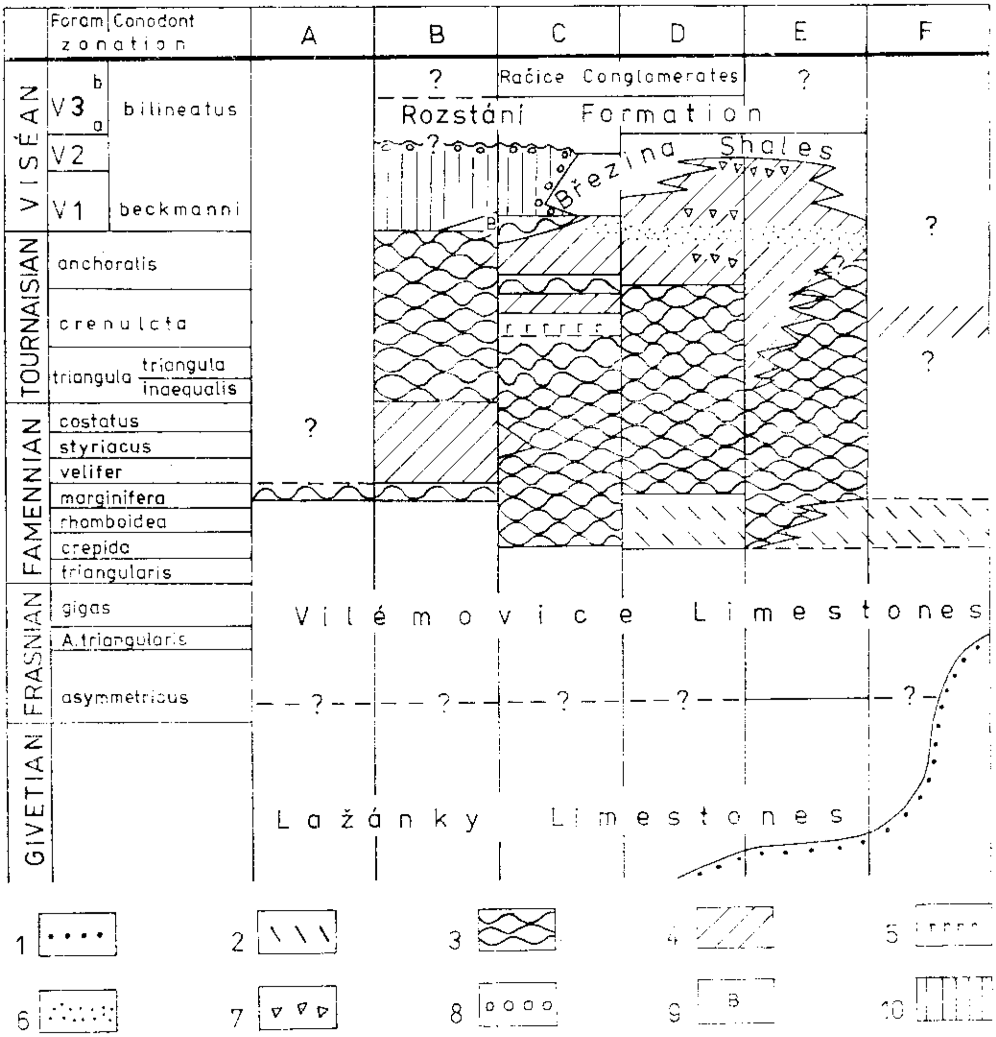
Mokrá Cement Factory. Only part of the district was flooded by the marine transgression towards the northwest. The Lažánky Limestone is dark grey, thickly-bedded, very fine-grained and locally contains a rich stromatoporoid fauna; less commonly it contains a coral fauna. Laminae and thin argillaceous intercalations with increased content of organic matter are found, especially close to the base. These zones are also relatively enriched with magnesium. The prevalence of ramose forms of stromatoporoids in combination with algae and primitive foraminifers suggests a shallow, sheltered marine environment, separated from the more intensely aerated sea (semilagunal facies of "banks" type).

As indicated by the presence of Amphipora ramosa in the lowermost part of the Lažánky Limestone, a restricted marine transgression took place as early as in the Lower Givetian. The subsidence of the bottom of the basin in relation to the wider surroundings of the Moravian Karst was relatively slow (the thickness of the Lower Givetian is about 60 m). This tendency did not change even during the Upper Givetian (thickness about 47 m). More vigorous subsidence took place only at the Givetian/Frasnian transition (thickness about 60 m). This is evidenced by the simultaneous

Table 1

Stratigraphic table of the resolvable blocks A—F (see Fig. 3).

1 — terrestrial basal clastic formation; *2* — dark grey laminated and locally organodetrital limestones; *3* — nodular limestones; *4* — dark grey organodetrital limestones; *5* — black cherty limestones; *6* — sandy limestones to sandstones; *7* — limestone breccias; *8* — limestone conglomerates; *9* — Březina Shales; *10* — stratigraphic gap



appearance of species of *Amphipora pinquis* together with *Amphipora laxeperforata*. The total thickness of the Lažánky Limestone in borehole V-35 is 180 m.

Vilémovice Limestone

The Vilémovice Limestone is of light-grey colour, very fine-grained, very thickly bedded to massive. Thin bedded to laminated layers are only occasionally observed in the uppermost part of the sequence.

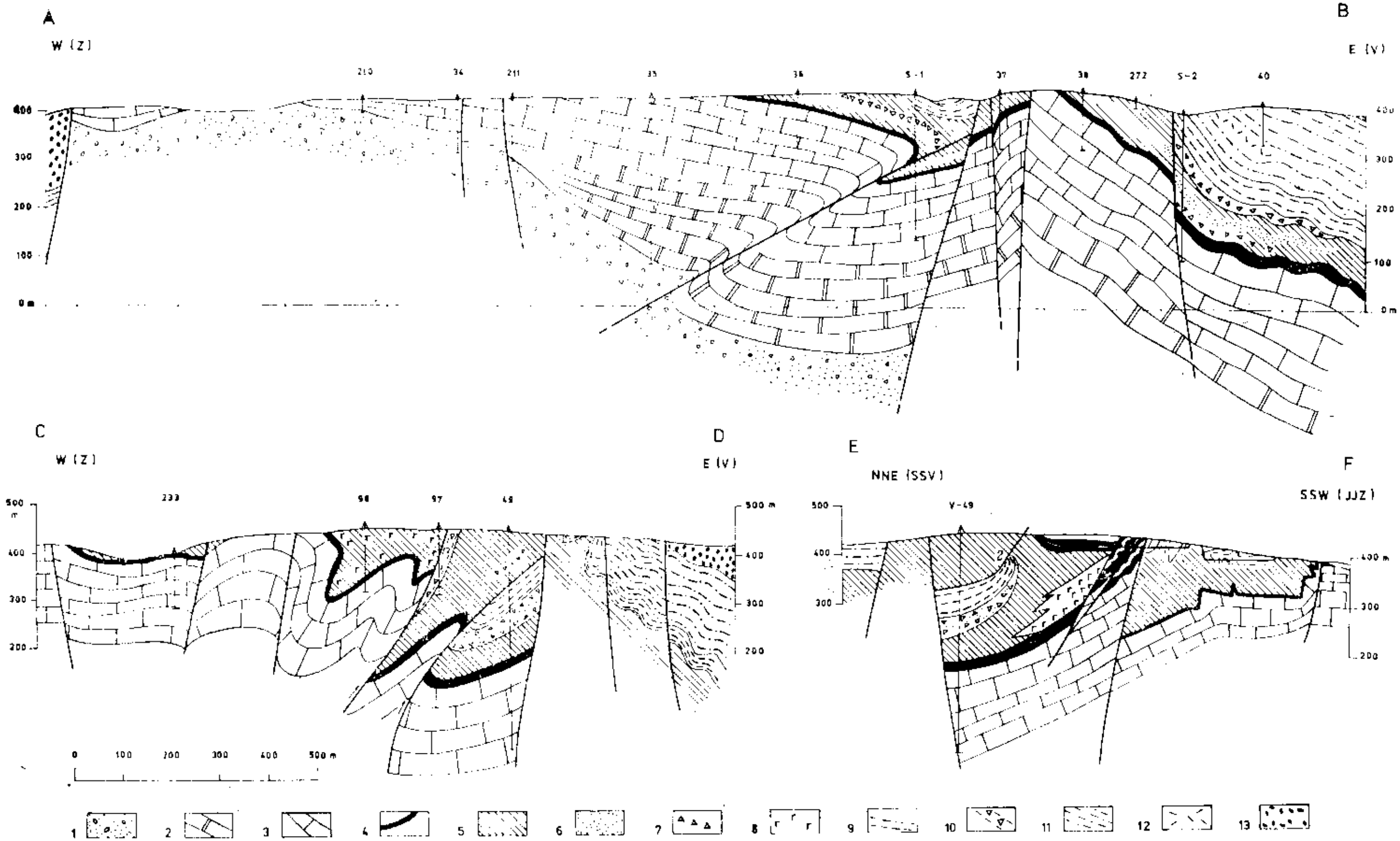
Chemically the Limestone is very pure; only very rarely thin interbeds (5 cm) of light-green claystones occur. Occasionally organodetrital layers may be observed containing fragments of stromatoporoids and corals. These fragments are lined with light-grey algal coatings which is suggestive of deposition in a very shallow aqueous environment well supplied with oxygen. Relatively more abundant are the white-grey, locally pinkish coloured, thinly laminated stromatolites of algal origin. Complex stromatactis (filled with granular, zonal calcite — K u k a l 1971) are fairly common in this Limestone. In the southernmost part of the area micritic varieties appear that contain stromatactis of the bird's-eye type; they are intercalated with organodetrital limestone. This evidences a periodic deposition in semi-closed lagoons between minor reefs. The semilagoonal to lagoonal environment is characterized by algae and primitive foraminifers. Among the stromatoporoids the ramose forms of the genera Amphipora (especially *Amphipora moravica, Amphipora rudis* and *Amphipora laxeperforata)* and Stachycodes prevail. The spheroidal forms of stromatoporoids are rare and occur only in the southernmost part of the quarry *(Actinostroma, Atelodictyon, Tienodictyon, Stromatoporella)* and in the western quarry.

Interestingly, very small authigenic quartz crystals may be found in the algal limestones. The algae were capable of binding SiO_2 dissolved in seawater from which the quartz crystals grew in the course of diagenesis.

The Vilémovice Limestone was laid down during the course of a gradual marine transgression, in a southern direction but in this locality also towards the southwest, to the area of Hády; the transgression reached this area only in Upper Frasnian times. Almost no clastic material was introduced into the basin from the coast.

The Vilémovice Limestone was deposited during Lower and Upper Frasnian times (Polygnathus asymmetricus to Palmatolepis gigas conodont Zones) and Lower Famennian (Palmatolepis triangularis to Palmatolepis rhomboidea conodont Zones). In Block B, the lithological transition into the overlying Křtiny Limestone occurred in the Lower part of the Palmatolepis marginifera Zone (see below), in Block E in the Palmatolepis crepida Zone.

The Lower Frasnian sequence is known only from boreholes, especially borehole V-35 in which it attains a thickness of about 73 m. The



4. Geological cross sections
1 — terrestrial basal clastic formation (Lower to Middle Devonian ?); *2* — Lažánky Limestones (Givetian); *3* — Vilémovice Limestones; *4* — Křtiny Limestones; *5* — organodetrital limestone; *6* — sandy limestone to sandstone; *7* — limestone breccia; *8* — black cherty limestone (*5*—*8* — Hády—Říčka Limestones); *9* — Březina Shales; *10* — limestone breccia in Březina Shales; *11* — Rozstání Formation; *12* — limestone fragments and pebbles in the Rozstání Formation; *13* — Račice Conglomerates

acceleration of both subsidence and marine transgression trending southwestward took place only in late Frasnian times (occurrence of *Amphipora moravica)*. The thickness of the Upper Frasnian and the Lower Famennian in the Vilémovice Limestone facies is estimated to be 120 m. In this period also the westernmost part of the investigated area was flooded by the sea. The total thickness of the Vilémovice Limestone does not exceed 200 m. The stratigraphy of the overlying strata, as mentioned above, will be described separately for each block.

Block A

Křtiny Limestone

The Křtiny Limestone was, in the past, exposed in the southeastern part of the block only but was totally extracted. It is a grey micritic, finely nodular Limestone with a yellow-grey marly matrix. Laminae and thin interbeds between individual limestone beds are also built of corresponding marly material. The preserved thickness does not exceed 5 m. The geological age is evidenced by a conodont fauna: the Lower part of the Palmatolepis marginifera Zone has been recognized. The Křtiny Limestone was laid down in the course of a slow marine regression in a shallow open sea; in this quiet environment micritic Limestones with an argillaceaus admixture were deposited. The argillaceous substance is land-derived, from the deeply and intensively weathered rocks of the Brno Pluton, exposed along the coast (Dvořák 1972).

The overlying strata are not known from this block. They are probably beneath the Tertiary and Quaternary valley fill bounding the exploitation area of the cement factory to the south.

Block B

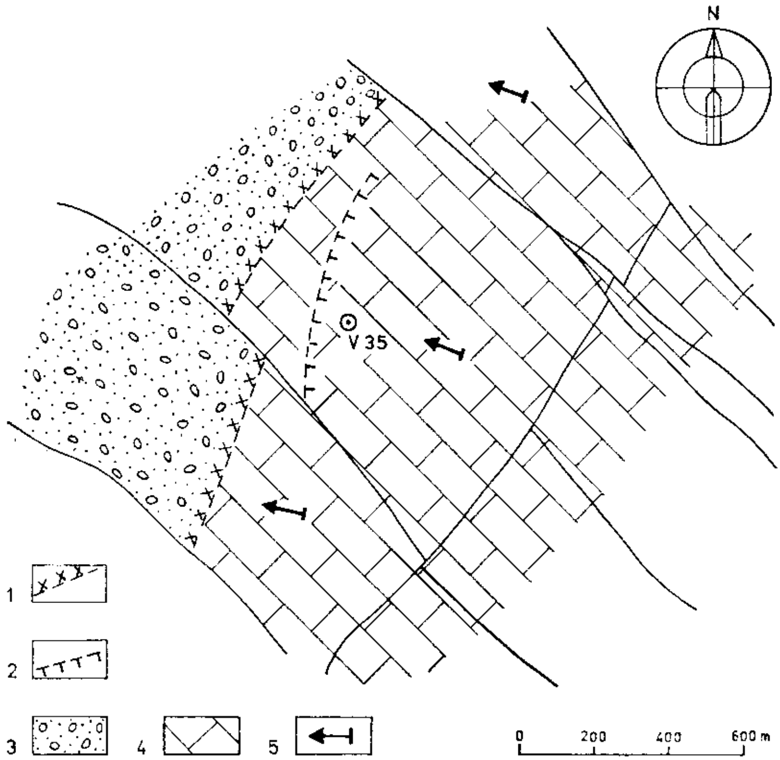
Křtiny Limestone

The Křtiny Limestone is exposed in the western and southern part of the fault block, along a NW—SE striking fault. The Limestone is similar to that of Block A.

