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ON THE HISTORY OF THE INSTRUCTION OF DESCRIPTIVE GEOMETRY AT EDUCATIONAL INSTITUTIONS OF UNIVERSITY TYPE IN SLOVAKIA

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Riassunto. L articolo schizza la storia dell insegnamento della geometria descrittiva nelle università e nei politècnici dell odierna Slovacchia dallanno 1840 fino all ottavo/nòno decènnio del sècolo scorso. Si segue lo sviluppo delle istituzioni di tipo universitario e quello del politècnico dall Accadèmia dell Industria Mineraria e Selvicultura a Banská Štiavnica al Politècnico Slovacco alla Facolta delle Scienze Naturali dell Università Comeniana ai politècnici alle facoltà di educazioni fondate nei sesto/setimo decènnio nelle quali si ha insegnato alla geometria descrittiva. Si menziona in brève alcuni personàggi che contribuirono più efficacemente all instruzione universitaria nella geometria descrittiva e alla produzione dei libri di testo in questo ramo.

Summary. This paper sketchs a history of instruction of descriptive geometry at workplaces of a university type at the territory of today´s Slovakia approximately from the year 1840 until seventies/eighties of the 20th century. It observes a development of educational institutions from Mine and Forest Academy in Banská Štiavnica to Slovak University of Technology and Faculty of Sciences of Comenius University till to special universities of technology and faculties of education established in fifties/sexties of the 20th century which descriptive geometry was instructed at. There are noticed briefly some personalities which had played an important role in the university instruction of descriptive geometry and in textbook production in this domain.

The beginnings of the instruction of descriptive geometry at educational institutions of a college level at the territory of today's Slovakia are connected closely with the history of the Mine and Forest Academy in Banská Štiavnica (Schemnitz in German, Selymeczbánya in Hungarian), the first college of special technology in the world founded in 1762. Generally, Academy in Banská Štiavnica has played a pioneering role in the introduction of descriptive geometry as a new subject of the educational programme at technical and polytechnic institutes at the territory of the Austrian-Hungarian monarchy, Middle Europe and West Europe (except France). *Johann HÖNIG* (1810 – 1886), the first professor of the newly established chair of *technical drawing*, worked at Academy in the years 1839 – 1843. He was the first who gave lectures on descriptive geometry at the Academy. His progressive views at the theoretical education of engineers and demanding work style came up against stiff opposition of students and met a lack of understanding at Court Chamber. According a recommendation of this top leading and control organ, descriptive geometry had to be an optional subject while Hönig had demanded for it to be an obligatory one terminated by an examination. This disagreement was one of several causes (although not main) why Hönig has leaved Banská Štiavnica and moved to Vienna where he

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was appointed to the post of professor at the chair of descriptive geometry at the polytechnic institute. From October 1843, he remained at this post 27 years and has educated the first strong generation of theoreticians of descriptive geometry in Austria (Rudolf Niemtschik, Rudolf Staudigl, Rudolf Skuherský, Gustav Adolf Viktor Peschka and other). His textbook *Introduction to the study of descriptive geometry* (Anleitung zum Studium der darstellenden Geometrie, Vienna 1845) influenced in a crucial manner the instruction of descriptive geometry at polytechnic institutes in Austria and the formation of further textbooks as well. He is denoted by right as a *founder of descriptive geometry* in Austria and took an essential credit for the building of a position of Austria (or Austria-Hungary) as a "*country of descriptive geometry*" ([1], [2]).

The departure of J. Hönig had weakened the position of descriptive geometry at Academy in Banská Štiavnica only for a short time. According to lecture list and curricula from the year 1846, descriptive geometry was introduced as an obligatory subject with a final examination. The tuition was held in the summer term of the first academic year in an extent of 10 classes of lectures weekly and one third of practical courses from 10 classes per week ([3]). Practical courses in geometrical and perspective drawing in the second academic year continued contents of descriptive geometry and mathematics rather independently. The kernel of the descriptive geometry tuition consisted in Monge´s method and its application on various geometrical and technical objects. It is preserved neither a detailed curriculum nor a record of lectures but it could be supposed with a high probability a knowledge of the Hönig´s textbook and its using in the tuition.

