

Tribute to the father of Slovakian geology, Professor Ján Pettko, who was born in Horná Drietoma two hundred years ago

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Johannes Pettko was born on November 11th 1812 in Horná Drietoma near Trenčín. He was the son of tabular judge Daniel Pettko and Kristina Hradská, the daughter of a Lutheran priest. He grew up with his brothers Zigmund and Peter and his sister in the picturesque Drietoma valley on the border of Trenčín and Wlallachia counties. The beautiful scenery of the White Carpathian Mountains with their vast mysterious forests and hamlets, where gypsum, and sandstone building blocks and millstones were mined, proved a rich source of inspiration for his boyhood dreams. From his childhood, he listened to tales of ghosts, witches and forest voodoo, and he was fascinated by rumours of caves and treasures which were thought to be hidden somewhere deep under these Drietoma hills.

Johannes and his brothers were first educated by their father, and later they attended elementary school in Trenčín. When he was nine, he transferred to the high school in Győr. Talented students, whose parents could afford it in those times, attended studies of either law or theology. Johann also graduated from the Lutheran Theological Seminary in Bratislava (Pressburg, 1828–1833), where he studied rhetoric, philosophy and theology. He continued his study of philosophy and law at the Academy in Prešov (1833–1835), and worked as a justice probationer in the Trenčín County Council Office. At that time, in addition to his native Slovak language, he fluently mastered Latin, in which he was educated by his father, Hungarian which he learned in Győr, German language spoken at the Lyceum in Bratislava and also French and English.

Pettko's humanitarian concerns gradually changed in favour of natural science. Following some trials held in Prešov and discussions with his family, he gradually realized the future he really wanted. At this time, he discovered the possibility of studying at the Mining Academy in Banská Štiavnica. This thrilled Pettko, who was obsessed with mathematics. This was a great opportunity to obtain a scholarship in the Academy for a young man struggling with financial problems. An income of two hundred guldens met these requirements.

Pettko began his study at the Mining Academy in the mining town of Banská Štiavnica in 1836. Pettko was a descendant of a poor nobleman, so he became a very diligent student in order to increase his chances of gaining a scholarship. He was soon an outstanding student, unafraid of hard work. He especially liked the mining and forestry courses required for mining students. Gradually, he took on other prerequisite subjects which required a lot of effort to master.

After finishing Mining Academy studies, he received an offer to work in the nearby town of Kremnica as a trainee in gold and silver preparation. The Kremnica mining smelter adopted this young adept mining graduate firstly as an accountant and then as adjutant to the Comorian Examiner who controlled silver melting procedures at the Kremnica mint. For this work he received 30 mites of daily wage which equalled the wages of a journeyman bricklayer. He knew he must improve his financial situation, so he applied for positions as senior secretary in the Smolník surveyor's office and also as a sketching official at the Hungarian Court Chamber in Pest.

However, Ján Pettko was much more attracted by the depths of the Earth than by a clerical future. His investigative spirit drove him on. In 1842, the Presidium of the Court Chamber in Vienna offered further degree opportunities to excellent Mining Academy graduates. Pettko completed a mineralogical course lead by Professor Wilhelm Haidinger at the Mining Museum of the Vienna Court Chamber, astounding teachers by his thorough preparation. During his studies he worked as an assistant in the chemical laboratory of the Vienna Mint, which at that time was led by Löwe.

During this study, he became the second controller of the amalgamation smelter in Zlatá Idka (1843). However, Pettko took a much more attractive offer from the Court Chamber. This was to complete a study tour of the mine works in Harz and Silesia lasting several months, with Gustav Faller, Adolf Hrobonyi, and Francis Kolozsváry. During this tour, he studied the latest technical advances and local mining metallurgical processes. This journey lasted longer than planned, and his intended programme was interrupted by an appointment initiated by Professor Haidinger.

Professor Haidinger remembered Pettko as a great future talent during a meeting in Vienna, where problems in the Mining Academy at Banská Štiavnica were being resolved. He therefore recommended Ján Pettko as the most suitable candidate to replace a teacher at the recently (1840) established Department of Geology, Mineralogy and Palaeontology at the Mining and Forestry Academy in Banská Štiavnica. Haidinger highly appreciated Pettko's perseverance, hard work and ingenuity and he later provided a wealth of good advice. However, Pettko's success met with extreme jealousy from many of his older colleagues who had been teaching there for many years.