To elucidate the age, samples of the conodont microfauna from both the uppermost Vilémovice Limestone and the base of the Křtiny Limestone were studied. The conodont fauna of both samples indicates a conformable age — the lower part of the Palmatolepis marginifera Zone. The upper part of the 8 m thick Křtiny Limestone again contained conodonts of the Palmatolepis marginifera Zone.

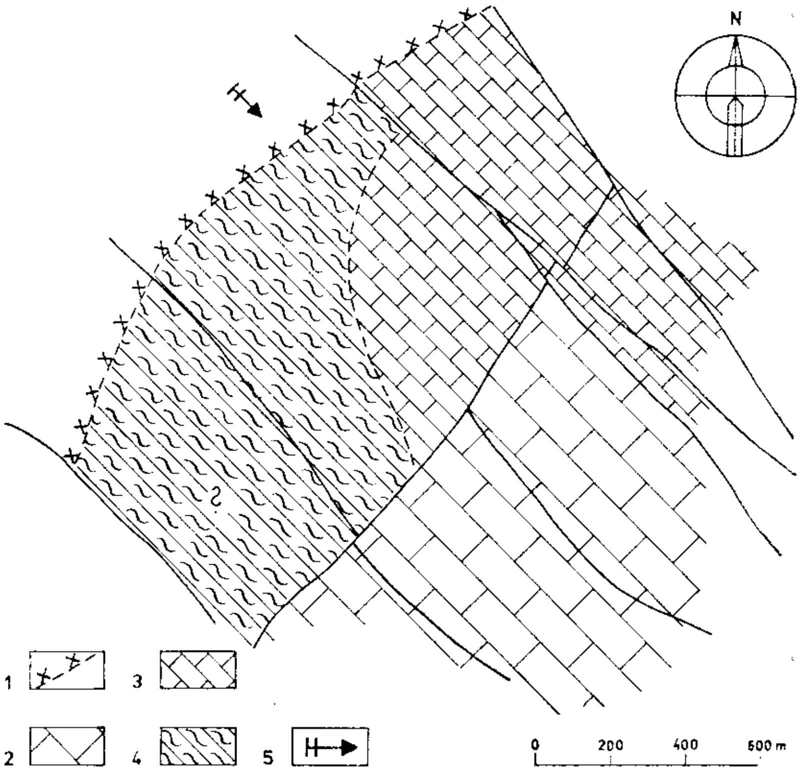
Hády—Říčka Limestone

As these Limestones are developed in the facies of the Říčka Limestone within the entire area, only the term Říčka Limestone will be used subsequently.



5. Palaeofacies scheme for the Upper Givetian rocks
1 — presumed shoreline; *2* — presumed shoreline of Lower Givetian; *3* — terrestrial purple arkoses and conglomerates; *4* — dark grey limestones with stromatoporoid fauna (Lažánky Limestones); *5* — direction of transgression

Thickly bedded, only locally thinly bedded, grey to dark-grey, fine-grained organodetrital limestones with rare chert nodules (parallel with the bedding). Dark-coloured, thin (max. 3 cm thick) intercalations of calcareous shale are also rarely present. The limestone shows a considerable degree of chemical purity. The conodont and foraminiferal fauna demonstrates the middle and late Famennian age. The conodont Zone Scaphignathus velifer has been detected about 80 m above the Křtiny Limestone. At the eastern edge of the block, immediately underlying the upper part of the Křtiny Limestone, a conodont fauna of late Famennian age was found: in the first locality the middle part of the Bispathodus costatus Zone was recognized; foraminifers *Quasiendothyra cobeitusana* and *Endothyra communis* are associated with it. In the second locality the presence of the Bispathodus costatus Zone (without

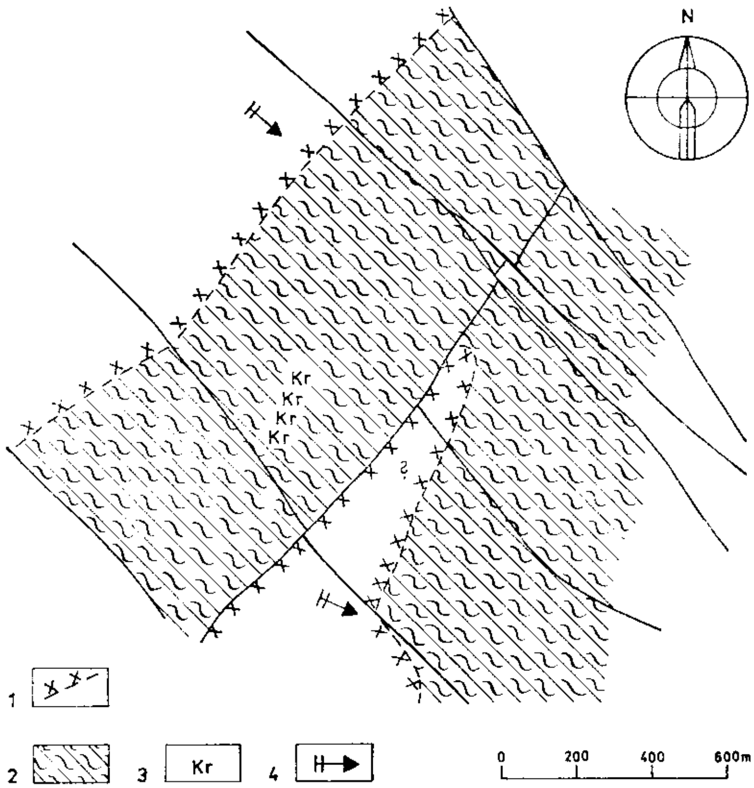


6. Palaeofacies scheme for the Lower Famennian (Palmatolepis crepida Zone)
1 — presumed shoreline; *2* — light grey limestone with stromatoporoid and coral fauna (Vilémovice Limestones); *3* — dark grey laminated and locally organodetrital limestones; *4* — nodular limestone; *5* — direction of regression

any possibility of further subdivision) was detected in two samples; the third sample stratigraphically belongs to the middle or upper part of this zone.

The Říčka Limestone was laid down in a high energy shallow-water environment where almost all the mud fraction was scoured away into the deeper or sheltered parts of the basin. This is proved by the sorting of organic skeletal fragments. The bottom of the basin subsided relatively rapidly which led to accelerated deposition of calcareous clastic material derived from local shallows. A diverse fauna (crinoids, brachiopods, foraminifers, etc.) enjoyed highly favourable conditions in these places.

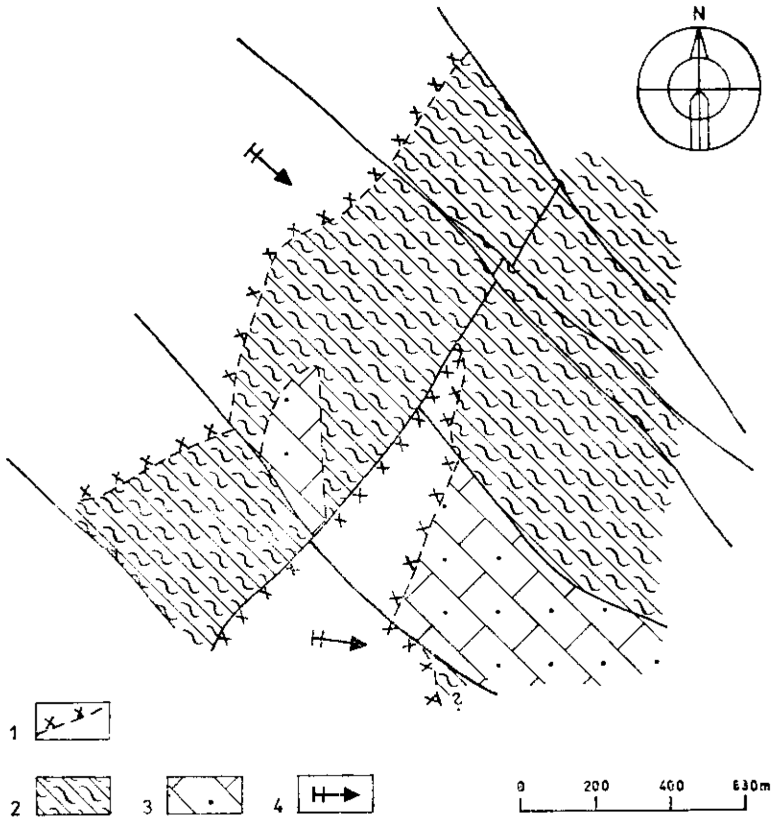
The skeletal fragments were transported by currents into the zones of subsidence, and accumulated there. This shale intercalations and bedding planes indicate breaks in the flow of water and deposition of organodetrital material. The possibility cannot be excluded that these intervals were much longer than those corresponding to the accumulation of individual organodetrital layers which could have been a rapid one-phase process. The thickness can be only roughly estimated at about 180—200 m because of the strong disharmonic folding present. After a short-lived slowing down of subsidence in the course of deposition of the Křtiny Limestone, a renewal of subsidence took place in the Middle and Upper Famennian which was, however, restricted to this single block.



7. Palaeofacies scheme for the Middle Famennian (Palmatolepis marginifera Zone)
1 — presumed shoreline; *2* — nodular limestone; *3* — crinoidal limestone; *4* — direction of regression

Upper Křtiny Limestone

The Upper Křtiny Limestone resembles the Lower Křtiny Limestone. The lower part is developed as yellow-grey to light-grey micritic limestone with nodular structure and a small quantity of inter-nodular, argillaceous matrix of yellow-brown colour. In the uppermost part, wedging out intercalations of black chert are present. The thickness does not exceed 17 m. The early to middle Tournaisian age is proved by the conodont Zone Pseudopolygnathus triangulus triangulus (in five samples) and the transition between the Pseudopolygnathus triangulus triangulus Zone and the Siphonodella crenulata Zone (in three samples) and the lower part of the Zone Siphonodella crenulata (one sample). The major part of the sequence thus belongs to the lower Tournaisian, the base of the middle Tournaisian can be proved in the uppermost strata only.

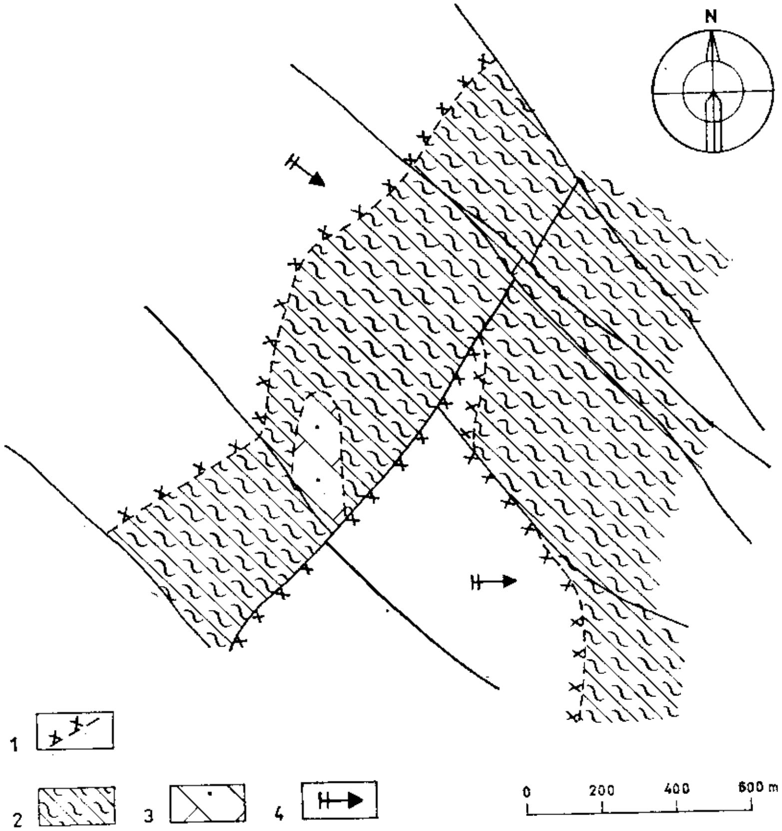


8. Palaeofacies scheme for the Upper Famennian (Bispathodus costatus Zone)
1 — presumed shoreline; *2* — nodular limestone; *3* — dark grey organodetrital limestone; *4* — direction of regression

Next comes an interbed, at maximum 2 m thick and wedging out towards the south, of thinly- to medium-bedded very fine-grained limestone with abundant, up to 2 cm thick intercalations and nodules of black chert. The uppermost part of this limestone encloses an admixture of fine sand. The conodont fauna is indicative of the lower part of the Siphonodella crenulata Zone, whereas foraminifers indicate the Middle Tournaisian age (R. Conil — Louvain, Belgium — recognized a. o.: *Earlandia vulgaris minor, Earlandia elegans, Tournaelidae* and *Chernyshinella glomiformis*). This interbed represents the facies transition to the fault block C (see below).

Near the top is yellow-grey, locally pinkish, micritic limestone with more abundant intercalations of yellow-grey (locally with a pale purple tinge) shales with some arenaceous admixture. Towards the top the proportion of shale increases. Near the base, a graded, 15 cm thick interlayer of dark-grey organodetrital limestone appears; ner the base it contains a coarse-sand admixture which also includes weathered feldspar grains of pinkish colour and up to 1 mm in size. It is overlain by a 1 metre thick bed of micritic grey to light-brownish limestone with signs of nodular structure and very rare laminae of grey-green and yellow shales separating the individual layers. In small bedding plane depressions fragments of crinoid stems, skeletal parts of orthocone cephalopods, brachiopods and small rugose corals accumulated; these fragments are associated with quartz grains up to 1 mm in size.

