Coloquios de Paleontología, n.° 45. Editorial Complutense, Madrid, 1993

Lower Palaeozoic of the Barrandian area (Czech Republic) - a review

Petr STORCH*, Oldrich FATKA* & Petr KRAFT*

I. INTRODUCTION

In the Bohemian Massif (central Europa) the only nonmetamorphosed, weakly tectonized, and almost complete Lower Palaeozoic sequence is preserved in so called Barrandian area. In fact, the Barrandian area is composed of sedimentary and volcanic complexes of three superimposed basin, each of them representing a distinct tectonostratigraphical megacycle.

The first, Proterozoic, megacycle was terminated by tectonic and metamorphic processes of the Cadomian Orogeny. Small part of the former, very large Proterozoic basin has been preserved till now in central and western parts of Bohemia, and forms the Precambrian basement of all the Palaeozoic rocks.

In the Lower Cambrian, a new, entirely different basin originated in the Barrandian area. It is characterized by mostly continental (except of Middle Cambrian marine ingression) clastic sediments and may be roughly interpreted as a post-orogenic intermountain depression. Volcanism, tectonic uplift, and subsequent erosion terminated the second megacycle towards the end of Cambrian.

Ordovician history of the Barrandian area begins with Tremadocian transgression which flooded both the Precambrian basement and, in part, the former Cambrian deposits. Due to the rapid development and subsidence of linear, tectonically controlled, synsedimentary depression, a continuous Ordovician Middle Devonian marine sequence of the so called Prague Basin has been preserved. The Ordovician Middle Devonian strata of the Prague Basin belong to the third tectonostratigraphical megacycle.

* Czech Geological Survey, Malostranské nám. 19, Praha 1, Czech Rep.

During the Variscan Orogeny, the Lower Palaeozoic sequences of the Barrandian area, together with their Precambrian basement, were folded, faulted, uprised, and then eroded.

The Barrandian area is well known to the geologists as one of the classical regions of the European Lower Palaeozoic. Varied lithofacies and biofacies of its almost complete Cambrian-Middle Devonian sequence contributed greatly to the present knowledge of the early Palaeozoic part of the Earth's history. Many thousands taxa of marine fossils have been described from the Barrandian Lower Palaeozoic since the first studies of Joachim Barrande. Rich and diverse faunas, and complete sections, provided a good basis for the detailed stratigraphy and correlation of the sequence. Type sections of several standard chronostratigraphic units were approved in the Barrandian area (Silurian-Devonian boundary, Prídolí, Lochkovian, Pragian).

Due to great difficulties in correlation of Bohemian, and not only Bohemian, Ordovician succession with the classical British scale, three of British series (Llandeilo, Caradoc, Ashgill) were substituted by local, "Mediterranean" series (Dobrotivá, Beroun, Dráluv Dvur, Kosov). Some authors take the Ordovician series as stages as they have not yet been officially standardized.

II. PRECAMBRIAN BASEMENT

The oldest rocks of the Barrandian area were deposited during the Precambrian tectonostratigraphic megacycle and can be correlated with the upper Riphean and Vendian sequences in age. The correlation is based on microphytoplankton occurrences. Both the beginning and the end of the megacycle are poorly dated, however, in the Barrandian area.

According to the recent investigations, the Precambrian sedimentation took place on the oceanic crust. Several kilometres thick complex of greywackes, siltstones, claystones, conglomerates, and spilitic volcanites was folded, slightly metamorphosed rised up in course of Cadomian Orogeny. Rather complicated structural and lithological development of the Barrandian Precambrian (Proterozoic) beds lead the specialists to create several, not yet unified stratigraphical interpretations of the sequence.

One group prefers to discern three-step stratigraphical scheme (consisting of the Blovice-Teplá, the Davle, and the Dobrís groups), other specialists prefer the two-step stratigraphical scheme (discerning the Kralupy-Zbraslav and Stechovice groups), and one author produced the stratigraphical scheme which includes six «series».

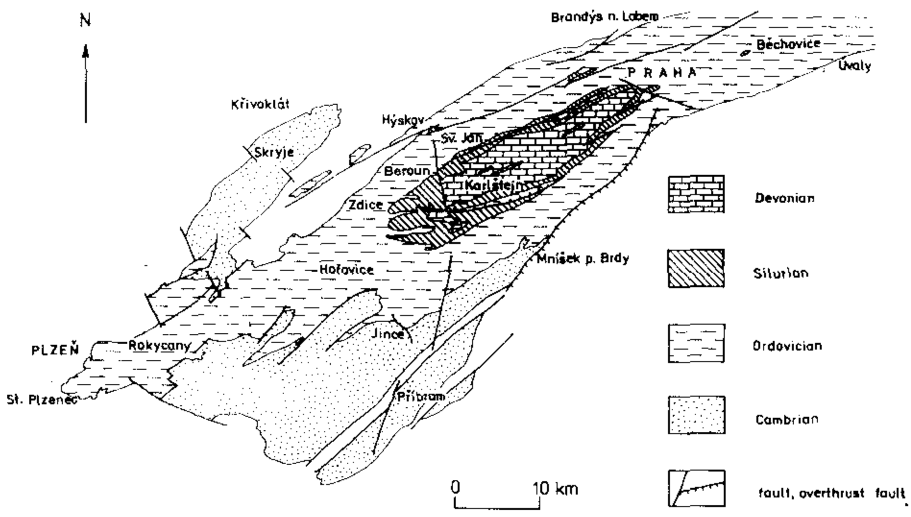

Figura 1.—*Sketch map of the Lower Palaeozoic of Barrandian area.*

III. THE CAMBRIAN

The second oldest megacycle is represented by Cambrian deposits. At present the Cambrian rocks are preserved in two separated regions -in the so called Príbram-Jince Basin and in the Skryje-Tyrovice area (fig. 1). In the Príbram-Jince Basin the Lower Cambrian rocks were deposited on the Precambrian basement with a pronounced angular disconformity as did the Middle Cambrian rocks in the Skryje-Tyrovice area. As oppose to completely marine deposits of Precambrian basement and the Ordovician-Devonian rocks of the Prague Basin, the sedimentary sequences of the two Cambrian outcrop areas are characterized by prevalence of continental, non-marine deposits. The sedimentation continued up to the Upper Cambrian in the much more extensive Príbram-Jince Basin. It is followed by rhyolite-andesite, partly subaerial, volcanic Strasice Complex. In the Skryje-Tyrovice area, the sedimentation was restricted to the Middle Cambrian, being succeeded by mostly subaerial rhyolite-andesite volcanites of Krivoklát-Rokycany Complex.

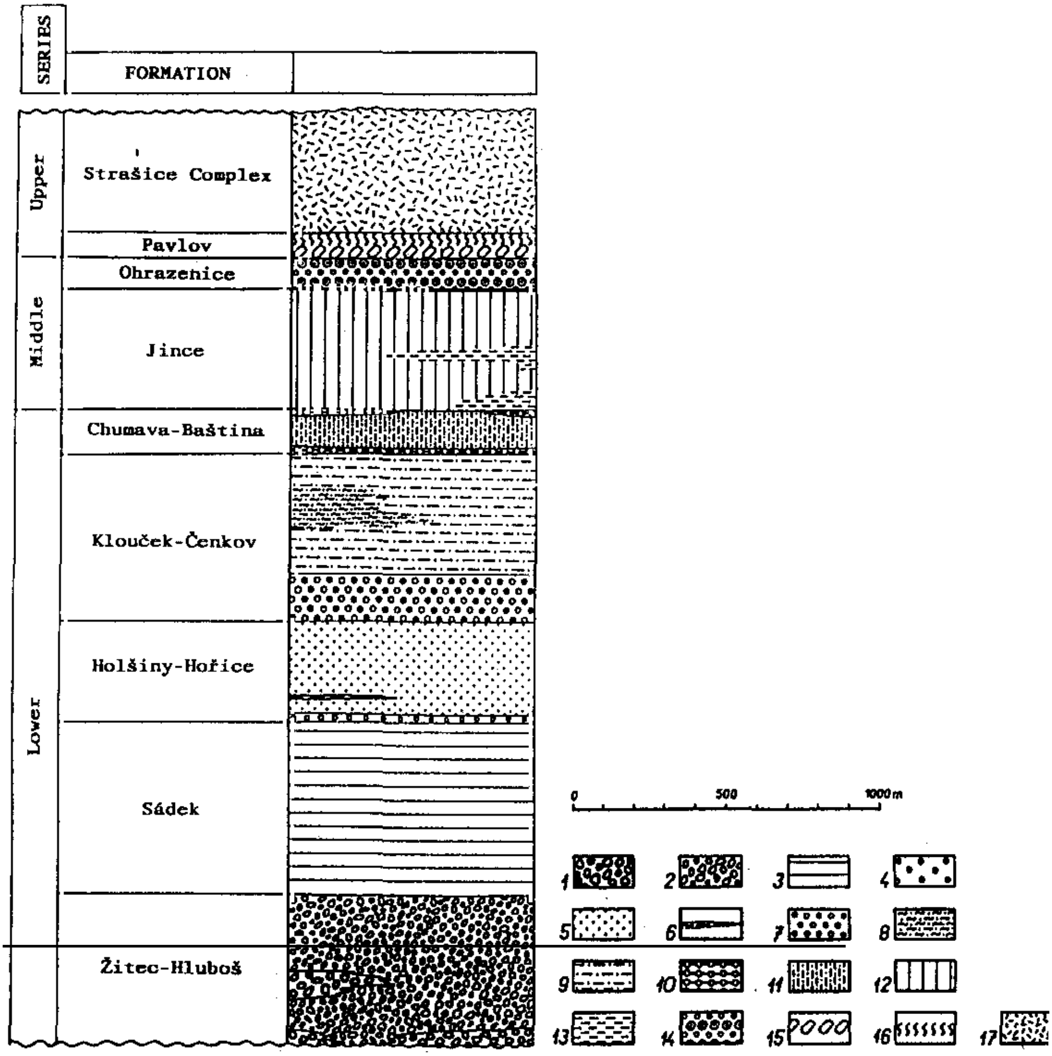

Figura 2.— *Stratigraphic chart of the Cambrian sequence of the Príbram-Jince Basin. (Modificated after HAVLICEK, 1971).*