The position of descriptive geometry in educational programmes and a quality of its instruction at the Mine and Forest Academy in Banská Štiavnica up to the end of its existence at the territory of Slovakia was influenced significantly by internal and all-Hungarian reforms and reorganizations which had impinged on Academy in the years 1860, 1865 – 66, 1872, 1895 and 1904. During these changes, diverse pressure and occasionally unqualified interventions were taken against descriptive geometry, among other measures also a temporary dissolution of a freestanding chair of descriptive geometry in the years 1866 – 1872. But generally descriptive geometry preserved its status of a fundamental subject in the theoretical basis of engineer education in an extent of 20 classes weekly converted into one term. This amount is comparable with the situation at foremost contemporary polytechnic institutes in Austria-Hungary and other industrial European countries as well ([4]). A positive consequence of the reforms in the years 1872 and 1895 was an incorporation of descriptive geometry into two first terms of the study in an extent of 4 classes lectures and 6 classes practical courses weekly in each term. A more regular and acceptable distribution of the subject matter was achieved by this measure. The same extent for

mine and metallurgy fields of study and a half for forest engineering was also confirmed by the last educational reform in Austria-Hungary in the year 1904 ([4]).

From the gallery of lecturers of descriptive geometry represented after Hönig by teachers *Josef MARSCHAN* (*MARAN*) (1843 – 47), *Albert MILLER* (1847-8), *Eduard* (*Edmund*) *PÖSCHL* (1850 – 66 and 1872 – 87), *Julius GRETZMACHER* (1866 – 7), *Emil HERMANN* (1869 – 72) and *László FODOR* (1887 – 1924) are exceptionally eminent two ones: Pöschl for his wide-ranging highly qualified pedagogical activities and for his merits in the modernization and Fodor (his proper surname was *MAYERHOFFER*), a native from the town Skalica at the Slovak-Moravian frontier, for his pioneer role in the propagating of instruction of descriptive geometry at grammar schools and universities and a significant textbook production. His textbooks on geometry and descriptive geometry, the textbook *Foundations of descriptive geometry* (Az ábrázoló geometria elemei, Banská Štiavnica 1882) in two volumes and later university textbooks represented by multiple repeated editions a stable basis for education in Hungarian part of Austria-Hungary and past 1919 in post-war Hungary almost three fourth of a century.

The relocation of the Mine and Forest Academy from Banská Štiavnica to Sopron in Hungary after the formation of Czecho-Slovak republic has interrupted the history of descriptive geometry at institutions of university type in Slovakia for twenty years. Renewed chapters of this history have begun to be written simultaneously with the actual establishing of the Slovak University of Technology (SUT) in the year 1938. The first lectures on descriptive geometry were held at the first study divisions of civil engineering – at the division of civil and transport constructions, of water buildings and cultural constructions and of surveying engineering. The today's Faculty of Civil Engineering of SUT in Bratislava is arisen out by a historic transformation from these divisions.

Descriptive geometry has held an important position in a system of basic theoretical education of engineers at SUT since the very beginning of its existence. In a subject list of theoretical basis in early years of the existence of SUT, descriptive geometry took the second position, immediately after mathematics ([5]). This place it also occupies with a summary amount of weekly classes converted into one term. It also was a component part of the Ist final state examination. The Institute of Descriptive Geometry and Stereotomy (later renamed to Institute of Descriptive Geometry) was established together with some other institutes immediately at the beginning of the existence of SUT. To the post of the head of institute was appointed extraordinary professor RNDr. *Jirí KLAPKA*, formerly honorary extraordinary professor at the University of Technology (UT) in Brno (Moravia) ([5]). His arrival as well as a moving of the extraordinary professor PhDr. *Josef KAUCKÝ* from the UT in Brno to the post of the head of the Ist Institute of Mathematics at SUT happened thanks to

their friendly relationships with the first rector of SUT, ordinary professor PhDr. *Jur HRONEC*, formerly a member of the university staff at the UT in Brno over one and half decade. After the break-up of Czecho-Slovakia, professor Klapka resigned from the post at SUT and returned to Brno in April 1939. In the near future he has seen a closing down all Czech universities by German Nazi authorities after famous tragical students events in November 1939.