Both at the base (below the graded arenaceous interlayer) and in this bed the conodont fauna corresponding to the Scaliognathus anchoralis Zone (4 samples) was detected. The proportion of shale with arenaceous and micaceous admixture increases rapidly towards the top. The shales enclose yellow-grey micritic limestone as small or lage nodules or intercalations. Phosphorite concretions, orthocone nautiloids and small horny rugose corals are also found in the shales; the following corals were determined by J. Kullmann (Tübingen, F. R. G.): *Rylstonia* cf. *squilmensis, Fasciculophyllum* sp. A, sp. B and *Canadiphyllum?* sp. A. The conodont assemblage contained species that are characteristic of both the uppermost Tournaisian (Scaliognathus anchoralis Zone) and the lower Viséan. Of major importance therefore is the foraminiferal fauna; V. Čermnych (Syktyvkar, U. S. S. R.) identified: *Forshia* sp., *Paleotextularia diversa, Eoendothyranopsis* sp., *Eoparastafella* sp., *Daniella* sp., *Tournayellina* sp., and *Paraendothyra* sp. It corresponds to the lowermost Viséan — V1a. The total thickness of the layers corresponding to the Scaliognathus anchoralis Zone and the lowermost Viséan does not exceed 5 m and this unit rapidly wedges out southward (see also Conil et al. 1971). In a westerly direction a syncline is developed above the



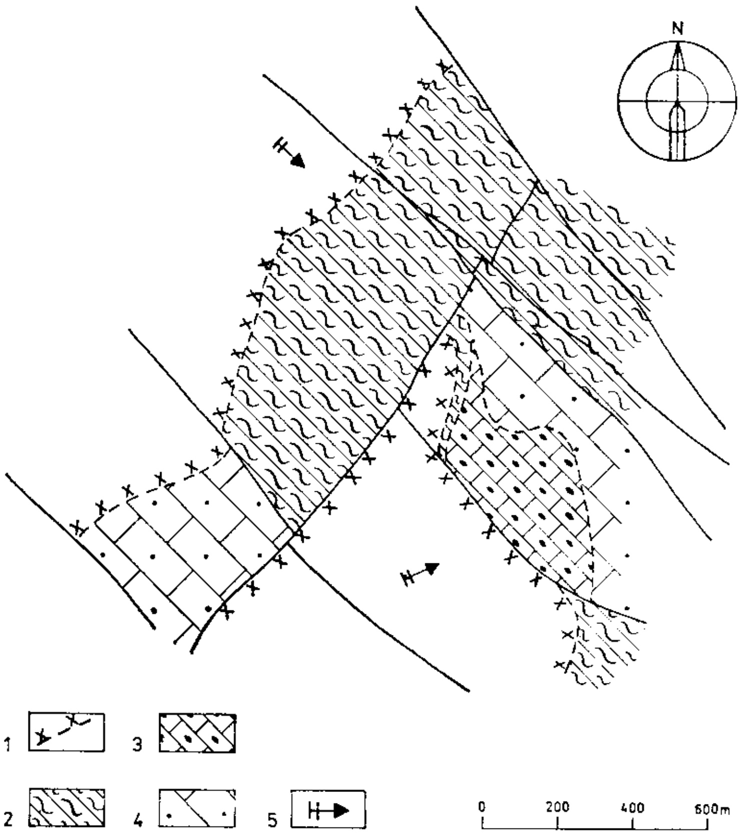
9. Palaeofacies scheme for the Lower Tournaisian
1 — presumed shoreline; *2* — nodular limestone; *3* — dark grey organodetrital limestone; *4* — direction of regression

Říčka Limestone; it is filled with nodular limestone, with interlayers of medium-grained calcareous breccia. The breccias contain a redeposited conodont fauna of lower Famennian age — the Palmatolepis marginifera Zone.

The Upper Křtiny Limestone provides evidence of renewed marine regression toward the east (described in the paragraph on Block B), considerable decelerated subsidence and increased land-derived introduction of coarser clastic material. These clastic materials prove the existence of dry land west of the present exposure; this land extended up to the area where rocks of the Brno Pluton or basal clastic sediments were outcropping. A quiet and shallow depositional environment prevailed, interrupted (due to storms?) by deposition of organic and terrestrial detrital material from strong currents. The existence of disturbed conditions along the edge of the shallow basin is confirmed by both the occurrence of calcareous breccias with redeposited conodont fauna of early Famennian age and phosphorite concretions, and the rapid wedging out of individual members towards the south (southwest as well?); this also proves the northeastern dip of the entire block even during the course of deposition (see the chapter on tectonics).

Březina Shale

Within the northeastern corner of the fault block, the Křtiny Limestone is overlain by fine, argillaceous grey-green shales with lens-like interlayers of pale purple-coloured shales. Minute flakes of mica cover



10. Palaeofacies scheme for the Middle Tournaisian
1 — presumed shoreline; *2* — nodular limestone; *3* — black cherty limestone; *4* — dark grey organodetrital limestone; *5* — direction of regression

the bedding planes. Pebbles up to 10 cm in size are dispersed in the rock; these consist of dark-grey organodetrital limestone. Shales, mostly the pale purple ones, contain a rich trilobite, brachiopod and molluscan fauna. Fragments of goniatite shells and crinoid ossicles are also abundant. The trilobite fauna is identical with that from the Březina locality, described by Chlupáč (1966). The shales are of early to middle Viséan age (see below). Their maximum thickness in Block B is 1.5 m. They wedge out to both south and west. It is not possible to ascertain whether any depositional break existed between the Křtiny Limestone and Březina Shale. The shales were laid down in a period of prevailing argillaceous deposition in an oxygenated, shallow-water environment close to the coast. The strongly-weathered, argillaceous material was derived from the gradually rising elevation of the Brno Pluton. The majority of the fauna suggests a relatively short transportation (accumulation of fauna along the bedding planes together with mica flakes). Sporadic finds of entire trilobites indicate, however, that they lived within this environment. The period of the Březina Shale deposition coincides with the boundary between the regression and renewed transgression represented by the deposition of the Rozstání Formation. It may be assumed that the sedimentation process not affected by any breaks between the Křtiny Limestone and the Rozstání Formation took place farther to the east.

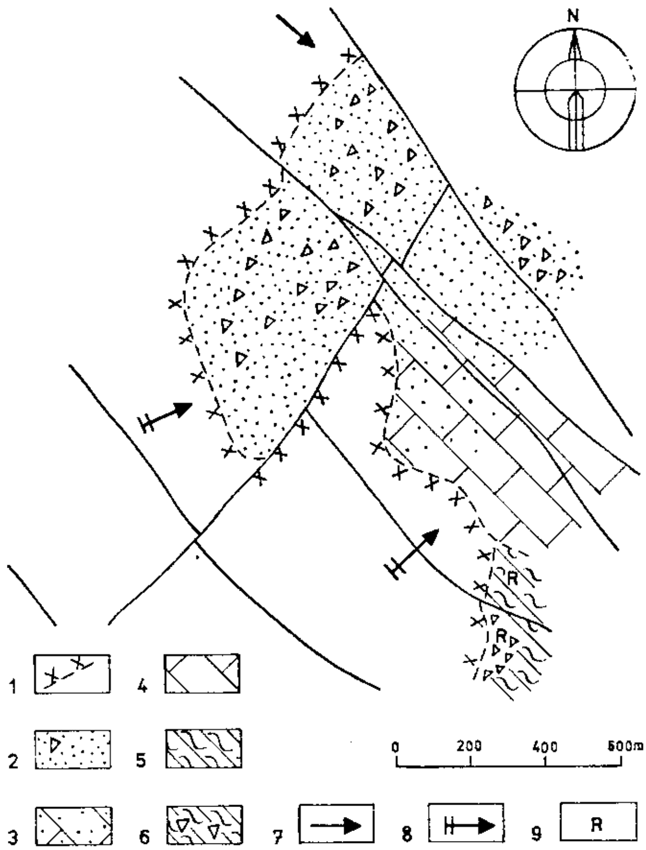
Rozstání Formation

The Rozstání Formation is but poorly exposed within Block B and its description is given in the chapter on Block C.

Block C

Křtiny Limestone

Grey, markedly nodular micritic limestone with relatively abundant argillaceous matrix which is grey or varicoloured (mainly in the upper part of the sequence). The Křtiny Limestone is about 30 m thick. The conodont fauna from the outcrops in the western part of the block suggests a late Famennian age (the lower and middle part of Bispathodus costatus Zone) and early Tournaisian age (Pseudopolygnathus triangulus triangulus Zone). The Bispathodus costatus Zone is 5 m at minimum (probably 10 m thick) so that the lower Carboniferous part is about 15 m thick. The onset of deposition of the Křtiny Limestone (with some limestone and iron ore oolites and onkoides on the base) was situated in the Palmatolepis crepida Zone (comp. Fig. 21).

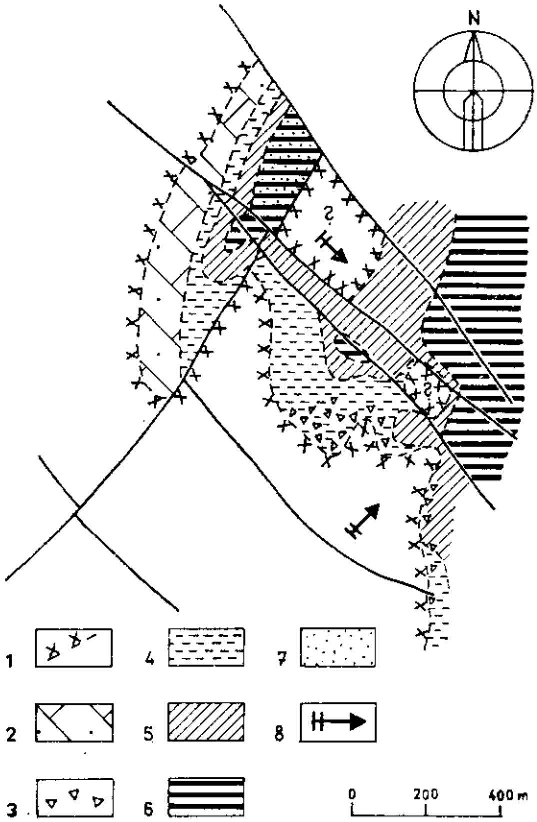


11. Palaeofacies scheme for the Upper Tournaisian and Lower Viséan)
1 — presumed shoreline; *2* — sandy limestone to sandstone with intercalations of limestone breccias; *3* — locally sandy organodetrital limestone; *4* — dark grey organodetrital limestone; *5* — nodular limestone; *6* — intercalations of limestone breccias in nodular limestone; *7* — direction of influx of clastic material in the basin; *8* — direction of regression; *9* — redeposition of Lower Famennian conodonts

A similar situation exists within the eastern part of the block — the Bispathodus costatus Zone was localized in the V-49 borehole 3 m above the lithological base of the Křtiny Limestone and only 11 m above this lithostratigraphic boundary an early Tournaisian age has been demonstrated. The investigations in Block B and D suggest it is improbable that the start of deposition of the Křtiny Limestone should coincide with the Palmatolepis crepida Zone in Block C. Deposition in the lower and middle Famennian was markedly condensated.

Říčka Limestone

Limestone with chert: the Křtiny Limestone is overlain by medium-bedded, black-grey, dense to fine-grained, organodetrital limestone; it contains abundant thin intercalations or concretions of black chert with



12. Palaeofacies scheme for the Middle Viséan
1 — presumed shoreline; *2* — dark grey organodetrital limestone; *3* — limestone breccia; *4* — predominant purple shale; *5* — predominant green shale; *6* — predominant black shale; *7* — sandstone at the base; *8* — direction of regression

diffuse boundaries. Thin interbeds of calcareous, black-brown shale are rather common. Conodonts and foraminifers suggest middle Tournaisian age (Siphonodella crenulata Zone). The thickness can only roughly be estimated at about 150 m. The Říčka Limestone was laid down in a reducing and quiet, somewhat deeper environment. The life conditions were favourable for fauna building their skeletal parts of SiO_2 (radiolarians, sponges). The remaining organic detritus was brought in from shallows by periodic currents. The subsidence of the basin was relatively rapid.

Dense limestone: dark grey to black-grey, medium-bedded (bed thickness about 20 cm) dense limestone with subordinate intercalations (up to 8 cm thick) of laminated calcareous shales of dark-brown colour. Under the microscope the limestone shows a very fine organodetrital texture. The thickness is 20 m. Conodont fauna also proves a middle Tournaisian age. The depositional environment was similar to that of the underlying cherty limestone but the organisms with siliceous skeletons are no longer present. The currents introduced more clastic clay material from the coast and this is also reflected in a most notable way the deposition of black-brown calcareous shale of 2 m thickness and occurring above the described Limestone.

Křtiny Limestone

The shale interbed is overlain again by grey to dark-grey micritic, locally markedly nodular limestone with subordinate light grey-green argillaceous matrix. The conodont fauna still indicates a middle Tournaisian age (Siphonodella crenulata Zone). The thickness of the Křtiny Limestone is estimated at 20 m.

Chert-bearing limestone, black-grey dense limestone and the Křtiny Limestone (all of middle Tournaisian age) decrease in thickness eastwards and pass into dark grey, organodetrital limestone (with a chert-bearing interbed of several metre thickness); this organodetrital limestone is 40 m thick at maximum as recognized in the borehole V-49.

Calcareous breccia

The shale interbed is locally overlain by a coarse-grained calcareous breccia; it pinches out north- and westwards and attains a thickness of up to 4 m. The predominant constituents are angular fragments (up to 50 cm long) of dark grey fine-grained organodetrital limestone (occurring as plates) with very abundant concretions of black phosphorite of oval shape and up to 3 cm in size.

Říčka Limestone

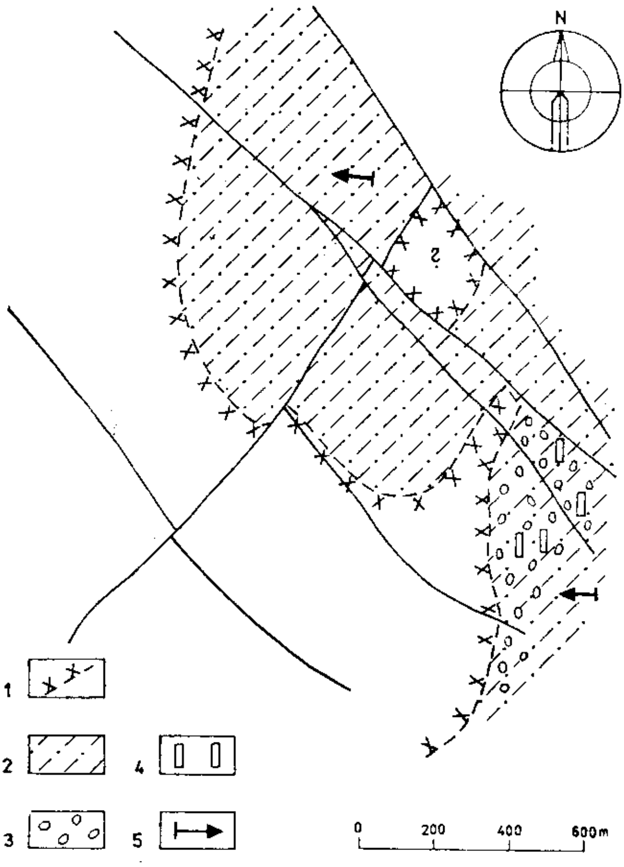
Organodetrital limestone: dark grey to black-grey thickly-bedded, fine-grained, organodetrital limestone, several tens of metres thick, overlies the upper part of the Křtiny Limestone or locally the calcareous breccia.

Křtiny Limestone

About 15 m of grey nodular limestone with intercalations of grey shale are exposed in the eastern quarry. No conodont fauna was ascertained.