1, Zitec Conglomerates; 2, Hublos Conglomerates; 3, Sádek Sandstones; 4, Holsiny Conglomerates; 5, Horice Sandstones; 6, Paseky Shales; 7, Kloucek Conglomerates; 8, Cenkov Sandstone (grey); 9, Cenkov Sandstones (reddish-brown); 10, Chumava Conglomerates; 11, Bastine Sandstones; 12, Jince Formation (shales, siltstones, finegrained greywackes); 13, Jince Formation (Quartzose sandstones); 14, Ohrazenice Formation (conglomerates); 15, Pavlovsko Formation (conglomerates); 16, Pavlovsko Formation (subarkoses); 17, andesites and basalts of Strasice Complex.

Príbram-Jince Basin

The sedimentation was confined to a rather narrow, tectonically predisposed intermountain depression. The longitudinal axis of the basin strikes at 40-45x. The Lower Cambrian sequence consists mostly of conglomerates, various sandstones, and subgreywackes. They were deposited under a continental environment, in alluvial plains and fans, stream channels, lakes and bays. Rapid subsidence of the basin as well a probably high relief of the surrounding landscape resulted in a rapid sedimentation of up to 2000 m thick deposits of the Lower Cambrian age.

Stratigraphic scheme reflects more or less regular interchange of coarser (conglomerates) and finer (sandstones) sediments. Each of the cycles was classified as formation which, as a rule, consists of two members.

The base of Middle Cambrian is marked by probably rapid marine transgression in the Príbram-Jince Basin. The sequence is composed of shales, siltstones, fine greywackes, and sandstones. Regression followed before the end of the Middle Cambrian.

The Upper Cambrian is represented by local sedimentation of sandstones succeeded by partly subaerial acid to intermediate volcanites.

Most of the Cambrian sequence is non- or sparsely fossiliferous. Both the Lower and Upper Cambrian deposits are not dated by fossils, as oppose to the Middle Cambrian ones which contain a rich and diverse fauna.

Zitec - Hlubos Formation

This formation rests with a prominent angular disconformity on the underlying Precambrian rocks. Two members, greenish Zite Conglomerates and reddish Hlubos Conglomerates with material of local origin (Precambrian greywackes, shales, lydites and spilitic volcanites) supplied by short streams. The complete thickness of the formation ranges from 100 to 600 m.

Sádek Formation

Unfossiliferous sediments of this formation are formed by subarkoses, subgreywackes, and greywackes with a clay matrix. Shales and conglomerates are rare. The thickness ranges from 250 to 1200 m.

Holsiny-Horice Formation

The older of the two members - Holsiny Conglomerates is formed by well sorted, largely monomictic, locally tuffitic quartzose conglomerates, having usually a sharp contact with the underlying Sádek Formation.

The Horice Sandstones are light-grey quartzose sandstones with subordinate greywackes.

Locally 5-10 m thick greenish claystones of Paseky Shales are developed in the lower part of the Holsiny-Horice Formation. The Paseky Shales represent the only fossiliferous level within the sandy and conglomeratic Lower Cambrian sequence. They yield an aglaspid merostome *Kodymirus vagans* and three other, yet undescribed crustaceans, associated with diversified cyanobacterial and phytoplankton assemblage.

Kloucek-Cenkov Formation

Unfossiliferous, polymictic, poorly sorted Kloucek Conglomerates are replaced laterally by finer but otherwise almost identical Cenkov Sandstones. Rhyolite tuff layers occur in some places. Thickness of the formation ranges between 400 and 800 m.

Chumava-Bastina Formation

Well sorted, white to grey, monomictic Chumava Conglomerates are laterally replaced by greywackes, subarkoses and sandstones of the Bastina Sandstones. Common layers of massive rhyolite and andesite tuffs are known from the western part of the basin. The common thickness of the formation ranges from 120 to 900 m.

Jince Formation

Up to 450 m thick Jince Formation is the only richly fossiliferous formation of the Príbram-Jince Basin. Highly diverse fauna which is common throughout the whole Jince Formation made possible precise dating and correlation. The sequence begins with the early Middle Cambrian trilobite biozones and terminates with late Middle Cambrian faunas.

Greywackes and sandy shales, prevailing in the lower and upper parts of the formation, are replaced by fine-grained greywackes and shales in the medial part of the sequence. Shaly layers contain diversified phytoplankton associated with locally common and diverse macrofauna (trilobites, hyolithids, echinoderms, brachiopods, ostracods, worms, trace fossils) and algae.

Symmetrical succession of the faunal assemblages fits well with an ideal transgressive-regressive marine cycle. Inarticulate brachiopod assemblages are known from the oldest and youngest layers, assemblages of diverse polymerid trilobites (*Acadolenus, Paradoxides, Conocoryphe, Ptychoparia* a.o.) appeared in deeper, medial part of the sequence. The time of the maximum regression is documented by stratigraphically limited presence of agnostid-dominated assemblage (*Onymagnostus, Hypagnostus, Tomagnostus*) in about the first third of the cycle. Macrofauna, mainly trilobites, enable to recognize 11 biozones and horizons, some of them well correlatable with those established in Scandinavia and Spain.

Ohrazenice Formation

Usually sharp lithologic boundary separates unfossiliferous, well sorted monomictic quartzose conglomerates and sandstones of the Ohrazenice Formation, from the underlying, shales of Jince Formation. Abundant blocks of Cambrian effusives as well as felsite bodies occur at some outcrops. The thickness of the formation ranges from 100 to 250 m.

Pavlovsko Formation

The last of the Cambrian formations is characterized by unfossiliferous, reddish polymictic conglomerates with a predominance of lydite and rhyolite-andesite pebbles. The area of sedimentation moved to the westernmost part of the PríbramJince Basin. It reflects pronounced palaeogeographic changes accompanying the tectonic and volcanic processes in the Upper Cambrian.

The following, extensive volcanic activity produced both the local Strasice Complex and the adjacent Krivoklát-Rocycany Complex. The Pavlovsko Formation reaches nearly 250 m in thickness.

Strasice Complex

The Upper Cambrian volcanism produced up to 500 m thick succession of andesites, basaltic andesites, and basalts which crop out in the northwestern part of the Príbram-Jince Basin. So called Strasice Complex is more alkaline, in general, than Krivoklát-Rokycany Complex situated northwards of the basin.

Skryje-Tyrovice area

In the Skryje-Tyrovice area the Middle Cambrian sediments are overlain, with an erosional disconformity, by Upper Cambrian rhyolitic and andesitic volcanites of the Krivoklát-Rokycany Complex. In age the Cambrian sediments of the Skryje-Tyrovice area equal only to the lower and middle parts of the Jince Formation of Príbram-Jince Basin.

The following five lithostratigraphical units were established in the Skryje-Tyrovice area:

Milec Sandstones.—Monomictic, grey, coarse sandstones to conglomerates with not too diversified and fragmentary trilobites, brachiopods and gastropods.

Tyrovice Conglomerates.—Grey polymictic conglomerates and greywackes with rare brachiopods and trilobites.

Skryje Shales.—Greenish-grey shales with local sandy and silty layers. They are typical by rich and diversified macrofauna (trilobites, brachiopods, hyolithids, echinoderms) and usually poorly preserved phytoplankton.

Vosník Conglomerates.—Unfossiliferous polymictic conglomerates which form usually two, or more, layers within the Skryje Shales.

The whole sequence is terminated by volcanites of the Krivoklát-Rokycany Complex. Four volcanic periods gave origin to up to 1500 m thick succession of rhyolites, rhyodacites, dacites and andezites. Often brecciated lavas, ignimbrites, and tuffs were mostly produced by subaerial composite volcanoes in the Krivoklát-Rokycay Complex.

The present knowledge about the Barrandian Cambrian is based on the following papers: stratigraphy HAVLICEK (1971), HAVLICEK (1992a), lithology KUKAL (1971), fauna and biostratigraphy SNAJDR (1958), MERGL and SLEHOFEROVA (1990), SDZUY (1972), FATKA and KORDULE (1992), palaeogeography - KRS et al. (1987).

Prague Basin

Since Tremadoc times (basal Ordovician) the new marine transgression attained the Barrandian area. The newly originated Prague basin was tectonically predisposed. Its longitudinal axis was given by subsiding tectonic zone of SW-NE direction, and striked at about 20° to the former, Cambrian, Príbram-Jince Basin.

