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125 YEARS OF THE DEPARTMENT OF TECHNICAL MECHANICS

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Hungary can claim to own the oldest engineer training institution of university rank within Europe. The Institutum Geometricum-Hydrotechnicum, established within the Faculty of Arts of the Pest University, had the primary purpose of training specialists for water control, for the survey of land and for the settlement of land ownership relations, areas of extreme importance for the country. As, however, these formed the tasks of state and other authorities, the mostly outstanding specialists as for example the famous water control engineers trained here worked for official authorities. The prospective engineers studied mechanics as well, two hours a week in the first academic year, which in 1792 was reduced to one lesson per week, and the practice remained the same throughout the existence of the Institutum until 1850. During this period, the subject was taught by the professors of physics of the Faculty of Arts, namely János Horváth between 1782 and 1791, József Domin between 1791 and 1801 Ádám Tomcsányi between 1801 and 1831, Lörinc Gröber between 1832 and 1834 and Ányos Jedlik between 1834 and 1850. Teaching was done in Latin. In the meantime, an important period of the industrial revolution took place in Europe which resulted in the appearance of the large scale capitalist industry. Factories operated, in which the inventions of the age, machines were running. This kind of industry called for a new breed of specialists, for people familiar with the machines. This, however, required a different type of training, subjects different from the ones taught in the Institutum, more physics and mechanics. The so-called 'polytechnicums' were established in Europe to meet such needs.

The 'Ecole Polytechnique' in Paris is generally mentioned as the first example of such institutions and, although, in its foundation such objectives had a role undoubtedly, it still cannot be viewed as a polytechnicum in the real sense of the word as Napoleon soon transformed it into a military institute in which function it has been operating ever since.

The real cradle of civilian polytechnical institutions was in Central Europe, more specifically in Austria, from where these institutions made their way toward East and West. The first civilian polytechnicum was the one founded in Prague in 1806, this was followed by those established in Graz in 1811 and in Vienna in 1815, and only a decade later, in 1826 was the first similar institution founded in Karlsruhe, Germany.

Hungary, making serious attempts at industrialization, soon realized the use of such schools. Public statements, newspaper articles demanding such institutions in Hungary as well appeared one after the other. In 1836, a proposition was submitted to the Parliament by Trencsén County. Why exactly Trencsén? Perhaps because that county lay on the border of the industrialized Moravia. According to the minutes, the deputy of the county '...wishes to establish a polytechnical institute, in which our youth, while practicing virtuous professions, farming, trading, craftsmanship and manufacturing, can be taught all aspects of mathematical sciences, namely mathesis, geometry, chemistry, architecture, drawing, mechanics and fortification...'.

The case thus was officially started, however, it did not develop at the expected pace, although the Parliament voted for the 'establishment of a Technical University in the country', and the proposal was sent to Vienna for approval by the king. Long years of debate followed as to whether the Parliament or the king has the right to found the institution. Vienna was in no hurry, the parliamentary sessions returned in vain to the question from time to time. In 1844, at last, the king issued a decree in which he established if not a Polytechnicum at least an industrial school named after Palatine József . The school started its operation in 1846 with a three-year educational course and eight departments among which, however, there was no department for mechanics and such lectures did not form part of the curriculum of the technical classes either. There was, however, a department entitled 'arithmetics, theoretical and practical geometry and dynamics', the first professor of which was József Arenstein, Piarist priest. His appointment was for a very short period only, as, because of his active participation in the revolution of 1848, he was dismissed in 1849 already. Teaching of disciplines related to mechanics formed presumable part of the tasks of the professor of dynamics in the second year.

The successor of Arenstein as head of the above department was István Kruspér. As known, in 1850 the Institutum Geometricum was merged into the 'Joseph Industrieschule', and the compound was raised to Polytechnicum rank. Teaching in the Polytechnicum was characterized by free selection of the courses, there were, however, some prerequisites, e.g. the study of theoretical dynamics required the previous completion

Miksa Bielek

of the advanced arithmetics, the descriptive geometry and the industrial science courses.