Řička Limestone

Dark grey organodetrital limestone transits into the underlying nodular limestone in that it contains a great number of redeposited nodules of grey micritic limestone. Upward the quantity of nodules decreases and the nodules are accumulated near the base of individual beds only and thus provide an indication of graded bedding (graded units up to 20 cm thick). The nodules contain a conodont fauna of lower Famennian age (Palmatolepsis marginifera Zone) and sporadic



13. Palaeofacies scheme for the lowermost Upper Viséan
1 — presumed shoreline; *2* — dark grey silty shale with thin intercalations of siltstones and greywackes; *3* — limestone pebbles in shales; *4* — limestone olistoliths; *5* — direction of transgression

conodonts and foraminifers of upper Famennian and lower Tournaisian ages. This proves that the Famennian Křtiny Limestone was uplifted and exposed to erosion during the upper part of the middle and in upper Tournaisian times.

The overlying dark grey, medium-bedded, fine-grained, organodetrital limestone locally contains thin shale intercalations and in its upper part occasional black chert. The thickness increases from south to north, from 10 m up to 30 m. This limestone belongs to the upper part of the middle Tournaisian as evidenced by both conodont and foraminiferal fauna.

Křtiny Limestone

The uppermost part of the Křtiny Limestone consists again of grey micritic, locally nodular limestone, stained light yellow upon weathering.

In the northern part of the block it contains up to 10 cm in diameter nodules of a dark grey, fine-grained organodetrital limestone (most probably transported for a short distance by slumping and redeposited). Some nodules are surrounded by dark grey chert. The thickness is only a few metres but increases somewhat northward. The conodont and foraminiferal fauna is indicative of the upper Tournaisian and the lowermost Viséan.

Říčka Limestone

The Březina Shale is underlain in the western part of Block C (boreholes V-237, MV-274, V-49) by dark grey organodetrital limestone with arenaceous intercalations. Foraminifers and conodonts indicate the late Tournaisian age of the limestone; hence, it is equivalent to the Křtiny Limestone occurring in the southeastern part of the block (see above).

Březina Shale

The Březina Shale is exposed in the northern part of the block only. Within the eastern part, it is exposed with thicknesses of a few to 10 m in the quarry. Southwards, it passes into limestone conglomerate indicating the former coast (compare Fig. 19). It cannot be decided unequivocally whether or not the depositional process was interrupted between the underlying Křtiny Limestone and the Březina Shale.

The Březina Shale is fine, argillaceous, locally calcareous, grey-green and pale purple shale, micaceous on some bedding planes. On some bedding planes fragments of crinoid stems, trilobites, and goniatites have accumulated. Locally (farther away from the original coast) the unit is developed as black, fine shale that was deposited in a somewhat deeper, anaerobic environment.

Within the more westerly area the Březina Shale was detected by the V-97 borehole and consisted of coarse-grained limestone breccia with abundant light green matrix and shale interbeds of the same colour; these shale interbeds contained entire cephalons and pygidia of larger trilobites. The breccia marks out the southern coastal zone. Within the area of MV-274 borehole, the pale purple Březina Shale passes both vertically and horizontally into dark grey organodetrital limestone with local arenaceous admixture. The foraminiferal fauna (in limestone intercalations) proves an early Viséan age. A gradual transition from the Říčka Limestone into the Březina Shale has most recently been observed in the eastern part of the uppermost bench of the quarry. The transitional zone consists of alternations of grey, fine-grained platy limestone and pale purple and red shale containing fragments of trilobite exoskeletons, brachiopod shells and other fauna.

Rozstání Formation

Dark grey, in a weathered state greenish-grey, silty-clayey shale; toward the roof, laminae and thin intercalations of siltstone and fine, locally medium-grained greywacke increase in number. The greywacke intercalations may locally attain a thickness of 10 cm, occasionally even 20 cm and the greywacke is calcareous with signs of gradded bedding (only locally well aparent). The Rozstání Formation shows everywhere a sharp junction with the underlying limestone. This transgressive base is usually marked by the presence of conglomerate, the pebbles of which consist of limestone entirely. Where this basal conglomerate is missing, well-rounded pebbles may be seen dispersed in the shale matrix. In a corresponding way, near the western margin of its occurrence, the Rozstání Formation contains limestone conglomerate up to 2 m thick at its base at the contact with the Březina Shale; this evidences a break in deposition. Within the northern margin of the block, in places where the Březina Shale is represented by the black-shale facies, a gradual transition into the Rozstání Formation is recongnizable. Westward and southwestward from here the marine transgression progressed in the course of the upper Viséan, during the deposition of the Rozstání Formation (see Fig. 13, 19).

Interbeds of coarse limestone conglomerates repeatedly occur throughout the sequence of the Rozstání Formation. Some pebbles are subrounded to well-rounded, other subangular; they consist of dark grey organodetrital limestone which is directly subjacent to the pebble bed. The size of pebbles fluctuates from 5 cm to 1 m. In addition, blocks of this limestone up to 10 m in length and 3 m wide occur. All this evidence suggests that in the course of deposition of the Rozstání Formation the sea encroached over the Říčka Limestone in which coastal cliffs existed. Such cliffs could only have been the source of those blocks that during storms underwent gravitational transportation to the places of present occurrence. In a similar way, the limestone conglomerate was transported by means of slumping. The rounding of pebbles suggests an origin in the surf zone. The limestone conglomerate gradually pinches out towards the east (see Fig. 22).

The clastic material of the shale and greywacke interbeds was introduced from the rising massifs of the crystalline metamorphic rocks of the Českomoravská vrchovina Highland. The material was rapidly laid down in the reducing environment of a subsiding basin, where a significant quantity of organic matter, mainly of floral origin, accumulated.

Fossil fauna was detected exclusively in the uppermost part of the Rozstání Formation beneath the Račice Conglomerate. In the V-240 borehole a lenticular intercalation of black-grey impure limestone was observed, showing cross sections of exoskeletons of juvenile goniatites and foraminifers; the fossils prove the base of the upper Viséan (V2b—V3a). The V-240 borehole is situated in the Block D, but the dating is valid for the entire region. Purkyňová (1979) described *Stigmaria ficoides* from the lower part of the Rozstání Formation.

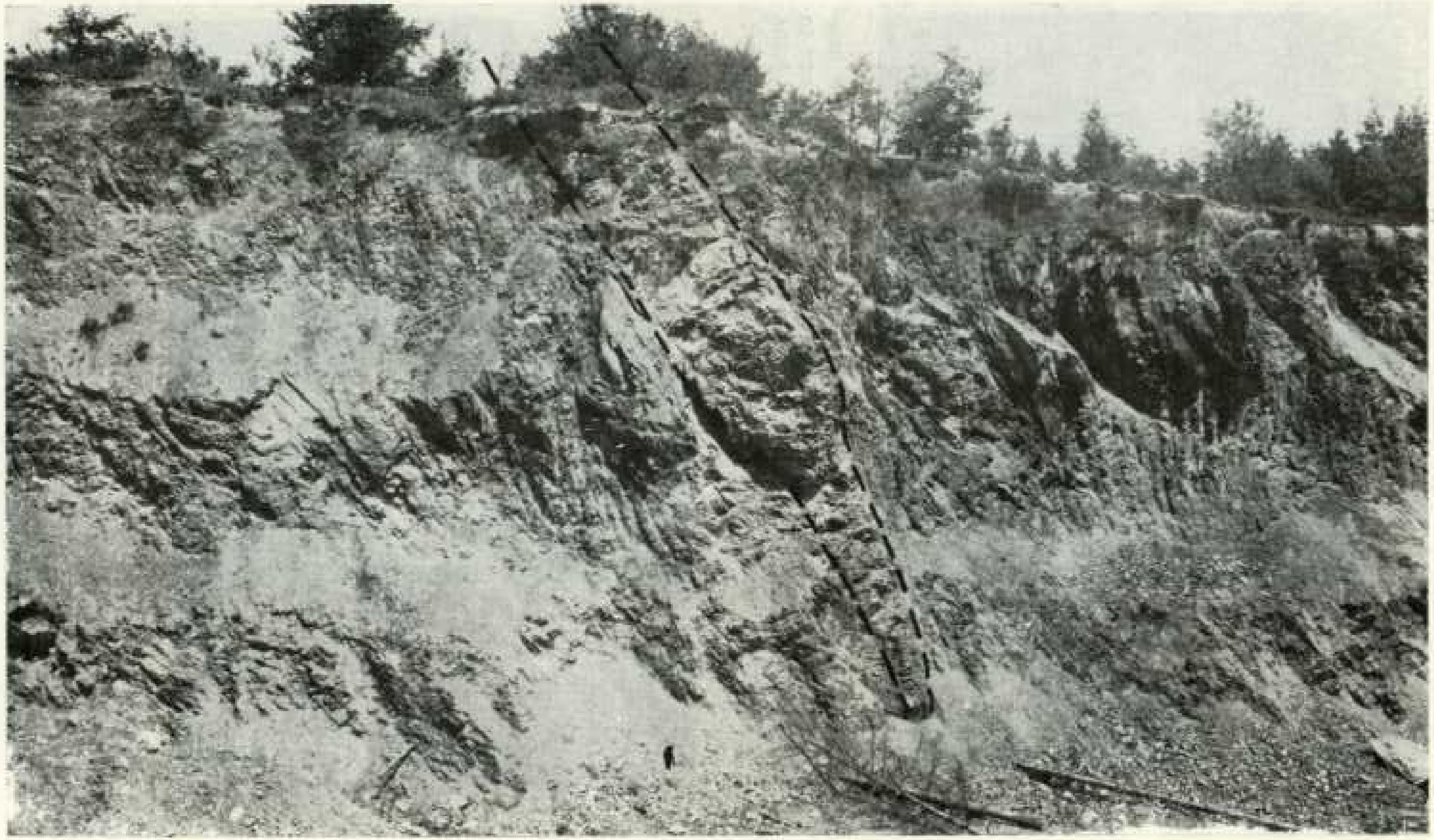
Block D

Vilémovice Limestone (the uppermost part)

The uppermost Vilémovice Limestone is exposed in the west in an abandoned quarry as beige-coloured, medium-bedded, laminated micritic limestone with organic markings of tubiform cross sections 0.8 cm in diameter. This type of Vilémovice Limestone is but 1 m thick and contains a conodont fauna of early Famennian age (the upper part of Palmatolepis crepida Zone at the base of the bed). More easterly, this bed is mostly darker-coloured; micritic limestone alternates with the organodetrital limestone and locally a rare stromatoporoid fauna and more common foraminifers of upper Famennian age may be found (i.e.

1. Mokrá, the western quarry. The Vilémovice Limestones on the base of the outcrop (Lowermost Famennian), the Křtiny Limestones in the middle part (Lower to Upper Famennian), the Hády—Říčka Limestones in the uppermost part of the outcrop (Upper Famennian)

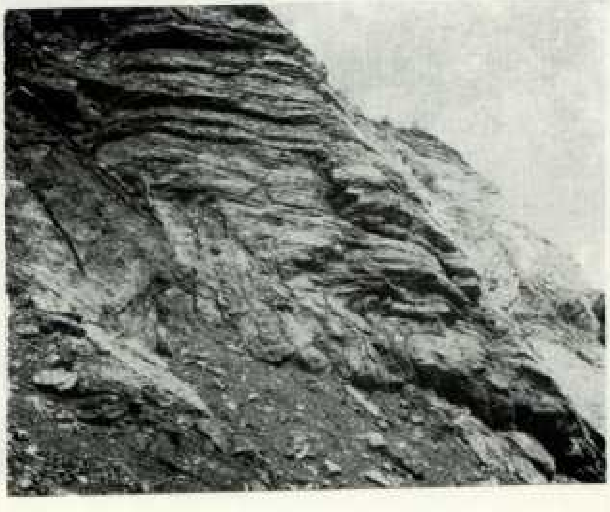
2. Mokrá, the E-wall of the northern floor of the quarry. Dislocation between the B and C blocks. The vertically standing organodetrital limestones (Hády—Říčka Limestones, Upper Famennian) on the right and folded and dislocated micritic limestones (Křtiny Limestones, Lower Tournaisian) on the left side

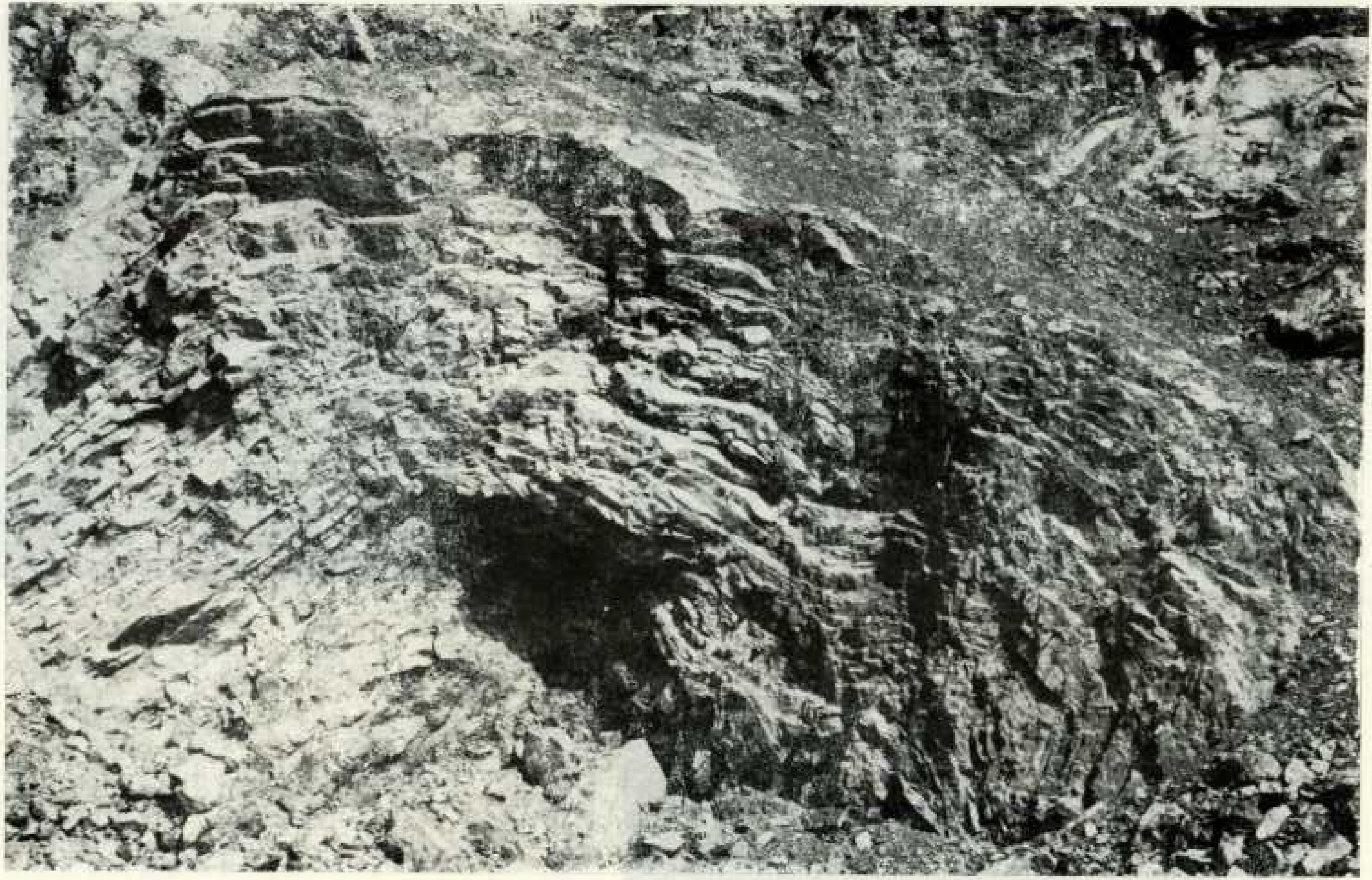


Mokrá, the eastern quarry. The big block of organodetrital limestones of Tournaisian age in subvertically standing in well-bedded alternation of shales and greywackes (Rozstání Formation, Upper Viséan)

