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Krkonoše Piedmont Basin

Excursion Guide

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Geology

Krkonoše Piedmont Basin is located at the north-east of the Bohemian Massif. The basin was formed as a part of a system of extensional/transensional basins which opened in the Bohemian Massif during the late phases of the Variscan orogeny.

Sedimentary fill of the thickness over 1800 m at the central and western part of the basin, and probably around 2500m in the eastern part, is fully non-marine - dominated by alluvial and lacustrine strata. The age of this deposits range from Westphalian D (Upper Carboniferous) to the Lower Triassic age. There are 7 fossiliferous horizons of mostly lacustrine origin covering the time period from Stephanian B to Asselian, Lower Permian). See Fig.1.

Fig.1.
Schematic stratigraphic section of the Krkonoše Piedmont Basin based on the borehole Pé-1, which is located in the central part of the basin.

LITHOLOGY	MEMBER	FORMATION	STAGE	SERIES	SYSTEM
	← Kalná Horizon	Prosečné Fm.	SAKMARIAN	AUTUNIAN	PERMIAN
	← Háje Horizon	Vrchlabí Fm.	ASSELIAN		
	← Rudník Horizon			LOWER	
	← Ploužnice Horizon	Semily Fm.	C	STEPHANIAN	CARBONIFEROUS
	← Black Shale Horizon	Syřenov Fm.	B		
		Kumburk Fm.	A		
			CANTABR.		
		D	WESTPHAL.		

Fauna

Evidence of fauna originates from six main stratigraphic levels in the Krkonoše Piedmont Basin:

1) The Black Shale Horizon of the Syřenov Formation represents sediments of a large lake which reached southward to the Plzeň Basin in western Bohemia. Upper Carboniferous invertebrates and ichthyofauna (acanthodians, sharks, and actinopterygians) of Stephanian B age were detected.

2) Fossiliferous sediments of the Ploužnice Horizon of the Semily Formation testify to a deposition in considerably smaller and shallower lake. In addition to fish (acanthodians, sharks, and actinopterygians) and terrestrial (insects) fauna, tetrapod footprints were also found. Age of this uppermost Carboniferous horizon is Stephanian C.

3) First Permian fossil record is known from the Rudník Horizon of the Lower Vrchlabí Formation. Lacustrine sediments are of Lower Asselian age (lowermost Permian) and represent deposition in a large lake with anoxic bottom. Invertebrates, acanthodians, sharks, amphibians (an archeosaurid *Archeosaurus dyscriton*; a branchiosaurid *Melanerpeton* sp.; eryopoids „*Ptyonius*“ *bendai* and ?*Cheliderpeton* sp.), and indeterminate remains of reptiles were found. The Rudník Horizon outcrops at the „Vrchlabí - road cut“ excursion stop.

4) The Kozinec Horizon of the Upper Vrchlabí Formation is of Upper Asselian age. Sandstones yield pelecypods and one tetrapod rib.

5) The Kalná and Veselá Horizons of the Prosečné Formation are of Lower Sakmarian age (Lower Permian) and represent sedimentation in smaller relatively shallow lake with anoxic to suboxic bottom conditions in the central part of the basin. Lacustrine sediments yield rich fauna which consist of invertebrates, sharks, actinopterygians, amphibians (branchiosaurids *Apateon* sp. and ?*Melanerpeton* sp.; an eryopoid ?*Cheliderpeton* sp.), and tetrapod footprints.

6) The Chotěvice Formation is probably of Upper Sakmarian age. Invertebrate ichnofossils are known only.

Locality Vrchlabí - road cut (excursion stop)

Sedimentology

During the Asselian the Krkonoše Piedmont Basin has asymmetric half-graben structure with steep northern margin and gently inclined platform southern margin. Rudník Horizon represent deposits of large stratified anoxic to suboxic lake which occupy most of the basin area during Lower Asselian. Usually this „horizon“ is composed of about 60 m of grey to grey-black mudstones with minor interbeds of carbonates, siltstones, sandstones and conglomerates. At the locality Vrchlabí, which is located at the northern margin of the basin, Rudník Horizon reaches anomalous thickness of 130 m, which is due to rapid subsidence rate along steep fault-bounded margin.

