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THE FIRST DEPARTMENT OF CHEMISTRY OF THE TECHNICAL UNIVERSITY OF BUDAPEST IS 150 YEARS OLD

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Abstract

The first Department of Chemistry of Joseph Technical University, the predecessor of the Technical University of Budapest, was founded 150 years ago, in 1847. During the 150 years it moved four times into other, in most cases new buildings, it had 7 professors as head of Department. The teaching and scientific activities of the Department and its professors are dealt with in the paper.

Keywords: history of chemistry, history of Technical University of Budapest.

In the first half of the last century, developing industries required experts well versed in mathematics, physics, chemistry, mechanics and general engineering. The first school providing this range of knowledge was the École Polytechnique in Paris (1794), followed by the polytechnical schools in the Austrian Empire (Prague 1806, Vienna 1815), and later in other countries. The first of numerous successful German schools was founded in Karlsruhe (1826). The importance of these schools was also recognized in Hungary. Starting in 1830, the issue was brought up several times in the parliament. Finally, a medium level (secondary school level) industrial school was founded in 1846 which was named Joseph Industrial School after the palatin of Hungary, archduke Joseph. Today's Technical University of Budapest developed from this school. At the beginning, the industrial school provided diplomas in technical fields, economy and agriculture. At the start it had six departments, one of them was the Department of Chemistry. Professor's posts of the departments were filled by competition, which was judged by a board of professors of the University of Science in Pest. The board recommended for the professor's post of the Department of Chemistry Károly Nendtvich, a medical doctor and senior lecturer at the Department of Chemistry of the University in Pest, who was appointed Professor and Head of the Department of Chemistry of the Joseph Industrial School by King Ferdinand V. on 24th October, 1847. This was the third chemistry department in Hungary. The first was founded in 1763 at the Academy of

Mining in Selmecbánya (Schemnitz, now Banska Stiavnica), and the second in 1777 at the University of Nagyszombat-Pest. The language of teaching was German in Selmecbánya, Latin in Nagyszombat-Pest, but Hungarian in the Joseph Industrial School. However, the new school did not receive appropriate housing.

Teaching started temporarily in the building of the University, but it was interrupted by the Hungarian revolution in March, 1848, which later developed into a war of independence. Austria put down the revolution with military aid from Russia. The autonomy and constitution of Hungary within the Habsburg empire were abolished and the country was merged into the Austrian empire. As a consequence, German was introduced as the language of teaching in the Joseph Industrial School. In 1854 the school moved into dwelling houses in hired the Castle District. The Department of Chemistry was accommodated in one of them, and had a rather primitive laboratory. In 1856 Emperor and King Franz Joseph I. raised the Industrial School to the rank of polytechnic school, and in 1860 Hungarian was restored as the language of teaching. In 1867, as a consequence of the so called Austro-Hungarian compromise, Hungary regained its earlier rights. An independent Hungarian government was established, which raised the Polytechnic school to University rank. It was then called Joseph Technical University. It had four faculties, one of which was the Faculty of Chemistry. The Technical University operated in the general system of universities and had similar rights. Nonetheless, it did not yet have full university rights, namely that to confer a doctor's degree. This right was granted by the King only in 1907.

Students graduating from the Faculty of Chemistry got a degree as chemists. In 1907 the name was changed to chemical engineer. The first chemist's diploma was issued for Albert Grittner in 1884.

The Joseph Technical University moved from the Castle District to the other side of the Danube in 1872, into a block of flats, which was temporarily reconverted for the purpose. However, no data are available on the site occupied by the Department of Chemistry and its laboratories. At the same time, planning and building operations started of a new building for the Technical University in the downtown district. The Chemistry and Physics Building was ready first, in 1882. It was taken over by Professor Nendtvich in 1882, but he retired in the same year, after leading the Department for 35 years.

In the meantime, in 1871 an independent department separated from the Department of Chemistry under the name of Department of Chemical Technology. The two departments had good premises in the new building, and were equipped with tools and appliances which were modern at the time.