1. Mokrá, the E part of the northern floor of the quarry. Limestone breccias with black phosphorite concretions (Middle Tournaisian)

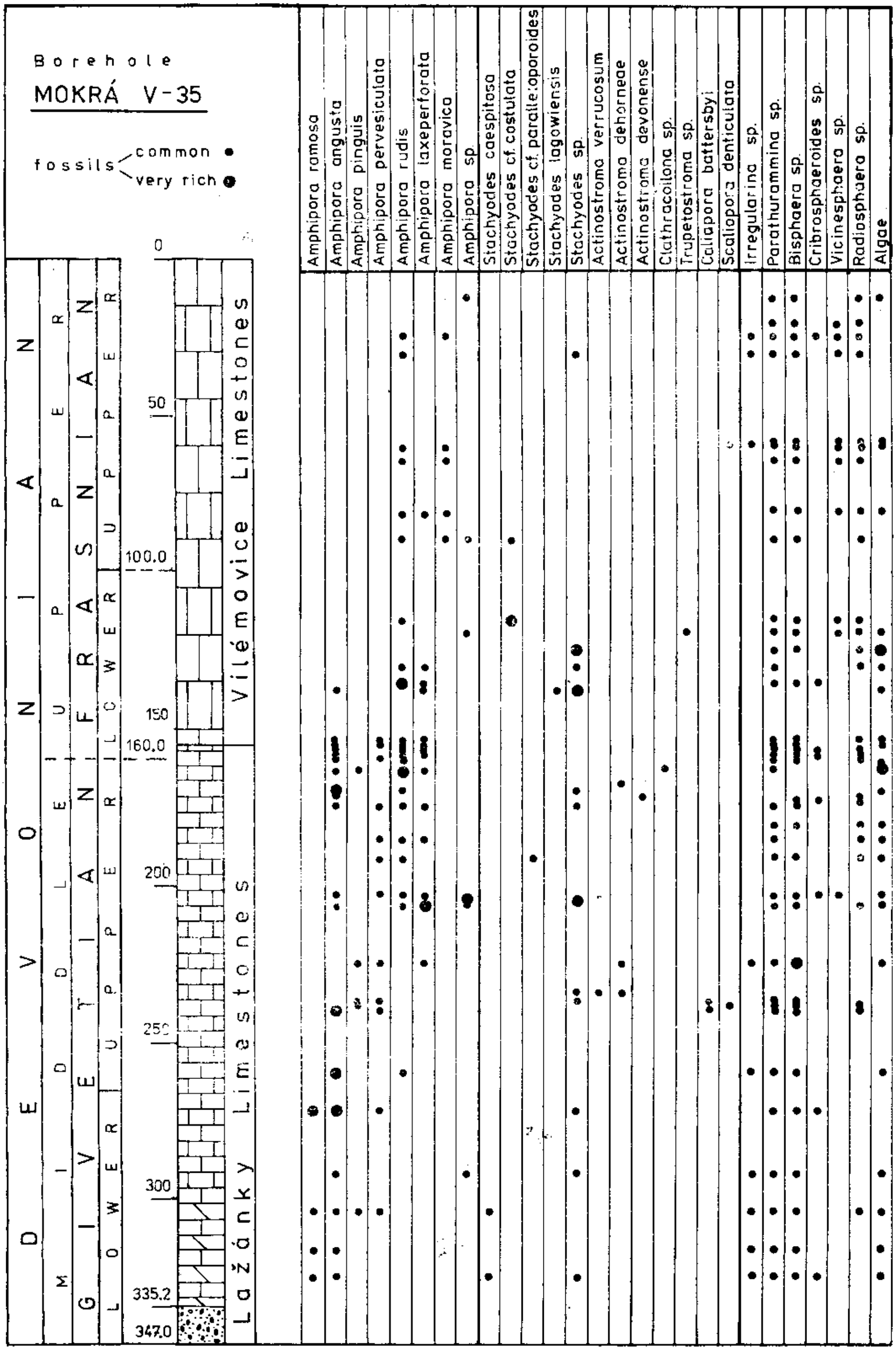
2. Mokrá, the W part of the northern floor of the quarry. Well-bedded nodular micritic limestone (Křtiny Limestones, Lower Tournaisian). The overturned fold with NNE vergency





Mokrá, the northern floor of the quarry. Well-bedded black l m estones with silicites (Hády—Říčka Limestones, Middle Tournaisian). Suit-case form of the anticlinale

All photographs by J. Dvořák



14. Section of the borehole Mokrá V-35 with stromatoporoid fauna

upward from the conodont Palmatolepis rhomboidea Zone — compare S-2 borehole). The uppermost part of the Vilémovice Limestone is about 15 m thick in this part of the block. With the exclusion of its lowermost part, the entire Famennian is represented. The rapid subsidence came to a halt in the course of deposition (a rapid subsidence is characteristic of the upper Frasnian and the lowermost Famennian). In the western section a regression started in the mid Famennian times while in the east the trend typical of the lower Famennian still prevailed. Movement of water in the basin was restricted and a reducing depositional environment predominated.

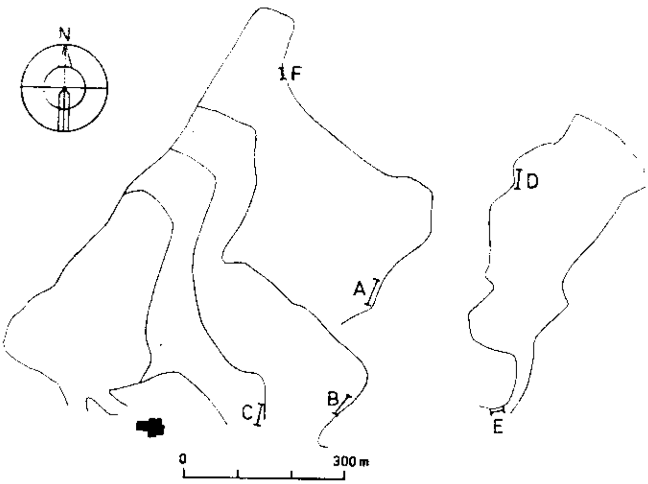
Křtiny Limestone

Grey, nodular micritic limestone about 10 m thick, with a minor dark grey, argillaceous admixture. By means of conodonts, ages of middle and late Famennian and early and middle Tournaisian (the lower part of Palmatolepis marginifera Zone and lower and middle part of Bispathodus costatus Zone, and Siphonodella crenulata Zone) have been proved; a significant condensation of the stratigraphic sequence is notable within this block.

Říčka Limestone

The development is highly variable. Near the base, the limestone is black-grey to black, very fine-grained. In the southwestern part of the block it also contains black chert — this lithofacies is passing from Block C. The thickness is less than 10 m.

Upwards in the sequence, the size of faunal fragments and lithoclasts increases and the dark grey limestone becomes coarse-grained. It encloses fragments of brachiopods, large crinoid stems, fragments of corals, trilobites, bryozoans, foraminifers and other fauna. Occasionally fragments of green algae may also be seen. Secondary micrite is the essential constituent of the limestone. Intense algal activity transformed the fragments of the skeletal parts of the fauna into micrite. The micritization is sometimes of a selective nature. In places a progressive micritization starting from the surface is recognizable — after the encrustation by green algae the micritization continues by means of their filaments into the centre of the fragments. Sometimes it also spreads from the axial canal of the columnar plates of crinoids. Limestone passes very frequently into lenticular beds of microbreccia and breccia, locally even coarse-grained. The breccia is mostly made up of fragments of dark grey organodetrital limestone and also of nodular, micritic Křtiny Limestone. The limestone is frequently arenaceous and passes into fine to coarse-grained calcareous sandstone. The coarse-grained arenaceous beds are 15—30 m thick. Abundant clastic quartz, derived from granitoid rocks of the Brno Pluton, is associated with sporadic grains of epizonal or mesozonal metamorphic rocks (from basal clastic sediments?).



15. Schematic map of the quarry walls (situation in the year 1983) showing the location of sketches A—F (Figs. 16—21)

Bipyramid grains of volcanic quartz occur occasionally. The average size of the quartz grains is up to 1 mm, the maximum up to 2 mm. The larger grains are subrounded and exhibit a corroded surface. They are indicative of redeposition from earlier sediments, presumably basal clastic sediments of Devonian age. In addition to quartz, opaque heavy minerals of leucoxene and alterite types and weathered feldspars (potassium feldspar and plagioclase) are present. Rock fragments are made up of granitoids, rarely mica schist or phyllite. Pyrite is locally common and silicification is observable everywhere. Black phosphorite occurs very frequently as grains in organodetrital limestone and as concretions of up to several cm in size in breccias. The sequence of the Říčka Limestone ends with calcareous breccias which may also have an argillaceous matrix and locally may be transitional into the overlying Březina Shale. Elsewhere thin-bedded, fine-grained organodetrital limestone with rare silicified or pyritized ooids appears.

The thickness of the Říčka Limestone increases from northwest to southeast from about 50 m to 100 m. It was laid down in a shallow marine environment (within the photic zone) with intense movement of water rich in bottom life and introduction of large quantities of coarse-grained clastic material (quartz) from the coastal area (Řicmanice—Ochoz elevation, the more rapid rise of which started in this period). The abundant occurrence of calcareous breccias suggests the rise of the westerly situated area. Redeposition affected limestones of both Famennian and Tournaisian age.

The age of the Říčka Limestone is proved by conodont and foraminiferal fauna: the deposition of the Říčka Limestone commenced in the upper Tournaisian and ended around the lower/middle Viséan boundary.

Březina Shale

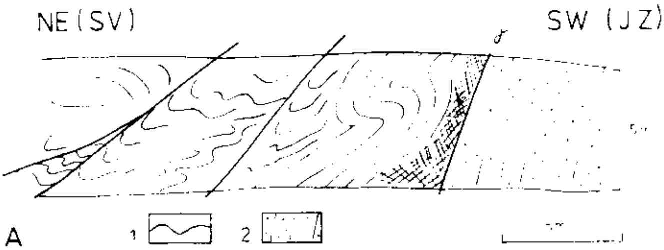
Within the southwestern border area (in the lower-grade block) the depositional break between the Říčka Limestone and Březina Shale is evidenced by the common occurrence of calcareous conglomerates. On the other hand, a gradual transition was observed in the S-2 borehole, but dispersed limestone pebbles may again be seen at the base. The Březina Shale is grey to grey-green, near the base black; it is fine, locally strongly calcareous. Besides crinoidal plates, sponge spicules may be common here and there; the spicules have usually accumulated in places of local silicification. The Březina Shale contains very rare laminae of siltstone or very fine-grained quartz sandstone and was predominantly deposited in a reducing, somewhat deeper environment.

The contact with the Říčka Limestone is not exposed in the northwestern part of the area. Near the base, there is a thin-bedded, grey calcareous sandstone over 10 m thick; locally it is micaceous or laminated. The lamination is affected by bioturbation so that structures generated by churning and stirring of the sediment by organisms appear. The sandstone is overlain by light olive-green calcareous shale passing upward into pale purple and later grey-purple calcareous shale. This part of the sequence is 8 m thick. Both sandstone and shale were laid down in a shallow-water, energetic marine environment of oxidic nature. The top of the unit consists of black argillaceous shale with pyrite; its thickness is 50 m; the shale was deposited in a stagnant, anaerobic reducing environment, farther from the original coast.

The age of the Březina Shale is determined by its position above the Říčka Limestone of early Viséan age (both units grade in part laterally one into the other) and rich goniatite and trilobite fauna studied earlier (Chlupáč 1966, Kumpera - Dvořák 1961). The Březina Shale is of middle Viséan age.

Rozstání Formation

Within Block D, this unit is neither exposed nor sufficiently recognized in the boreholes. It is assumed on the basis of geological mapping that the Rozstání Formation is of greater thickness along the eastern border of the block than in Blocks C and B. However, the question of how many levels bearing calcareous pebbles, or blocks, are present in the sequence remains unsolved. The most easterly situated V-240 borehole proved the existence of an intercalation of black-grey organogenic limestone with an argillaceous admixture in the silty shale directly underlying the Račice Conglomerate. The foraminiferal fauna found in this limestone intercalation is the first direct evidence of the age of the Rozstání Formation in the Drahanská vrchovina Highland. This fauna proves the middle/upper Viséan boundary (V2b—V3a) without any possibility of a more refined dating; the base of the upper Viséan seems, however, more firmly established.

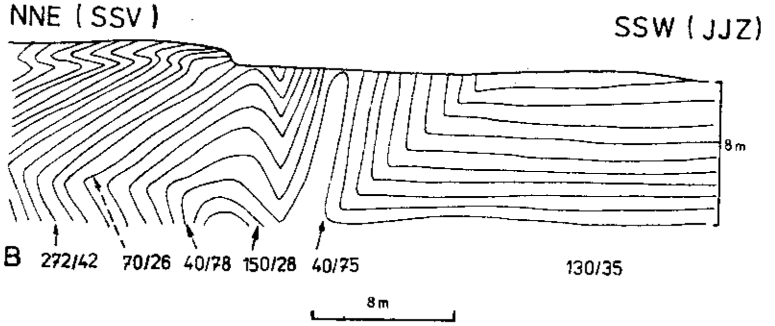


16. Sketch of the faulted contact between blocks B and C
1 — nodular limestones (Tournaisian); *2* — dark grey organodetrital limestone (Upper Famennian) — (A — on Fig. 15)

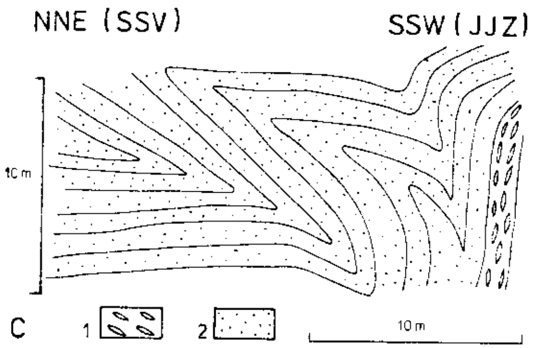
In the western part of the block, the Březina Shale passes gradually upward into dark grey silty shale (with rare siltstone laminae) and very fine-grained to fine-grained greywacke (lacking any graded bedding) of about 15 m total thickness. Siltstone laminae and intercalations of fine-grained greywacke (up to 4 cm in thickness) become more frequent upwards. Here, 2—5 cm thick graded layers also occur. No limestone pebbles or blocks were observed. The incomplete thickness (the overlying strata are not preserved) does not exceed 100 m.

