

Address of a Czech Geologist dedicated to the 150 Years Jubilee of the Geological Survey of Austria (Geologische Bundesanstalt)

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3 Text-Figures

*History of Geology
Austrian-Czech Relations*

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Abstract

The article describes several important activities of Austrian and Czech Geologists. First is the case of the interrelations between the Moldanubicum and Moravicum written in honour of Franz Eduard SUSS. The second case is the twin cities with mining academies in both countries – Leoben and Příbram. The third case follows the stone from the Barrandian to the Natural History Museum in Vienna. The fourth one follows the Austrian and Czech investigations in the Middle East and the fifth case compares the geological situation of the Carnic Alps and the Barrandian.

The appendix gives the list of geologists who participated in the geological investigations in both countries up to World War I.

Grußadresse eines tschechischen Geologen anlässlich der 150-Jahr-Feierlichkeiten der Geologischen Bundesanstalt

Zusammenfassung

Anhand einiger Fallbeispiele beleuchtet der Autor die ungemein enge Verflechtung der österreichischen und der tschechischen Geologie. Zur ehrenden Erinnerung an Franz Eduard SUSS wird die faszinierende Forschungsgeschichte der wechselnden Konzepte des Moldanubicums und des Moravicums memoriert. Das zweite Fallbeispiel ist die Geschichte der Bergakademien in den "Zwillingsstädten" Leoben und Příbram. Weiters wird dem Schicksal einer Dekorsteinplatte des Barrandiums bis in das Naturhistorische Museum in Wien nachgespürt. Die engen Beziehungen der tschechischen und österreichischen Geologie reichen sogar bis in den Mittleren Osten und im fünften Essay wird die intensive Verknüpfung der Paläozoikumsforschung in den Karnischen Alpen und dem Barrandium aufgezeigt.

Im Appendix wird eine Aufzählung jener Erdwissenschaftler gegeben, die bis zum Ersten Weltkrieg an der geologischen Erforschung beider Staaten Anteil hatten.

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To whom it may concern

In 1960 the official Agreement between the Austrian and Czechoslovak governments on the cooperation in geology was signed. This was an official act which opened a crevice in closely watched border between the eastern block and western countries. Even though political and administrative barriers persisted, dozens of Czechoslovak geologists visited Austria on the basis of this act. They could attend scientific conventions, exchange geoscience informations and open new personal contacts. Austrian approach to this cooperation was always very generous. The festive volume, edited in 1990 on the occasion of the 30 years anniversary of this official co-operation summarized various collaboration activities in the geosciences. Out of these, stratigraphy and palaeogeography, structural geology and geophysics, petroleum geology, geochemistry and economic geology, represented main topics. This volume was introduced by an official foreword signed by the two formed directors, in which the cooperation was thoroughly evaluated and many names of late geologists living in the past century or in the first half of 20th century mentioned. Among them we find the names of JOACHIM BARRANDE (1799–1884), JOHAN BAPTIST ČZŽEK (1806–1855), AUGUST EMANUEL REUSS (1811–1873), FERDINAND HOCHSTETTER (1829–1884), VIKTOR L. ZEPHAROVICH (1830–1890), FRANZ X. M. ZIPPE (1791–1863), EDUARD SUESS (1831–1914), FRANZ EDUARD SUESS (1867–1941) and others. The K.-K. Geologische Reichsanstalt (Geological Survey of Austria) was founded in 1849 as the third State Geological Survey in the world, one year after the British and Irish State surveys. Many Bohemian and Moravian geologists are in the list of staff members of the Austrian Geological Survey and worked either in their home country or in some other parts of the Empire. Vice versa, many Austrian members devoted their life to the investigation of Bohemia, Moravia and Silesia, future Czech Republic. Some of them held prestigious position in the Survey, as that of chief geologist or even director. The names as W. v. HAIDINGER (1849–1865), F. HAUER (1866–1884) and DIONÝZ ŠTŮR (1827–1893) evidence this statement. Thanks to the geologists who take care of the archives of the Austrian Geological Survey and the University of Vienna we have a possibility to go through biographical materials of many outstanding persons who lived and worked in the last century and are referred to in the literature up to now. Some of them suggested new regional and general geological terms which were widely accepted and are still in usage.

My contribution to this Festive Volume cannot be considered detailed or systematic analysis of the past Czech-Austrian geological relations. My intention was to select a few examples of intimate cooperation and mutual interests in the development of geosciences in the two countries. My first choice was FRANZ EDUARD SUESS who investigated the relations between the Moldanubian and Moravian zones, introduced new denominations of geological units and opened the problem which is still an enigma. The second story deals with the recent history of the Silurian orthoceras limestones. Third one reminds the Austrian and Czech share in the geologic investigations in the small oil-rich Middle East country. Fourth case reminds the the development of the Austrian and Bohemian mining education in the last century. Fifth article tries to describe a strange stratigraphical and paleontological similarities of two distant areas of the two countries.

As an appendix we present the short list of geologists and naturalists who prior to 1918 participated in the geoscience researches in both countries, Austria and contemporary Czech Republic, neglecting their nationality and affiliation.

This inventory represents a part of the fruitful work of Dr. PAVEL VLAŠIMSKÝ, member of the Publishing Department of the Czech Geological Survey, who kindly passed me this list over and I adapted it only slightly for this purpose.

The Austro-Hungarian heretage can be observed by the visitors of the library of the Czech Geological Survey even in recent times. Long-term employee of this library Mrs MARIE MEZEROVÁ, now retired, informed me kindly about the very beginning of the new Czechoslovak State Survey's library in 1919. The registration number of all the volumes has a prefix which indicates the country of origin. Curiously enough, number one was given neither to Czech nor to Moravian periodicals but to Austrian ones. What was the reason of this? Possibly, that Austrian journals were the most numerous in this newly born institution. Also the tradition played an important role, because it was generally accepted that the Czechoslovak State Geological Survey is one of the successors of the Imperial Austrian Geological Survey in Vienna.

The case of the Moravian mystery

FRANZ EDUARD SUESS was born in Vienna in 1867 as the son of famous professor of geology EDUARD SUESS. FRANZ EDUARD mentioned in his own curriculum that he attended the secondary school in Vienna and after that started his university studies at the Faculty of Philosophy of the University of Vienna. He mentioned also his military service in 1888–1889 and his promotion to the rank of lieutenant in reserve troops. In 1891 he defended his Doctor Thesis dealing with the Tertiary deposits in the Upper Austria and Bavaria. During his studies he made many field trips under the guidance of his father and Prof. Frech, mainly to the Austrian and Bavarian Alps. In 1891 he spent two months in England and Scotland and visited not only the Museums in London but also the geological localities in the Caledonian mountains. His lecture on this trip took place in Prague and was organized by the Lotos Association. In 1891 F. E. SUESS joined the German Technical University at Prague, where he was appointed assistant and worked under the guidance of prof. Uhlig. That time he participated in the investigation of Jurassic fossils from the Himalaya Mts. His cooperation with prof. F. BECKE should be also mentioned. BECKE's experience in petrology and mineralogy helped him later in his reconstruction of the development of the Bohemian Massif. In 1893 F. E. SUESS joined the K.K. Geol. Reichsanstalt in Vienna, where he first became assistant and after that "Adjunkt". His interests were devoted to the mapping of the Moravian part of the Bohemian Massif, first of the sheet Velké Meziříčí (Gross-Meseritsch), after that Brno (Brünn), Třebíč (Trebitsch) and Moravský Krumlov (Mährisch Krumau). That time his theory about the differences in the development of the Moldanubian and Moravian zone started to crystallize. He was involved, however, also in the applied geology, in 1897 studied the thermal springs of Teplice spa (Teplitz-Schönau) and groundwater regime in the Tertiary coal basin in the surroundings of Most (Brüx). During his stay at Moravian Třebíč he became acquainted with the collection of moldavites. He supported theory of their cosmis origin. It is not generally known, that F. E. SUESS introduced the term tektite into the literature. Several times he visited the area of Kraslice (Graslitz) and evaluated the earthquake swarms along the Krušné Hory Mts (Erzgebirge) fault zone. On the beginning of the nineteenth century he started to work on his famous synthesis of the development of the eastern parts of the Bohemian Massif. He took advantage of his sabbatical year and made comparative studies of several zones of the

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Geologie von Österreich. 2. H.*

1. 26. Oktober 1931: Einleitung und Großgliederung
2. 29. " " Österreichs Geologie im Rahmen der Europa's.
3. 9. November " Moldanubische Scholle: Geschichte.
4. 16. " " Die Granite und ihre Stellung in der mold. Scholle.
5. 19. " " Das metamorphische Grundgebirge und seine Entstehung (Gibbs Gneis, Granulit)
6. 23. " " Die moravischen Fenster
7. 26. " " Der moravisch-silesische Bau
8. 30. " " Strömungen in der mold. Scholle und Beobacht. über die Alpen
9. 3. Dezember " Die Westalpen
10. 7. " " Die Gipsalpen
11. 10. " " Die Gipsalpen und das Engadiner Fenster
12. 14. Jänner 1932: Engadiner Fenster und Tauernfenster
13. 18. " " Resultat Tauern
14. 21. " " Tauern als Kuppe: West vom d. Fenster, Sommeringfenster.
15. 28. " " Sommeringfenster u. Ostalpinen Kristallin.
16. 4. Februar " Zentralalpen
17. 11. " " Hauptmerkmale, Kalkalpe etc.
18. 15. " " Kalkalpen, Stratigraphie
19. 18. " " Kalkalpen Tektonik
20. 22. " "
21. 25. " " Flyschzone u. Klippen.
22. 29. " " Ostalpin Stratigraphie
23. 3. " " Talbildung etc.
24. 4. " " Auswässerungskanäle, Eiszeit

Fig. 1. From the F. E. SUSS's notebook. Curriculum for lectures in the winter term 1931–1932 at the University of Vienna. Within "Geology of Austria" F. E. SUSS taught about the relations between Moldanubicum and Moravicum (items 4–7) which proves his persisting interests in this theme. From the Archives of the University of Vienna.

Bohemian Massif, namely of the Saxonian, Bavarian, Austrian, Bohemian and Moravian ones. In 1903 he guided the excursion for the International Geological Congress to the surroundings of Brno City and presented there his views on the relations between the tectonic units of the Bohemian Massif. In the same time first version of his fundamental work appeared, called "Bau und Bild der böhmischen Masse" (Structure and Image of the Bohemian Massif). In 1904–1905 his new comparative studies confronted the Brno Massif and Drosendorf area in Austria.