Károly Nendtvich (1811–1892) graduated from the University of Pest as a medical doctor, and had a post as assistant, and later as senior lecturer at the Department of Chemistry of the same University. After he was appointed professor at the Joseph Technical School, he made a long study tour in Germany. Even before he became professor, he gained distinction in creating the terminology of chemistry in Hungarian, as Hungarian terms were lacking. In this respect he sometimes went too far, giving the elements invented Hungarian names, which, fortunately became gradually disused in later times. He wrote his first textbook in 1844, followed by numerous other textbooks which ran into several editions during the next half century. They were the only textbooks of their kind at the time in the country. As an analytical chemist, he was involved in the applications of his science rather than in its development. He applied analytical chemistry for the purpose of getting a better knowledge of the mineral resources of the country. Thus, he analysed 26 sorts of coals mined in Hungary, various soils and mineral waters, by means of methods available at the time. In 1847 Nendtvich was elected a Member of the Hungarian Academy of Sciences founded in 1825. He was the rector in the years 1873-1874.

The sucessor of Nendtvich as Head of the Chemistry Department of the Joseph Technical University became Lajos Ilosvay (1851–1936) in 1882, who held this position for 52 years, an unprecedented period, which is probably a world record of its kind. Lajos Ilosvay received a degree first as a pharmacist and then as a teacher from the University of Science of Budapest, and later the doctor's degree in chemistry. He started his career as an assistant lecturer, and later became a senior lecturer at this university. As a professor at the Technical University, he gave the following lecture courses in the year 1900: General chemistry in the first semester of the first year, 5 hours per week. This lecture course was compulsory not only for chemistry students but for first-year students of all the other engineering faculties of this university. He also gave lectures in organic chemistry, in the second year, 2 hours per week in the first semester and 5 hours per week in the second, and in theoretical chemistry, 2 hours per week in the second semester of the second year. Analytical laboratory courses in two semesters, 13 hours per week.

The introduction of the first ion-specific reagent is linked with the name of Ilosvay (1889). He used the diazotization reaction of Griess for the detection and determination of nitrite. He also dealt with the formation reactions and detection of ozone, nitrogen oxides and hydrogen peroxide, and also with air pollution studies. He was the first to write a textbook on exclusively organic chemistry (1906) in Hungary. Ilosvay played a very active role in the scientific public life in Hungary. He was Rector of the Technical University in the years 1900–1903, Dean of the Faculty of Chem-

istry in the years 1884 – 1892. From 1891 he was Member, from 1915 Vice President of the Hungarian Academy of Sciences. In the years 1914–17 he was State Secretary in the Ministry of Culture and Education and played a very important and leading part in various Hungarian organizations and societies.

However, earlier than expected, the new Technical University became too narrow due to rapidly increasing interest in engineering professions. Again, new buildings were needed. The site found for the Technical University was the filled area on the right bank of the Danube, on the Buda side. Again, the chemistry building on Gellért square was built up first, and teaching started in it in 1904. The building of the Technical University was finished in 1909, an it was opened on 25th May, 1910 by King Franz Joseph I. In 1911 the Department of Chemistry was divided again, and the independent Department of Organic Chemistry was founded in 1913. This was followed in 1921 by the separation of the Department of Inorganic Chemistry. The original Department assumed the name of Department of General Chemistry. It was in charge of the analytical lecture and laboratory courses for chemical engineering students, and of teaching chemistry to all other students of the Technical University.

In 1934 Joseph Technical University was united with other universities under the name of Joseph Technical and Economical University. In the framework of this, for a short period the Department of General Chemistry was united with the Chemical Institute of the Veterinary School, which was on the other end of the city. The Head of the latter Institute, Gyula Gróh took over the leadership of the Department of General Chemistry of the Technical University. This, however, was only a formal takeover. In practice, the Department of General Chemistry was led by Jenő Plank (1890–1974), who has been associate professor since 1928, and was appointed full professor in 1940 at the Department, which became independent again.

