

## Two hundred years of geological sciences at the University of Warsaw

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There are universities in Europe boasting 700 years of history, and even longer. The University of Warsaw is not one of them. The town of Warsaw gained significance in the seventeenth century, when the capital of the country was moved here, but this lasted only a little more than one century; in the XVIII Century Poland lost its independence. The town found itself in the Russian occupation zone. There was a short-term release in the Napoleonic era followed by the relatively liberal attitude of Russia in the first years of the return of her reign. This sparked a revival of economic and educational initiatives. One of the most important was the establishment in 1816 of the Royal University of Warsaw.

Lectures on mineralogy in Warsaw University still came within Natural History. Geology, referred to then as geognosy, after the Freiberg school of Abraham Gottlob Werner, was just at its very beginning. But there was not enough time to develop. In 1831 there was a national uprising. When the uprising fell the University was punitively closed. It was the first but not the last, of the tragic events experienced by the people and the city, and which also affected the life of the University.

The University disappeared from Warsaw for the next 31 years, these being the years of geology breakthrough. “Never, perhaps, did any science, with the exception of astronomy, unfold, in an equally brief period, so many novel and unexpected truths, and overturn so many preconceived opinions” – wrote Charles Lyell (1850, p. 62) about the first half-century of the nineteenth century. The University of Warsaw did not participate in the heroic period of the science, when geology came out of the deep meander of Werner’s neptunian paradigm onto a much simpler road.

When the university was opened again, named then the Main School, European geology was already profoundly changed. At the School two parallel divisions,

of mineralogy and of geology with palaeontology, were established. The stratigraphy research professors appeared and, at the beginning, the lectures were in Polish. The location of the School at the western margin of the Russian Empire did not help, however, in its scientific development and the failure of the next national uprising, of 1863, led to its complete russification.

Since then Polish youths mostly preferred to study at foreign universities. Russian professors employed at the university, now called the Imperial University of Warsaw, were able, however, to raise the geological sciences to a level never achieved here before. Alexander Lagorio, who arrived from the University of Dorpat, started genetic petrography of igneous rocks and ambitiously steered it into the experimental syntheses of minerals from alloys. He was followed by his Polish student Józef Morozewicz, who developed these experiments to an unprecedented scale. Lagorio raised also Georgy Wulf, who is famous as one of the pioneers of crystal physics, and the co-author of the Wulf-Bragg condition, which is the basis of X-ray analysis. The world-wide fame brought in also Vladimir Amalicki, who came from St. Petersburg (a member of the Royal Geological Society of London). The Permian vertebrates discovered by him in northern Russia indicated that Russia, India and Africa were then a single continent. This was well before Wegener’s concept of Pangaea was proposed.

The First World War put an end to the Imperial University. Before German troops entered Warsaw, the University was evacuated deep into Russia and soon afterwards finally closed. Meanwhile, in 1916, in the walls of abandoned Imperial University, the Polish University was founded.

The geological sciences at the new Polish University were very different from the ones taught in the previous Russian university. Stanislaw Thugutt, like Lago-

rio educated in Dorpat, did not research petrography, but chemical mineralogy, especially the zeolites, the area in which he was a world-class specialist. Jan Lewiński, geology lecturer, although educated in Warsaw had nothing in common with Amalicki. He focused on the stratigraphy of the Jurassic and Cretaceous of Poland. These two were joined then by Roman Kozłowski, with a Ph.D. from the Sorbonne in Paris and with wide experiences from Bolivia. He responded to the appeal directed to Polish scientists abroad to return home, as their Country needed them. He started lectures on palaeontology and gained world recognition with his works on the Paleozoic invertebrates. However, further development neither of education nor researches was possible; geology was not among the favorite disciplines.

The Polish University lasted only 23 years. In 1939, on September 25, German bombs fell on the building housing the Geological laboratories. The building was completely destroyed, with all the equipment.

The terror of the German occupation lasted five and a half years. Throughout the war, the University had worked continuously in conspiracy, within the structures of the Polish Underground State. The educational work was, however, very limited. Besides teaching small groups of students geology cannot be taught effectively this way.

At the end of the war began the Warsaw Uprising, after which the town was turned by Germans to rubble. Despite this, the University immediately resumed its activity. Geology was located in the surviving house of prof. Jan Samsonowicz, the successor of prof. Lewiński.