Račice Conglomerate

The Račice Conglomerate is in sharp contact with the Rozstání Formation in the southeastern part of the block whereas farther to the north greywacke intercalations appear between the conglomerate and shale. The Račice Conglomerate is coarse, polymictic and contains a greywacke matrix. The majority of pebbles consists of metamorphic rocks of the Moravicum and Moldanubicum of the Českomoravská vrchovina Highland (Š t e l c l 1960). The basal part of the Račice Conglomerate, outcropping along the easter edge of the area, is a part of the 3000 m thick Myslejovice Formation; this formation consists mainly of conglomerate and much less greywacke and shale in the southern part of the Drahanská vrchovina Highland. The age is upper Viséan [Goα,β,γ Zones — D v o ř á k 1969, K u m p e r a - L a n g 1975].



17. Sketch of disharmonic folding within organodetrital limestones (Upper Famennian)
Numbers — orientation and angle of inclination of beds (B — on the Fig. 15)



18. Sketch of disharmonic folding of the nodular (*1*) and organodetrital (*2*) limestones with NNE vergence (C — on Fig. 15)

Boulders of up to 1 m in size and made up of dark grey, fine-grained organodetrital limestone are found close to the base of the Račice Conglomerate. The limestone locally contains large brachiopods of the genus Gigantoproductus, rugose corals and foraminifers; it is of late Viséan age (V3a) and was laid down simultaneously with the upper part of the Rozstání Formation (D v o ř á k 1958, D v o ř á k - C o n i l 1969). The site of their original deposition is not yet known; it was probably some-where near the coast at places sheltered against the introduction of clastic material. The destruction of this sediment and transportation to the site of deposition as pebbles to boulders most probably occurred during the course of an extensive marine transgression accompanied by a rapid and general subsidence.

The Račice Conglomerate originally covered the entire area. Southwestward of the area under study, it transgressively overlies directly the Říčka Limestone of Tournaisian age.

Block E

Upper Vilémovice Limestone

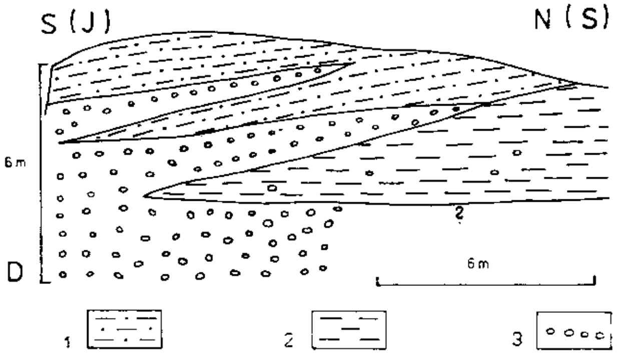
In the vicinity of S 1 borehole, the upper Vilémovice Limestone shows a similar development as in the western part of the Block D. Its thickness ranges from 6 to 20 m. In the southwestern part of the block, as may be seen in the western quarry, Vilémovice Limestone is markedly bedded and locally contains a rich stromatoporoid fauna of upper Frasnian. Even 0.5 m below the base of the Křtiny Limestone spherical coenostea of stromatoporoids were found in association with conodonts of the Palmatolepis crepida Zone.

Křtiny Limestone

The more or less markedly nodular limestone is predominantly of grey colour but in the uppermost part of the unit it turns black-grey; the thickness fluctuates around 15 m. In the southern part of the block, the limestone encloses an interbed of 0.5 m thickness consisting of crinoidal coarse-grained limestone that supplied a rich conodont fauna of the lower part of the Palmatolepis marginifera Zone. Within this block, the Křtiny Limestone deposition started in the lower Famennian, in the Palmatolepis crepida Zone. The uppermost part of the Křtiny Limestone in the southwestern section of Block E yielded a conodont fauna belonging to the lower part of the Bispathodus costatus Zone (the overlying Říčka Limestone is of the same age).

In the southwestern part of the block, however, the Křtiny Limestone extends up to the lower Tournaisian (Pseudopolygnathus triangulus triangulus Zone) whereas in the northern section it extends up to the upper part of middle Tournaisian (Polygnathus carinus Zone).

A wedging out intercalation, up to 20 cm thick, was observed in the Křtiny Limestone in the western quarry; it consists of dark grey limestone rich in cross sections of clymenias.



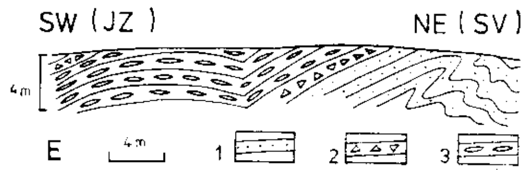
19. Sketch of the interfingering of dark grey shales, siltstones and greywackes (*1* — Rozstání Formation), green shales (*2* — Březina Shales) and limestone conglomerates (*3*). The gradual transgression towards the SSW is illustrated (D — on Fig. 15)

Říčka Limestone

In the southwestern part of Block E the Říčka Limestone is of late Famennian age (Bispathodus costatus Zone) and is made up of medium-bedded dark grey to grey fine-grained limestone alternating with subordinate intercalations of micritic limestone with signs of nodular structure; this alternation is indicative of a lateral transition into the Křtiny Limestone toward the N and E. Graded beds 10 cm thick are occasionally seen; their base consists of dark grey fine-grained limestone (6 cm) grading upward into laminated, very fine-grained limestone (2 cm) which is finally overlain by grey micritic limestone (2 cm).

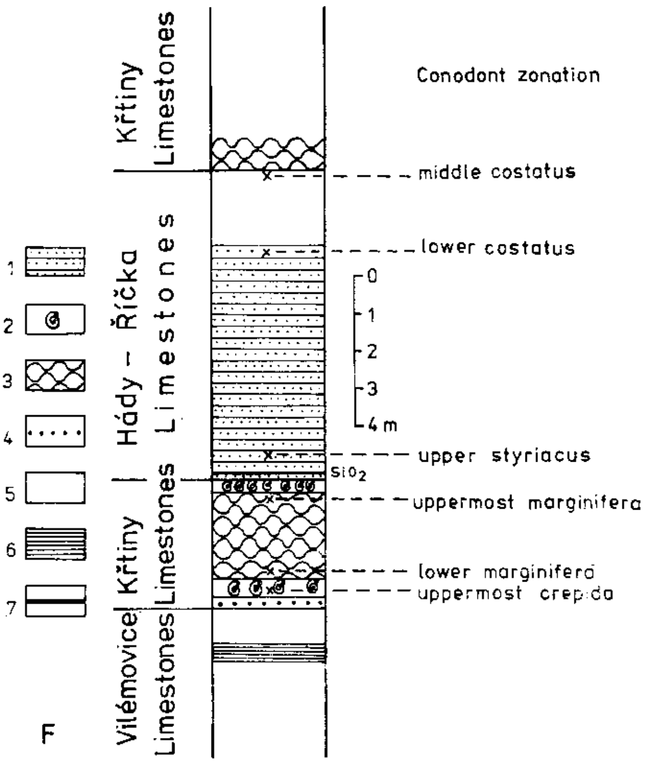
Within the northern and southeastern part of the block, the Křtiny Limestone is overlain by black-grey to black very fine-grained to dense limestone, enriched with organic material and about 2 m thick. The rock does not contain any conodonts or foraminifers. Above it, calcareous breccia occurs; its thickness is 5 m and it contains abundant phosphorite concretions at the base. The conodont fauna of the breccia is of late Tournaisian age (base of Scaliognathus anchoralis Zone). The same age is evidenced by the foraminiferal assemblage. The rate of subsidence increased in late Tournaisian times and the sea again flooded the original area. This period is characterized by the deposition of limestone breccias with phosphorite; the phosphorite probably formed during the Upper Tournaisian along the coast.

The deposition of fine coarse-grained organodetrital limestone continued in the Upper Tournaisian; the limestone contains a great admixture of sand and may locally pass into calcareous sandstone (see Fig. 1). Graded beds up to 10 cm thick, with a base consisting of a coarse sandstone, appear in the southeastern part of the block (V-235 borehole).



20. Sketch of the relationship between organodetrital limestones (*1* — Upper Famennian), limestone breccias (*2*) and nodular limestones (*3* — Tournaisian). In the limestone breccias, a redeposited conodont fauna of Lower Famennian age was found (E — on Fig. 15)

The arenaceous limestone attains a thickness of about 30 m in the west; eastwards it decreases to 10 m (autochthonous part of the S-1 borehole), but towards the southeast (V-235 borehole) the thickness is virtually unchanged.



21. Detailed stratigraphical section of the Famennian limestones
1 — grey organodetrital limestone grading up to micrites in each layer; *2* — cephalopod bearing grey biomicrite; *3* — grey nodular limestone; *4* — oolitic ironstones and limestones; *5* — light grey to grey dense micritic limestone; *6* — light grey laminated limestone; *7* — black chert (F — on Fig. 15)

The V-235 borehole is located in the thrusted block and is comparable only to the allochthonous thrusted part of S-1 borehole, in which the arenaceous limestone is 28 m thick. In some places the arenaceous limestone encloses interbeds of arenaceous limestone breccia. Fragments of rugose corals and relatively rare foraminiferal and conodont faunas of late Tournaisian age occur in the arenaceous limestone.

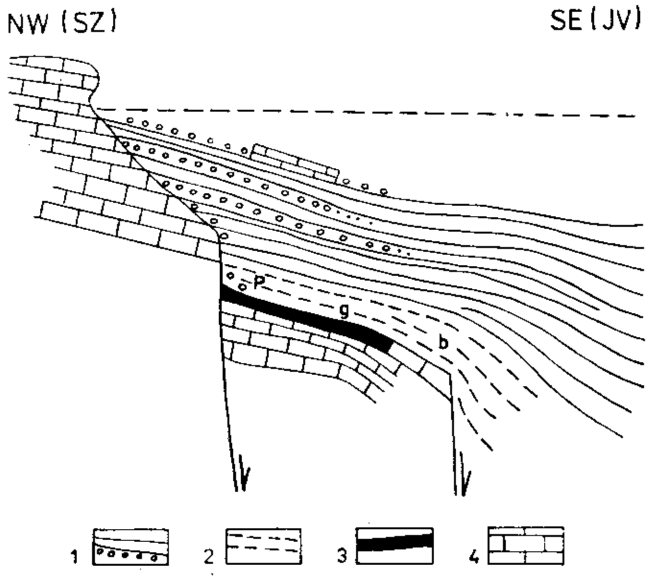
The arenaceous limestone is overlain by dark grey, organodetrital limestone, containing sporadically quite subordinate intercalations of dark-coloured shale. The thickness is about 15 m. The limestone contains a foraminiferal fauna of early Viséan age. Next comes coarse limestone breccia with phosphorite concretions, about 5 m thick, observed in both S-1 and V-235 boreholes. A lithologically different development has been observed in these two boreholes only above the limestone breccia. Whereas the limestone breccia represents the end of deposition of the Říčka Limestone in the V-235 borehole (it is overlain by Březina Shale), in the S-1 borehole a black shale with strongly compressed goniatites and abundant intercalations of coarse-grained organodetrital limestone is superjacent to the breccia; upward, the limestone intercalations increase in quantity and finally prevail. This part of the sequence is 12 m thick and contains a foraminiferal fauna of middle Viséan age. The described Říčka Limestone of early and middle Viséan age is in time terms an equivalent of the lower part of the Březina Shale, mainly in the Block C and partly also in the eastern section of Block D.

Březina Shale

The Březina Shale is of pale purple colour in the south (V-235 borehole) but northward and toward the roof it passes into olive-green, fine argillaceous shale. Within the area of the S-1 borehole, near the base the shale alternates with thin intercalations of dark organodetrital limestone. The Březina shale is mostly of middle Viséan age. Its thickness is estimated at 50—80 m.

Rozstání Formation

The Rozstání Formation is preserved only in the northeastern part of the block as a relict that escaped erosion. The unit is again represented by dark grey, silty-argillaceous shale with sporadic laminae of siltstone and very fine-grained greywacke.The thickness does not exceed 80 m.



22. Model of the deposition of the Rozstání Formation on the SE edge of the locality.
1 — dark grey shale with thin intercalations of siltstones, greywackes and limestone pebbles (lowermost Upper Viséan); *2* — Březina Shales (*p* — purple, *g* — green, *b* — black — Lower and Middle Viséan); *3* — nodular limestone (Upper Tournaisian to Lowermost Viséan); *4* — dark grey organodetrital limestone (Middle Tournaisian). Not to scale!

Block F

Upper Vilémovice Limestone

The lithological development equals that in the western part of Block D. Thicknesses are greater than 8 m. There is no paleontological evidence of age (the studied samples were free of any conodont fauna).

Křtiny Limestone

The lithology is similar to that in Block E, but the thickness is reduced even further — only to a few metres. No conodont fauna has been detected so far. The succession became considerably condensed in this block during Famennian times and even a break in deposition cannot be excluded.

Říčka Limestone

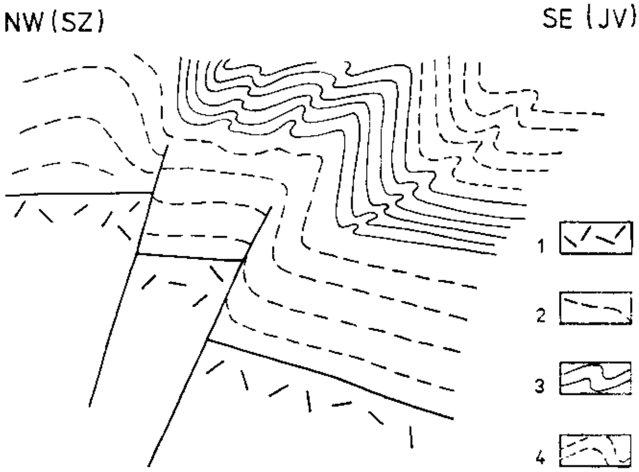
Dark grey, fine to very fine-grained organodetrital limestones containing a poorly preserved conodont fauna near the base. The fauna is indicative of a Tournaisian age (there are no clues to more detailed dating). The thickness of the preserved sequence does not exceed 50 m.