In March, 1905, F. E. SUSS was appointed professor at the University of Vienna. Step by step he formulated his geotectonical hypothesis, recognized Thaya Dome (Thaya Kuppel – Dyjská klenba) and Schwarzawa Dome (Schwarzawa Kuppel – Svratecká klenba) and also pre-Permian origin of the Boskovice Graben (Boskowitz Furche – Boskovická brázda) as the extension of the Austrian Diendorf fracture zone. In the meantime Suess studied also the groundwater regime in Karlovy Vary (Karlsbad) spa area and searched for new evidences for the tektite origin. After few years of hesitation he made himself clear in 1910: "Moldanubian basement rocks have been thrust over the Moravian ones", and the subsequent erosion of the Moldanubian nappe exhumed the Dyje and Svratka domes as tectonic windows. This model has survived 90 years and with some modification is persisting until

now even though some alternative reconstructions appeared, as mentioned below. After the collapse of the Austro-Hungarian Empire in 1918 F. E. SUSS was detached from the field work in the Czechoslovak part of the Bohemian Massif, but in spite of some criticism of his model he continued to investigate the Austrian part of the Bohemian Massif in the Waldviertel and Mühlviertel. Later on, in the footsteps of his father he worked on his general geotectonic theory of mountain building. He was devoted University teacher. His notebooks and the list of lectures, curriculum of the winter term 1931–1932 reveals his continuing interests in the relations between Moldanubian and Moravian zones of the Bohemian Massif (see fig. 1). F. E. SUSS with the help of BECKE's petrological observations clearly recognized the differences in metamorphic history of the Moldanubian and Moravian zones using also analyses of tectonic structures and detailed field observations.

The contact between the Moldanubicum and Moravicum and the broader relations between these two units are not solved yet. Combined petrological research, geological mapping, structural studies and determination of radiometric ages of different units caused an incredible mess of regional, geotectonic and structural terms and models. Presumed boundary between the Moldanubicum and Moravicum manifests itself far better in Moravia than in Austria. Both Austrian and Czech geologists either accepted SUSS's view, or tried to offer an alternative model. Several Austrian and Czech geologists shift the "Moldanubian line" more to the west, or explain the tectonic pattern by an existence of more superimposed slices,

thrust westwards. It was also recognized, that the metamorphism of the Moravian zone as well as its structure, are older than the Moldanubian overthrust and that the Moravian deformations are not directly related to the overthrusting processes. There exist also geological "heretics" who totally doubt about the existence of the so called Moravian Line. During the recent international conference "Palaeozoic Orogenesis and Crustal Evolution of European Lithosphere" (Prague, 1998) at least four brand new or modified models on the structure of southeastern part of the Bohemian Massif were presented. New SHRIMP-zircon ages for the orthogneisses of this area are worth mentioning (FRIEDL et al. 1998). For the Bíteš (Bittesch) gneiss this dating provided many well-defined concordant data points around 590 Ma which are interpreted as magmatic formation ages. Spitz gneiss is together with the Dobra gneiss considered constituent of the Proterozoic basement within the Moldanubian nappe complex. It is also suggested that this granitoid basement represents an intra-Moldanubian overthrust with its extension into the Moravo-Silesian terrane. Its ages are clustering around 620 Ma which is interpreted as magmatic crystallization age.

Gföhl gneiss is thought to form the uppermost tectonic unit of the Variscan nappe pile. Most radiometric analyses yielded concordant ages around 480 Ma, providing clear evi-

dence for Early Paleozoic magmatic activity in the southeastern Bohemian Massif. These data provide evidence for the two different stages of magmatic activity and the existence of two geotectonic units: For the Bittesch (Bíteš) gneiss, Thaya (Dyje) Batholith and Brno Batholith the radiometric ages indicate the 590–580 Ma magmatic event. For the Gföhl gneiss, this age corresponds to the Early Paleozoic 480 Ma event. Geophysical data, published in recent ten years, illustrate the crust model along the profile line across the Moldanubian-Moravian border as very flat thrust plane with probable mylonites. Below it, Moravian orthogneisses and mica schists occur, above it, Moldanubian granulites and Gföhl gneisses. The thrust plane can be traced up to 6 km below the surface. Informal usage of regional geological and structural terms in last decades caused enormous confusion in the Austrian and Czech literature, to say the truth, in the Czech literature the mess is even greater than that in the Austrian. The terms Moravian zone or unit, Moravian block, Moravicum, Moravo-Silesian zone, Brno unit, Brunnia, Brunovistulicum, Brno Massif, Moravosilesian Massif, are used in an arbitrary, sometimes contradictory sense. Recently Suk et al. (1996) did their best in trying to put things terminologically in order, but the confusion still persists.

The case of wandering stone

Stones are have been wandering continuously across the state borders between Czech Republic and Austria.

Stones in their premature form are also transported as river suspension, bed load and dissolved matter. It was calculated that about 2.4 million tons of river materials leaves yearly the Czech Republic. Out of this amount, about 1.1 million tons of materials are in suspension, negligible amount is transported by traction on the river bottom and about 1.3 million tons in the solution. This number, 2.4 million tons yearly, represents an average value. The volume of transported material is related to the discharge. During catastrophic events, when the river discharge multiplies ten and more times, the same holds for the amount of suspension and bed load, partly also for the solutes. The Czech territory supplies in this ways three seas. The North Sea through the Elbe catchment, the Black Sea through the Danube catchment and the Baltic Sea mainly through Oder catchment and partly also through the Wisla catchment. 60 % of the surface of the Czech Republic belongs to the Elbe River catchment, 35 % the Morava (March) River and thus to the Danube catchment and only 5 % to the Oder and Wisla catchments. Now, the Morava catchment is of special interest, because this river transports custom free material day by day, night by night across the Czech-Austrian frontier. Annual average of the clay, silt, sand and solutes, carried through the Morava River channel, is 0.8 million tons. This number corresponds to the surface area of the Morava River catchment, as compared to the Elbe one. It was calculated that during the catastrophic flood in the Morava River catchment in July 1997, the amount corresponding to the annual average passed through the river only during 6 days of the flood maximum.

Unfortunately, this river-borne material which is kindly delivered from the Czech Republic to Austria, does not stay there long. Only small part is deposited in the Danube natural levee and flood plain, most of it continues its wandering to the Balkan states and Black Sea where it either settles in the picturesque Danube delta or becomes part of the deep water Black Sea floor sediments.

Thus, the river-born material is only on transit in Austria. On the other hand, there are many other geological materials

of Czech origin which rest in Austria and vice versa. This geological exchange started already in prehistorical times, when the trade routes from the Adriatic to the Baltic area crossed the two territories. There were no natural barriers for the migration of people from the Vienna basin northwards through the Moravian lowlands. The passes through the Waldviertel and Mühlviertel were easily accessible as well as the Lužnice valley to the Třeboň basin. In the mediaeval times intensive good exchange comprised also geological materials, as ores, jewels and gemstones, decorative stones, salt and others. Petroarcheology discovered interesting stones of the Austrian Alpine provenance on Prague buildings and some Moravian limestones in the Austrian historical monuments. The new epoch, with its industrial revolution, embracing both the Austro-Hungarian Empire and two independent states after its collapse, witnessed even more intensive exchange of industrial products and materials of geological character. Modern export-import analyses proved that the Austrian share on the Czech foreign trade is not negligible, specially taking into account the geological materials. Thus in 1997 the following amount of commodities crossed southward the Czech-Austrian border:

Black coal	2.051 thousand tons
Lime	21 thousand tons
Cement	146 thousand tons
Sand	254 thousand tons
Gravel and aggregates	2,021 thousand tons

Also the research and documentation materials started to be exchanged and the museums, universities and geological surveys possess numerous samples from the two countries in their collections.

Last and recent example of such an exchange is the wandering of the limestone block from the Kosov quarry (not Kosovo !!) near Beroun (25 km SW of Prague). Distinguished Austrian guests of the Czech Geological Survey admired in the entrance hall of the Klárov building in Prague the slab of the Silurian orthoceras limestone. Its younger brother was blasted from the Kosov quarry wall and prepared for transport to Vienna in early November 1998. Its size is 85 x 85 x 30 cm, its weight 550 kg. It is a real "Schaustück" with beautifully preserved orthoceras shells, elongated, partly with preferred orientation. Stratigraphically the stone belongs to the uppermost Kopanina Formation (Ludlow, Silurian). Petrologically this limestone can be described as biodetrital limestone, with predominating orthoceras shells, also with fragments of trilobite carapaces, some crinoid stems and other biodetrital components. The matrix is formed of sparite with micrite nests. The admixture of siliciclastic material can be also observed, mainly quartzose silt and fine-grained sand. Some framboidal aggregates of pyrite also occur. Neither dolomitization nor pyritization were observed. Its chemical composition is as follows: (according to former analysis of the analogous stone in the laboratories of the Czech Geological Survey):

CaCO ₃	96.58 %	Na ₂ O	0.08 %
MgCO ₃	0.25 %	K ₂ O	0.23 %
SiO ₂	1.76 %	C _{org}	0.15 %
Al ₂ O ₃	0.73 %	S	0.22 %

The Kosov quarry is still active and supplies the nearby Králův Dvůr cement factory with raw materials. This complex quarry of several levels offers an extraordinary exposure of several formations: On the bottom there is Kosov Formation (Ashgill, topmost Ordovician), made of siltstones, claystones

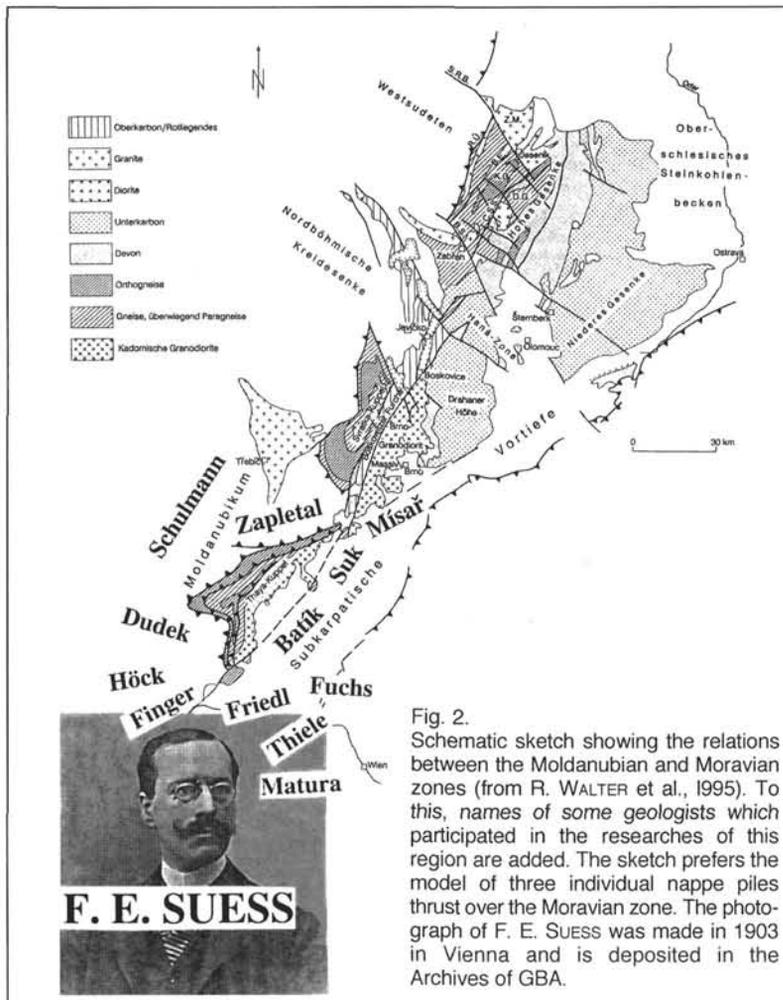


Fig. 2. Schematic sketch showing the relations between the Moldanubian and Moravian zones (from R. WALTER et al., 1995). To this, names of some geologists which participated in the researches of this region are added. The sketch prefers the model of three individual nappe piles thrust over the Moravian zone. The photograph of F. E. SUESS was made in 1903 in Vienna and is deposited in the Archives of GBA.