1857 was the department of 'Mechanik und Maschinenlehre'organized Vince Hauszmann, who spoke no Hungarian, was appointed head of the department. As instruction in Hungarian was reintroduced, Hauszmann was transferred to the Graz Polytechnicum. Subsequently, István Kruspér headed the department temporarily, until Miksa Bielek took over in 1864. In 1867 the department was divided into two parts: one dealing with machine construction (Bielek) and the other with the study of machine dynamics. With the latter, the independent department of technical mechanics was formed, which, since 1882 is also the name of the department, as then it became Department of Theoretical Machine Construction and Technical Mechanics. That was the year when the Technical University moved from its temporary buildings in the Buda castle and later in Két Nyúl street in Pest (corner of Gönczi Pál and Lónyai streets) to the buildings on Muzeum boulevard.

Let us, however, jump back in time. A competition was announced in 1867 for the professorship of the department. Ignác Horváth, applying from Zurich, won the competition and acted as associate professor until he became an ordinary professor in 1869. The class structure corresponding to today's faculties at the Technical University came into being in 1871.

Horváth belonged to the mechanical engineering class. He was born on July 25, 1843, attended the renowned Pest Real High School, then the Joseph Polytechnicum. Later he worked as assistant teacher at the department for dynamics and machine construction. In 1866 he received the scholarship of the municipal council to study at the technical university in Zurich. After his appointment, he got permission to spend his scholarship period in Paris, where he attended lectures at the Ecole Polytechnique, the Ecole des Mines and the Ecole des Ponts et Chaussees.

Ignác Horváth

Horváth had several publications in French periodicals in this period. He continued to publish diligently after his return to Hungary, as well. He became ill in mid-seventies, he suffered from lungs disease. He could fulfil the task of lecturing less and less, spent most of his time seeking curing in Nice and Mentone, on the French Riviera. His psychological condition was also gradually deteriorating, and committed suicide on April 18, 1881.

He established the mechanical laboratory named 'dynamical workroom' which he introduced in the Engineer and Architecture Newsletter in 1873. As a supplement to the equipment of the workroom, he purchased a Werder pulling machine, as well, which at that time was the pride of the university. Its installation and operation was also described in detail by the printed media of the age. The Hungarian Academy of Sciences elected Ignác Horváth its corresponding member in 1874. In his inaugural lecture

he spoke about 'The water measuring in Budapest carried out on the occasion of the 1876 flood'. Water measuring constituted the greater and most significant part of his scientific activity anyway. He constructed an instrument for measuring waterspeed which then was for a long time used in the profession.

His books are: 'Dynamometer für Arbeitsmaschinen' (1873), 'Mechanics I.'(1874). His lectures survived in the form of student lithographic prints under the titles 'The notion of Hydraulics' (1880), 'Statics', and 'Technical mechanics'.

Dezső Nagy

The successor of Horváth was Dezső Nagy, mechanical engineer, born on December 6, 1841 in Székesfehérvár. Similarly to his predecessor, he also started his studies at the polytechnicum in Pest and followed in Zurich where he received his degree. He became associate professor at the Technical University on Bielek's side in 1867. He was appointed professor of the newly organized Department of Machine Construction II in 1870, at a very young age. In 1882 he moved on to the Department of Technical Mechanics and Theoretic Machine Construction. He retired in 1913 and died in Budapest on March 19, 1916. He also acted as dean of the Class of Mechanical Engineering between 1877 and 1882.

He was a teacher in the first place. It was during his period as head of department, that the instruction of mechanics was separated on the faculties of mechanical engineering and engineering thus the material taught

better suited the needs of the individual faculties. Nagy initiated the setting up of a material testing laboratory in 1894. He was the founder and first president of the Association of Hungarian Material Testers. He was also the initiator for the elaboration of the first rules of the Hungarian construction industry. According to the syllabus of his theoretical machine construction lectures held in 1889/1890, he lectured on the following topics: kinematics: mechanisms and laws of machinery motions, energy measuring devices, flywheels, regulators, theory of animal forces and machines powered by them, theory of applied hydraulics.