From the paleontological and sedimentological point of view the most important part is section no.4 (see Fig. 2), which is lithologically more interesting in comparison to the rest of the sequence which is composed mainly of monotonous grey to grey-black mudstones. Section 4 is dominated by lacustrine offshore facies. Suboxic offshore facies at the base are overlaid by anoxic black shales and laminites, which are interbedded by muddy turbidites. Anoxic bottom conditions were established due to rise of lake-level and lake water stratification. Fine lamination of anoxic facies reflects annual (probably seasonal) changes of climate and bioproductivity, whereas presence of cm-scale muddy turbidites documents cyclicity of the order of several years. Deep water sedimentation was followed by shallow water offshore and nearshore facies, which are highly fossiliferous (terrestrial plants, fish, amphibians etc., see Fig.2, 6.5 m). Sedimentary sequence is capped by nearshore microbial mats.

Fossil content

Rudník Horizon yielded rich fauna and flora of the *Acanthodes gracilis* biozone (Lower Asselian). Invertebrates are represented by pelecypods (?*Anthraconaia* sp.), conchostracans (*Limnesteria palaeoniscorum*, *Pseudestheria* aff. *Pseudestheria breitenbachensis*), ostracods (*Carbonita* sp.), and insects (very rare fragments of wings). Aquatic vertebrates are represented by acanthodians (*Acanthodes gracilis*), sharks (*Bohemiacanthus carinatus*), actinopterygian fishes (*Paramblypterus caudatus*, *Paramblypterus gelberti*, *Paramblypterus reussii*, *Paramblypterus rohani*, „*Amblypterus*“ *angustus*, „*Amblypterus*“ *zeidleri*, *Igornichthys* sp.), and dipnoans („*Sagenodus*“ *tardus*).

Amphibians (Labyrinthodontia; Temnospondyli) are rare but dissorhoids (*Archegosaurus dyscriton*, *Melanerpeton* sp.) and eryopoids („*Ptyonius*“ *bendai*, ?*Cheliderpeton* sp.) were described or mentioned till now. Indeterminable skeletal remains of a reptile were also found. Findings of ichnofossils (trails of arthropods *Taslerella* sp. and tetrapod footprints *Protritonichnites lacertoides*) are not common..

Nine fossiliferous sections were detected at the Vrchlabí road cut :

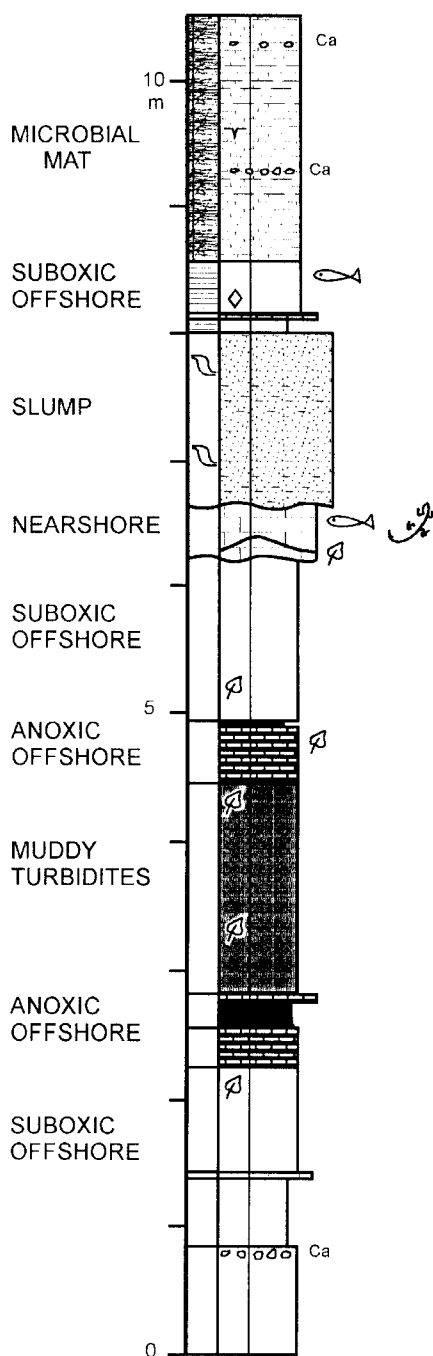
1) The oldest sections nos. 9 and 8 sedimented in a shallower lake near a shore. Fauna is represented only by conchostracans (*Pseudestheria* aff. *Pseudestheria breitenbachensis*). Conifers are prevalent, cordaits are not common (drier site).