The Mining Academy was founded by imperial regulation in 1735, and it was a unique establishment not only within the



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Habsburg Empire, but also on a global scale. It remains the oldest university focused on higher education in mining and rock engineering activities. Geology there was initially taught in the Department of Mineral Chemistry and Metallurgy. Later, geoscience lectures were conducted by the Department of Mathematics and Mining. Gustav Rössler, the founder of the Geognosy Department, could not devote sufficient time to it because of illness, and departmental superiors were unhappy with the scientific results of his deputy, Joseph Niederist.

Even as a replacement teacher, Ján Pettko took his office with full commitment and dedication. Scientific and educational activities of the Department began intensive development. He introduced separate subjects in forestry, geology, metallurgy and mineralogy for mining candidates based on modern scientific knowledge. He advocated application of the latest geoscientific and engineering methods. In 1847, the increase in the level of scientific knowledge and increased departmental reputation resulted in Pettko being appointed full-time Head of the Department, Professor of Geology and Mining Consultant.

Thus, until 1871 Professor Ján Pettko led the Department of Geology, Mineralogy and Palaeontology at the Academy of

Mining and Forestry Academy for a period of twenty-seven years. This department activity in surveying geology in the Banská Štiavnica ore district initiated a new phase in teaching geological science. The scientific interest here focused on petrography and mineral deposits. Pettko developed a comprehensive system of teaching all of the following at the Mining Academy; oryctognosy, geology, geognostics, regional geology, mineralogy, crystallography, petrography, stratigraphy, palaeontology, volcanology, mineralogical-metallurgical and analytical chemistry, mining methodology and mountain engineering (montanistics). He placed great importance on practical training and regularly organized student geological excursions to mines and their surrounds. He created a professional geological library and personally secured new editions of professional papers. His accumulated museum collections for the Academy became important teaching tools, and these gradually gained international fame. Pettko enhanced the academic collection through many external donations, so that it contained over 4000 minerals, rocks and palaeontological finds. He bought Professor Hauch's mineralogical collection in 1856 and then added von Zipser's palaeontological collection.

Thanks to Pettko's teaching activities, geoscience teaching at the Mining Academy was acclaimed at the global level. Pettko actively collaborated with leading geo-scientists of the Austrian-Hungarian Monarchy and Central Europe, educating many excellent geologists. Famous names included Dieneš Štúr, Benjamin Winkler, József Szabó, Joseph Hrntsár, Alexander Pauliny, and also many others who influenced the development of geoscience research throughout the Austrian-Hungarian Empire.

Ján Pettko conducted a vast amount of field research in the Kremnica-Štiavnica Hills which contributed significantly to knowledge of the geological structure of central Slovakia. This included; (1) distinguishing petrographic types of the Štiavnica volcano complex and its eruption phases, (2) describing the occurrence of granite aplites in the Benedict Gallery and also perlitites from Hliník and Lehôtka, and silica and quartzite from Banská Štiavnica, and (3) he reported volcanite superposition over the Mesozoic rocks in Sklené Teplice and over numulitic limestones in Vyhne. Based on this knowledge, he developed the "crater-volcano" concept of central Slovakia, and he set this date at the Late Tertiary age. Moreover, he discussed the destructive extent of post-volcanic erosive activity. Graphic representation of his results from Kremnica and Banská Štiavnica (1853) was of a great importance, introducing the first coloured geological map of the central Hron Valley. Its importance persisted although it had an imperfect topographic base and was quite shadowed, with poor quality printing. His geological maps then served as the basis for all subsequent geological mapping of the Imperial Geological Institute of Vienna.

Ján Pettko's other important work included; (1) description of the fossil alga *Tubicaulis* from limnoquartzites near Ilija and Hliník, (2) fossils collected from travertine at Vyhne and Sklené Teplice, (3) the *Rhinoceros tichorhinus* skull he discovered from travertine in Sliač and described by Karl Peters in 1854, (4) *Uptonia jamesoni* and "Ammonites" *nodotianus* from Pettko's collection of ammonites from the Adnet Limestone near Turecká, Staré Hory and Bystrická valleys were described by Franz Hauer

in 1855, (5) he distinguished Lower Triassic quartzites from Tertiary quartzites on the basis of ichnofossils, after allocating silica quartzite near Banská Štiavnica, and (6) his list of published scientific works contains over 40 titles.