Béla Bresztovszky

Béla Bresztovszky (born in Nagykároly, August 28, 1872), the professor of the department appointed in 1914, received his degree in mechanical engineering at our university. Following his degree work he went on a study tour to Darmstadt, Munich, Berlin and Paris, with a two-year scholarship. He became assistant professor at the department of bridge construction between 1897 and 1899, and worked in parallel at the bridge department of Ganz Shipyard. In 1900 he became senior assistant professor at the Department of Technical Mechanics and Theoretical Machine Construction, from 1912 onwards he held the title of extraordinary professor. He had a vivid interest in the scientific public life, as well as in national politics. From 1920 to 1922 and between 1925 and 1927 Bresztovszky filled the position of dean of the mechanical engineering class. It was during his period

as head of the department that the name of the department was changed simply to'technical mechanics'. He died in an accident in Budapest on June 7, 1941.

Bresztovszky gained substantial merit for the role he played in the development of aviation in Hungary. He was Vice-president of the Hungarian Aero Federation and founder of the Amateur Flying Association at the Technical University. He wrote several textbook-like university notes each of which has been published several times, such works are, for example: 'Dynamics and mechanics' (1920), 'Statics and strength of materials' (1920), and 'Technical material testing' (1930). The last topic was of special importance to Bresztovszky and made up the greater part of his research activity.

Ádám Muttnyánszky

Ádám Muttnyánszky (born in Budapest, October 4, 1889) became head of the Department of Technical Mechanics in the most difficult times, in 1942. He received his mechanical engineer's degree at our university in 1911, and was appointed assistant professor of the Department of Strength of Materials and Supporting Structures of the Faculty of Architecture in the same year. He became assistant professor at the Department of Technical Mechanics in 1914, he could, however, fill the position only in 1919, due to his military service. Subsequently he parted with the university and became technical manager of the Pilisvörösvár Mineworks. In 1939 he read

Applied Mechanics as senior assistant professor of the 2nd, then the 3rd Department of Machine Construction. In 1941 he was appointed head of the laboratory of the Department of Aerodynamics due to the death of Breśztovszky, however, Muttnyánszky was given the task of reading the subjects taught by the Department of Technical Mechanics in the same year already. In 1942 he is appointed full professor at this department and is commissioned to head the department which task he performs until his retirement in 1959. During his teaching activity he was instrumented in restoring the department ruined in World War II and in reorganizing the education of mechanics. In the meantime he made substantial efforts to gain appropriate support enabling those students to continue their studies who were forced by the war to disrupt them.

Compared to his predecessors, he reshaped the theoretical nature of the teaching of mechanics through giving a greater emphasis to the practical aspect and made the instruction more engineer-like through the use of tasks collected on the basis of his engineering experience. He was an excellent lecturer, his students remember his lectures as an experience of their own even decades later. His outstanding qualities as a teacher shine through his university notes and textbooks as well.

Muttnyánszky wrote five books independently, contributed to two books and wrote five specialized essays. Of his books, flawless from a didactic point of view, the textbooks entitled Statics (1951), Strength of materials (1956), Kinematics and Kinetics (1957) are of special importance. His favourite field of research was applied mechanics.

In 1953 Muttnyánszky invited to the department professor Endre Reuss who was world-wide regarded by the specialists of mechanics as the one who laid the foundations of the modern study of plasticity. From this time onwards, scientific work at the department was led mostly by professor Reuss.

In 1955 the Faculty of Mechanical Engineering assigned the task of teaching, the subject called Mechanisms, to the department and transferred the teacher group led by Lajos Buzás, associate professor to the department for this purpose.