and quartzose sandstones, above overlying Liteň Formation (Llandovery – Wenlock, Silurian), made of black graptolitic shales, limestone intercalations and diabase sills, and Kopanina Formation (Ludlow, Silurian) of variable composition with several limestone types. The top of the quarry wall consists of the Přídolí Formation (Přídolí, Silurian), made of platy biomicritic limestones with marly intercalations. The mentioned block of the orthoceras limestone was transported by the Austrian suite in the Austrian pick-up on November 19, 1998, directly from Kosov to Vienna and became part of the geological collections of the Museum of the Natural History. Thus too analogous stones are now decorating the Czech Geological Survey and the Vienna Museum of Natural History.

In the footsteps of Lawrence of Arabia

The story of Lawrence of Arabia is well known from literature of fact, fiction, and movies. He became legend thanks to his knowledge of the Middle East lands, nature, population and Arabic language. As the leader of Arab troops he helped Britain to drive Turks out and conquered the desert, oases and settlements of vast Middle East regions. The role of Czech traveller and ethnographer ALOIS MUSIL (1868–1944) who worked also in Prague and Vienna, is also well known. He contributed considerably to the geographical knowledge of the Middle East countries. Let us omit the long lasting time gap between two wars and post-war times and draw our attention to the small Arabic country at the Persian Gulf whe-

re the geologists of two countries, Austria and Czech Republic, somewhat influenced the geological researches. This country is called Kuwait. It is small, not larger than 18,000 km² and comparatively young. It gained its independence in 1921 after the famous battle of Jahra. It started to flourish in fifties and recently suffered the attack and occupation by its more mighty northern neighbour. It survived and was liberated during the Gulf War in January 1991.

Our story starts a little earlier, in sixties. During our trips through the Middle East countries we surprisingly met several Austrians on interesting spots. Just on the border between Iraq and Jordan, in the town named Rutbah, then Austrian lady was running a prosperous hotel. In Baghdad we found that the proprietor of the Sahara hotel in the city centre is also Austrian. And, last but not least, the director general of the prestigious travel agency in Kuwait City was Austrian as well. Was it just a coincidence that all these Austrian friends worked in the travel business? Later on we were told that this is no coincidence at all and that many Austrians throughout the world succeeded as hotel or restaurant keepers.

But back to the geology. Three Austrians deserve a special treatment because their work is considered milestone in the history of geological researches of Kuwait. In 1968 W. FUCHS, T. E. GATTINGER and H. F. HOLZER constructed first synoptic geological map of Kuwait at a scale 1 : 500 000 (issued by the Geological Survey of Austria in Vienna). This map clearly shows main geological units of Kuwait and their interpretation. The author of

this article remembers when he was introducing this map to the students of geology at the Kuwait University. He dared to compare it to "the Holy Bible of the Kuwait geology". Nevertheless, after recognizing some disagreement, he changed it to "the Holy Koran of the Kuwait geology".

The superficial geology which this map shows, on the contrary to the subsurface, seems to be very uniform, but mainly Quaternary geologists recognized and defined many units there.

The oldest sediments cropping out are the Eocene carbonates of the Dammam Formation. Overlying formations are mostly of siliciclastic nature. Great part of the Kuwait territory is covered by the Miocene and Pliocene deposits, called the Fars Formation, which is correlated with the outcrops in the Zagros mountains in Iran and Iraq. Fars Formation with its cross bedded sands and marls forms most interesting pre-Quaternary outcrops in Kuwait, the ridge called Jal az Zor. Quaternary deposits are represented by many types of sediments. Among them, Pleistocene gravelly Dibdibba Formation, oolitic sands, coastal sabkha deposits, beachrock and eolian sands are the most interesting. Kuwait sabkha deposits served as a basic material for the elaboration of interesting theory about the dolomite genesis. The interaction of the following three big geological units modelled the present geological image of Kuwait:

1. The Mesopotamian geosyncline, also called the Zagros trough, filled with at least 8 km thick sequence of Paleozoic, Mesozoic and Tertiary sediments.
2. The Arabic Shield consisting of metamorphic and magmatic rocks 1100–470 million years old.

3. The Zagros Range, made of older autochthonous and younger allochthonous sediments including ophiolites. As a part of the Alpine-Himalayan belt it suffered two main deformation phases, first one before 70–35 million years, second one before 20–3 million years.

The abovementioned map by the Austrians was later used by their successors. Few Czech geologists were among them. Some of them joined the Kuwait University, others the Kuwait analogy of the Academy of Sciences, so called KISR (Kuwait Institute of Scientific Research). Czech geologists contributed to the mapping of Quaternary sediments, to the knowledge of the Pleistocene and Holocene eolianites, sabkhas and eolian bedforms in the desert. Also the Czech geophysicists took part in the research of subsurface structures in Kuwait, either with the University of with the Oil Company. In the geological bibliography of Kuwait (coauthor Z. KUKAL) we find names of geologists which were or still are among the staff members of the Czech Geological Survey, as FRANTIŠEK PÍCHA, JAROSLAV TYRÁČEK and MIROSLAV REJCHRT. For all of them the Austrian map from 1968 served as a spring-board for more detailed researches. Moreover, it was fascinating to explain to our Kuwait colleagues and university students the history of multinational Austro-Hungarian Empire and its final separation into independent nations.

The case of twin centres of mining education

By the Emperor's decree of January 23, 1849, two state educational institutes were established, where mining sciences were supposed to be taught and studied, one in Austria, second in Bohemia. Austrian choice was Leoben in Styria, rather far from Vienna, Czech representative was Příbram, only 50 km from Prague. Leoben obtained a statute of a Mining Academy already in the academic year 1860/1861, Příbram four years later. Next statutes of the two mining academies were issued in 1874. According to them, mining and geology or metallurgy could be studied separately or combined. The two institutes became even more prestigious in 1895 when a curriculum was extended, state examinations introduced and a function a rector elected by professors installed.

The history of teaching of mining science closely associated with geology can be traced hundredfifty years back in the history of the two countries. In Austria, a school of mining and metallurgy was originally founded at Vordenberg, about 20 km west of Leoben. It moved to Leoben in the mentioned year 1849. Several members of the Leoben Mining Academy devoted great part of their academic life to the work in Bohemia. Mainly R. HELMHACKER (1840–1915) and F. KATZER (1861–1925) should be named here. Present "Leoben University of Mining and Metallurgy" with more than 1000 students offers degree courses in many subjects, as mining and petroleum engineering, mining geology, mine surveying, mining machinery and many others. Also a postgraduate course in mineral exploration was opened for graduates from developing countries. Leoben with its suburb Donawitz, is now a flourishing town with about 40,000 inhabitants and a large steel mill of the Voest-Alpine Corporation. In the whole Austria, however, this town might be better known as a producer of its "Gösser Beer".

In Bohemia, the conditions for mining teaching developed mainly in the Krušné Hory Mts (Erzgebirge), where J. MATHESIUS (1504–1585) and specially GEORGIUS AGRICOLA (1494–1555) in their works opened the floor for the birth of mining education. Thus in December, 1716, according to the Emperor's rescript, J. F. WEYR, the administrator of the mi-

ning office in Jáchymov (Joachimsthal), was entitled to teach in the regular mining school. Later on, in March 1763, the Department of mining sciences was founded in Prague as a part of the Faculty of Philosophy. J. Th. A. PEITHNER was appointed first professor in mining sciences. Few years after this, however, the education in mining sciences was transferred from Prague to the Slovak town of Banská Štiavnica (Schemnitz) where PEITHNER continued to teach mining and mining law. Simultaneously, this department in Prague was abolished and thus the teaching in mining sciences in Bohemia died out for several decades.

After more than 80 years, the abovementioned Emperor's decree caused the opening of a mining school in Příbram in Central Bohemia in 1849. Many distinguished experts in economic geology and mining were among the staff members of the Příbram Mining Academy. The Příbram Mining Academy survived difficult years of the World War I. and also the years of the First Republic (1918–1938), even though many efforts were observed to move this Academy from Příbram to Prague. In May 1945, after the World War II., the Příbram Mining Academy resumed its activities, but soon, in September 1945, the President's decree ordered to transfer the Mining Academy to the Moravosilesian city of Ostrava, centre of the Upper Silesian black coal basin and heavy industry in former Czechoslovakia. But this is a new story which is not analysed here.

Going back to the twin cities, Leoben and Příbram, remarkable geological background of these two cities can be observed. Both of them became famous not only by their mining education but also by the occurrence of mineral deposits in interesting geological environment.