The sedimentation persisted up to the Middle Devonian without any prominent breaks. Ordovician strata are typical by siliciclastic deposits which are replaced by limestone facies since about the middle of Silurian. The limestone Devonian sedimentation terminated by siliciclastic flysh deposits in course of Givetian. The youngest deposits are preserved in the centralmost part of the sinclinorium of the Prague Basin.

Repeated, tectonically predisposed submarine volcanism produced large but local accumulations of alkaline basalt lavas, hyaloclastites (granulates) and tuffs.

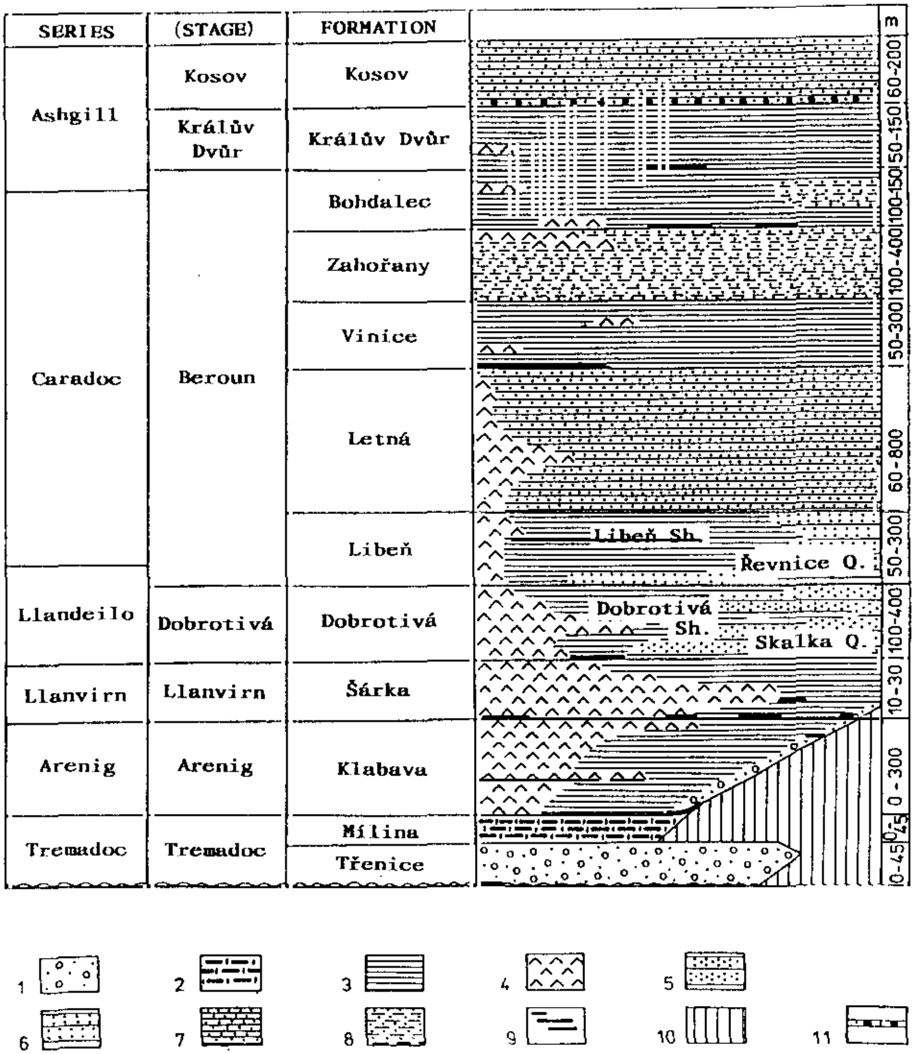

Figura 3.—*Stratigraphic chart of the Ordovician sequence. (After CHLUPAC et al., 1992).*

1, conglomerates, greywackes and sandstones; 2, cherts; 3, shales; 4, basaltic volcanites; 5,6, quartzose sandstones; 7, alternation of sandstones, greywackes and siltstones; 8, silty shales and siltstones; 9, sedimentary iron ores; 10, stratigraphical hiatus; Sh. shales; Q., quartzites.

IV. ORDOVICIAN

The lower Tremadocian sea penetrated into a narrow, newly originated, depression of the Prague Basin. Beginning with the Arenig the synsedimentary tectonic differentiation of the basin gave origin to several segments parallel to the longitudinal axis of the basin. Further synsedimentary differentiation, perpendicular to the longitudinal axis, produced another two segments: less subsiding southwestern segment, and more subsiding northeastern segment, characterized by greater thickness of the sediments. The basin extended outside the central depression since about the Llanvirn.

The Ordovician succession of the Prague Basin is typical by alternation of shaly and sandy facies. Time to time the distal parts of shallow-water sandstone facies, reached even the central depression of the basin. In general, however, the central depression of the Prague Basin is characterized by black clayey shales since the beginning of the Llanvirn (Sárka Fm.) till the upper Beroun (Bohdalec Fm.). Several iron ore horizons are present. Usually they are used as basal markers of the lithostratigraphic units.

The shallow sea which flooded the Barrandian area was situated at the northern periphery of Gondwana continent in Ordovician. It was populated by a «Mediterranean Province» fauna, reflecting cold or cool temperate climatic conditions. The fauna is very close to that of other peri-Gondwanian regions (Spain, France, Sardinia, Italian-Austrian Carnic Alps). also the topmost Ordovician glacial event accompanied by prominent glacio-eustatic regression is well recorded in the topmost Ordovician Kosov Formation in the Prague Basin.

Extensive Ordovician basalt volcanism was concentrated mostly to Komárov Complex. It began in the Arenig and persisted up to the uppermost part of Beroun. The maximum volcanic activity is documented from Llanvirnian and upper Berounian strata. The maximum thickness reaches nearly 1000 m. The Ordovician deposits are up to 2500 m thick, including the volcanics.

The Ordovician of the Prague Basin is subdivided into 7 stages (or series according to some authors) with 12 formations.

Trenice Formation

At that time the Prague Basin originated as a narrow and shallow depression without the axial deepening, bordered by emerged elevations. A deep central depression appeared first in the Arenig. The Trenice Formation is built predominantly by quartzose sandstones, greywackes, and arkoses, with local iron ore lenses. Dominance of inarticulate brachiopods accounts for the environmental conditions unfavourable for marine fauna. An abundant fauna (trilobites, brachiopods, cystoids) is confined to iron ore lenses only. The anomalous environment of the chemical sedimentation, in which the iron ore lenses originated, was favourable to the marine fauna. The formation is up to 30 m thick.

Mílina Formation

In the Upper Tremadoc, the Prague Basin became shallower and narrower (on the territory of Prague the sea was less than 8 km wide). It reflects the *Ceratopyge* regressive Event. At that time the Prague Basin had a lagoonal character with a prevalence of chemical sedimentation. Chert beds represent 50% of the total thickness (up to 35 m) of the formation. Unfavourable living conditions continued. The fauna is dominated by inarticulate brachiopods whilst the other groups (trilobites, articulate brachiopods) are rare.

Klabava Formation

In the Arenig the flooded area increased greatly and the sea spreads to the SW. Due to the tectonic activity the basin differentiated into a few, narrow, longitudinal segments. Eustatic transgression, correlatable with the Hunnebergian transgressive Event, and rising zones flanking the basin, caused replacement of the Tremadocian chemical sedimentation by a clastic one since the beginning of the Arenig. Principal lithofacies - grey-green shales, red shales and greywackes (so called «Olesná Beds»), redeposited tuffs and tuffites, differ, each from other, in their fossil content as well.

Up to 300 m thick Klabava Formation is poor in fossils. the green shales contain mainly graptolites and inarticulate brachiopods, other fauna is local and rare. Fauna of tuffs, tuffites and red shales consists nearly exlusively of inarticulate and articulate brachiopods. Biostratigraphy and correlation of the Bohemian Arenig sequence is based mainly on graptolite fauna. Well preserved and diversified acritarchs, chitinozoans, and conodonts which also have a great correlative potential, were found in the Klabava Formation.

Sárka Formation

The early Llanvirn is characterized by a drastic changes in sedimentation. Striking sea transgression flooded the surrounding pre-Ordovician elevations. Prominent iron ore horizon is usually developed at the base of black silty shales of Sárka Formation. Submarine basalt volcanism of the Komárov Complex, which began in the early Klabava Formation, culminated in the Sárka Formation and the associated volcanosedimentary depostis reached their widest distribution. Highly diverse fauna of the formation is best preserved in siliceous concretions (so called «Rokycany or Sárka spheres»). These concretions weathered out from the shales, than are concentrated in soil and can be collected like potatoes. The fauna is also present in shales, but poorly preserved due to flattening. Apart from about 50 trilobite species (*Placoparia, Ectillaenus, Selenopeltis, Pricyclopyge, Asaphellus* a.o.), echinodermes, gastropods, bivalves, ostracodes, brachiopods and other fauna are abundant. The Sárka Formation attains 250-350 m in thickness in the northeastern part of the basin.