Beside the department led by Muttnyánszky, in 1951 the Faculty formed the Department of Technical Mechanics II which was headed by György Kozmann, associate professor, then full professor from 1953. This department operated until 1959, and merged with the Department of Technical Mechanics when Muttnyánszky retired. Professor Ádám Muttnyánszky maintaned close contact with the department until his death in 1976. He helped the progress of the department in the correct direction with his advice and by participating further in the task of writing university notes.

Endre Reuss

The work of Professor Endre Reuss (1900-1968), although not as head of the department, had a significant impact on the activity of the department and on the scientific life in Hungary. Reuss received his mechanical engineering degree at our university in 1922. From 1922 till 1924 he was assistant teacher at the department, between 1924 and 1950 he worked in the Municipal Gasworks, from 1950 till 1953 he was engineer of the Chemical Planning Institute. Only after this he joined the department as professor. Between 1955-1957 he was the dean of the Faculty of Mechanical Engineering. His active scientific activity dates back to when he was an assistant prpfessor.

The major part of the 20 scientific essays he published raise original thoughts. His most significant essay is his paper published in the 10th volume of ZAMM in 1930. In this paper, joining the research done by Prandtl on the plastic body, Reuss inferred a material law considered significant ever since, the equation, later called Prandtl-Reuss. This equation, which rivals in its significance Hooke's law, is even today considered the material law of bodies which is the simplest, but comprises a great deal of material characteristics. His six university note and book chapter form further valuable parts of the technical literature on mechanics.

Endre Reuss retired in 1967, his intensive scientific activity continued, however, with the use of modern computer technology, until nearly his death in 1968.

György Kozmann

Between 1959-1970 professor György Kozmann (born in Debrecen on May 11, 1905) was the head of the department of Technical Mechanics. He received his degree in mechanical engineering at our university in 1930. Subsequently he worked in Csepel until 1932 after which he joined the staff of the Defense Ministry. From 1936 he worked as the head of the pressing plant in the Diósgyőr Factory of MÁVAG. In 1949 he was appointed head of the State Technical Institute. In 1951 the Technical Institute merged into the Technical University and was transformed into the evening and correspondence education which was also headed by György Kozmann. As associate professor he became the head of the newly established Department of Technical Mechanics II.

After his contract as head of the Department of Technical Mechanics had expired, he continued to work at the department as professor. He went on withthe activity that he had been doing with great enthusiasm during his period as head of the department, as well, namely the activity of establishing the structure for postgraduate engineer training. The apoplexy he suffered during one of such postgraduate lectures forced him to retire in 1974. In his teaching activity he followed the same approach as his predecessor, professor Muttnyánszky, and entrusted professor Reuss with

the leading of the scientific activity at the department to an increasing extent. The scientific literary work of professor Kozmann is hallmarked by 8 university textbooks and 2 technical books.

Gyula Béda

From 1970 till now, the head of the department has been professor Gyula Béda (born in Koncháza on May 21, 1931). He received his degree in mechanical engineering at the Technical University of Heavy Industry of Miskolc in 1953. Subsequently he was postgraduate aspirant, from 1956 senior assistant professor and from 1961 associate professor at the Department of Technical Mechanics of the Miskolc University. In 1967 he was transferred to the Department of Technical Mechanics at our university where he became full professor in 1968 and head of the department in 1970. Between 1972 and 1981 he worked as dean of the Faculty of Mechanical Engineering. In the 1970s the circle of subjects related to mechanics became wider in the training of mechanical engineers. The subject appeared in the curriculum of upper-year students as well. This period is also characterized by the lecturers' active participation in the development of the curriculum, through writing new books and university textbooks. The university textbooks Strength of Materials IV/1, 2 (1966, 1967) and Continuum-Mechanics I (1980), the notes Analytical Mechanics (1989) written with a co-author, as well as the technical books Continuum-Mechanics (1986),

Mechanics of Elastic Bodies (1987) written with a co-author, and the textbook entitled Kinematics and Dynamics (1991) provide an insight into the expansion of the subjects taught.

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