Jenő Plank graduated from the Joseph Technical University as a chemical engineer, and received his doctor's degree there. He was member of the staff from 1916. During World War II, in the battles of Budapest, in the winter 1944–45, the University, which stood on the Danube bank, suffered serious damages. The Chemistry Building, which was in the frontline for several weeks, was also badly damaged. Professor Plank led the hard work of reconstruction in the years 1945–47, while teaching was not interrupted for a single semester. In 1945 he was elected member of the Hungarian Academy of Sciences. He was also Dean of the Faculty of Chemisty in 1945–46. He conducted scientific research in the field of metal analysis. He wrote several books. During the communist takeover in 1949 he was forced to early retirement, like so many university professors in the country. Jenő Plank was succeeded by László Erdey (1910–1970),

who graduated from the University of Science in Budapest as a teacher of chemistry and physics, and received his doctor's degree in chemistry from the same university. He worked for the Budapest Municipal Chemical and Food Examining Institute, where he acquired an extremely rich and wide practice in analytical chemistry.

In this period the number of students increased significantly in the whole country. Accordingly, the number of teaching staff increased, and the supply with equipment improved at the Department of General Chemistry. The number of the teaching staff, which earlier consisted of 3–5 people, increased to 20–30 persons in the following decades. The field of activity, the tasks to be performed also widened. In addition to teaching, the Institute was required to do research. To reach this end, the Hungarian Academy of Sciences, which, in this period became the most important institution to organize and control scientific research, and in practice played the role of a ministry of research, founded a Research Group of Analytical Chemistry within the Institute.

Professor Erdey was a versatile scientist, who had a comprehensive knowledge of analytical chemistry, and had the capacity to do extensive research, with cooperation from his coworkers, in many fields of his science, including several modern instrumental methods of analysis. This period witnessed fundamental changes in this science all over the world. Classical methods were gradually replaced by instrumental methods, until, in our time they have practically disappeared from the laboratories, along with their tools. László Erdey, with his several hundred papers, books which were published in several languages, with the new analytical techniques developed, earned international fame. His activity covered titrimetry, organic chemical analysis, spectrography, thermal analysis, ion exchangers and radiochemistry. His textbooks on analytical chemistry ran into 12 editions. Like his predecessors, he was also elected Member of the Hungarian Academy of Sciences. He was Dean of the Faculty of Chemistry in 1950–52.

In 1966, a part of the Department became independent under the name of Department of Applied Chemistry, and took over the task of the teaching of non-chemistry students. The mother institute assumed the name of Institute for General and Analytical Chemistry.

In 1970, Ernő Pungor (b. 1923) became the Head of the Institute. At the time he was already professor of the University of Veszprém and Member of the Hungarian Academy of Sciences. Professor Pungor got a degree in chemistry, and a doctor's degree from the University of Sciences in Budapest. He began his career at the Chemistry Department, then, in 1962 he was appointed Professor at the University of Veszprém. Professor Pungor is a scientist of high international rank and renown, whose scientific achievements have been acknowledged by many awards in Hungary

and abroad. Several hundred papers and patents mark the success of his activity centered around the methods of electrochemical and optical analysis. His theoretical and practical achievements in the field of ion-selective electrodes are of special importance. Following the change of the political system in Hungary in 1990, he took over the post of the President of the National Committee of Technological Development, first in the rank of under-secretary of state, then as minister without portfolio, a post which was practically that of a minister in charge of science and technology. He was Dean of the Faculty of Chemistry in 1972–1981.

The successor of Professor Pungor became István Hargittai (b. 1941) in 1991. He studied chemistry at the universities of Budapest and Moscow. He was elected Member of the Hungarian Academy of Sciences in 1987. He has been the Head of the Research Group for Structural Chemistry of the Academy, and invited Guest Professor at various Universities all over the world. His research is mainly concerned with structural chemistry, theoretical chemistry, molecular interactions and symmetry. He is author of several books mostly published in English.

While in earlier times there was only one professor, who directed the institute until he retired, since 1975 there may be more than one professors at the Institute, and the appointment as Head is valid for 5 years. At the end of this period the post is open for competition. Professor Hargittai refrained from the competition.

His successor is György Pokol, who graduated from the Faculty of Chemistry of the Technical University of Budapest, and received his doctor's degree from the same University. He has been working at the Institute since 1970. His main research interests include thermochemistry and solid-state chemistry.