Dobrotivá Formation

Facies patterns of the Dobrotivá Formation differ from those of Sárka Formation. In the central part of the basin, the clayey sedimentation crossed the Llanvirn-Dobrotivá boundary. In the marginal parts of the basin, quartzose sandstones (Skalka quartzites) may occupy the whole thickness of the Dobrotivá Formation. Large accumulations of hyaloclastites and tuffs of the Kovárov Complex are confined to about the same area as those of Llanvirn age. Locally, the shales contain diverse and abundant fauna, clearly evolved from the fauna of Sárka Formation. Quartzites are characterized by common trace fossils of Tigillites Ichnofacies and almost full absence of skeletal fossils.

The maximum thickness of the formation (350 m) is reached in the black shale facies of the central depression.

Liben Formation

Lithofacies of the Liben Formation are very similar to those of the Dobrotivá Formation. Black-shale facies of the Liben Formation is widely distributed throughout the basin. The second facies - Revnice Quartzites, was deposited mostly at extensive shallows surrounding the central depression with shaly sedimentation. In the western part of the basin, the quartzites built the whole thickness of the formation (several tens of meters). The fauna much differs from that of the Dobrotivá Formation. Frequently crushed fossils are restricted to quartzites with clay-galls. The black shales are almost unfossiliferous in contrast to those of the Dobrotivá Formation. Black Liben Shales are nearly 200 m thick in the Prague territory.

Letná Formation

The flysh-like Letná Formation is formed by up to 600 m thick sequence of sandstones and greywackes alternating with shales and siltstones. The alternation is explained by fluctuated supply of clastic material. Locally common fauna is closely related to that of the Liben Formation. Trilobites (*Eccoptochile,* *Dalmanitina*), brachiopods (*Drabovia,* a.o.), molluscs, conularids a.o. are confined generally to greywackes and sandstones.

Vinice Formation

The beginning of the Middle Beroun is characterized by a moderate deepening of the basin. In contrast to the earlier formations, no near-shore sediments have been preserved. The bulk of this formation (20-450 m) consists of black clayey shales with variable silty and sandy admixture, rich in organic matter. Nucice iron ore Horizon is developed, as a rule, at the base of the formation. The fauna is closer to the next Zahorany Formation than to the preceding Letná Formation. Trilobites, bivalves, gastropods, and hyolithids are present but not too diversified in shales. A specific faunal assemblage with echinoderms and brachiopods occurs in the iron ore horizon.

Zahorany Formation

The Zahorany Formation is preserved only in the central part of the basin. It is 70-400 m thick sequence of siltstones and silty shales with rare intercalations of silty sandstones. The rocks are characterized by numerous trace fossils of the *Zoophycos* Ichnofacies. Benthic fauna of the Zahorany Formation is close to that of the Vinice Formation but much more diverse. It is characterized by trilobites (*Primaspis, Selenopeltis, Nobiliasaphus, Flexicalymene, Dalmanitina,* a.o.), echinoderms (*Echinosphaerites, Aristocystites, Craterina* a.o.), brachiopods, bivalves, gastropods.

Bohdalec Formation

The Bohdalec Formation, as a rule, is composed of up to 550 m thick, dark grey, clayey shales. The so called Polyteichus Facies consists of siltstones alternating with silty and clayey shales. It is confined to the Prague territory. the fauna of the Bohdalec Formation is clearly derived from that of the Zahorany Formation. It comprises trilobites (*Eudolatites, Kloucekia, Selenopeltis* a.o.), brachiopods (*Svobodaina, Rafinesquina* a.o.), bivalves, gastropods, graptolites, and hyolithids. The *Polyteichus* Facies is typical by bryozoans associated with crinoids.

Králuv Dvur Formation

The Králuv Dvur Formation is confined to the central part of the basin. It consists of 25-200 m thick grey or green clayey shales with silty admixture. Faunal assemblages of the Králuv Dvur Formation differ considerably from those of the Bohdalec Formation and thus the boundary between Beroun and Králuv

Dvur is faunistically very prominent. The new fauna is clearly enriched by Baltoscandinavian elements. The sessile and vagrant benthos are represented by rich trilobites (40 species), abundant bivalves, hyolithids, gastropods, brachiopods a.o. The fauna is not uniformly distributed in this formation. Benthic forms are local as oppose to widely distributed planktonic forms (graptolites, some inarticulate brachiopods).

Kosov Formation

The beginning of the Kosov formation coincides with a drastic change over in sedimentation. The clayey sediments of the Králuv Dvur Formation are overlain by glacimarine diamictites (coarse sandstones with scarcely disseminated pebbles). The next, principal part of the 40 -150 m thick Kosov Formation is characterized by shallow-water, storm-influenced sequence of quartzose sands-

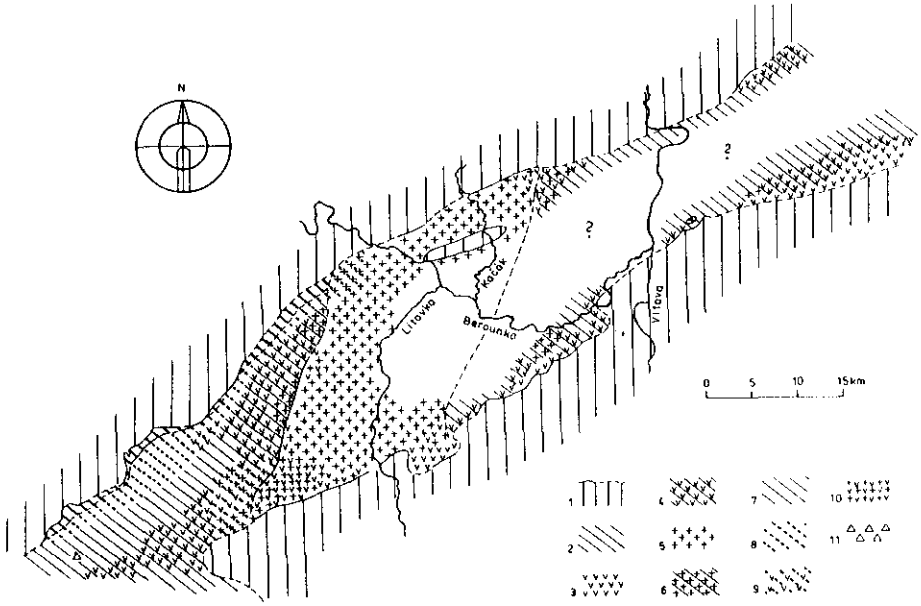

Figura 4.—*Lower Ordovician facies distribution (exemplified by the Klabava Formation). (After CHLUPAC et al., 1992).*

1, proposed land; 2, grey and grey-green shales; 3, red shales, siltstones and greywackes; 4, alternation of red and green shales (red beds are more common in the lower part of sequence); 5, basaltic volcanites of the Komárov Complex; 6, alterned tuffs and shales; 7, tuffites; 8, shales with tuffites in the uppermost part of sequence; 9, alternation of tuffites and red and green shales; 10, basalt tuffs overlain by tuffites; 11, local occurrence of rhyolite near Sedlec and andesite near Ohrazenice.

tones, subgreywackes, siltstones and silty shales. The sediments contain common trace fossils of the *Cruziana* Ichnofacies. The storm-influenced sedimentation was not suitable for the development and/or preservation of skeletal fauna. In the uppermost part of the formation the environmental conditions improved. Just below the base of the Silurian black shales, light mudstones of the Kosov Formation contain, though locally, rich and highly-diverse *Hirnantia* fauna. Microfossil assemblages (acritarchs and chitinozoans) changed just near the Ordovician Silurian boundary.

General imformation about the Ordovician sequence of the Prague Basin were given by HAVLICEK (1981, 1982, 1992b), HAVLICEK and VANEK (1966, 1990), CHLUPAC and KUKAL (1988). HAVLICEK and MAREK (1973), KUKAL (1963a, 1963b), FIALA (1971), BOUCEK (1973), BRENCHLEY and STORCH (1989).

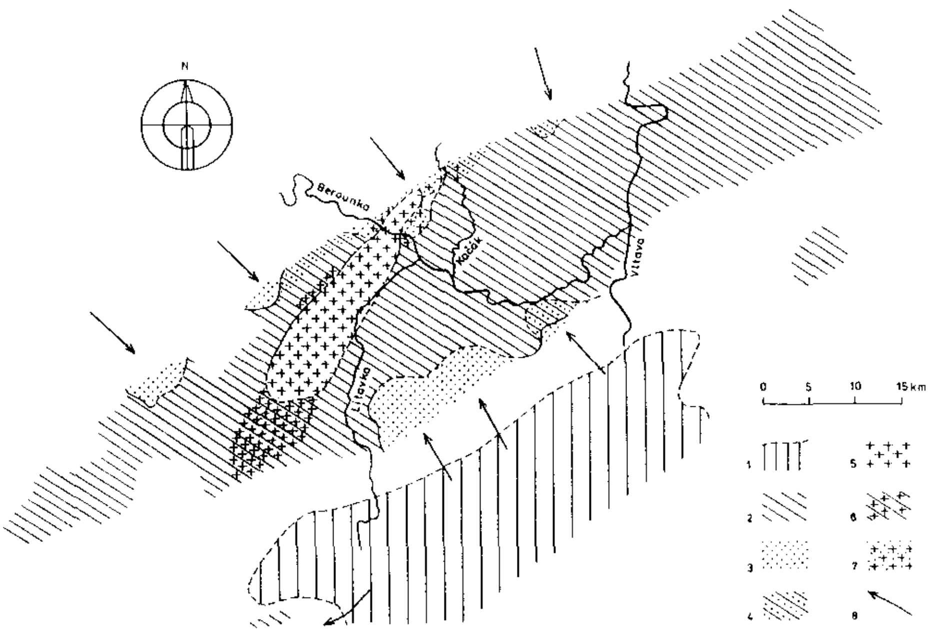

Figura 5.—*Middle Ordovician facies distribution (exemplified by the upper part of Dobrotivá Formation. (After CHLUPAC et al., 1992).*

1, proposed land; 2, black clayey shales; 3, qurtzose sandstones (quartzites); 4, alternation of qurtzose sandstones and shales; 5, basaltic volcanites of the Komárov Complex; 6, clayey shales with tuff intercalations; 7, quartzose sandstones with tuff intercalations; 8, transport of terrigenous material.