Leoben is situated on the Mur River 544 metres above sea level. At the city outskirts there still exists the Seegraben mine which exploited brown coal seams from the Miocene sediments. Underlying Carboniferous rocks of the Greywacke Zone consist of phyllites, banded limestones and sandstones. Further to the northwest and southeast, the upland passes into mountain ranges of the Seckauer Alpen and Gleinalpe. They are made of granites enclosed in strongly metamorphosed sediments. Geologically unique mineral deposit in the surrounding of Leoben, however, is Erzberg which towers over the small mining town of Eisenerz. This site bears traces of one of the oldest mining settlements in Austria. Mining of iron dates back to the 3rd century, the first smelters were built between 1150 and 1260 and mining continues until today. The deposit is situated at the northern margin of the "Greywacke Zone", near to its border to the superimposed thrust nappes of the Northern Calcareous Alps. Mineralized Lower to Upper Devonian limestones lie on the Ordovician metamorphosed quartz keratophyre and Silurian slates. The Erzberg deposit served for many years as a typical example of metasomatic replacement deposit, where primary limestones have been replaced by siderite and ankerite by hot solutions. New investigations revealed the difference in the ages of siderite and ankerite and it is believed by some authors that fine grained siderite might be primary and subsequently was remobilized during the Alpine orogeny. Siderite and ankerite are accompanied by smaller amounts of dolomite, hematite, quartz, calcite, arsenopyrite, chalcopyrite, tetrahedrite, cinnabar and pyrite. Some secondary minerals also occur, as iron oxyhydroxides, malachite, azurite and aragonite. The average iron content of the exploited ore is 32 p.c. It contains about 2 p.c. of manganese and some sulphur and phosphorus. The ore reserves are estimated at 400 millions metric tons.

The city of Příbram is approximately of the same size as Leoben, but in contrast to it, is easily accessible from the ca-

pital both by car and train. The trip from Prague to Příbram does not take more than 50 minutes by a motorway. The geological situation of Příbram is as much interesting as that of Leoben. The Příbram ore district is located just on the border of three geological units, the Upper Proterozoic slates, the Barrandian Lower Paleozoic represented mostly by the Middle Cambrian, and the Central Bohemian Pluton. The whole area was strongly affected by the Variscan orogeny which caused also the emplacement of the granitoid rocks and intrusion of numerous diabase veins. Broad complicated synclinal structure originated with numerous faults having a thrust character. Out of them, the so-called Clay Fault (Lettenkluff), is most important. The origin of ore veins in this ore field is genetically connected with the postmagmatic phase of the Central Bohemian Pluton. Three zones represent places of a maximum concentration of ore veins, two of them being associated with major faults third one situated in the pluton proper.

The oldest parts of the Příbram ore field are situated at Březové Hory and Bohutín which now belong to the Příbram City agglomeration. Silver mining started already in the 13th century, with maximum culmination at the beginning of the 16th century. After exhaustion of the richer near-surface veins mining was transferred to the depth and in the Vojtěch mine the depth of 1,000 metres was reached for the first time in the mining history of the world in 1875. Curiously enough, famous JOACHIM BARRANDE visited the gallery in the lowermost level in 1879 when he was eighty years old. Few years later the memorial table was placed there commemorating this event, saying that "Dieser Stelle hat der berühmte Geologe J. BARRANDE an seinem 80. Geburtstag den 12. August 1879 eigenhändig abgestuft" later moved to the Příbram Museum at Březové Hory, opposite to the mining skansen, where you can find it up to now (see fig. 4). In the 20th century the Příbram ore veins with Ag-Pb-Zn ores were mined to a depth of 1,300–1,520 metres. In sixties and seventies of this century, when uranium was mined in Příbram, one of the mines approached the depth of 2000 m.

The history of mineralization is very complicated and is being studied up to now, using stable isotope geochemistry, study of fluid and gas inclusions and many other sophisticated methods. The oldest stage of mineralization was represented by a vein filling by siderite, quartz, pyrite, arsenopyrite, sphalerite, galena, boulangerite and others. After that siderite was replaced by sulphides. In the reopened fissures, new generation of siderite was deposited followed by quartz, sphalerite and chalcopryrite. The galena was silver-bearing. In the Bohutín veins the polyascendent Ag-Pb-Zn mineralization originated during four stages: I – polymetallic – galena – sphalerite, II – polymetallic – sulphoantimonides, III – antimonite, IV – carbonate. The ore filling is atypical since it contains abundant oldest siderite and abundant "hard ore". i. e. fine-grained quartz with disseminated ores – pyrite, galena, sphalerite, boulangerite, Ag ore with quartz and siderite, also with accessory cassiterite, stannine, scheelite, etc. The veins with banded structure mainly contain siderite, sphalerite of two generations, galena, quartz, baryte and in the band centre ankerite-dolomite and calcite, which contained Ag-ores in cavities. The ores were comparatively rich, at the beginning of the 20th century the average annual ore contents were 77 to 486 g/t Ag, 1.55 to 5.21 % Pb, 1 to 2 % Zn and about 0.5 % Sb.

The last historical stage of the Příbram ore district is connected with the uranium mining. Soon after the war in 1945 during prospection uraninite was found with polymetals in the veins and also in old dumps. Large-scale exploitation of uranium by the Uranium Mines Enterprise run by Soviets

was step by step transferred from Jáchymov (Joachimsthal) to Příbram district which was the main uranium supplier since 1954. Soon the Příbram uranium district with its total ore production of 50,000 metric tons became one of the largest world uranium deposits. In the Příbram uranium district the mineralized veins are located near the contact between the Central Bohemian Pluton and Proterozoic rocks, the irregularly mineralized portions occur almost solely in the Proterozoic. They accumulated in so called vein knots which can be characterized as spatially close veins of one direction or crossing veins of several directions. They are composed of ore veinlets in a zone of crushed, hydrothermally affected rocks, the mineralization commonly makes about 40–50 % of the total fault fills. The uraninite mineralization consists of dominant calcite and other carbonates, uraninite (pitchblende), and to a small extent of U-antraxolite, coffinite, and sulfides. The radiometric dating of the uraninite shows the ages between 290 and 250 Ma.

For nearly forty years in several mines both polymetals and uranium were mined, in some of them only uranium. The activities stopped after velvet revolution in 1989. Nowadays the mines are maintained, one of them serves as a source of hot mine waters for the heating of the administrative buildings and some subsurface spaces might be became underground repositories of low-radioactive wastes.

Thus contemporaneous Příbram cannot offer academic mining education as Leoben, but several hundreds of mineral species in the local museum where well-organized collections and professional staff show the famous mining history of the area.

As the geology concerns, Příbram can offer also magnificent geological outcrops in the Litavka River valley, where the oldest Czech macrofauna was discovered, namely the crustacean species *Kodymirus vagans* found in the lagoonal sediments of the Lower Cambrian age. Geologists and laymen are also attracted by the picturesque reconstructed Holy Hill Monastery which overlooks the city and for centuries was the most sacred centre of pilgrimage in Bohemia.

Going through the list of the directors and professors of the two Mining Academies in Příbram and Leoben we can discover numerous experts the life of which is connected also with the Vienna and Prague universities and also with the Austrian Geological Survey. First director of the Příbram

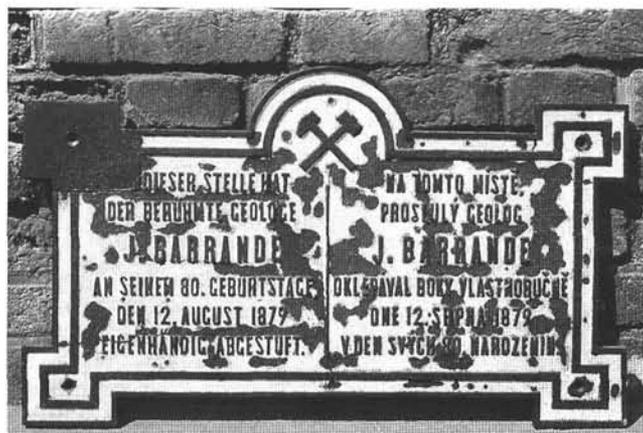


Fig. 3. Memorial table commemorating the BARRANDE'S visit of the Příbram mines on 12. August 1879. He was 80 years old and in spite of this visited the lowermost gallery of the Vojtěch Mine where the depth of thousand metres was reached first times in the world. The metal table was originally placed on the wall of this gallery, later carried over to the Mineralogical Museum of Příbram, Březové Hory, where it is up to now.

Academy was Fr. X. ZIPPE who a little later was appointed professor of geology and mineralogy at the Vienna University. We can also mention JOHANN GRIMM (1805–1874) who headed the Příbram Academy until his death. He was appreciated as one of the founder of the geology of mineral deposits in Bohemia. The activities of professor FRANZ (FRANTIŠEK) POŠEPNÝ (1836–1895) embraced not only several geoscience disciplines but also several countries inside of the Austro-Hungarian Empire and abroad. He worked at the Příbram Mining Academy from 1879 up to 1889. His book "The Origin of Ore Deposits" which appeared in English in the United States was considered one of the milestones in the history of economic geology. His fundamental work is mentioned in all the textbook with appreciation. According to some experts, POŠEPNÝ can be considered greatest Czech geologist ever born.

The case of a strange coincidence

Carnic Alps vs. Barrandian – differences on one hand and similarities on the other hand. Differences in the geotectonic position but similarities in the stratigraphic development!

The relief of high mountains of the Carnic Alps versus the mild undulating landscape of the Barrandian. More than 1300 m high cliffs and peaks made by Silurian up to Lower Carboniferous limestones, Mount Kellerspitzen reaching 2774 metres in the Carnic Alps versus the Cambrian and Ordovician Brdy Mts not exceeding 900 m in the Barrandian. The similarities, however, can be seen in the stratigraphical and facial development of the Lower Paleozoic sediments. That is why joint efforts of Austrian and Czech biostratigraphers, mainly H.-P. SCHÖNLAUB from the Austrian side and I. CHLUPÁČ and J. KŘÍŽ from the Czech side, contributed to the general biostratigraphic schemes and proposals to the International stratigraphic commissions and subcommissions. Thanks to the one of these proposals, Přídolí unit was internationally accepted as highest subdivision of the Silurian System with its boundary stratotype in Bohemia. SCHÖNLAUB'S contribution based on the conodont research formed a substantial part of this project.

The photographic atlas of the carbonate rocks from the Carnic Alps published by L. H. KREUTZER from GBA made possible to compare the spectra of microfacies with the Barrandian occurrences. This comparison embraces the Silurian and part of the Devonian (Přídolí and Prag). Very similar microfacies occur, in the Carnic Alps being a little more variable. Nevertheless, the predominance of biomicritic and biotrital limestones is clear. There is no difference in bioclasts and their abundance. Dolomitization pattern is very similar in the two areas. The most marked difference, which can be observed, is more intensive secondary micritization in the limestones of the Carnic Alps. Slightly greater influence of anchimetamorphic processes can be also registered in the Alpine carbonates. Nevertheless, the similarity of microfacies speaks in favour of identical depositional environments, possibly in the same climatic zone of a Peri-Gondwanian realms.

Paleontological evaluation of the Silurian bivalves from the two areas, published now by J. KŘÍŽ (Czech Geological Survey), revealed striking similarity in the identified species. Out of 73 species, 49 occur both in the Carnic Alps and the Barrandian. The closest relations in the bivalve distribution can be observed during the Ludlowian. Paleoeological conclusions, presented by the mentioned Czech author, considering also the rate of species migration, mean, that the two basins were not separated and the distance between the Carnic Alps and Barrandian was approximately the same

during the Silurian as it is today. This reconstruction is interesting specially now, when the hypotheses of large-scale strike-slip and transform replacements of terranes is suggested by many authors.