Since May 1939 the history of Institute of Descriptive Geometry at SUT is connected inseparably for many years with the work of Dr. Tech. *Gabriel CENEK* (1900 – 1956) which worked up to that time as a teacher of mathematics and descriptive geometry at a state technical college in Bratislava. Since the above-mentioned date he was a supply professor at SUT (since the year 1945 professor), since the academic year 1940/41 the head of the institute and after a reorganization in the year 1950 the head of Department of Descriptive Geometry until his death in the year 1956.

The instruction of descriptive geometry was carried out in all divisions in the first academic year, namely in all divisions of civil engineering in an extent of 4 lecture classes weekly in both winter and summer term and 4 practical courses classes in winter term and 3 practical courses classes in summer term, respectively. Some other divisions of an engineers study were established in the next years: division of machine building, of electrical engineering, of forest engineering and of mining engineering. The extent of instruction of descriptive geometry amounted approximately a half in comparison with the extent in the division of civil engineering. The division of machine building and electrical engineering had additionally a curriculum on kinematics in the extent of 2 lectures classes and 2 practical courses classes weekly in the winter or summer term alternately. The contents of tuition[1] of descriptive geometry consisted of geometrical mapping methods based on parallel projections (marked projection, Monge´s method, axonometry), central projection with elements of projective geometry, applications and technical adaptations of central projection (linear perspective, bas-relief etc.), mappings of curves and surfaces with constructions of tangents, tangential planes, osculating planes etc., particularly mappings of technically important curves and surfaces (surfaces of rotation, developable and non-developable ruled surfaces, helicoidal surfaces, translation surfaces, topographical surfaces etc.). Some special lectures on special construction surfaces and on fundamentals of stereotomy had been held for students of civil engineering.

The instruction of descriptive geometry for students of teachers´ training in descriptive geometry and drawing for secondary, grammar and technical schools was organized parallel with the tuition in engineers´ divisions. Both fields of study had common lectures on fundamentals of descriptive geometry. Besides, special lectures on

[1] "Tuition" is meant as a process of an immediate communication between the teacher and pupils/students.

various scopes were held for students of teachers´ training. Students of the Faculty of Sciences of Comenius University (CU) in Bratislava in teachers´ training for descriptive geometry at grammar school and technical colleges followed several courses of lectures and practical courses held by contractual reader RNDr. *Viktor SVITEK* which had a full-time job as a teacher of a grammar school. Assistant duties in descriptive geometry at the Faculty of Sciences of CU were complied mostly by *Michal HARANT*, later in post-war period one of prominent personalities of instruction of descriptive geometry at this faculty.

G. Cenek was appointed to the post of an extraordinary professor of descriptive geometry in the year 1945. (By University Law from the year 1950 the category of extraordinary professors was abolished and a unique category of professors remained.) As professor, he was elected or appointed several times to the post of dean at various faculties: in 1945, 1946/47, 1947/48, 1950 – 1952 at the division and at faculty of special sciences, respectively, 1951 – 1953 at the faculty of mining engineering, 1955/56 at the faculty of architecture and structural engineering. After the death of G. Cenek in the year 1956 associated professor RNDr. *Václav MEDEK* (1923 – 1992) has become the head of the department of descriptive geometry at SUT. He devoted his entire pedagogical career to the descriptive geometry. All-university department of descriptive geometry at SUT has been dissolved in the year 1961 and members of its staff were detached to separate faculties into the staff of department of mathematics at the faculty of electrical engineering or into the staff of departments of mathematics and descriptive geometry at the faculty of civil engineering and at faculty of machine building, respectively. (This fact has adumbrated a liquidation of the descriptive geometry as an autonomous subject in curricula at the faculty of electrical engineering.) V. Medek has become the head of the department at the faculty of civil engineering and at this workplace he was appointed to the post of full professor in the year 1965.

No autonomous institute of descriptive geometry was established at the Faculty of Sciences of CU before the year 1950. A decisive part of the work at the training of teachers of descriptive geometry for secondary, grammar and technical schools (i. e. lectures, examinations, final state examinations) fell on the supply professor of the descriptive geometry G. Cenek which was also appointed to the post of honorary professor at the Faculty of Sciences of CU since the year 1944. She was partially supported and substituted in this work by activities of the contractual reader V. Svitek and assistant M. Harant. After establishing of department of mathematics at the Faculty of Sciences of CU in the year 1950 M. Harant as a reader has become a head of a section of this department denoted as Institute of Geometry. He remained at this post until the year 1960 when he was moved to University of Transport Engineering in Žilina. He had also there a great merit in creation of workplaces directed onto instruction of descriptive geometry.