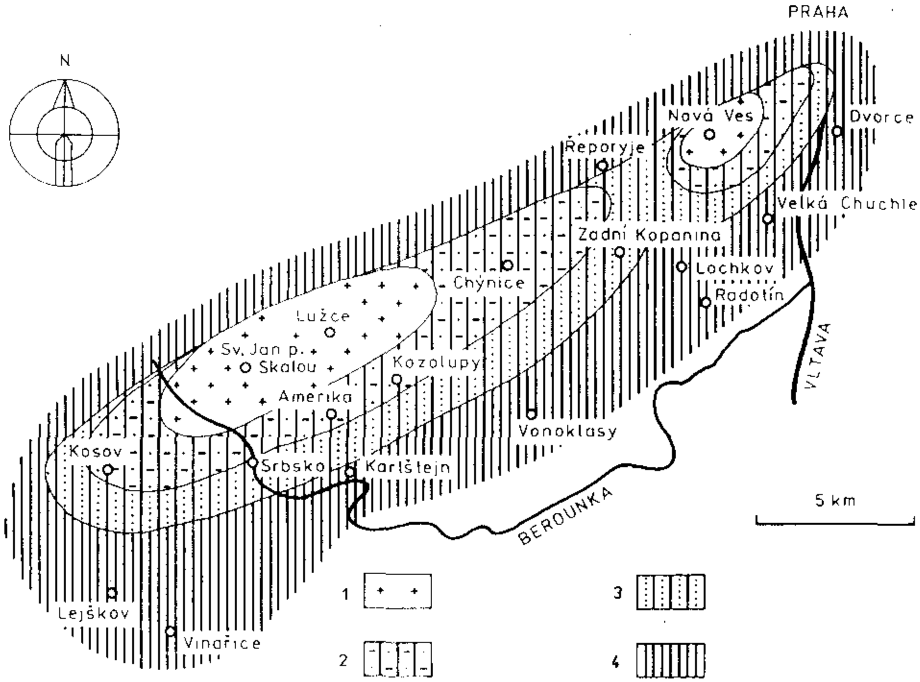

Figura 6.—*Silurian facies distribution (exemplified by the Motol Formation-Kopanina Formation boundary interval). (After Horny, 1955, 1962).*
1, basalts, hyaloclastites, tuffs; 2, calcareous tuffites, tuffitic biodetrital limestones; 3, tuffitic shales with limestone intercalations; 4, calcareous shales with graptolites.

V. SILURIAN

The complete, unmetamorphosed Silurian sequence with richly diversified benthic and pelagic faunas is confined, together with the Devonian deposits, to the central part of the present synclinorium of the Prague Basin. In contrast to the Ordovician, the linear character of the synsedimentary depression of the Prague Basin is less conspicuous in the Silurian and Devonian, because the sediments deposited outside the subsiding central segment of the former basin, were destroyed by the erosional processes which followed the Variscan orogeny. For this reason the Silurian rocks have been preserved only in the central part of the Prague Basin, Between Prague and Zdice.

During the Silurian, gradual synsedimentary deformation of the basin was accompanied by strong submarine volcanism which culminated in the late Wenlock and early Ludlow. That time volcaniclastic accumulations gave rise to submarine elevations and even an emergent island surrounded by shallow-water bioclastic limestones.

The main phenomenon of the Silurian volcanism in the Prague Basin were the submarine eruptions characterized by extensive granulation of basalt lavas. The term granulation means disintegration of hot and thin lava on contact with water. This process has been compared to granulation of high furnace slag poured into streaming water. Resulting granulates and granulate tuffs, designated as hyaloclatites in abroad, are more common than homogenous lava flows in the Silurian sequence of the Prague Basin. Also various mixed sediments, ranging from the calcareous tuffites to bioclastic limestones with volcanic glasses and lapilli, originated around the volcanic centres.

The maximum thickness of the Silurian sequence is more than 450 m in the volcanic-rich area near Svaty Jan. Along the southeastern limb of the silurian outcrop area the total thickness of the Silurian is only 200 m. The black graptolitic shales prevail in the Lower Silurian, but towards the top of the Silurian they were gradually replaced by limestones. The sedimentation of limestones continued from the Upper Silurian to the Lower Devonian without interruption, except of local gap at the top of the former volcanic island near Svaty Jan. Absolute prevalence of biodetrital and bioclastic types is a typical feature of the Silurian limestones in the Prague Basin. The Silurian deposits as a whole originated in a shallower warm-water environment, in about the subtropical climatic zone.

Zelkovice Formation

The base of the formation coincides with the base of the Silurian Period. The light, topmost Ordovician mudstones with *Hirnantia* fauna are overlain by up to 20 m thick, dark, graptolitic shales of the Zelkovice Formation. Black shales start just with the basalmost Silurian *ascensus-acuminatus* Zone. The sequence of the Zelkovice Formation consists of various, black, muddy sediments such as clayey shales, siliceous shales, mudstones, and laminites, always containing numerous graptolites. Recently the laminites of the lower and middle parts of the Zelkovice Formation have been interpreted as contourites, deposited by contour current sub-parallel to the longitudinal axis of the basin. In the southern part of Prague territory the whole sequence of the formation is missing due to the activity of this current.

Rather diversified benthic fauna was found in the middle part of Zelkovice Formation near Hyskov. There are basalt tuffs and granulates associated by richly fossiliferous shallow-water limestones and calcareous tuffites of the middle Llandovery age (*M. sedgwickii* Zone).

Litohlavy Formation

The Litohlavy Formation begins with up to 3 m thick layer of light barren mudstone. The following sequence consists of black clayey graptolitic shales with numerous intercalations of similar pale greenish or yellowish, unfossiliferous but bioturbated claystones and mudstones. The average thickness of the formation is about 30 m, the maximum thickness attains 75 m. Minimum thickness has been recorded in the territory of Prague (Pankrác, Malá Chuchle), where there the lower part of the formation is missing, still due to the current activity.

Motol Formation

The Wenlock history is characterized by a progressive environmental differentiation of he Prague basin which gave origin to various litho- and bio-facies. Due to the volcanic activity, the role of calcareous sedimentation increased strongly in the middle of Wenlock. Calcareous shales and a variety of biodetrital, often tuffitic limestones prevail in the vicinity of volcanic elevations along the northwestern limb of the Silurian outcrop area.

Dark-grey calcareous graptolitic shales deposited throughout the basin up to the *riccartonensis* Zone. Then the volcanic activity initiated in Reporyje-Butovice and Svaty Jan volcanic centres.

The latter one produced over 200 m thick complex of volcaniclastics and mostly granulated, alkaline basalt lavas. Nearby various tuffitic limestones become frequent towards the top of the volcanic sedimentary sequence. Svaty Jan volcanic centre reached the sea-level at about the top of Wenlock. The volcanic island was fringed by coarse-grained, mostly crinoidal limestones deposited under the wave-action influence.

Motol Formation attains over 250 m in thickness in the centre of Svaty Jan area. The thickness is reduced to 40-80 m in purely graptolitic shaly facies.

Kopanina Formation

The whole Ludlow sequence is characterized by the limestone sedimentation, whilst the graptolitic shales are even more restricted than they are in Wenlock. The volcanic activity played a significant role, mainly in the lower part of Kopanina Formation. Although the volcanic activity disappeared, large volcanic accumulations modified the basin-floor morphology and sedimentation till the Lower Devonian.

In the early Ludlow extensive shallows fringed the volcanic centres, being covered by coral-crinoid biostromes. In the upper part of Ludlow, light, biodetrital limestones, including two horizons of orthoceras limestones, extended across the most of the present outcrop area.

The thickness of the Kopanina Formation depends much on the minor synsedimentary tectonic movements and facies development. In the deepest, southeastern limb of the Silurian synclinorium the formation is represented by up to 80 m thick calcareous shales. Throughout the wide periphery of the volcanic centres the tuffites and various limestones measure about 150 m in thickness. On the top of the former Svaty Jan volcanic island the sedimentation omitted, and local but long-lasting gap in sedimentation continued. No Ludlow sediments are known from the vicinity of Svaty Jan.

Pozáry Formation

All the sequence of the Pozáry Formation (former Prídolí Formation) is characterized by the limestone sedimentation. The formation consists of two principal lithofacies - the shallow-water biodetrital limestones in the Svaty Jan area (i.e. in the area of the pre-Prídolí volcanic centre), and the deeper water platy limestones and calcareous shales in the rest of the outcrop area.