An event of global significance in science was the publishing of the monograph of prof. Roman Kozłowski in 1949, which fundamentally changed our view on the systematic position of graptolites. It had almost symbolic value for the emerging Polish science. The text had been prepared before the war. It survived the annihilation of Warsaw hidden in the oven of a burnt house, and watercolor illustrations, prepared by the author, were found in Paris, where they were submitted before the war. After its publication, Kozłowski was awarded the André H. Dumont Medal by the Belgian Geological Society, and later the Academy of Sciences of the United States awarded him the Mary Clark Thompson Gold Medal, the Geological Society of London the Wollaston Medal, and the Sorbonne and the University of Modena gave him honorary doctorates.

Unfortunately, the political history in Poland went on a different track than had been hoped. The imposed by force of a totalitarian communistic system was in its worst, criminal phase. In the country remained rem-

nants of armed resistance forces, the prisons were full, but, at the same time, with a huge effort, the nation raised the country from the damages of war. The "Iron Curtain" separated the country from the western world and science along with the whole culture was subjected to Marxist and pro-Soviet limitations and doctrinal deformations.

But, paradoxically, for geology this was the time of unprecedented development. Following the Soviet model, the system of central planning economy was introduced also in Poland. The efforts were focused on the development of heavy industry, and of mining. This required the intensification of exploration of mineral raw materials. Consequently, with the initiative of Soviet experts, the geology in Poland was thoroughly reorganized. Certainly, this also included the universities, because it was intended to multiply the numbers in geological education. Because of the shortages in the teaching staff, geological education was limited to selected universities, in Warsaw, Kraków and Wrocław. At other universities geological education has been closed and a few professors from there were moved to the University of Warsaw.

At the University of Warsaw these reorganizations has made a change comparable to the replacement of a craft workshop by a factory. In 1952, instead of 3 divisions, the Faculty of Geology was established, with 12 divisions and 16 subordinate units. They covered the full spectrum of geological sciences, although the assembling of the necessary teaching staff has taken years. The faculty was also in a need of new assistants, who were needed promptly, as usually 120 students or more were accepted every year. Consequently, in the first years a large part of the young scientific staff was composed of students.

The few pre-war professors had unprecedented opportunities for the creation of large scientific schools and for launching the major research projects. The communist regime had to tolerate them and even cherish them. Without the pre-war elite the development of the science would not have been possible, especially in conditions of separation from the western world. The volume of regional and thematic researches was extensive. Roman Kozłowski could then develop widely his palaeozoological studies, Jan Samsonowicz Paleozoic stratigraphy, and Kazimierz Smulikowski could extend his petrographic studies to the igneous and metamorphic rocks of the Sudetes, the area incorporated into Polish territory after the war.

Regrouping of a large part of the staff accelerated scientific specialization. Stefan Z. Różycki led the world's only Department of Quaternary Geology, focusing on climate and stratigraphy researches. In the 1960s and 70s,

the students of Edward Passendorfer successfully entered the mainstream researches in sedimentology of carbonate and clastic rocks, structural geology and geotectonics, and modern stratigraphy. The influence of the Soviets in science was only accidental. There was applied geology, especially engineering geology (Warsaw's department was the second in the world, after Moscow) and hydrogeology, and to a lesser extent, geology of ore deposits which benefited from a privileged support. The geology of ore deposits, however, was pursued mainly in the Academy of Mining and Metallurgy in Kraków.

There was, however, also a dark side to the situation. Scientific contacts with the free western world became very limited and the scientific equipment was poor and outdated. Its shortcomings were felt mainly by mineralogical sciences. The geological publications, intended mostly for a domestic reader, were almost entirely in Polish. This led to a gradual limitation of scientific projects to local regional geology. Consequently, the early professors of the Faculty, and the first generation of their students, contributed primarily to further widening of the knowledge of the structure and geological history of Poland, and applied geology was focused on support of the national economy.

Fortunately, this dark side had not affected the entire environment. Leading researchers in basic geology have never resigned from the participation in global scientific exchange. An invaluable role was fulfilled here by the journal *Acta Geologica Polonica*. The journal has reflected adequately the subsequent evolution of the history of Warsaw University geology. It was founded in 1950 by prof. Jan Samsonowicz, and affiliated to the Polish Academy of Sciences. Then, the editorial responsibilities were taken by prof. Edward Passendorfer, and consequently, during the entire history of the journal, it was edited by next generations of his students. The journal was open to everyone, but it was shepherded and shaped by the scientists from this environment.