Appendix

(This inventory is presented with the kind help of Dr. PAVEL VLAŠIMSKÝ from the Czech Geological Survey, Prague)

Selected "cases" document long-lasting intimate relations between the Austrian and Czech geologists. In order to complete biographical data the following list of geologists which worked on the present territory of Austria and Czechia. Among them Austrians, Czechs, Germans and some other nationalities can be found. The common denominator of all of them is the fact, that they were active in the two countries. The inventory embraces a period until 1918. The names are in alphabetic order and only real basic professional characteristics are given:

Note: GRA – Geologische Reichsanstalt
GBA – Geologische Bundesanstalt

- ABEL, OTHENIO, Prof. (1875, Wien – 1946 Loibichl). Austrian geologist and paleontologist. Member of GRA, from 1907 professor of paleontology at the University of Vienna. From 1935 professor at the Göttingen University. Author of pioneer papers on vertebrate paleoecology and paleopathology.
- ALTAR PAVEL, Ing. (1889, Prostějov – 1942 Majdanek). Montanist. Studied at Vienna University and Mining Academy, Leoben. Died in the concentration camp.
- ANDRIAN-WERBUNG, FERDINAND VON, Bergrat (1835, Vormbach am Inn – 1914, Nice). Austrian geologist and antropologist. In 1857–1869 member of the Austrian Geological Survey (GRA). Mapped different areas of the Monarchy, also Českomoravská vrchovina Upland and Železné hory Mts. Later joined the Ministry of Finance in Vienna.
- BABÁNEK FRANTIŠEK, Ing. mont. (1836, Kamenný Přívoz – 1910, Praha). Czech geologist and montanist. Graduated at the Academy at Banská Štiavnica (Schemnitz), worked mostly with local authorities at Příbram and Jáchymov (Joachimsthal). In 1863 also worked for GRA.
- BAKEŠ JAROSLAV, MUDr (1871, Blansko – 1930, Brno). Mineralogist, layman. Studied in Vienna. Owner of significant collection mainly from the localities of Austro-Hungarian Empire.
- BARRANDE JOACHIM (1799, Sanguis – 1883, Frohsdorf). His biography and importance are described in the separate article of this volume.
- BECK HEINRICH, Dr., Bergrat (1880, Wien – 1979, Wien). Geologist, member of GRA, later chief geologist. Mapped in North and East Moravia.
- BECKE FRIEDRICH, Prof. Dr. (1855, Praha – 1931, Wien). Mineralogist and petrologist. Between 1890 and 1898 professor at the German University in Prague, between 1898 and 1927 professor at Vienna University. One of the pioneers of microscopic petrology of metamorphic rocks. Described the rocks of the Bohemian Massif, also Tertiary volcanites and distinguished the Atlantic and Pacific volcanic provinces.
- BERWERTH FRIEDRICH MARTIN, Prof. PhDr., Hofrat (1850, Schäßburg/Sighisoara – 1918, Wien). Austrian Mineralogist and petrologist. Worked in the Museum of Natural History in Vienna, later as professor of Vienna University. Studied the rocks of Eastern Alps and Bohemian Massif, described also meteorites.
- BITTNER ALEXANDER (1850, Frydland – 1902, Wien). Austrian geologist, born in Sudeten. Studied in Vienna Worked in GRA, from 1897 as chief geologist. Studied mostly the Triassic and Tertiary in various countries of the Monarchy.
- BLASCHKE FRIEDRICH, PhDr. (1883, Wien – 1911, Rottenmann). Austrian zoologist and paleontologist. Member of Museum of Natural History in Vienna. Author of an important paper on the Tithonian fauna from Štramberk (1911). Tragically killed in the avalanche.
- BORN IGNAZ VON, HOFERAT, Bergrat (1742, Capnic – 1791, Wien). Austrian and Czech Montanist from the German aristocratic family. Studied at the Prague University law and montanistic. Devoted

- mineral collector. From 1769 with the local authorities in Banská Štiavnica, Prague and Jáchymov. Described uraninite as new mineral (1772). Very active science manager in aristocratic circles.
- BRUDER GEORG, PhD (1856, Innsbruck – 1916, Ústí nad Labem /Aussig). Czech geologist of German origin. Studied at Prague University, in 1882–1890 assistant at the Prague German University, later teacher at secondary schools. Studied mostly Cretaceous and Jurassic fossils of northern Bohemia. Member-correspondent of GRA.
- BUKOWSKI GEJZA von, Dr. (1858, Bochnia near Krakow – 1937, Bochnia). Austrian and Polish geologist, between 1889 and 1918 member of GRA. Mapped in the northern Moravia, later in Dalmatia, Greece and Turkey. In 1919 one of the founders of Polish Geological Institute (Survey) in Warsaw.
- BURKART EDUARD, Dr. (1865, Brno – 1841, Brno). Moravian mineralogist. Studied mineralogy and chemistry in Brno, Vienna, Zurich and Berne. Author of the book on the Moravian minerals (*Mährens Minerale und ihre Literatur*, 1953).
- CAMMERLANDER CARL von (1861, Sibiu/Hermannstadt – 1892, Wien). Geologist, assistant at the GRA. Studied in Vienna. Worked in Moravia.
- CORNIL FELIX (1882, Praha – 1909, Graz). Graduate from the Leoben Mining Academy. Published papers on the petrology and mineralogy of the České Středohoří Mts. (Böhmisches Mittelgebirge).
- CZERMAK FRIEDRICH, Dr. phil. Dipl. Ing. (1890, Ostrava – 1960, Bad Aussee). Austrian geologist and montanist.
- ČZŽEK JOHANN BAPTIST, Ing. mont. (1806, Jirny/Groß-Gima, – 1855, Atzgersdorf). Czech geologist and paleontologist. Worked on the Directorate of Mines at Příbram, from 1835 in "Hofkammer des Münz- und Bergwesens" in Vienna. Chief geologist of GRA from 1849. Mapped mainly the Lower Austria and South Bohemia. Studied Tertiary foraminifers of the Vienna Basin.
- ETTINGSHAUSEN CONSTANTIN von, Dr. med. (1826, Wien – 1897, Graz). Austrian botanist and phytopaleontologist. Studied in Vienna, later member of GRA. Investigated Tertiary floras in several regions of the Monarchy. From 1871 professor of botany and phytopaleontology at the University of Graz. Described the Carboniferous, Cretaceous and Tertiary floras.
- FEISTMANTEL OTAKAR, Prof. Dr. (1848, Stará Huta/Althütten – 1891, Praha). Czech geologist and paleobotanist. Investigated mainly stratigraphy and paleontology of the Bohemian and Moravian Permocar-boniferous. In 1873 entitled to prepare an exposition on Austro-Hungarian coal basins for the World Exhibition. Between 1874 and 1882 worked in the Geological Survey of India. He compared Glossopterid floras of India, Australia and Tasmania. Introduced the term Gondwana into geological literature. From 1883 professor at the Czech Polytechnics in Prague.
- FOETTERLE FRANZ, Ing. mont., Bergrat (1823, Mramotice/Mratomitz – 1876, Wien). Austrian geologist. Studied in Banská Štiavnica (Schemnitz). Worked in GRA from its foundation. Supervised the geological mapping in Moravia and Silesia. This resulted in edition of the geological map 1 : 288 000 "Geologische Karte der Markgrafschaft Mähren und des Herzogthums Schlesien". Together with F. von Hauer compiled a study about the mineral resources of the Habsburg Monarchy (in 1855).
- FOLGNER RAIMUND (1888, Miedzybrodzie – 1917, Voronesz). Austrian geologist. From 1912 staff member of the Leoben Mining Academy. Cooperated with the GRA and mapped the Eastern Alps and Bohemia. Died as war prisoner in Russia.
- FRIITSCH KARL (1812, Praha – 1879, Wien). Meteorologist and geophysicist. Cooperated in the meteorological and geomagnetical observations in Bohemia. From 1851 worked in the "Zentralanstalt f. Meteorologie und Erdmagnetismus" in Vienna. Described the impact of geomagnetical oscillations on the living organisms.
- GÄNGL von EHRENWERTH, JOSEF, Prof. (1843, Spittal/Drau – 1921, Klagenfurt). Austrian metallurgist. Worked on the mining academies at Leoben and Příbram.
- GLÄSSNER MARTIN F., Prof. Dr.jur.et phil. (1906, Ústí nad Labem/Aussig – 1989, Adelaide). Austrian and later Australian geologist and paleontologist.
- GÖTZINGER GUSTAV, Prof. Dr, Hofrat (1880, Neu Serowitz – 1969, Pressbaum). Austrian geologist. From the beginning of the 20th century mapped in Moravia. Published papers about the Alpine and Carpathian flysch. After the World War II. appointed Director of the GBA.
- HAIDINGER WILHELM KARL RITTER von, Bergrat (1795, Wien – 1871, Dornbach). Austrian geologist and mineralogist. Director of GRA, supervised the geological mapping of the whole Habsburg Monarchy at a scale 1 : 144 000. Outstanding mineralogist, described 54 new mineral species. See his biography by T. Cernajsek (Abh.d.Geol.Bundesanstalt, 53, 1996).
- HASSINGER HUGO, Prof. (1877, Wien – 1952, Wien). Austrian geographer. From 1918 professor of geography at Basle University. Expert in geomorphology and regional geography. Published also paper "Die Mährische Pforte" (1914).
- HEINRICH ALBIN (1785, Frydland na Moravě/Friedland – 1864, Brno). Moravian naturalist. From 1836 worked in the Brno Museum. Also cooperated with the GRA in the geological mapping of Moravia.
- HELMHACKER RUDOLF V., Prof. Ing. mont. (1840, Rokycany/Rokitzan – 1915, Praha). Czech geologist and montanist. From 1875 professor at the Leoben Mining Academy. Worked in Russia as expert on gold prospection. Mapped Prague with its surroundings and East Bohemia.
- HIBSCH JOSEF EMANUEL, Prof. Dr. (1852, Homole/Hummel bei Leitmeritz – 1940, Wien). Geologist and petrographer. In 1874–1878 assistant at the Technical University in Vienna. Between 1880 and 1914 taught at "Landwirtschaftliche Landesanstalt" at Libverda, between 1919 and 1921 at "Hochschule f. Bodenkultur" in Vienna. Studied geology, petrography and mineralogy of the České Středohoří Mts. (Böhmisches Mittelgebirge) and issued 20 sheets of the geological map at a scale 1 : 25 000.
- HINGENAU OTTO von, Baron, Prof. Dr., Hofrat (1818, Triest – 1872, Wien). Austrian montanist and geologist. Worked with the mining authorities in Kutná Hora, Leoben and Vienna. From 1853 professor of mining law at the Vienna University. Worked also in geology and wrote "Uebersicht der geologischen Verhältnisse von Mähren und Österreich-Schlesien" (1852). In fifties cooperated with the GRA in the geological mapping of Moravia.
- HINTERLECHNER KAREL, Prof. Dr. (1874, Ljubljana – 1932, Ljubljana). Austrian geologist of Slovenian origin. Studied in Vienna. After that joined the Polytechnics in Brno, later member of GRA for 20 years. Studied crystalline rocks in Bohemia and Moravia. Produced several sheets of special geological maps. In 1919 appointed professor at the Ljubljana University. He continued in mapping of some Czechoslovak regions as an external member of the State Geological Survey in Prague.
- HOFER HEIMHALT HANS von, Prof. Dr. mont. h. c. (1843, Loket/Elbogen – 1924, Wien). Austrian geologist and montanist. Studied in Leoben, worked in Příbram in the Central Mining Bureau-Between 1879 and 1881 Head of the Department of Mining at Příbram Mining Academy. Author of several books on mineral deposits. He wrote together with F. Foetterle "Geologische Uebersicht der Bergbaue der Österreichischen Monarchie" (1855) and the book "Das Erdöl und seine Verwandten" (1888). He is considered pioneer of studies in petroleum geology in Europe. Called also "Erdölpapst der Frühzeit").
- HOFMANN ADOLF, Prof. (1853, Žebrák – 1913, Praha). Czech geologist. Worked as assistant at the Leoben Mining Academy. Studied Tertiary fossils from Styria and Bohemia. From 1889 successor of Pošepny at the Příbram Mining Academy. Between 1895 and 1897 rector of this Academy. Studied gold deposits in Central Bohemia. Author of "Atlas der Leitpflanzen palaeozoischer Steinkohlenablagerungen in Mitteleuropa" (1899, together with F. Ryba).
- HOCHSTETTER FERDINAND von, Prof. PhD., Hofrat (1829, Esslingen – 1884, Wien). Austrian geologist and geographer of German origin. From 1852 member of the GRA in Vienna, from 1860 professor at the Technical University at Vienna, in 1876 joined the Museum of Natural History at Vienna. Around 1850 took part in the mapping of West Bohemia, studied thermal springs in Karlovy Vary (Karlbad) and geology of North Bohemian Tertiary basins. Member of the Novara expedition into the Pacific Ocean. Pioneer of geological and paleontological studies in New Zealand.
- HOLUB EMIL, Dr. (1847, Holic – 1902, Wien). Czech doctor, naturalist and traveller. From 1872 worked in South Africa. Undertook several expeditions into the virgin African regions. Carried out geodetical, geological and meteorological researches.
- HOŘOVSKÝ EDUARD, Ing. mont. (1831, Příbram – 1898, Wien). Czech montanist. From 1854 "chief geologist" of the Ostrava coal mines, from 1895 Director General of the Rotschild Mines. Wrote Czech book about the coal mining techniques and the German-Czech-Russian mining dictionary. Suggested new Czech geological, mining and metallurgical terminology.
- HRABÁK JOSEF, Prof. Ing. mont. Dr. mont. h. c., Oberbergrat (1833, Sirá – 1921, Příbram). Czech montanist. In sixties assistant at the Leoben Mining Academy. From 1871 professor at the Příbram Mining Academy. Later he wrote papers about the history of Czech mining and metallurgy.