The platy limestones with shaly interlayers extended throughout the most of the basin and account for its remarkable deepening at about the base of Prídolí. Numerous cosmopolitan benthic faunas of this facies are in contrast to rather endemic faunas inhabiting the shallow-water environment in and around the Wenlock and Ludlow volcanic highs. The Silurian-Devonian boundary beds are developed in form of so-called *Scyphocrinites* Horizon and/or the third bank of the *Orthoceras* limestone. The minimum thickness of the formation (15-20 m) was recorded in the shallow-water biodetrital limestone facies of the Svaty Jan.

Maximum thickness of 80-90 m was recorded in the western part of the basin.

An uninterrupted, richly fossiliferous sequence of the Pozáry Formation near Reporyje was suggested and later (1984) accepted as the international type section of the fourth series of the Silurian System - the Prídolí Series.

The present knowledge about the Silurian facies development, stratigraphy, and faunal assemblages is based principally on the comprehensive papers of BOUCEK (1953), CHLUPAC (1987), HAVLICEK-STORCH (1990), HORNY (1955, 1962), HORNY - PRANTL - VANEK (1958), KRIZ (1975) KRIZ et al. (1986), KUKAL (1964, 1985), PRIBYL (1983), and STORCH (1986). Basalt volcanism was described by FIALA (1970). Most of the data and conlcusions, as well as almost complete list of papers, were published in the monograph of CHLUPAC et al. (1992).

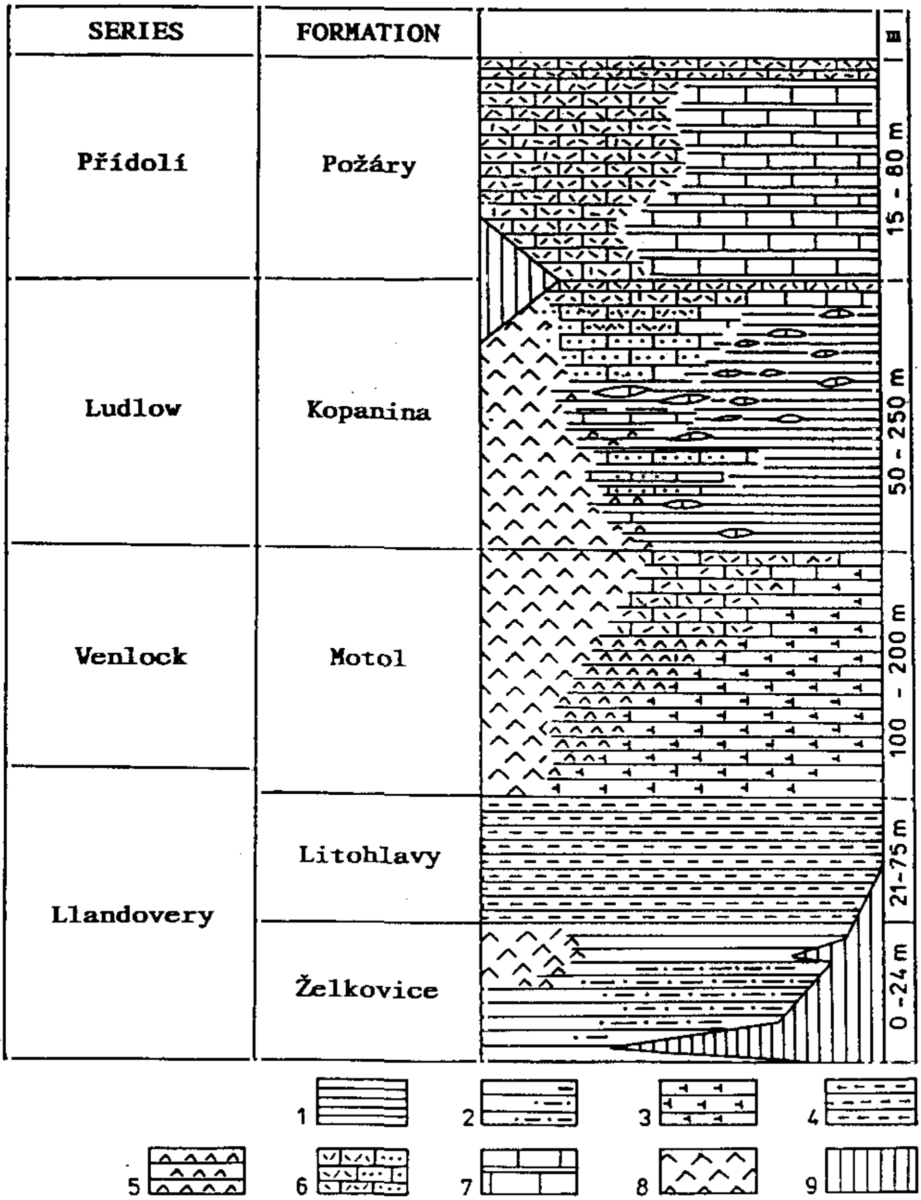

Figura 7.—*Stratigraphic chart of the Silurian sequence (Modified after CHLUPAC et al., 1992, STORCH, 1986).*

1, calcareous shales; 2, alternation of graptolitic shales and silty silicites; 3, calcareous graptolitic shales; 4, alternation of black graptolitic shales and greenish mudstones; 5, tuffitic shales; 6, limestones (bioclastics and biomicritic); 7, platy limestone.: with intercaled by calcareous shales; 8, alkaline basalts and hyaloclastites; 9, stratigraphical hiatus.

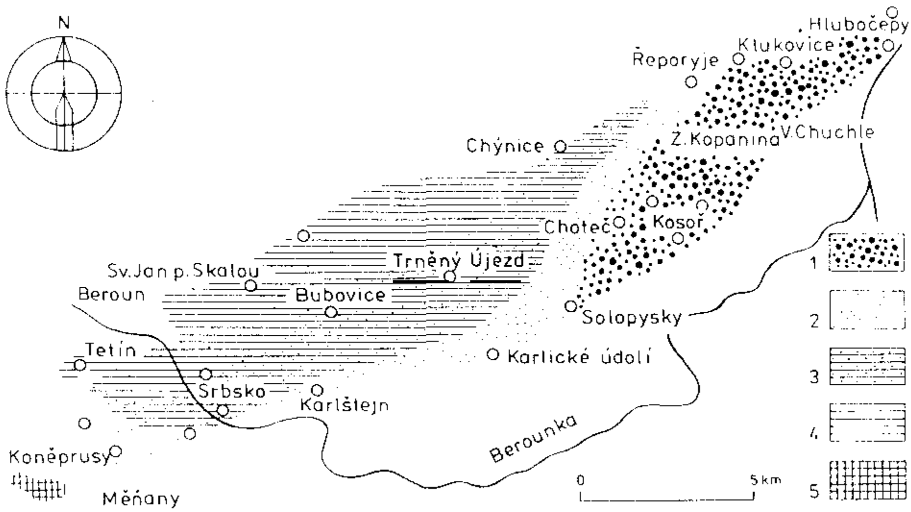

Figura 8.—*Devonian facies distribution (exemplified by the lower part of Zlíchov Formation). (After CHLUPAC et al., 1992).*
1, Coral Chapel Horizon gravitites (slumping beds, turbidites); 2, fine-grained biodetrital limestones distal parts of Coral Chapel Horizon; 3, biomicritic Zlíchov Limestones; 4, micritic Zlíchov Limestones; 5, local hiatus, former Koneprusy Reef of Pragian age emerged.

VI. DEVONIAN

Central part of the Lower Palaeozoic synclinorium of the Prague Basin is formed by mostly limestones sequences of the Lower and Middle Devonian. Continuous, richly fossiliferous Silurian - Devonian boundary sequence at Klonk near Suchomasty has been the first, officially accepted international boundary stratotype in the world. There the base of Devonian is marked by the appearance of graptolite *Monograptus uniformis* and chitinozoan *Angochitina chlupaci*. Later on, another two international stratotypes, standard sections of Lochkovian and Pragian, have been chosen in the Prague Basin. Another two stages of Bohemian origin - Zlíchovian and Dalejan, are widely used by Devonian stratigraphers as well.

Devonian sequence of the Prague Basin is characterized by two major lithofacies. the first one, represented by shallowwater biodetrital, mostly crinoidal limestones, includes also local reef development of pragian age near Koneprusy. The second principal facies is a deeper water one. It is represented mostly by micritic limestones.

Several prominent fluctuations in sea-level were recognized in the Devonian sequence of the Prague Basin. Some of them related to global eustatic events.

The sedimentation culminated by siliciclastic flysh-like Roblín Beds of Givetian age. Rapid sedimentation of the Roblín Beds reflected incoming Variscan tectonic movements which subsequently uplifted, folded and faulted the basin. The average thickness of the Devonian is 500 m in the Prague Basin.

Devonian biostratigraphy is mainly based on conodonts and tentaculitids. Also graptolite, goniatite, and chitinozoan biostratigraphy is applied for some stratigraphic intervals.

Both sediments (e.g. reef limestones, bahamites) and fauna (highly diverse, with many warm-water elements) account for well-oxygenated shallow sea in the tropical climatic zone.