2) The section no. 7 sedimented in a deeper stratified lake. Only conchostracans (*Pseudestheria* sp.) and flora (sphenophyts, pterophyts, pteridosperms, and dominated cordaits and conifers) were found.

3) The sections nos. 6 and 5 yielded only poor remains of flora (sphenophyts, pterophyts, pteridosperms, and conifers).

4) The section no. 4 is the most interesting as regards to fauna and is the main point of excursion stop. Fossiliferous carbonate contains rare pelecypods (?*Anthraconaia* sp.) and insects. Acanthodians (*Acanthodes gracilis*) are very

VRCHLABÍ - SECTION 4



common, often with well preserved delicate structures of the head and branchial region. Worse preserved sharks (xenacanthids) and actinopterygian fishes (*Paramblypterus* sp.) are not so common. Very important is occurrence of small branchiosaurid amphibians (*Melanerpeton* sp.). About 50 specimens were found (other specimens are probably in a private collections). Such amount of findings is unusual in the Rudník Horizon and in the Krkonoše Piedmont Basin at all. These small animals are passed for larval stages of terrestrial eryopoids. Some authors supposed neoteny of these larvae during lucky conditions. Trails of arthropods (?*Taslerella* sp.) were also found. Changes of flora (lycophyds, sphenophyts, pterophyts, pteridosperms, cordaits, and conifers) in the framework of the layer suggest a successive humidification. Changes of fauna suggest that lake became successively shallower.

5) The section no. 3 yielded poor fauna (fish scales and coprolites) and flora (conifers).

6) In an unnamed layer were found tetrapod footprints (*Protritonichnites lacertoides*) which indicate more or less subaeric conditions.

7) Near the base of the section no. 1 were found bedding surfaces with conchostracans and mud cracks which indicate shallow water. Other parts of the layer represent period of deepest stratified lake overtaken in this locality. Common fauna includes acanthodians (*Acanthodes gracilis*), sharks (*Bohemiacanthus carinatus*), and actinopterygian fishes (*Paramblypterus* sp.). This layer yielded very rich flora (sphenophyts, pterophyts, pteridosperms, cordaits, and conifers).

Fig.2. Sedimentological log of the Section 4 of Rudník Horizon at the locality Vrchlabí - road cut.

Zoological Garden Dvůr Králové n. Labem - gallery (excursion stop)

Evolution of Life on the Earth as Seen by Zdeněk Burian

This exhibition presents a cross-section of paintings representing one specific area of creativity in the work of Zdeněk Burian. He was an artist of great versatility. Although in this country he was chiefly known as illustrator, palaeontology and palaeo-anthropology were his true domains, as is documented by his numerous pictorial reconstructions of primaeval man and nature. Burian's paintings relevant to this thematic sphere form the central subject of this exhibition. Several other paintings - though transcending this basic framework - were included to document Burian's impressive range of interests and the lively quality of his style of expression.

Burian's life-long preoccupation was with nature in the broadest sense of the term, inclusive of man. Man - seen from Burian's angle of vision - is an integral constituent of nature. This conception was ultimately determined by the artist's spontaneous rapport with the realities of nature, by his intuitive understanding of natural phenomena envisaged in their astounding complexity, functional design and interaction. Matched by Burian's exquisite craftsmanship, this intense vision reflects a creative sensibility that remains unparalleled in the history of Czech painting, a creative temperament for which it would be difficult to find a counterpart in any of the trends currently at work in world painting. It is no exaggeration to claim that Burian's paintings are the primary medium through which the world today perceives primaeval landscapes. His paintings were reproduced in numerous specialized publications, in books of non-fiction and in periodicals published in the world's major languages. Apart from English, French, German and Russian publications, his illustrations frequently accompany books published in Italian, Dutch, Swedish, Spanish and other languages including Chinese and Japanese. What is perhaps most important - none of his evocations of primaeval life are the work of pure fiction. On the contrary, they represent the result of thorough research based on a perceptive study of the latest findings of science.