Despite the political difficulties, the journal soon began publishing in English. The first issue published entirely in English appeared in 1971, edited by prof. Andrzej Radwański. The journal presented primarily works of basic geology, with a potential global significance. The world-wide exchange of offprints gave a chance to get information about the current state of knowledge, the export of our achievements and the establishing of valuable scientific contacts. Direct contacts with foreign scientists were rare, and mostly thanks to their visits to Poland.

The academic duties of the first generation of professors of the Faculty came to an end at the turn of 1960s and 70s, whereas the second generation lasted till the turn of the century. The last of them left the Faculty just

a few years ago. They had had a chance to witness the gaining by Poland its independence from the collapsing Soviet empire, its political transformation and eventually Poland's access to the European Union.

Although these changes took place peacefully, the price was still high. It was paid by the whole of society, and of science, and within it by geology. The broad participation in social resistance, the martial law introduced in 1981, and the economic shock therapy of 1989 temporarily slowed down scientific activity. The sudden opening to the world, controlled previously by political and economic barriers, caused an accumulation of changes to society, to which one had suddenly to adapt.

Polish science experienced a decrease of its prestige and underfinancing. The introduction of the competitive, grant research funding solved the system of access to funds, and made the culture of scientific work closer to business. English now conquered scientific publishing to almost the very end. The emphasis for these changes came from the physical and mathematical sciences; geologists accepted them reluctantly presenting partly justified reservations. One must, however, be subject to new requirements.

Meanwhile, geology has been losing its importance. Poland drastically reduced drilling operations and mining. Applied sciences lost the sponsorship of the "national economy". As a result, the employment of geologists diminished markedly and students had a huge problem finding a job in the profession.

All these difficulties also affected geology at the University of Warsaw. Its prestige and possibilities have now become dependent primarily on scientific successes at the international level. At the same time, the opening of the "Iron Curtain" led to the confrontation of geology from both of its sides, with the western one treating Polish geology with a grain of salt, at least at the beginning. There appeared, however, wide opportunities for international cooperation. Although restricted by the modest financial possibilities from the Polish side, the cooperation was supported by foreign scholarships, of e.g., Humboldt, Fulbright and other foundations, offering support for the leading young scientists. They primarily started researches outside Poland in cooperation with prominent foreign scientists. There appeared soon a new, most successful type of scientific career, based mainly on joint researches, free of political borders and restrictions.

More and more of the scientific reports by the geologists of the University of Warsaw have been published in foreign journals. Their new expectations were also answered by *Acta Geologica Polonica*. Since 2004, when it was edited by Ryszard Marcinowski and Ireneusz Walaszczyk, the journal has been indexed in

various databases of the Web of Science, and it became truly international in terms of the share of foreign authors and of published reports, which covered issues spread across the globe. *Acta Geologica Polonica* is now published jointly by the Polish Academy of Sciences and the Faculty of Geology of the University of Warsaw, however, its editorial office traditionally remains at the University.

The Faculty of Geology has long lost a privileged position in the geological education of the Country, because geology has been re-opened in other Polish universities. However, it has survived the changes of recent decades, has adapted to them, and maintained a wide spectrum of geological programs. It is dominated by the classical disciplines, seen by some as a drawback and by others as an advantage, but the science is modern and at a high-level. An overview of the recent scientific activity of the staff of the Faculty is provided by the present issue of *Acta Geologica Polonica*.

The last two centuries cover the whole history of the University of Warsaw. This is also more or less the time that geology has been using fully scientific methods. The Warsaw University geologists were able to participate in the development of their science only if and to the extent to which they were allowed to by the fate of

the University. It should be appreciated, however, that as soon as it was possible they have been achieving the highest world-level in science. Geological studies at the University of Warsaw were able to overcome all the obstacles of two hundred years of unfavorable history, and since more than a half of the century it has been experiencing its greatest boom.

*An extended version of the history of geology at the University of Warsaw was recently published by the author in Monumenta Universitatis Varsoviensis, the series created to celebrate the 200th anniversary of the University (see Szulczewski 2016)*

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