- JAHN JAROSLAV JILJÍ, Prof. PhDr. (1865, Pardubice – 1934, Praha). Czech geologist. From 1893 member of GRA. Mapped mainly in Bohemia. Between 1899 and 1928 professor at the Technical University in Brno.
- JEITTELES LUDWIK HEINRICH CHRISTIAN (1830, Wien – 1883, Wien). Austrian naturalist. Professor at several secondary schools throughout the Monarchy. Studied earthquakes and prehistory.
- JELÍNEK KAREL, Prof. PhDr. (1822, Brno – 1876, Wien). Czech and Austrian meteorologist and geophysicist. Worked at the observatory in Vienna and Prague. In fifties professor of mathematics at the Polytechnical institute in Prague. Between 1863 and 1870 director of the "Zentralanstalt f. Meteorologie und Geomagnetismus" in Vienna.
- JČÍNSKÝ JAROSLAV, Prof. Ing. Dr. mont. h. c. (1870 – Slezská Ostrava – 1959, Praha). Czech montanist and geologist. Chief geologist of Ostrava and Rosice coal mines. From 1914 director of the coal mines at Pécs in Hungary. Between 1930 and 1939 professor at the Příbram Academy.
- JOHN JOHNSBERG CONRAD H. von, Ing. (1852, Kronstadt – 1921, Wien). Austrian chemist and mineralogist. Worked in the chemical laboratory of GRA, between 1881 and 1911 as its Head. Analysed many geological materials from the countries of the Monarchy.
- JOKÉLY JOHANN, Ing. mont. (1826, Eger – 1862 Budapest). Hungarian geologist. From 1852 member of GRA. Carried out geological mapping in many Bohemian regions. Wrote papers about geology and mineral deposits of Krkonoše Mts. (Riesengebirge) and Krušné Hory Mts. (Erzgebirge). In 1862 appointed as professor at the Budapest Polytechnics, soon after that tragically died.
- JÜTTNER KAREL, PhDr. (1883, Osijek – 1959, Bratislava). Moravian geologist and archeologist. Carried out geological researches in Moravia and archeologic study of the Pavlovské vrchy Mts. (Palauer Berge).
- KAHLER FRANZ, Prof. Dr, Hofrat (1900, Praha – 1995, Graz). Austrian geologist. Member of the Museum of Natural History at Klagenfurt, from 1956 professor at Graz University. Studied Paleozoic stratigraphy in Carinthia, also micropaleontology.
- KÁŠ ALBERT, Prof. Ing. Dr. mont. h. c. (1848, Příbram – 1933, Příbram). Czech montanist. Studied in Příbram and Leoben. Assistant at Mining Academy in Leoben, later, 1887–1911, professor at the Mining Academy in Příbram. Expert in mining machinery.
- KŘÍŽ JOSEF (1857, Wien – 1919, Kyjov). Moravian geologist and ethnographer. Studied geology, mineralogy and ethnography of Moravia.
- KNETT JOSEF (1869, Wien – 1946, Weidling bei Klosterneuburg). Austrian geologist. Studied also the Vienna Basin both in Moravia and Austria.
- KOŘISTKA KAREL, Prof. PhDr. (1825, Březová – 1906, Praha). Czech geographer and mathematician. Professor at Polytechnical Institute in Brno, later in Prague. Pioneer of modern geodesy, geomorphology and cartography. For GRA carried out geodetical measurement in the Eastern Alps.
- KRASSER FRIDOLIN, Prof. Dr. (1863, Jihlava/Iglau – 1922, Praha). Czech botanist and phytogeologist. Worked in the Museum of Natural History at Vienna. From 1906 professor at the German Polytechnics at Prague and German University. Studied Mesozoic floras of the Eastern Alps and of the Bohemian Cretaceous basin.
- KREIL KARL, Prof. (1791, Ried – 1862, Wien). Austrian meteorologist and geophysicist. From 1839 started systematic meteorological observations in Prague. In 1851 first director of the "Zentralanstalt f. Meteorologie und Erdmagnetismus" at Vienna. Published the book "Klimatologie von Böhmen" (1865).
- KUBIENA WALTER R., Prof. Dr. Ing. (1897, Nový Jičín/Neutitschein – 1970, Klagenfurt). Austrian and German soil scientist. Director of the Soil Science Institute at Reinbeck near Hamburg. Pioneer of the soil micromorphology.
- KUDERNATSCH JOHANN (1819, Neujahrsdorf – 1856, Wien). Austrian montanist and geologist. Worked with the Authorities in Austrian Eisenerz, later in the Central Office of Mines in Austria.
- LAUBE GUSTAV KARL, Prof. Dr. (1839, Teplice – 1923, Praha). Czech geologist of German origin. From 1871 professor at the German Polytechnics in Prague, from 1876 professor at the German University in Prague. Carried out studies and geological mapping of the Krušné Hory Mts (Erzgebirge), studied paleontology of the Jurassic, Cretaceous and Tertiary sediments. Investigated thermal springs in West Bohemia.
- LENZ OSKAR, Prof. (1848, Leipzig – 1925, Soos bei Baden). Austrian geologist and geographer of German origin. From 1872 member of GRA. Carried out researches in Bohemia and Croatia. Between 1887 and 1907 professor of geography at the German University in Prague. Member of expeditions to Greenland and Central Africa.
- LIDL FERDINAND von (1829, Bad Ischl – 1915, Graz). Austrian geologist. Also member of GRA, carried out geological mapping in West Bohemia. Wrote papers about coal basins of West Bohemia.
- LIEBUS ADALBERT, Prof. PhDr. (1876, Lengyeltóti – 1945, Praha). Czech-German geologist and paleontologist. Worked also in GRA. From 1912 taught at the German University in Prague, from 1923 professor of paleontology. He studied mainly Tertiary and Quaternary vertebrates and also recent and fossil foraminifers.
- LIPOLD MARCUS VINCENC (1816, Mozirje – 1883, Idria). Austrian montanist and geologist of Slovenian origin. Worked first as mining officer. From its foundation in 1849 member of GRA. Mapped in the Eastern Alps, later as chief geologist also in Barrandian. Well known opponent of "theory of colonies" which was suggested by J. Barrande. Published many papers about coal deposits in the Central Bohemia and Ordovician sedimentary iron ores. From 1867 President of the Mining Office at Idria.
- LOSCHMIDT JOHANN JOSEPH, Prof. (1821, Karlovy Vary – 1895, Wien). Austrian chemist and mineralogist. Professor at the University in Vienna. Wrote papers on crystallography.
- LENKENTHAL FERDINAND LOWL von, Dr. (1856, Posanitz – 1908, Gaisberg). Austrian geographer. Studied geomorphology, for example development of volcanic relief.
- LUCERNA ROMAN, Prof. Dr. phil. (1877, Klagenfurt – 1945, Praha,?). Czech-Austrian geomorphologist of Serbian origin. Taught at several secondary schools in Moravia. Published papers on the Quaternary of Moravia, Slovakia and Alps. From 1931 professor at the German University in Prague. Probably died during the Prague uprising in May 1945.
- MACHATSCHKEK FRITZ, Prof. (1876, Vyškov – 1957, München). Austrian geomorphologist. From 1915 professor at the German University in Prague, from 1928 in Vienna. One of the founders of structural geomorphology.
- MÁŠKA KAREL JAROSLAV (1852, Blansko – 1916, Brno). Moravian archeologist and paleontologist. Carried out archeological researches at many Moravian localities. Discovered a jaw of the Neanderthal man in the Šipka Cave (1880). Studied also Quaternary vertebrates.
- MAYER JOSEF, Prof. (1752, Praha – 1814, Wien). Czech naturalist. First professor of natural sciences at the Philosophical Faculty of the Charles University. Studied physical geography and zoology.
- MEHOFFER IGNÁC (1747, Fulnek – 1807, Brno). Moravian naturalist. Studied regional geography, history and mineralogy. Wrote a booklet "Erdkunde der Markgrafschaft Mähren" (1814).
- NISSL von MAYENDORF GUSTAV, Prof. (1839, Verona – 1919, Wien). Austrian naturalist. From 1860 professor of geodesy and astronomy at the German Polytechnics in Brno. He studied trajectories of meteorites.
- OPPENHEIMER JOSEF, Doc. Dr. (1883, Rousínov – 1933, Brno). Moravian geologist. From 1908 member of the German Polytechnics in Brno. From 1919 external member of the State Geological Survey of Czechoslovakia. Investigated the geology and paleontology of West Carpathians in Moravia and Slovakia, also the Devonian and Jurassic in Moravia.
- PANETH FRIEDRICH ADOLF, Prof. (1888, Wien – 1958, Wien). Austrian and later English chemist. Worked at the Vienna University, Radiologic Institute in Vienna and from 1919 at Technical University in Prague. After that joined German and British universities. From 1953 director of Max Planck Institute in Mainz. Introduced radioactive tracers into hydrology. Author of textbook "Lehrbuch der Radioaktivität" (1923, with HEVESY).
- PATERA ADOLF (1819, Wien – 1894 Tišín/Teschen). Austrian metallurgist. Between 1849 and 1851 lecturer at Příbram Mining Academy. Later worked in Jáchymov (Joachimsthal) and in Vienna, where he founded the State metallurgical and chemical laboratory.
- PAUL CARL MARIA (1838, Wien – 1900, Wien). Austrian geologist. From 1861 member of GRA. He mapped Cretaceous deposits in East Bohemia, later in Slovakia and Croatia. From 1883 chief geologist for the region of the Carpathian flysch. From 1890 mapped flysch units in Moravia.
- PEITHNER von LICHTENFELS JAN TADEÁŠ, Prof. (1727 Boží Dar/Gottesgab – 1792, Wien). Czech-Austrian montanist. In 1763 appointed first professor of mining sciences at the Prague University. From 1776 worked in "Hofkammer im Münz- und Bergwesen" in Vienna. Wrote a unified Mining Law for the Habsburg Monarchy.