Ján Pettko was eagerly involved in the organization of geological research throughout the period of the Hungarian Monarchy. Undoubtedly, the most important work in this respect was his involvement in the design and establishment of the Hungarian Geological Society. In 1848, during a meeting with Francis and Augustin Kubinyi, Christian Andrej Zipser and Joses Mařan in the Kubinyi birth-house in Vidina near Lučenec, he participated in the preparation of articles dealing with the organization of this society. He was a very active participant in the inaugural meeting of the society in 1850, and he remained an enthusiastic collaborator of the Geological Society. In 1852, he was empowered to make geological maps of the Malé Karpaty Mts in the broader area of Malacky and also in smaller areas around the towns of Pezinok and Modra.

The events of 1848–1849 significantly affected students and instructors in the Mining Academy. During November 25–27th 1848, the governor Louis Beniczky assembled officers, teachers and academic lecturers and demanded their oath to the Constitution. The whole college had to swear allegiance to the constitution of an independent Hungarian government. At this time, fears of the blooming Hungarian influence vastly increased, especially for the majority of people who were sympathetic to minorities living in Austria.

On January 5th 1863, Professor Pettko read a Cuvier-like lecture on the causes of glacial ages: a short excerpt from this was published in Wiener Zeitung in an “Annex Wochenschrift für Österreichische Wissenschaften”.

The Viennese geologists, Fritz Hochstetter and Eduard Suess, sarcastically argued against Pettko's views. Pettko was depressed by the fact that the magazine refused to publish his rejoinder and that personal and national attacks against him were escalating. Therefore, he was so badly affected by this that towards the end of his life his active geological work changed direction. He found himself at the end of his teaching career and felt both disappointed and a failure, to such an extent that he considered retirement. But his great spirit triumphed and his scientific interests turned back to mathematics. He explained his repeated eye diseases: “In recent years, I used too often a magnifying glass. In consequence, one my eye is blind and the other one on the other side is weak. I gave up testing of minerals and rocks, and then I started with mathematics again”

Perhaps we consider this an inadequate response. However, as later pointed out by Hugo Böckh in 1891 during Pettko's rehabilitation, catastrophic glacial interpretation was recognized at that time by many of the world authorities (Zöpritz, Jaekel). Pettko's depressed mood was certainly further affected by scepticism concerning the deteriorating status of the Mining Academy during Bach's absolutism, and the strengthening of centralization following Austro-Hungarian settlement.

A possible carefree retirement was affected by financial problems. In 1870, a general financial crisis swept across the country, and this had serious consequences for him as an aging teacher. He was well educated and wise, but very inexperienced in financial



matters. Over the years, family support helped his financial position. Pettko's personality was marked by this period. He was modest and quiet and although he had no support or helpers, he still tried to solve the financial problems of young students. However, he could not sustain financial security for long, and on October 26th 1890, Ján Pettko died in Bratislava, in the circle of his loving family.

Professor Ján Pettko's work was very popular with his audience, despite its complexity and consistency. Thus, he was able to lay the foundation for a new geological school. It was highly respected by experts of the Imperial Geological Institute of Vienna who geologically mapped the Central Slovakian region in the late 19th century. Many of these were his former students. Alexander Paulíny gave the name “pettkoite” (today this is synonymous with voltaite) to a new mineral in honour of his professor. Even many years after his death, Professor Pettko was often mentioned in the Geological Institute in Vienna and also often referred to in Budapest. The Slovak Geological Society revered and honoured him in 1965 with a commemorative plaque in Drietoma, and the International Geological Congress in 1968 placed another board on the Szabo Rock near Hliník nad Hronom. However, the 1990 centenary of the death of Professor Pettko was overshadowed by other, more hectic events...

Today, in Bratislava, a leaning monument to him stands under a sleek lime tree in the cemetery on Kozia Street, near busy Palisády Street. The accompanying shabby Hungarian script now does not fully reveal the significance of this monument to most passers-by; that here, under this place, along with his wife Carolina Pettko, nee Kachelmann of Vyhne, the first University Professor of Geology not only in Slovakia, but in the Hungarian region, Johann Pettko born in Horná Drietoma is burrowed...

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