Lochkov Formation

Lochkovian is represented by Lochkov Formation which has been divided into two members. The first one is formed by shallow-water facies of the Kotys Limestones. It occurs in the NW limb of the Devonian outcrop area, roughly above the former volcanic highs of Silurian age. The second facies, that deeperwater one, is represented by dark, platy, Radotín Limestones with pelagic faunas. The latter facies is largely confined to the SE limb of the basin. The thickness of the Lochkov Formation varies between 25 and 100 m.

Praha Formation

In the Pragian Stage the sedimentary facies of the Prague Basin became highly differentiated. Nodular, micritic Dvorce Prokop Limestones, developed in the area between Prague and Karlstejn, represent the deepest depositional environment. They are associated by local, related facies of Reporyje Limestones. Shallower environment is represented by the transitional facies of biomicritic and biodetrital, crinoidal facies of Lodenice Limestones, Slivenec Limestones, and Vinarice Limestones. The uplifting zone near Koneprusy made possible rapid growth of large, coral-bryozoan-crinoidal reef body which is documented by present, white Koneprusy Limestones. Highly diverse benthic macrofauna of the Praha Formation, more than 800 species have been described till now, corresponds well with the highly differentiated living conditions.

The Praha Formation reaches up to 200 m in thickness in the reef facies whilst it is condensed to about 40 m thick sequence in the facies of micritic nodular limestones.

The international standard section of the Pragian Stage was established at Velká Chuchle-Prídolí. The base is defined by the first appearance of the conodont *Eognathodus selectus sulcatus*.

Zlíchov Formation

As oppose to the complex facies development of the underlying formation, the Zlíchovian deposits are rather uniform throughout the basin. In the vicinity of Prague the lowermost part of Zlíchov Formation is marked by several banks of coarse allodaphic limestones of Coral Chapel Horizon. Probable turbidites are rich in large pebbles of highly fossiliferous reef limestones of early Zlíchovian age.

The following sequence is formed by dark biomicritic and fine biodetrital limestones with black chert nodules. The limestones contain much less diverse fauna, dominated by trilobites (*Reedops, Odontochile*). The earliest goniatite cephalopods appear in the Zlíchov Formation.

The common thickness of Zlíchov Formation varies between 80 and 120 m. In the Koneprusy area the Pragian reef emerged in the Zlíchovian. It was slightly eroded at that time and the Koneprusy limestones are overlain unconformably by the Emsian Suchomasty Limestones.

Daleje-Trebotov Limestones

Daleje-Trebotov Formation corresponds with Emsian Stage in age. It consists of three principal lithofacies, all reflecting temporary deepening of the Basin. Reddish, micritic, finely nodular Trebotov Limestones prevail in the upper part of the sequence whilst greenish, calcareous Daleje Shales dominate in the lower part, where there they follow the underlying Zlíchov Formation. Crinoidal, pinkish Suchomasty Limestones were deposited in the shallowest, Koneprusy area.

The bedding planes of Daleje Shales are crowded by tentaculids *Nowakia* and *Styliolina*. Anarcestid goniatids are frequent in all three members of the formation. Benthic fauna became more diverse if compared to the underlying Zlíchov Formation.

Volvanic activity, though not intensive, revived in the restricted area near Chynice and Chotec. Granulated alkaline basalts and tuffs occur within the limestone sequence of DalejeTrebotov Formation. The total thickness of the formation varies between 25 and 90 m.

Chotec Formation

Middle Devonian Eifelian Stage starts with grey, thick bedded biodetrital limestones of Chotec Formation. At the base of the formation dark grey limestones and abrupt faunal change reflected widely recognized «*ugleri*-event» which may have been caused by eustatic transgression. Thick bedded, grey, Chotec Limestones reaches nearly 60 m in thickness.

Shallow-water environment persisted in the area of former reefs near Koneprusy. There, grey crinoidal *Acantopyge* Limestones deposited, with numerous beds of bahamites within the sequence. Bahamites account for very shallow-water sedimentation in tropical sea.

Srbsko Formation

The latest Eifelian and greater part of Givetian are represented by Srbsko Formation, the latest of preserved sedimentary formations of the Prage Basin. The base of Srbsko Formation is marked by sudden appearance of black shales of Kacák Beds and reflects another, widely recognized, transgressive, anoxic «Kacák Event».

About 10 m thick Kacák beds are followed by up to 250 m thick flysh-like Roblín Beds. The latter member, formed by alternating shales, siltstones, and fine sandstones, is interpreted as a sequence of distal turbidites modified by contour currents. They are rather rich in land-plant fossils (*Relimia, Protolepidodendron, Pseudosporochnus* a.o.).

Roblín Beds have already reflected incoming Variscan tectonic deformations which later, still before the Carboniferous, uprised, folded, and faulted all the Lower Palaeozoic sequence of Barrandian area.

The Silurian-Devonian boundary type -and reference- sections were described by CHLUPAC et al. (1972). The most important papers, concerning the Devonian stratigraphy and faunal communities, were published by CHLUPAC (1957, 1982, 1983), CHLUPAC et al. (1985), and CHLUPAC and KUKAL (1988). Sedimentology of Devonian lithostratigraphical units was described by KUKAL (1964). Devonian basalt volcanism was studied by Fiala (1970). Most of the data and interpretations are involved into the recent monograph of CHLUPAC et al. (1992).

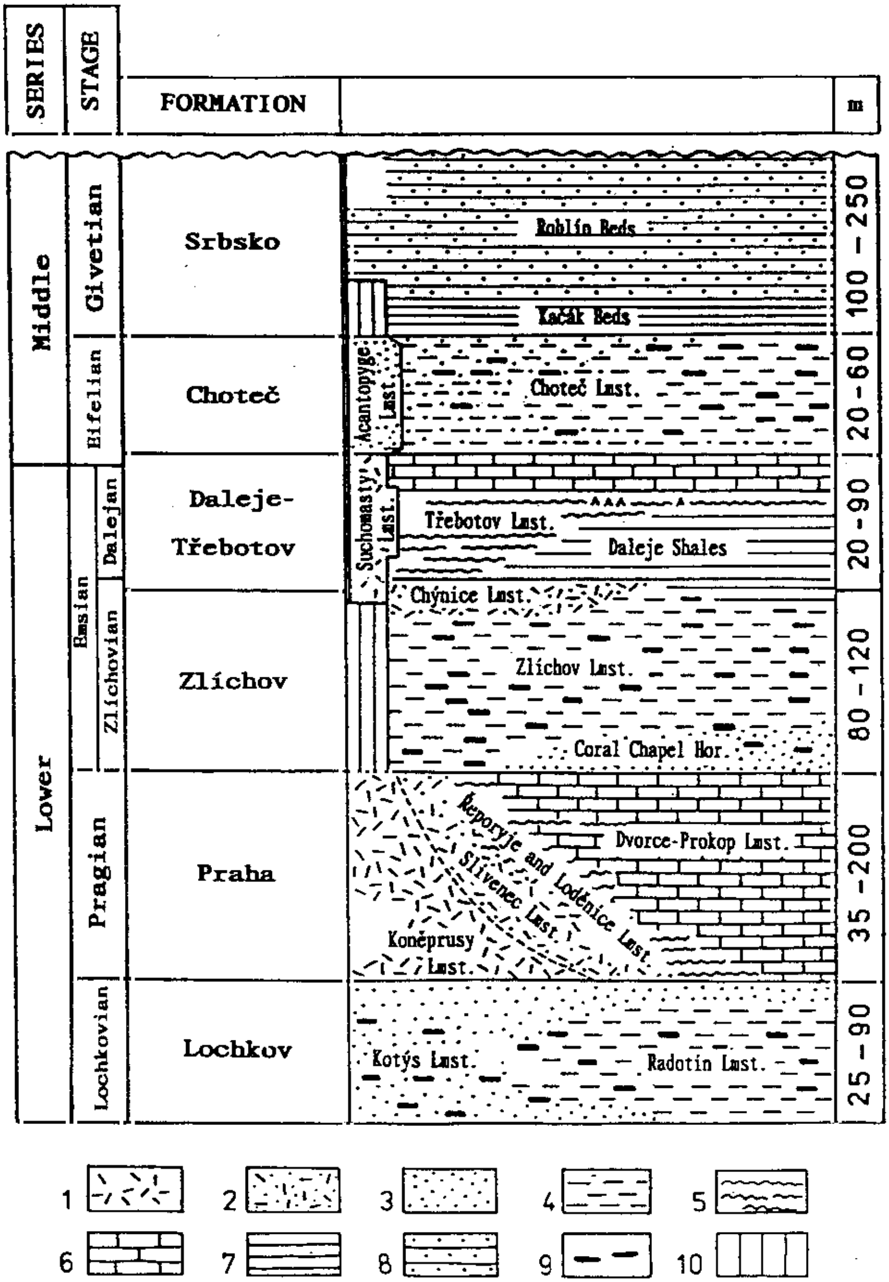

Figura 9.—*Stratigraphic chart of the Devonian sequence. (After* CHLUPAC *et al., 1992).*

1, reef limestones; 2, reddish biodetrital limestones; 3, grey biodetrital and/or bioclastic (allodaphic) limestones; 4, bedded grey biodetritial and/or biomicritic limestones; 5, reddish, predominantly micritic limestones; 6, grey micritic, mostly nodular limestones; 7 calcareous shales; 8, flysh sequence of sandstones, siltstones, and shales; 9, common occurrence of cherts; 10, stratigraphical hiatus; Lmst., limestones.