- PELIKAN ANTON, Prof. Dr. phil. (1861, Wien – 1918, Praha). Austrian and Czech mineralogist and petrologist. Between 1899 and 1917 professor at the German University in Prague. Studied volcanites of the Moravian and Silesian Paleozoic, also zeolites from the České Středohoří (Böhmisches Mittelgebirge).
- PENCK ALBRECHT, Prof. Dr. (1858, Reudnitz – 1945, Praha). German geographer and Quaternary geologist. From 1885 professor of geography at Vienna University, between 1906 and 1926 at Berlin University. Investigated glaciology and subdivided the Quaternary into four glacial epochs (together with E. Brückner). Wrote pioneer studies in glaciology and geomorphology. His work deeply influences Austrian and Czech geomorphology and Quaternary geology. In 1944 moved for security reasons from Berlin to Prague where he died in the hospital on March 7, 1945.
- PETERS CARL FERDINAND, Prof. Dr. (1825, Libčeves/Liebshausen – 1881, Graz). Austrian geologist and paleontologist. From 1850 external member of GRA. Mapped in the Eastern Alps. From 1855 professor at the Pecs University, from 1864 at Graz University.
- PETRASCHECK WILHELM, Prof. Dr. (1876, Pancsova/Pancevo – 1967, Leoben). Austrian geologist. From 1901 member of GRA, from 1918 lecturer, later professor at the Leoben Mining Academy. Studied mostly coal basins of the whole Austro-Hungarian Monarchy. Participated in the geological mapping of East Bohemia.
- PORTH EMIL (1832, Praha – 1858, Trieste). Czech geologist and montanist. He opened copper mines near Jilemnice and Rokytnice in North Bohemia. Later became member of GRA and mapped the Krkonoše Mts. (Riesengebirge) and Krkonoše Piedmont area. Died during the return from the expedition to the Asia Minor, led by F. Foetterle.
- POŠEPNÝ FRANZ, Prof. Ing. mont., Bergrat (1836, Jilemnice/Starkenbach – 1895, Wien). Czech-Austrian ore geologist. In 1863 he worked for GRA, later (1875-1879) for the Ministry of Agriculture in Vienna. He initiated the foundation of Faculties of ore geology in mining academies. Between 1879 and 1889 member of Příbram Mining Academy. He became world-famous by his fundamental work "The Genesis of Ore Deposits" published in U.S.A. By some experts is considered greatest Czech geologist ever born (see also the evaluation of his work above in the same article). Czech Geological Survey, Prague, published a booklet about his life and work, also the Czech translation of his book.
- PROCHÁZKA VLADIMÍR JOSEF, Dr. (1862, Tišnov – 1913, Tišnov). Moravian geologist and journalist. Between 1888 and 1891 external member of GRA. From 1909 staff member of Moravian Museum in Brno. He studied mostly Moravian Tertiary.
- REDLICH KARL A., Prof. Dr. phil. (1869, Brno – 1942, Merano). Czech-Austrian geologist. From 1895 member of Leoben Mining Academy. Between 1913 and 1939 professor at German Technical University in Prague. Studied Tertiary and Quaternary vertebrates, later also magnesite deposits in Austria and Slovakia.
- REMEŠ MAURIC, MUDr., RNDr. h. c. (1867, Příbor – 1959, Dvorce). Moravian doctor and naturalist. Except of medicine he studied paleontology and balneology of Moravia. He wrote "Introduction to the General Paleontology" (1936, together with J. AUGUSTA).
- REUSS AUGUST EMANUEL, Prof. Dr. med., PhDr. (1811, Bílina – 1873, Wien). German geologist from Sudeten. Studied also geology of České Středohoří Mts. (Böhmisches Mittelgebirge). From 1849 professor of mineralogy at Prague University, from 1863 at Vienna University. The Cretaceous of North Bohemia and the Tertiary of the whole Monarchy were his main fields of interest. He wrote also fundamental paleontological papers about foraminifers.
- RIEPL FRANZ XAVER, Prof. (1870, Graz – 1857, Wien). Austrian montanist. From 1816 director of mines at Jáchymov, between 1819 and 1938 professor at the Polytechnics in Vienna. Devoted mineral collector.
- RITTINGER PETER (1811, Nový Jičín/Neutitschein – 1872, Wien). Austrian montanist. Worked at the Ministry of Agriculture in Vienna. Expert in processing of mineral raw materials. Author of modern textbook (1867).
- ROSIWAL KARL AUGUST, Prof. Ing. (1860, Wien – 1923, Wien). Austrian geologist. Assistant at the Vienna University, between 1891 and 1918 member of GRA. In 1900 chief geologist and supervisor of geological mapping of the Bohemian Massif. Editor of many map sheets. He underlined detailed petrographic studies. Investigated also the impact of coal and kaolin mining on the Karlovy Vary mineral springs. Wrote several papers about the geology of Karlovy Vary area. From 1918 professor at the Technical University in Vienna.
- RYBA FRANTIŠEK, Prof. PhDr. (1867, Cholebon – 1918, Příbram). Czech geologist and paleontologist. From 1895 with the Příbram Mining Academy, in 1903 appointed professor. Studied mainly stratigraphy and paleobotany of the Central Bohemian coal basins.
- SCHAFFER FRANZ XAVER, Prof. (1876, Šumperk/Mährisch Schönberg – 1953, Wien). Austrian geologist coming from Sudeten. From 1923 Head of the Department of Geology and Paleontology at the Museum of Natural History in Vienna. He studied mainly the geology of Vienna surroundings. Author of a geological synthesis "Geologie von Österreich" (1951).
- SCHMIDL ADOLPH, Prof. Dr. (1802, Lázně Kynžvart/Königswart – 1863, Budapest). Austrian geographer from Sudeten. Between 1847 and 1857 worked with the Academy of Sciences in Vienna. Investigated systematically karst areas in Slovenia, Eastern Alps and Hungary. Introduced the term "Höhlenkunde". From 1857 professor at the Budapest Polytechnics. Considered founder of scientific speleology.
- SCHNEIDER RUDOLF, Prof. PhDr. (1881, Dolní Lukavice – 1955, Praha). Czech meteorologist and climatologist. From 1905 member of "Zentralanstalt f. Meteorologie und Geomagnetismus" in Vienna. In 1920 first director of the new State meteorological institute in Prague. From 1930 professor at the Czech University in Prague.
- SCHÖFFEL RUDOLF, Prof. (1839, Příbram – 1916, Teplice-Trnovský/Turn). Austrian montanist. Studied at Příbram, from 1862 professor at Leoben Mining Academy, where he taught mineral processing, chemistry and physics.
- SCHRAUF ALBRECHT, Prof. Dr. (1837, Czernowitz – 1897, Wien). Austrian mineralogist, professor at Vienna University. Studied also minerals from Jáchymov (Joachimsthal).
- SCHRÖCKINGER VON NEUDENBERG JULIUS, baron, Geheimrat (1813, Brno – 1882, Wien). Austrian geologist. Active in state authorities. Studied also minerals from Jáchymov (Joachimsthal).
- SCHUBERT RICHARD JOHANN, Dr. (1876, Mohelnice/Müglitz – 1915, Gorlice). Austrian geologist and paleontologist. Assistant at the German Polytechnics in Prague. From 1900 member of GRA. Studied Miocene foraminifers, after that mapped in Dalmatia and in Moravia. Killed in the World War I.
- SCHWIPPEL CARL (1821, Praha – 1911, Wien). German geologist living in Prague. Carried out geological researches in Brno surroundings.
- SIMONY FRIEDRICH, Prof. Dr., Hofrat (1813, Hrochův Týnec/Hrachov teinitz – 1896, St. Gallen/Admont). Austrian geographer. Member of the Museum at Klagenfurt, after that worked in GRA. Later first professor of geography at the Vienna University. Expert in geomorphology, glaciology, limnology and climatology of Eastern Alps.
- SOMMERMEIER LEOPOLD (1885, Fürstenberg a. Oder – 1963, Wien). Austrian montanist and petroleum geologist. Investigated stratigraphy and tectonics of petroleum deposits in the South Moravia and Slovakia.
- SPENGLER ERICH GUSTAV FERDINAND (Prof. PhDr. (1866, Znojmo/Znaim – 1962, Wien). Austrian and Czech geologist. Between 1911 and 1915 assistant at Graz University, in 1915–1918 member of GRA. After the war professor of geology and paleontology at the German University in Prague. Mapped Eastern Alps, later also Tertiary of West Carpathians.
- SPITZ ALBRECHT (1883, Jihlava/Iglau – 1918, Schulden, Südtirol). Austrian geologist. Mapped in Southern Alps for GRA. Missing on the Italian front in 1918.
- STEINMANN JOSEF JOHAN, Prof. PhDr. (1779, Lanškroun/Landskron – 1833, Praha). Czech naturalist. Studied in Vienna and investigated the flora of the Vienna surroundings. Professor at the Polytechnics in Prague, carried out investigations in the analytical chemistry, mineralogy and botany. Analysed Bohemian mineral waters and many minerals from Bohemian localities.
- STERNECK VON DAUBLESKY ROBERT, general (1839, Praha – 1910, Wien). Austrian geodeticist and geophysicist of Czech origin. Worked in the Military Geographical Institute in Vienna. Carried out geodetical and gravity measurements in Bohemia. On the basis of gravity measurement in Příbram mines calculated an average density of the Earth.
- STOKLASA JULIUS, Prof. PhDr., Dr. techn. h. c. (1857, Litomyšl/Leitomischl – 1936, Praha). Czech biochemist, radiobiologist and agronomist. Studied in Vienna. From 1897 professor of agrochemistry at the Technical University in Prague. Worked in plant physiology, soil chemistry, soil microbiology and studied also the influence of radioactivity on organisms. One of first scientific environmentalists, expert in the atmospheric contamination.
- STOLICZKA FERDINAND, Dr. (1838, Zámeček/Hochspald, Mähren – 1874, Murghu, Cashmir). Czech geologist and traveller. Studied