Tectonics

Tectonic movements, mainly vertical ones, exerted a great influence upon the nature of deposition (facies control), but mainly upon the thicknesses of the succession. As the substratum of the Devonian sequence is built of granitoids of the Brno Pluton (dissected by old dislocations of NW—SE and NNE—SSW direction into minor blocks), the Devonian and Carboniferous depositional process reacted to the differing subsidence of small blocks by varied thickness and different lithofacies. This is most marked in the succession following the deposition of the reefal Vilémovice Limestone.

The differing subsidence of blocks A to D in the Famennian, Tournaisian and Viséan time is regular in that the northeastern block always subsided relative to the southwestern block. Block B subsided in the middle and upper Famennian (Říčka Limestone is 200 m thick), Block C in the middle Tournaisian (over 200 m of cherty limestone, organodetrital limestone, Křtiny Limestone), Block D in the upper Tournaisian and lower Viséan (over 100 m of Říčka Limestone, mainly arenaceous limestone and limestone breccia). While no depositional break occurred within the Block D from the Famennian up to the upper Viséan, in Blocks A, B, and C a hiatus occurred between the lowermost Viséan and the upper Viséan (transgression of Rozstání Formation). From the Famennian onward, these blocks came gradually to be dry land (compare Figs. 9—13).

The direction of the main fold and thrust structures is NNE—SSW (compare Fig. 4). As a result of the synsedimentary subsidence of individual partial blocks, dragging and deformation of sediments deposited took place along faults of NW—SE direction. The southwestern blocks, that were relatively rising, were expanding and exerted pressure on unconsolidated sediments of the northeastern blocks. In this way disharmonic folds formed, usually showing a northeastern vergence. This has been proved by both detailed measurements of strata in the quarry faces (compare the geological map, Fig. 1 and sketches of tectonic deformation as observed in the quarry faces of the NNE—SSW direction, comp. Figs. 16—18). Thus e.g. in the western part of Block B, near the contact of the Vilémovice Limestone with the Křtiny Limestone, the strike of the beds is NNE-SSW with a steep dip to the east (the strata may be overturned towards the east). This transition of medium dips of strata, as observed in the Vilémovice Limestone in the westernmost part of the block, into the steep dips at the boundary with the younger units may also be related to a deeper-lying strike fault zone in the granitoids of the Brno Pluton (NNE—SSW direction — comp. Fig. 23). Farther to the southeast, the strike of the strata and fold axes are rapidly changing to a NW—SE direction (the fold axes are mostly dipping SE). At places of contact of limestones with the Rozstání Formation (in the east), the structures regain the NNE—SSW direction (the fold axes dip NNE). This phenomenon was proved in Blocks B and C. The recognized differential block movements taking place in the course of the depositional process, indicate that a great part of the deformation processes took place probably during sedimentation.



23. The structure of the superimposed Devonian and Carboniferous sediments is related to the block pattern of the crystalline basement. The faultlines acted as normal faults during sedimentation and later on they were converted to thrust-faults within the basement and overturned folds within the overlying succession. The disharmonic folding was induced within the mechanically inhomogeneous sequence by a tectonic compression connected with a shortening of the Late Palaeozoic sedimentary basin
1 — Brno granitoid massif of Proterozoic age; *2* — basal clastic formation of Devonian age, Lažánky and Vilémovice Limestones; *3* — Křtiny and Hády—Říčka Limestones; *4* — Březina Shales and Rozstání Formation. Not to scale!

The great increase of thickness of the Rozstání Formation along the eastern margin of Block C, associated with the occurrence of abundant intercalations of limestone conglomerates and blocks of the Říčka Limestone of Tournaisian age, indicate another deep boundary within the Brno Pluton (of NNE—SSW direction); its existence is reflected in the differing nature of deposition within the easternmost partial blocks. So far, there are no sufficient data available to evaluate the nature of deposition in this area and it may only be assumed that no depositional break occurred between the Devonian and the upper Viséan (compare Figs. 6—13).

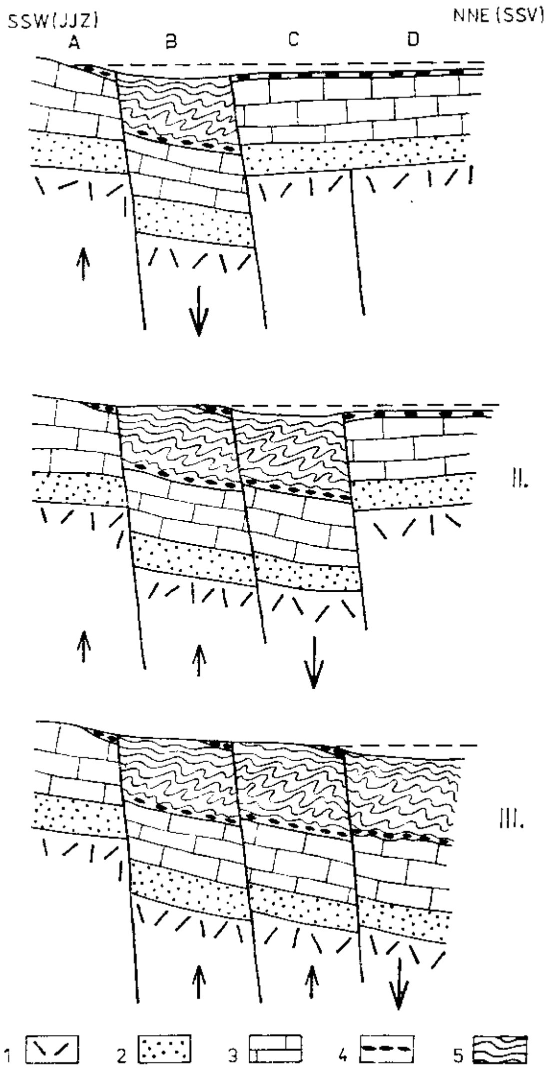
Table 2

Distribution of important forams found in the environs of Mokrá

Foram. zones	Characteristic forams	Belgium		British Isles	Urals (yarus)
11	*Palaeotextularia consobrina, Cribrostomum, abundant Archaediscus, rare Ammarchaediscus, Glomodiscus*	V2b-V3a	VISÉAN	Holkerian	Gubakhinskiĭ Usť-Ilimskiĭ
10	*Tubispirodiscus, Archaediscus, Endothyranopsis, Eoendothyranopsis, Glomodiscus, Uralodiscus, Planoarchaediscus, Ammarchaediscus*	V1b-V2a	VISÉAN	Arundian	Druzhininskiĭ
9	*Omphalotis, Eoendothyranopsis, Globoendothyra, Eoparastafella, Plectogyranopsis, Pseudolituotuba, Pseudolituotubella, Tetrataxis, Eotextularia diversa, Dainella, Florennella, Latiendothyranopsis*	V1a Tn3c	VISÉAN TOURNAISIAN	Chadian Courceyan	Ilychskiĭ Pesterkovskiĭ Kosvinskiĭ
8	*rare Dainella, Florennella, Latiendothyranopsis;* *Spinoendothyra, Brunsia, Pseudoammodiscus, Inflatoendothyra, Eoforschia, Paraendothyra, Spinobrunsiina*	Tn3c	TOURNAISIAN	Courceyan	Kizelovskiĭ
7	*Paraendothyra, Spinobrunsiina, Tuberendothyra, Latiendothyra latispiralis*	Tn3a—b Tn2c	TOURNAISIAN	Courceyan	Kizelovskiĭ Kynovskiĭ
6	*Chernyshinella tumulosa, Chernyshinella glomiformis, Palaeospiroplectamina, Septabrunsiina*	Tn2b Tn2a Tn1b (pt.)	TOURNAISIAN	Courceyan	Kynovskiĭ
5	*Uviella, Quasiendothyra kobeitusana, Quasiendothyra konensis, Quasiendothyra lipinae, Quasiendothyra communis,* *Latiendothyra parakosvensis,* *Septatournayella rauserae,* *Septabrunsiina*	Tn1b (pt.) Tn1a Fa2d Fa2c Fa2b	FAMENNIAN	DEVONIAN	Lytvenskiĭ Kushelginskiĭ Murzakaevskiĭ
4	*unilocular forams, Septabrunsiina, Tournayellidae*	Fa2a Fa1b	FAMENNIAN	DEVONIAN	Makarovskiĭ
3	*Nodosaria, Geinitzina, Multiseptida, Tikhinella,* *Paratikhinella, Tournayellidae*	Fa1a Fr2	FAMENNIAN FRASNIAN	DEVONIAN	Askynskiĭ Mendymskiĭ Domanikovyĭ

The post-depositional tectonic deformation, caused by orogenic pressures generally oriented from west to east (from the Variscan median mass toward the Variscan foreland), are represented by thrusts proved in Block E by the S-1 borehole and in the northern part of Block C by the old V-97 and V-49 boreholes. The existence of thrusts also cannot be excluded in the northwestern part of the Block D but has not been proved yet.

The geological map does not show the thrust proved by the S-1 borehole as it is obscured by a normal fault trending NNE—SSW; the north-



24. Palaeotectonic reconstructions of differential block-subsidence and gravitational disharmonic folding during Upper Famennian (I), Middle Tournaisian (II), and Lower Viséan (III)
1 — Brno granitoid massif; *2* — basal clastic formation; *3* — reef limestones; *4* — nodular limestones; *5* — organodetrital limestones (black cherty limestones, sandy limestones, limestone breccias). A—D — resolvable blocks. Not to scale!

Table 3

Distribution of important conodonts found in the environs of Mokrá

Gnathodus homopunctatus — Mestognathus beckmani Zone (Lower Viséan)	
	Gnathodus delicatus Branson et Mehl *Gnathodus girtyi simplex* Dunn *Gnathodus girtyi sonia* Rhodes, Austin et Druce *Gnathodus texanus* Roundy *Gnathodus typicus* Cooper
Scaliognathus anchoralis Zone (Upper Tournaisian)	
	Hindeodella segaformis Bischoff *Gnathodus girtyi simplex* Dunn *Gnathodus semiglaber* Bischoff *Polygnathus communis carinus* Hass *Pseudopolygnathus* cf. *P. triangulus pinnatus* Voges *Scaliognathus anchoralis* Branson et Mehl
Spathognathodus bultyncki Zone (Upper Tournaisian)	
	Polygnathus communis carinus Voges *Spathognathodus bultyncki* Groessens
Polygnathus communis carinus Zone (Middle Tournaisian)	
	Gnathodus delicatus Branson et Mehl *Gnathodus* cf. G. punctatus (Cooper) *Polygnathus delicatus* Branson et Mehl
Upper part S. — P. triangulus Zone — Lower part Siphonodella crenulata Zone (Lower Tournaisian)	
	Polygnathus inornatus inornatus Branson et Mehl *Polygnathus inornatus nodulatus* Druce *Polygnathus inornatus rostratus* Rhodes, Austin et Druce *Polygnathus purus purus* Voges *Polygnathus purus subplanus* Voges *Polygnathus symmetricus* E. R. Branson *Pseudopolygnathus fusiformis* (Branson et Mehl) *Pseudopolygnathus primus* (Branson et Mehl) *Pseudopolygnathus triangulus triangulus* Voges *Siphonodella cooperi* Hass *Siphonodella duplicata* (Branson et Mehl) *Siphonodella crenulata* (Cooper) *Siphonodella isosticha* (Cooper) *Siphonodella lobata* (Branson et Mehl) *Siphonodella obsoleta* Hass *Siphonodella quadruplicata* (Branson et Mehl) *Siphonodella sulcata* (Huddle)
Bispathodus costatus Zone (Upper Famennian)	
Middle	*Bispathodus aculeatus aculeatus* (Branson et Mehl) *Bispathodus aculeatus* cf. *plumulus* (Rhodes, Austin et Druce) *Bispathodus costatus* (E. R. Branson) *Bispathodus jugosus* (Branson et Mehl) *Bispathodus ultimus* (Bischoff) *Palmatolepis gracilis gonioclymeniae* Müller *Palmatolepis gracilis sigmoidalis* Ziegler *Polygnathus communis communis* Branson et Mehl

Table 3 *(continued)*

Lower	*Bispathodus costatus* (E. R. Branson) *Bispathodus jugosus* (Branson et Mehl) *Palmatolepis gracilis sigmoidalis* Ziegler *Polygnathus communis communis* Branson et Mehl *Polygnathus extralobatus* Schäffer *Polygnathus znepolensis* Spassov
Polygnathus styriacus Zone (Middle Famennian)	
Upper	*Palmatolepis gracilis gracilis* Branson et Mehl *Palmatolepis gracilis gracilis* Branson et Mehl *Palmatolepis perlobata maxima* Müller *Palmatolepis rugosa rugosa* Branson et Mehl *Polygnathus marginatus* Schäffer *Polygnathus styriacus* Ziegler *Polygnathus znepolensis* Spassov
Scaphignathus velifer Zone (Middle Famennian)	
Upper?	*Palmatolepis gracilis gracilis* Branson et Mehl *Palmatolepis* cf. *P. rugosa trachytera* Ziegler *Spathognathodus inornatus* (Branson et Mehl)
Lower	*Bispathodus stabilis* (Branson et Mehl) *Palmatolepis glabra lepta* Ziegler et Huddle *Palmatolepis perlobata schindewolfi* Müller *Polygnathus nodocostatus nodocostatus* BM *Polygnathus nodocostatus ovatus* Helms *Polygnathus Semicostatus* Branson et Mehl *Polygnathus znepolensis* Spassov *Spathognathodus strigosus* (Branson et Mehl)
Palmatolepis marginifera Zone (Lower Famennian)	
Uppermost	*Palmatolepis perlobata schindewolfi* Müller *Palmatolepis perlobata sigmoidea* Ziegler *Polygnathus fallax* Helms et Wolska *Polygnathus lagowiensis* Helms et Wolska
Upper	*Palmatolepis glabra lepta* Ziegler et Huddle *Palmatolepis marginifera marginifera* Helms *Polygnathus glaber glaber* Ulrich et Bassler *Polygnathus glaber bilobatus* Ziegler *Polygnathus nodocostatus* ovatus Helms *Polygnathus perplexus* (Thomas) *Polylophodonta confluens* (Ulrich et Bassler)
Lower	*Icriodus alternatus* Branson et Mehl *Palmatolepis glabra acuta* Helms *Palmatolepis glabra pectinata* Ziegler *Palmatolepis glabra prima* Ziegler et Huddle *Palmatolepis marginifera marginifera* Helms *Palmatolepis quadrantinodosa* Branson et Mehl *Palmatolepis quadrantinodosa inflexa* Müller *Palmatolepis quadrantinodosa inflexoidea* Ziegler *Palmatolepis stoppeli* Sandberg et Ziegler *Polygnathus glaber glaber* Ulrich et Bassler *Polygnathus nodocostatus nodocostatus* Branson et Mehl *Polygnathus triphyllatus* (Ziegler)

Table 3 *(continued)*

Palmatolepis crepida Zone (Lower Famennian)	
Upper	*Palmatolepis crepida* Sannemann *Palmatolepis glabra lepta* Ziegler et Huddle *Palmatolepis glabra prima* Ziegler et Huddle *Palmatolepis minuta loba* Helms *Palmatolepis minuta wolskae* Szulczewski *Palmatolepis quadrantinodosalobata* Sannemann *Palmatolepis* cf. *P. regularis* Cooper *Palmatolepis subperlobata* Branson et Mehl *Palmatolepis tenuipunctata* Sannemann *Palmatolepis termini* Sannemann *Polygnathus procerus* Sannemann
Middle	*Palmatolepis delicatula delicatula* Branson et Mehl *Palmatolepis quadrantinodosalobata* Sannemann *Palmatolepis regularis* Cooper *Palmatolepis* cf. *P. regularis* Cooper *Palmatolepis subperlobata* Branson et Mehl *Palmatolepis tenuipunctata* Sannemann *Palmatolepis termini* Sannemann *Palmatolepis triangularis* Sannemann

western block was repeatedly downfaulted up to the thrust line. On the other hand, the geological map shows the thrust detected by the V-97 borehole; the course of the thrust detected by the V-49 borehole has not been localized because of a thick, weathered mantle.