REFERENCES

BOUCEK, B. (1953): «Biostratigrafie, vyvoj a korelace zelkovickych a motolskych vrstev ceského siluru». Sbor. *Ustr. Ust. geol., Odd. paleont.*, **20:** 421-460. Praha.

— (1973): *Lower Ordovician graptolites of Bohemia*. Academia. 1-185. Praha.

BRENCHLEY, P. J.; STORCH, P. (1989): «Environmental changes in the Hirnantian (upper Ordovician) of the Prague Basin, Czechoslovakia». *Geological Journal*, **24:** 165-181. Liverpool.

CHLUPAC, I. (1957): «Faciální vyvoj a biostratigrafie stredoceského spodního devonu». *Sbor. Ustr. Ust. geol., Odd. paleont.*, **23:** 369-485. Praha.

— (1982): «The bohemian Lower Devonian stages». *Courier Forschung Institut Senckenberg*, **55:** 345-400. Frankfurt a.m.

— (1983): «Trilobite assemblages in the Devonian of the Barrandian area and their relations to palaeoenvironments». *Geologica et Palaeontologica*, **17:** 45-73. Marburg.

— (1987): «Ecostratigraphy of Silurian trilobite assemblages of the Barrandian area, Czechoslovaquia». *Newsletter Stratigraphy*, **17** (3): 169-186. Berlin, Stuttgart.

CHLUPAC, I.; HAVLICEK, V.; KRIZ, J.; KUKAL, Z., & STORCH, P. (1992): *Paleozoikum Barrandienu*. Cesky geologicky ústav. 292 pág. Praha.

CHLUPAC, I.; JAEGER, H., & ZIKMUNDOVA, J. (1972): «The Silurian-Devonian boundary in the Barrandian». *Bulletin Canadian Petroleum Geology*, **20:** 104-174. Calgary.

CHLUPAC, I., & KUKAL, Z. (1988): «Possible global events and the stratigraphy of the Palaeozoic of the Barrandian (Cambrian-Middle Devonian, Czechoslovakia)». *Sbor. geol. Ved, R.G.*, **43:** 83-146. Praha.

CHLUPAC, I.; LUKES, P.; PARIS, F., & SCHONLAUB, H.P. (1985): «The Lochkovian-Pragian boundary in the Lower Devonian of the Barandian area (Czechoslovakia)». *Jahrbuch Geologisches Bundesanstalt*, **128:** 9-41. Wien.

FATKA, O., & KORDULE, V. (1992): «New fossil sies in the Jince Formation (Middle Cambrian, Bohemia)». *Vest. Ces. geol. úst.*, **67** (1): 47-60. Praha.

FIALA, F. (1970): «Silurské a devonské diabasy Barrandienu». *Sbor. geol. Ved, Geol.*, **17:** 7-89. Praha.

— (1971): «Ordovicky diabasovy vulkanismus a biotické lamprofyry Barrandienu». *Sbor. geol. Ved, Geol.*, **19:** 7-97. Praha.

HAVLICEK, V. (1971): «Development of a linear sedimentary depression exemplified by the Prague Basin (OrdovicianMiddle Devonian; Barandian area-central Bohemia)». *Sbor. geol. Ved, Geol.*, **35:** 7-48. Praha.

— (1982): «Ordovician in Bohemia: development of the Prague Basin and its benthic communities». *Sbor. geol. Ved, R.G.*, **37:** 103-136. Praha.

— (1992a): «Kambrium». *In:* CHLUPAC, I. et al.: *Paleozoikum Barrandienu (Kambrium-Devon).* Vydavatelství Ces. geol. úst., 31-55. Praha.

— (1992b): «Prazská pánev. Ordovik». *In:* CHLUPAC, I. et al.: *Paleozoikum Barrandienu (Kambrium-Devon).* Vydavatelství Ces. geol. úst., 56-116. Praha.

HAVLICEK, V., & MAREK, L. (1973): «Bohemian Ordovician and its international correlation». *Cas. mineral. geol.*, **18:** 225232. Praha.

HAVLICEK, V., & STORCH, P. (1990): «Silurian brachiopods and benthic communities in the Prague Basin (Czechoslovakia)». *Rozpr. Ustr. úst. geol.*, 1-275. Praha.

HAVLICEK, V., & VANEK, J. (1966): «The biostratigraphy of the Ordovician of Bohemia». *Sbor. geol. Ved, R.P.*, **8:** 7-69. Praha.

— (1990): «Ordovician invertebrate communities in black-shale lithofacies (Prague Basin, Czechoslovaquia)». *Vest. Ustr. Ust. geol.*, **65:** 223-236. Praha.

HORNY, R. (1955): «Studie o vrstvách budnanskych v západní cásti barrandienského siluru». *Sbor. Ustr. Ust. geol., Odd. goel.*, **21** (2): 315-447. Praha.

— (1962): «Das mittelbohmische Silur». *Geologie,* **11** (8): 873916. Berlin.

HORNY, R.; PRANTL, F., & VANEK, J. (1958): «K otázce hranice mezi wenlockem a ludlowem v Barrandienu». *Sbor. Ustr. Ust. geol., Odd. paleont.*, **24:** 217-278. Praha.

KRS, M.; KRSOVA, M.; PRUNER, P.; CHVOJKA, M., & HAVLICEK, V. (1987): «Paleomagnetism, paleogeography and multi-component analysis of Middle and Upper Cambrian rocks of the Barrandian in the Bohemian Massif». *In:* KENT, D.V. & KRS, M. (Eds.): *Laurasian paleomagnetism and tectonics. Tectonophysics,* **139:** 1-20. Amsterdam.

KRIZ, J. (1975): «Revision of the Lower Silurian stratigraphy in Central Bohemia». *Vest. Ustr. Ust. geol.*, **50:** 275-283. Praha.

KRIZ, J.; JAEGER, H.; PARIS, F., & SCHONLAUB, H.P. (1986): «Prídolí - the fourth subdivision of the Silurian». *Jahrbuch Geologisches Bundesanstalt,* **129:** 291-360. Wien.

KUKAL, Z. (1963a): «Sedimentarní textury barrandienského ordoviku». *Rozpr. Cs. Akad. Ved, R. mat. prír. Ved,* **73** (2): 1-94. Praha.

— (1963b): «Vysledky sedimentologickych vyzkumu barrandienského ordoviku». *Sbor. geol. Ved, Geol.*, **1:** 103137. Praha.

— (1964): «Litologie barrandienskych karbonátovych souvrství». *Sbor. geol. Ved, Geol.*, **6:** 123-165. Praha.

— (1971): «Sedimentology of Cambrian deposits of the Barrandian area (Central Bohemia)». *Sbor. geol. Ved, Geol.*, **20:** 53-100. Praha.

— (1985): «Vyvoj sedimentu Ceského masívu». *Knih. Ustr. Ust. geol.*, **61:** 5-221. Praha.

MERGL, M., & SLEHOFEROVA, P. (1990): «Middle Cambrian inarticulate brachiopods from Central Bohemia». *Sbor. geol. Ved, Paleont.*, **31:** 67-104. Praha.

PRIBYL, A. (1983): «Graptolite biozones of the Kopanina and Prídolí Formations in the Upper Silurian of Central Bohemia». *Cas. Mineral. Geol.*, **28** (2): 149-167. Praha.

SDZUY, K. (1972): «Das Kambrium der acadobaltischen Faunenprovinz». *Zbl. Geol. Paläont.*, **2** (1/2): 1-91. Stuttgart.

SNAJDR, M. (1958): «Trilobiti ceského stredního kambria». *Rozpr. Ustr. Ust. geol.*, **24:** 1-280. Praha.

STORCH, P. (1986): «Ordovician-Silurian boundary in the Prague Basin (Barrandian area, Bohemia)». *Sbor. geol. Ved, Geol.*, **41:** 69-103. Praha.

Coloquios de Paleontología, n.° 45. Editorial Complutense, Madrid, 1993

The Palaeozoic stratigraphy of China

BAOYU LIN *

INTRODUCTION

The Palaeozoic strata are well developed in China. They consist of diverse sedimentary rocks containing abundant biota and mineral resources. The recorded study of the Palaeozoic stratigraphy began in 1882 and lasted for more than one hundred years.

In this talk we are going to introduce something about Palaeozoic stratigraphy such as the distribution of the strata, the types of the sedimentation, the classification of chronostratigraphy of China, the boundary problems and the biogeographical provinces.

I. THE CAMBRIAN SYSTEM

The Cambrian is well developed and widely distributed in China, with various types of sedimentation and a variety of biotas, and is rich in mineral deposits of phosphate, iron, mercury, rare elements, gypsum and salts, pyrite and coal, etc. It occurs especialy extensively in the southern part of the Northeast, North, Central and Southwest China, with the exception of the Altay, Junggar, North Tibet and Taiwan.

(I) Cambrian Sedimentary and Faunal types

The sedimentary types of the Cambrian in China comprise stable platform type on the one hand, and active geosynclinal type on the other even acompa-

* Institute of Geology, chinese Academy of Geological Sciences, Beiging.