Zdeněk Burian was born on 11 February 1905 at Kopřivnice in Northern Moravia. At the age of fourteen, he enrolled for study in the second year of the Art Academy. Two years later, in 1921, the first book containing his illustrations was published. His interest in palaeontological and palaeo-anthropological reconstructions was awakened in the second half of the 1930s by the Late Professor Josef Augusta of Charles University Prague. Palaeontology and palaeo-anthropology continued to dominate Burian's work throughout his lifetime. For about 45 years, Burian studied this particularly challenging field of modern science with unflinching dedication. He cooperated with a number of Czech and foreign scholars. Apart from Prof. Augusta, he was in close contact with Prof. Filip, Prof. Špinar, prof. Thenius, Dr. Mazák and other eminent scholars. Burian died in Prague on 1 July 1981 at the age of 76. The sheer magnitude of his works just cause for acclaim. Apart from illustrations and jackets designed for 456 book titles, he created over 200 independent book covers and illustrated about 550 short stories published in various magazines. His total output as illustrator and designer thus reaches the staggering figure of 14 thous. works of this type. A no less impressive achievement are his 1,110 oil paintings and over 250 independent creations employing tempera, gouache, pastel-drawing and other techniques. Palaeontological and palaeoanthropological themes are represented by 386 oil paintings, 128 tempera paintings, gouache paintings and pastel-drawings and by more than 350 pen-and-ink drawings and pencil-drawings. The result is a monumental ensemble of paintings and drawings presenting the artists tribute to the fascinating mystery of the origin and development of organic life on our planet.

The planned series of 34 major paintings depicting scenes from primaeval life - a series specially intended for this exhibition - remained unfinished. Death thwarted the artist's

grandly-sketched project. Nevertheless, the fragments of 22 major canvases, created between 1977 and 1981 and supplemented by further paintings completed at an earlier date, remain an eloquent testimony of Burian's magnificent epic sweep.

The works presented at this exhibition provide interesting insight into one of the dominant themes of the work of Zdeněk Burian, and evoke, with unexampled visual power, the ancient history of life on the Earth.

Kuks (excursion stop)

The hospital building and Church of Holy Trinity on the right bank of the Labe River are only mere fragments of the grand architectural complex that was created here in the early 18th century, when over a period of twenty years Count Franz Anton Sporck built a spa, chateau, hospital, race course, numerous guest houses, a theatre, inns, house of philosophers, farm buildings, servants quarters and much more. All the structures were based on a uniform artistic principle calling for exact symmetry, proportionality and balance of elements. The whole was dominated by two buildings on opposite sides of the river: on the left bank the two storey chateau and on the right bank the hospital and hospital church with the Sporck family tomb. The valley inbetween was transformed into a vast park richly decorated with statuary: individual statues, statuary groups, fountains, ornamental columns.

What are the reasons that it came to be here, in this comparatively remote spot?

In the year 1662, the estate was purchased by Count Johann Sporck, General of Austrian Calvary, and later became the property of his son Franz Anton. In those days Kuks was only a small community and the family did not reside there. However, it was known in the surrounding area for its springs, which were said to heal many diseases. Count Sporck, a highly educated and very enlightened man for his days, sent samples of the waters to the Prague University in 1665 to have them analysed. On receiving a favourable report the following year he decided to build a spa in Kuks. He made Kuks his chief place of residence and built a chateau and baths whose comfort and splendid furnishings truly put everything known to date in the shade. Construction was more or less completed by 1720. At the same time a large hospital was being erected on the opposite bank, including a church and numerous statues. Thus was created a work of unparalleled artistic value both at home and far beyond the nation's borders.

Alas, time took its toll and the building on the left bank deteriorated with the passing years until 1901, when even the chateau was torn down. Of all the magnificence all that remained was the hospital and its sculptural ornaments. The hospital was intended for retired soldiers, mainly veterans of the Turkish wars and invalids. It was built from the year 1708 until 1719 by the Italian architect Giovanni Battista Alliprandi, who had made Bohemia his home. Dominating feature of the hospital silhouette is the Church of the Holy Trinity whose architectural design ranks it among the most important structures of the high Baroque.

In front of the church and hospital we can see numerous statues sculptured by Matthias Braun. It was a fortunate and fruitful association of educated feudal lord and temperamental artist which lasted some twenty years with interruption and produced a number of works that are the pride of the nation's art to this day. All the statues are hewn from the hard local sandstone in larger than life size. Originally they were polychrome and remnants of the colours, mainly the red ground colour, may still be seen in some places.