Professors of the Department of General and Analytical Chemistry

- Sándor Gál, b. 1933, Prof. 1983, Dean of the Faculty of Chemistry 1988–1996, Member of the Hungarian Academy of Sciences;
- István Hargittai, b. 1941, Prof. 1991, Member of the Hungarian Academy of Sciences;
- Klára Tóth, b. 1939, Prof. 1991, Member of the Hungarian Academy of Sciences;
- György Horvai, b. 1949, Prof. at the Department of General and Analytical Chemistry 1991–1995, since 1995 Prof. at the Department of Chemical Informatics;
- Ernő Lindner, b. 1948, Prof. 1995;
- Jenő Fekete, b. 1949, Prof. 1997.

- György Pokol, b. 1950, Prof. 1994. Head of the Department since 1996.

Emeritus Professors

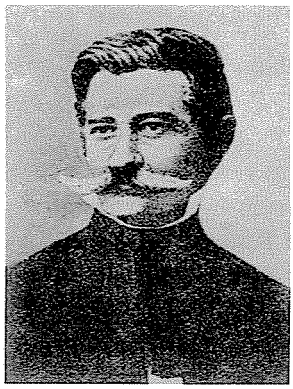
- Ernő Pungor, b. 1923, Prof. University of Veszprém 1962, Prof. T. U. Budapest 1970, Prof. em. 1991, Member of the Hungarian Academy of Sciences, General Director of the Zoltán Bay Research Foundation 1994;
- Ferenc Szabadváry, b. 1923, Prof. 1973, Prof. em. 1993, Member of the Hungarian Academy of Sciences.

Titular Professors and Readers

- Ferenc Paulik, b. 1922, tit. prof. 1983, ret. 1982;
- Gábor Tóth, b. 1942, tit. prof. 1991,
- Klára Erőss-Kiss, b. 1936, tit. prof. 1992, ret. 1991,
- Zsófia Fehér, b. 1944, tit. prof. 1995;
- Géza Nagy, b. 1944, tit. prof. 1995, since 1997 professor of Chemistry, University of Pécs;
- Ottó Gimesi, b. 1933, reader ret. 1993;
- László Pólos, b. 1927, tit. reader ret. 1987.

Deceased Professors

- Tibor Meisel (1929-1986), Prof. 1982;
- László Mázor (1912-1996), tit. prof. 1973, ret. 1972.



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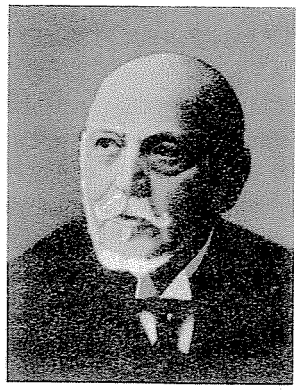

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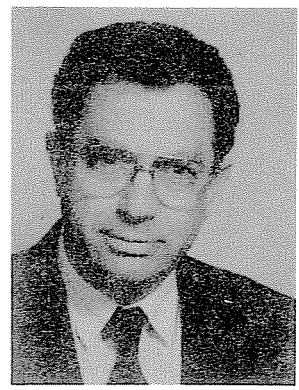
Jenő Plank

László Erdey

Ernő Pungor



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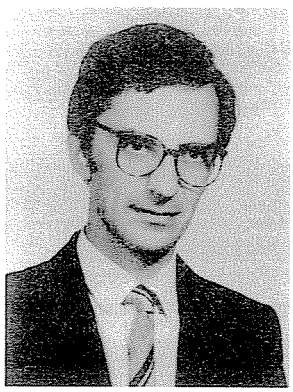

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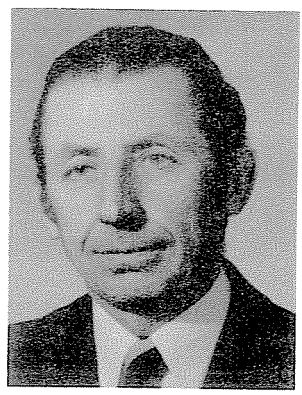