The majority of blocks shows an inclination towards the northeast conformable with the inclination at the time of deposition; Block F is an exception as it is inclined southwestward. For this reason the greatest thickness of the Křtiny and Říčka Limestone can be expected along the northeastern edges of blocks, together with much more complex fold structures accompanied by thrusts.

The entire Palaeozoic sedimentary succession experienced strong heating, even during the depositional process and soon afterwards. Metamorphism reached the higher meta-anthracite stage. In the course of this process mineralized hot solutions were rising along faults active during the depositional process and affected especially the brittle and very pure Vilémovice Limestone. The mineralization ranges from minute quartz veinlets to more extensive silicification (near the southeastern boundary of A and B Blocks) and galena mineralization (detected in the S-2 borehole) inside thick calcite veins.

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Přeložil J. Petránek

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Geologie paleozoika v okolí lomů mokerské cementárny (Moravský kras)

(Résumé anglického textu)

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Předloženo 10. prosince 1984

Biostratigrafický výzkum konodontové, foraminiferové, korálové a stromatoporoidové fauny umožnil rozpoznat složitý vývoj sedimentace a deformace v jednotlivých drobných krách, ohraničených subvertikálními synsedimentárně fungujícími dislokacemi. Mozaika ker má základ v podložním proterozoickém brněnském granitoidním masívu. Rozdíly v mocnostech a charakteru sedimentace se projevily hlavně po ukončení depozice útesových vilémovických vápenců ve spodním famenu. Kondenzovaný sled hlíznatých vápenců se ukládal během pozvolné regrese moře z míst, kam dospělo během depozice vilémovických vápenců. Na krách s rychlejší subsidencí se ukládaly tmavě šedé lavicovité organodetritické vápence, až 200 m mocné (famen—spodní visé). Nejmladší vápence laterálně přecházejí do červenofialových, zelených i černých březinských břidlic, obsahujících trilobity (spodní—střední visé). Během mořské transgrese ve svrchním visé se ukládaly tmavě šedé prachovité břidlice s laminami prachovců a gradačně zvrstvenými tenkými vložkami drob. Sedimentace byla ukončena račickými slepenci.

Jednotlivé kry klesaly rychleji postupně od JZ k SV: kra B během svrchního famenu, kra C během středního tournai a kra D během svrchního tournai a spodního visé. Jihozápadněji ležící kry se vyznačovaly kondenzovanou sedimentací a vynořením vždy po zrychlené subsidenci. Během sedimentace se jednotlivé kry nakláněly k SV, takže nedávno předtím uložené sedimenty, schopné plastické deformace, byly gravitací hrnuty ve stejném směru. Vznikala tak složitá struktura disharmonických vrás se sv. vergencí, která byla synsedimentárně i později zkomplikována tektogenní kompresí, směřující od Z k V.

Vysvětlivky k tabulkám

Tabulka 1. Stratigrafická tabulka rozlišovaných ker A—F (obr. 3).
1 — terestrické bazální klastické souvrství; *2* — tmavě šedé laminované a lokálně organodetritické vápence; *3* — hlíznaté vápence; *4* — tmavě šedé organodetritické vápence; *5* — černé rohovcové vápence; *6* — písčité vápence až pískovce; *7* — vápencové brekcie; *8* — vápencové slepence; *9* — březinské břidlice; *10* — hiát.

Tabulka 2. Distribuce důležitých foraminifer nalezených v okolí Mokré.

Tabulka 3. Distribuce důležitých konodontů nalezených v okolí Mokré.

Vysvětlivky k obrázkům

1. Odkrytá geologická mapa s. okolí Mokré.
1 — račické slepence (svrchní visé); *2* — rozstáňské souvrství (nejnižší svrchní visé); *3* — březinské břidlice (spodní a střední visé); *4* — vápencové brekcie (tournai, visé); *5* — písčité vápence až pískovce (svrchní tournai—spodní visé); *6* — černé rohovcové vápence (střední tournai); *7* — tmavě šedé organodetritické vápence (střední famen—střední visé); (*4*—*7* — hádsko-říčské vápence); *8* — křtinské vápence (famen—nejnižší visé); *9* — vilémovické vápence (frasn—spodní famen); *10* — terestrické klastické sedimenty (spodní až střední devon?); *11* — vrty; *12* — profily (obr. 4); *13* — kontury lomových stěn; *14* — izohypsy rozhraní mezi bazálními klastickými sedimenty a nadložními útesovými vápenci (lažáneckými a vilémovickými) v metrech nad mořem.
2. Mapa rozlišitelných biostratigrafických jednotek.
1 — svrchní visé; *2* — střední visé; *3* — spodní visé; *4* — tournai; *5* — famen; *6* — frasn; *7* — přerušení sedimentace.
3. Schematická mapa rozlišitelných ker.
4. Geologické řezy.
1 — terestrické klastické sedimenty (spodní až střední devon?); *2* — lažánecké vápence (givet); *3* — vilémovické vápence; *4* — křtinské vápence; *5* — organodetritické vápence; *6* — písčité vápence až pískovce; *7* — vápencové brekcie; *8* — černé rohovcové vápence; (*5*—*8* — hádsko-říčské vápence); *9* — březinské břidlice; *10* — vápencové brekcie v březinských břidlicích; *11* — rozstáňské souvrství; *12* — vápencové úlomky a valouny v rozstáňském souvrství; *13* — račické slepence.
5. Paleofaciální schéma svrchního givetu.
1 — předpokládané pobřeží; *2* — předpokládané pobřeží ve spodním givetu; *3* — terestrické červenofialové arkózy a slepence; *4* — tmavé vápence se stromatoporoidovou faunou (lažánecké vápence); *5* — směr transgrese.
6. Paleofaciální schéma spodního famenu (zóna Palmatolepis crepida).
1 — předpokládané pobřeží; *2* — světle šedé vápence se stromatoporoidovou a korálovou faunou (vilémovické vápence); *3* — tmavě šedé laminované a místy organodetritické vápence; *4* — hlíznaté vápence; *5* — směr regrese.
7. Paleofaciální schéma středního famenu (zóna Palmatolepis marginifera).
1 — předpokládané pobřeží; *2* — hlíznaté vápence; *3* — krinoidové vápence; *4* — směr regrese.
8. Paleofaciální schéma svrchního famenu (zóna Bispathodus costatus).
1 — předpokládané pobřeží; *2* — hlíznaté vápence; *3* — tmavě šedé organodetritické vápence; *4* — směr regrese.

9. Paleofaciální schéma spodního tournai.
1 — předpokládané pobřeží; *2* — hlíznaté vápence; *3* — tmavě šedé organodetritické vápence; *4* — směr regrese.
10. Paleofaciální schéma středního tournai.
1 — předpokládané pobřeží; *2* — hlíznaté vápence; *3* — černé rohovcové vápence; *4* — tmavě šedé organodetritické vápence; *5* — směr regrese.
11. Paleofaciální schéma svrchního tournai a spodního visé.
1 — předpokládané pobřeží; *2* — písčité vápence až pískovce s vložkami vápencových brekcií; *3* — jen místy písčité organodetritické vápence; *4* — tmavě šedé organodetritické vápence; *5* — hlíznaté vápence; *6* — vložky vápencových brekcií v hlíznatých vápencích; *7* — směr přínosu klastického materiálu do pánve; *8* — směr regrese; *9* — redepozice spodnofamenských konodontů.
12. Paleofaciální schéma středního visé.
1 — předpokládané pobřeží; *2* — tmavě šedé organodetritické vápence; *3* — vápencové brekcie; *4* — převládající červenofialové břidlice; *5* — převládající zelené břidlice; *6* — převládající černé břidlice; *7* — pískovce na bázi; *8* — směr regrese.
13. Paleofaciální schéma nejnižšího svrchního visé.
1 — předpokládané pobřeží; *2* — tmavě šedé prachovité břidlice s tenkými vložkami prachovců a drob; *3* — vápencové valouny v břidlicích; *4* — vápencové olistolity; *5* — směr transgrese.
14. Profil vrtem Mokrá V-35 se stromatoporoidovou faunou.
15. Schematická mapa stěn lomů (situace v roce 1983) s lokalizací nákresů A—F (obr. 16—21).
16. Nákres dislokačního kontaktu mezi bloky B a C.
1 — hlíznaté vápence (tournai); *2* — tmavě šedé organodetritické vápence (svrchní famen) (A na obr. 15).
17. Nákres disharmonického vrásnění organodetritických vápenců (svrchní famen). Čísla — směr sklonu vrstev a jeho velikost (B na obr. 15).
18. Nákres disharmonického vrásnění hlíznatých (*1*) a organodetritických (*2*) vápenců se ssv. vergencí (C na obr. 15).
19. Nákres prstovitého zastupování tmavě šedých břidlic, prachovců a drob (*1* — rozstáňské souvrství), zelených břidlic (*2* — březinské břidlice) a vápencových slepenců (*3*). Odkryv ilustruje postupnou transgresi moře k JJZ (D na obr. 15).
20. Nákres znázorňující vztah mezi organodetritickými vápenci (*1* — svrchní famen), vápencovými brekciemi (*2*) a hlíznatými vápenci (*3* — tournai). Ve vápencové brekcii byla nalezena redeponovaná konodontová fauna stáří spodního famenu (E na obr. 15).
21. Detailní stratigrafický profil vápenci famenského stáří.
1 — šedé organodetritické vápence, přecházející do mikritových v každé vrstvě; *2* — biomikrity, obsahující cefalopody; *3* — šedé hlíznaté vápence; *4* — oolitické železné rudy a vápence; *5* — světle šedé až šedé celistvé mikritové vápence; *6* — světle šedé laminované vápence; *7* — černé rohovce (F na obr. 15).
22. Model ukládání rozstáňského souvrství na jv. okraji lokality.
1 — tmavě šedé břidlice s vložkami prachovců a drob a valouny vápenců (nejnižší svrchní visé); *2* — březinské břidlice (*p* — červenofialové, *g* — zelené, *b* — černé — spodní a střední visé); *3* — hlíznaté vápence (svrchní tournai až nejnižší visé); *4* — tmavě šedé organodetritické vápence (střední tournai). Bez měřítka.
23. Vztah struktur v devonských a karbonských sedimentech ke kerné stavbě krystalinika podkladu. Dislokace fungovaly jako poklesové během sedimentace a později se změnily na násunové v podkladu a překocené vrásy v nadložním sledu. Dishar-

monické vrásnění v mechanicky nehomogenních vrstvách bylo způsobeno tektonickým stlačením, které doprovázelo zkrácení pozdně paleozoické sedimentační pánve.

1 — brněnský granitoidní masív proterozoického stáří; *2* — bazální klastické souvrství devonského stáří, lažánecké a vilémovické vápence; *3* — křtinské a hádsko-říčské vápence; *4* — březinské břidlice a rozstáňské souvrství. Bez měřítka.

24. Paleotektonická rekonstrukce rozdílné subsidence ker a gravitačního disharmonického vrásnění během svrchního famenu (I), středního tournai (II) a spodního visé (III).

1 — brněnský granitoidní masív; *2* — bazální klastické souvrství; *3* — rifové vápence; *4* — hlíznaté vápence; *5* — organodetritické vápence (černé rohovcové vápence, písčité vápence, vápencové brekcie). A—D — rozlišované kry. Bez měřítka.

Vysvětlivky k fotografiím

Příl. I

1. Mokrá, z. lom. Na bázi odkryvu vilémovické vápence (nejnižší famen), uprostřed křtinské vápence (spodní až svrchní famen) a hádsko-říčské vápence v nejvyšší části odkryvu (svrchní famen).
2. Mokrá, v. stěna s. etáže lomu. Dislokace mezi krami B a C. Svisle stojící vrstvy (hádsko-říčské vápence, svrchní famen) napravo a zvrásněné a dislokované mikritové vápence (křtinské vápence, spodní tournai) na levé straně.

Příl. II

Mokrá, v. lom. Velký blok organodetritických vápenců tournaiského stáří svisle stojící v dokonale vrstevnatých břidlicích a drobách, které se střídají (rozstáňské souvrství, svrchní visé).

Příl. III

1. Mokrá, v. část s. etáže lomu. Vápencové brekcie s černými fosforitovými konkrecemi (svrchní tournai).
2. Mokrá, z. část s. etáže lomu. Dokonale vrstevnaté hlíznaté mikritové vápence (křtinské vápence, spodní tournai). Překocená vrása se ssv. vergencí.

Příl. IV

Mokrá, s. etáž lomu. Dokonale vrstevnaté černé vápence se silicity (hádsko-říčské vápence, střední tournai). Kufrovitá antiklinála.

Všechny fotografie J. Dvořák

Геология палеозоя в окрестностях карьеров цементного завода Мокра

Биостратиграфические исследования вместе с использованием данных по буровым скважинам и регионально-структурная система предоставили возможность начертить картину геологического развития окрестностей м. Мокра. Область изучения разделяется на 6 глыб, имеющих каждая отдельно принципиальное влияние на осадкообразование и тектонику в период с нижнего фаменского яруса по визе. До фаменского времени вся область обладала единым характером. Вертикальными тектоническими движениями контролировались фациальное развитие и мощности осадочных пород, залегающих на основании, образованном брненским гранитоидным массивом. Горячие минеральные растворы восходили по синседиментационно действующим разломам.

Přeložil A. Kříž