CHEMISTRY in POLISH UNIVERSITIES 1783-1939

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1. At the turn of XVIII c.

At the turn of XVIII c. three towns of the Polish Territory could be considered university centres: Cracow (Kraków), Wilno (now Vilnius in Lithuania) and Lwów (now Lviv in Ukraine). From 1783, lectures in chemistry were given in Kraków university (called „the Crown Main School") in Polish by a physician, Jan Jaśkiewicz (1749-1809) and later by Franciszek Scheidt (1759-1807); in Wilno such lectures were presented from 1784 by an Italian, Joseph Sartoris in Latin. These scholars also organised small laboratories for their own studies. In 1772 the southern part of Poland was annexed by Austria, and Lwów became the capital of an Austrian province called Galicia. Here, the Austrian authorities opened a German university at which Joseph Markovičs (1755-1795), a Hungarian of Croatian origin, gave chemistry lectures in German. He conducted certain experimental studies on explosives and analysed crude oil from the nearby Carpatian sources.

Kraków and Wilno remained within the borders of the Polish state until 1795, when Poland as a whole lost the independence. The Austrian authorities tried to limit the activity of the old Kraków University, but chemistry lectures in Polish continued with minor interruptions. Although Wilno was incorporated into Russian Empire, the local University did not cease to be a Polish school. From 1797, chemistry was taught there in Polish by Jędrzej (Andrew) Śniadecki (1768-1838) and his student Ignacy Fonberg (1801-1891). Śniadecki was the author of the fist Polish chemistry handbook in 1800, re-edited in enlarged form in 1806 and 1816. Together with Fonberg he developed the laboratory inherited from Sartoris.

2. Teaching of chemistry in Warsaw in XIX century

After the Vienna Congress in 1815 Warsaw became the capital of the Congress Polish Kingdom under Russian domination. The emperor of Russia Alexander I, as the king of Poland opened in 1816 the Royal University of Warsaw, were chemistry was taught by Adam Kitajewski (1789-1837). The Technical University also began to be organised in 1826 in Warsaw, but both these schools and the Wilno University have been closed by the Tsarist authorities in 1832 as a repression for November anti-Russian Uprising.

Twenty five years were in the Kingdom only primary and secondary Polish schools. In 1857 a Medico-Chirurgical Academy has been opened and in 1862 a Polish university named „the Warsaw Main School" that was active for seven years till 1869. Chemistry was lectured by Jakub Natanson (1832-1884), alumnus of Dorpat University. After 1869 the Russian authorities repressed any scientific movement in the Polish Kingdom (named then a Vistula District) and destroyed there all Polish centres of science. The Russian Emperor University of Warsaw was then opened. In 1898 the Russian Technical University was also opened in Warsaw.

Although the Russian authorities forbade the organisation of Polish societies, in 1875 certain Polish entrepreneurs as count Ludwik Krasiński, the owner of pyrite mine

in Spain and an asphalt plant in Italy, as well as certain scientists, including Jakub Natanson, were able to constitute a Warsaw Division of the Russian „Society for Promoting the Development of the Russian Commerce and Industry" which enjoyed the right to hold debates in Polish. The aim of the Division was to promote Polish businessmen. It organised lectures on different practical chemical topics held twice a month for twenty years. In 1875 the members of Warsaw Division organised a Museum of Industry and Agriculture, whose aims far surpassed those of a normal museum. To this Museum chemical laboratory was founded on a base of the small private laboratory of Napoleon Millicer (1842-1905). . In 1882, the Museum moved to a new building, where five rooms were assigned to the chemical laboratory. It conducted analyses for the Polish entrepreneurs and farmers, but also instructed young people about the methods of chemical analysis. Here, many future Polish professors and scientists took their first steps in chemical analysis. They included Marya Skłodowska (later Mme Curie), who later, in Paris, applied the methods learned in this laboratory to analyse the pitchblende and in 1898 to separate the salts of the first radioactive elements: polonium and radium. Polish scientists have also organised in Warsaw a clandestine Polish university which held lectures, including chemistry, in ever-changing places, hence its name – the „Flying University". After 1905, it became a private „Society of Scientific Courses" with laboratories attached, including a laboratory of colloidal chemistry and a radioactivity laboratory cared by Mme Curie from Paris.