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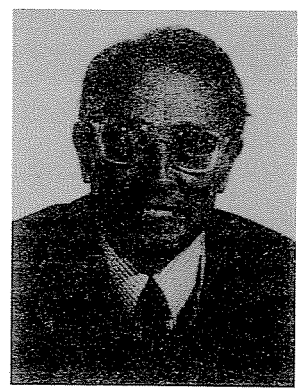

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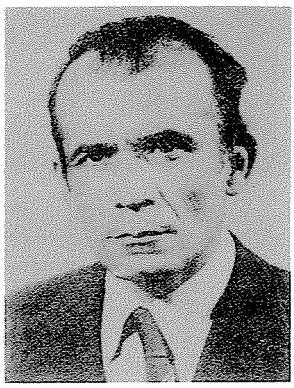

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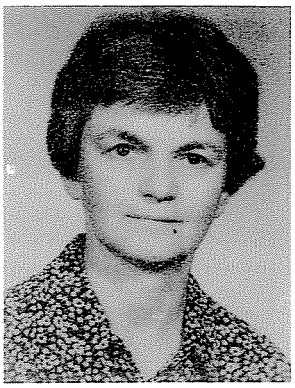

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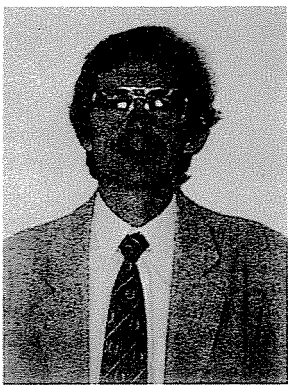
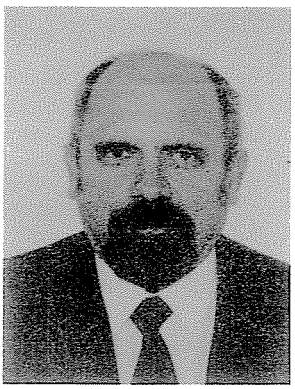


Ernő Lindner

György Horvai



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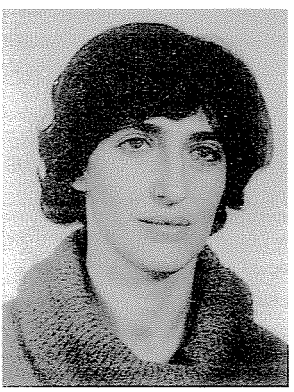

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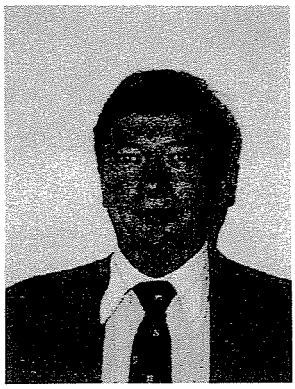

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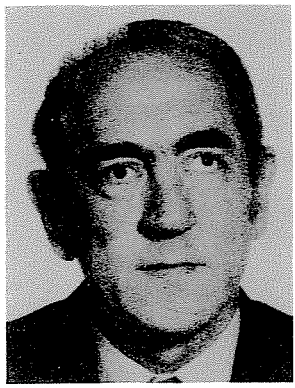
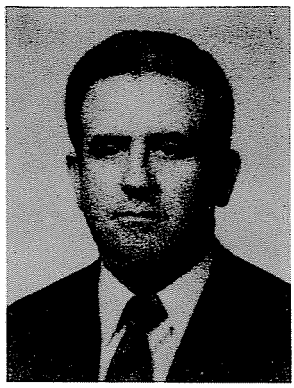


Ottó Gimesi



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Kiss, S. and Small, A. B. (1986a): Roundoff Errors in FFT. *Proc. 5th IEEE Symposium on Signal Processing*, Boston (MA), May 3–5, 1986. New York, NY, IEEE Press, CH0092-2875/86, pp. 3.5–3.9.

Kiss, S. and Small, A. B. (1986b): Ellenállások (Resistances). Budapest, Tankönyvkiadó. pp. 533–535. (in Hungarian)

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