- at Vienna University. Between 1861 and 1863 member of GRA. Studied Tertiary bryozoa and Mesozoic molluscs from Austria and Hungary. From 1863 worked as geologist and paleontologist for the Geological Survey of India, where he investigated Cretaceous and Tertiary fossils.
- STUDNÍČKA FRANTIŠEK JOSEF, Prof. PhD. (1836, Janov – 1903, Praha). Czech mathematician, meteorologist and geographer. Studied in Vienna. From 1865 professor of mathematics at the Czech Polytechnics, later at the Czech University in Prague. Expert in physical geography and meteorology. Founder of meteorological observation network in Bohemia.
- Suess EDUARD, Prof. Dr. (1831, London – 1914, Wien). Austrian geologist. Studied in Prague and Vienna. Worked first in the Vienna Museum, later, from 1857 became professor at the Vienna University. Active first in paleontology, later in geotectonics. Author of mountain building hypotheses. He wrote many papers related to the Austria, Bohemia and Moravia. One of the greatest geologists of the 19th century.
- Suess FRANZ EDUARD, Prof. Dr. phil. (1867, Wien – 1941 Wien). Austrian geologist, son of Prof. Eduard Suess. For his biography see special chapter of this paper.
- ŠTŮR DIONÝZ, Hofrat, Hauptbergrat (1827, Beckov – 1893, Wien). Slovak and Austrian geologist and paleontologist. Studied in Vienna and Banská Štiavnica (Schemnitz). Member of GRA from its foundation in 1849. Mapped in various parts of the Monarchy. As chief geologist of GRA worked mostly in paleobotany, studied also Culm and Upper Carboniferous Moravian floras. Correlated stratigraphy of Eastern Alps and West Carpathians. In 1885–1892 third director of GRA.
- TAUSCH von GLÖCKELSTHURN LEOPOLD von, Dr. phil. (1858, Budapest – 1899, Wien). Austrian geologist. From 1885 member of GRA. Mapped in Galicia and Moravia.
- Teller FRIEDRICH, Prof. Dr. (1852, Karlovy Vary/Karlsbad – 1913, Wien). Austrian geologist coming from Sudeten. Member of GRA and professor at Vienna University. Mapped Eastern Alps. As chief geologist of GRA supervised the edition of special geologic maps 1 : 75 000. Member of committee for the protection of Karlovy Vary (Karlsbad) thermal springs (1895).
- TERZAGHI KARL, Prof. Dr. Dr. h. c. mult. (1883, Praha – 1963, Winchester, U.S.A.). Austrian and later American engineering geologist. Studied in Graz, worked in Austria, United States and Turkey. Between 1929 and 1938 professor at the Technical University in Vienna, Head of the Dpt of soil mechanics. Between 1946 and 1956 professor at Harvard University, Cambridge.
- Tietze EMIL ERNST AUGUST, Dr. phil. (1845, Wrocław/Breslau – 1931, Wien). Austrian geologist. From 1869 member of GRA. Mapped in Moravia and Silesia, also flysch in Galicia and terrains in Bosnia-Herzegovina. Carried out also hydrogeological studies in Brno area. Between 1902 and 1918 director of GRA.
- TOULA FRANZ, Prof. Dr., Hofrat (1845, Wien – 1920, Wien). Austrian geologist and mineralogist. In 1881–1917 professor at Technical university in Vienna. Member of Arctic expedition in 1869–1890. Worked also in Bohemia, Asia Minor, Eastern Alps and Vienna Basin.
- Trauth FRIEDRICH, Prof. Dr. (1883, Wien – 1967, Wien). Austrian geologist and paleontologist. From 1908 worked in the Vienna Museum and Technical University. Studied mostly the Mesozoic of Eastern Alps. Described Cretaceous corals from Příbor in Moravia (1911).
- Tschermak von SEYSENEGG, Prof. Dr. (1836, Litovel/Littau – 1927, Wien). Austrian geologist and petrologist. From 1862 custodian and later director of "Hofmineralienkabinett" in Vienna. Between 1868 and 1906 professor of mineralogy at the University of Vienna. Author of pioneer works on feldspars, micas, meteorites, etc.
- UHLIG VIKTOR, Prof. Dr. (1857, Karlova Huta/Karlshütte – 1911, Wien). Austrian geologist and paleontologist. Studied in Graz and Vienna. From 1891 professor at the Technical University in Prague, from 1900 professor at Vienna University. Studied geological structure of West Carpathians, first recognized their nappes. Investigated also Jurassic sediments in Brno area, Jurassic and Cretaceous cephalopods and foraminifers.
- VACEK MICHAEL (1848, Brtnice/Pinnitz bei Iglau – 1925, Wien). Long-term member of GRA, after 1890 chief geologist. Investigated iron ores in Styria and Neogene mammals from Lower Austria.
- VÁCLAVÍK, Ing. (1836, Bidovice – 1873, Skalice near Vimperk). Czech expert in water management. Studied in Austria, France and Netherlands. Suggested new methods of irrigation and water supply.
- WÄHNER FRANZ, Prof. Dr. (1856, Zlaté návrší/Goldenhöhe – 1932, Praha). Austrian geologist from Sudeten. Studied in Vienna, worked at Vienna University. From 1901 professor at German Technical University in Prague. Worked in Eastern Alps, studied Jurassic ammonites.
- WEHRLE ALOIS, Prof., Bergrat (1791, Kroměříž/Kremsier – 1835, Wien). Austrian chemist and montanist. Studied in Vienna. From 1820 professor of chemistry, mineralogy and metallurgy at Mining Academy in Banská Štiavnica (Schemnitz). Analysed many minerals from various localities.
- WETTSTEIN von WESTERSHEIM RICHARD, Prof. (1863, Wien – 1931, Trins/Tirol). Austrian botanist and paleobotanist. In 1892–1899 professor at the German University in Prague, between 1891 and 1931 at the University in Vienna. Expert in geobotany.
- WOLDŘICH JAN NEPOMUK, Prof. DFr. (1834, Velký Zdíkov – 1906, Praha). Czech geologist, paleontologist and archeologist. Studied in Vienna. Taught for 30 years at various secondary schools in Slovakia and Austria. Between 1893 and 1905 professor of the Czech University in Prague. Investigated mostly Quaternary fossils and Quaternary stratigraphy in Bohemia and Moravia.
- WOLDŘICH JOSEF, Prof. RNDr. (1880, Wien – 1937, Prague). Czech geologist, son of J. N. Woldřich. Studied in Prague and Berlin. From 1920 first professor of geology at the University in Brno. From 1929 professor at the Technical University in Prague. Between 1934 and 1937 worked as the second director of the Czechoslovak State Geological Survey. Outstanding geological manager, active in regional geology, paleontology, stratigraphy, engineering geology and hydrogeology.
- Wolf HEINRICH (1825, Wien – 1882, Wien). Austrian geologist. In 1850 joined GRA, from 1877 chief geologist. He mapped in Moravia, East Bohemia and Hungary. Also expert in applied geology, as water-supply management.
- ZEPHAROVICH VICTOR LEOPOLD von, Prof. Dr. (1830, Wien – 1890, Praha). Austrian geologist and mineralogist. Studied in Vienna and Banská Štiavnica (Schemnitz). In fifties member of GRA. Mapped in the West Bohemia. Between 1857 and 1861 professor of mineralogy at the University in Cracow. Pioneer of studies on mineral paragenesis. Described minerals from many Czech localities. Edited Austrian topographic mineralogy ("Mineralogisches Lexicon für das Kaiserthum Österreich" (1859 and following years). Identified several new minerals.
- ZIPPE FRANZ XAVER MAXMILIAN, Prof. PhD. (1791, Kytlice – 1863, Wien). Austrian and Czech geologist and mineralogist coming from Sudeten. Studied in Prague. Between 1824 and 1849 custodian at the Prague Museum. Under his guidance one of the best mineral collections in Europe originated there. Wrote geological synthesis of Bohemia (1831), described coal-bearing formations in Bohemia (1835). From 1835 professor at Prague Polytechnics. First director of Příbram Mining Academy in 1849. From 1850 professor of mineralogy at the University in Vienna. Zippe is considered founder of scientific geology, mineralogy and crystallography in Bohemia.
- ŽELIZKO JAN VRATISLAV (1874, Volyně – 1938, Praha). Czech geologist and archeologist. From 1901 worked for GRA. During the World War I. the only Czech geologist working in GRA. In 1919 joined new Czechoslovak State Geological Survey. He investigated stratigraphy of Ordovician and Silurian, Cretaceous of East Bohemia and Pleistocene faunas.

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