4. The Jagiellonian University in Kraków and the liquefying of air

As it was mentioned above, lectures in chemistry were given at Kraków University in Polish almost without interruptions. For a certain period, the chair of chemistry was combined with the chair of pharmacy. An analysis of local water sources and those of Carpathian mineral waters remained one of the main aims of the University chemical laboratory. The most important achievement of the chemical and physical laboratories at Jagiellonian University during nineteen century was the liquefying of air components in a static phase, achieved in 1883. At the very beginning of this year, Zygmunt Wróblewski (1845-1888), professor of physics at Jagiellonian University, returned from Paris, where he had been working for some length of time with Louis Paul Cailletet. Cailletet managed to liquefy air, but in a dynamic phase, only as a mist. Karol Olszewski (1846-1915), professor of chemistry in Kraków, proposed collaboration in attempts to liquefy oxygen and nitrogen. Olszewski was acquainted with the problem of liquefying certain gasses, as he demonstrated it during his lectures. He was as well a handy designer and maker of new instruments. He proposed and performed such modifications of the device brought from Paris, so that he could use the ethylene liquefied at reduced pressure as the cooling agent. In this way, achieved the temperature -136°C, lower than the critical temperature of oxygen. In February 1883, both scientists observed for the first time in the history of science the meniscus of the liquid oxygen and nitrogen, for the first time air was liquefied in a static phase.

After this joint success Olszewski continued to introduce new improvements, which permitted him to dispose with greater amounts of liquid gases. He thus could use liquid oxygen as a more effective cooling agent. He subsequently obtained a temperature of -213°C that enabled him to see hydrogen liquefied, but as a mist. Within ten years, Olszewski liquefied all gases known at that time, with the exception of helium and hydrogen, and solidified many of them. In 1894 he liquefied and solidified argon, sent him by W. Ramsay. At the turn of nineteenth century, the lowest

temperatures in the world were obtained in the Kraków laboratory, and liquefying laboratory devices constructed there were considered to be the best in the world and used in several European laboratories.

5. Lwów Universities, and the Petroleum and Nitrogen Industry

The strongest university centre on Polish lands in the nineteenth century, and specially in its last decade, was Lwów. During the whole century, the local university remained active with slight intervals, and in 1877 the Technical School opened in 1844, became a Technical University. Up to 1872 at these universities chemistry was taught in German, and then in Polish. Beginning from 1872, the head of the laboratory was the eminent Polish organic chemist, Bronisław Radziszewski (1838-1914), who suggested that see flora and fauna formed the origin of the crude oil. As mentioned above, the Borysław-Drohobycz region, not far from Lwów was rich in crude oil, and many local chemists were interested in processing. In 1853, Ignacy Łukasiewicz, an alumnus of the Kraków and Vienna universities, working as a dispensing chemist in a large pharmacy of Piotr Mikolasch in Lwów, distilled the oil and extracted kerosene. In march 1853, a kerosene lamp, the first in the history of the world technology was lit in Lwów, in the window of the Mikolasch pharmacy. On the night of 31 July the same year, a patient underwent surgery in the light of kerosene lamps used in the Lwów hospital. During the next year Łukasiewicz built the first petroleum shaft, an in 1856 – the petroleum refinery first in the world, in Ulaszowice near Jasło, preceding the first American refinery Oil Creek by five years.

In the Technical School (Technical University), instructions focused more on technological problems and petroleum processing. In 1872-1880 the topic of lectures of Herman Günsberg was the petroleum and mineral wax industry as well as the production of lighting gas. In 1886 was inaugurated at the Technical University an Experimental Station for the Petroleum Industry, where petroleum of different origin and the best processing methods could be studied. It was directed by Bronisław Pawlewski (1852-1917) and from 1891 by Roman Załodziecki. After World War I, when Lwów became a part of independent Poland, from 1922 the world known specialist, Stanisław Pilat (1881-1941) presented lectures on „The Technology of Petroleum and Mineral Wax". In 1924, he organised a new chair at the Chemical Faculty, dealing with „The Technology of Paraffin Oil and Gas Industry".

Another member of he Chemistry Faculty staff of the Lwów Technical University, who played an important role in the development of the Polish fertilizer and nitrogen industry, was Ignacy Mościcki (1867-1946), from 1912 the head of the chair of the Chemical Physics and Technical Electrochemistry. During World War I, he constructed a factory of cyanic compounds in Borki near Jaworzno, where his invention of the circulating electric arc was applied. In 1922, leading a staff of Polish engineers directed by him returned to full production a great plant of massive synthetic ammonia, nitric acid and nitrogen fertilizers in Chorzów. In 1916, Mościcki organised in wartime in Lwów the METAN society to promote the Polish chemical industry. In 1922-26 this society was transferred to Warsaw, where it exists up to this day as the „Ignacy Mościcki's Institute of Industrial Chemistry".

6. Other universities in the united Poland (1919-1939)

The regaining of the independence and the unification of the Polish territories after World War I created new needs and opportunities for Polish scientists. In 1915, a Polish University and Technical University were established in Warsaw. In Warsaw

Technical University, problems of sugar industry were studied by Kazimierz Smoleński. Wojciech Świętosławski developed the purification of organic substances by azeotropic methods.

Different branches of chemistry were developed in the newly opened University in Poznań and in the renowned University in Wilno.

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