Teachers´ Training College of CU (or Faculty of Education) was the third university institution (besides SUT and Faculty of Sciences of CU) that the instruction of descriptive geometry was carried out in years 1947 – 53 at. Institute of Mathematics and Geometry (under the guidance of V. Svitek) and since the year 1950 Institute of Mathematics as a component part of the Department of Mathematics and Physics (head professor RNDr. *Ján VANOVIC*) educated teachers for descriptive geometry in combination with mathematics or art ([10]).

Vast changes in organizing of university education in Slovakia in early years after the World War II and then especially in the first half of fifties had marked noticeably also the situation in instruction of descriptive geometry. The establishing of the University of Agriculture and Forest Engineering in Košice since the academic year 1946/47 and a following division and moving of a part of the university as University of Agriculture to Nitra and another part as University of Forest and Wood Engineering to Zvolen in the year 1952, the founding of University of Technology in Košice in the year 1952 where was also relocated the faculty of mining engineering from SUT in Bratislava, as well as the establishing of University of Education in Bratislava in the year 1953 have brought an establishing of many new workplaces with instruction descriptive geometry as a component part of a complex theoretical basis of engineers or as a wide specialization of teachers´ training. Sections providing instruction of descriptive geometry either formed independent departments such as e. g. Department of Descriptive Geometry at UT in Košice where reader RNDr. *Karol RECICÁR*, Ph.D., was a leading personality, or had been incorporated into departments of mathematics or into departments of special orientation such as e. g. in Zvolen and Nitra. During a short existence of University of Education (1953 – 59) the teachers´ training in descriptive geometry was provided by department of mathematics at Faculty of Sciences of this university. The head of this department was V. Svitek. The geometry section of this department has become after a fusion of University of Education with Comenius University together with Institute of Geometry at Faculty of Sciences of CU a kernel of the department of geometry established in the year 1960 and existing till the year 2004 continuously. In this year this department was incorporated as a section into a larger department. This section is in present a unique workplace educating teachers of descriptive geometry at the territory of Slovakia.

A considerable increase of the number of university workplaces providing instruction of descriptive geometry in Slovakia especially in the fifties and sixties of the 20th century bore also qualitative changes in the creation of textbooks and other study materials. While the first founder of institutes of descriptive geometry took great pains to saturate fundamental needs of theoretical instruction by a creation of textbooks and other auxiliary materials of

a classical style and recorded mainly the classical era of the development of descriptive geometry in the 19th century, following teachers´ generations reflected by their publications in a greater measure a diversification of the discipline into special domains – and not only of technical character – where descriptive geometry has ceased to fulfil a function of a mere application method but it became in them all the time an effective tool of their own theoretical progress. Expressions of these new tendencies were on the one hand attempts to synthesize theoretically various branches of geometry such as elementary, descriptive, analytic, differential and algebraic geometry, into a unique consistent and multi-side applicable *constructive geometry*, on the other hand all the time mightier stream of *computer geometry* using earlierly unsuspected technological means of a computers´ era and pervading all the time a wider milieu of teachers and users of descriptive geometry. Fundamental works published by V. Medek in cooperation with reader RNDr. *Jozef ZÁMOŽÍK*, Ph.D., have played a pioneer role in both fields in Slovakia.

Teachers´ training colleges and their successor universities cannot be omitted in the history of instruction of descriptive geometry in Slovakia. The instruction of some fundamentals of descriptive geometry is a component part of the professional training of teachers of mathematics. Numerous scientific institutes of both basic and applied research use descriptive geometry as a component part of their work methods and many other workplaces (e.g. medical, sports institutions etc.) use in practice methods of descriptive geometry despite of the fact that their proper interests are rather far from the subject of descriptive geometry. These and similar facts and regional, local and personal history of descriptive geometry in Slovakia as well as changes in the contents of instruction of descriptive geometry open immense horizons of a historical research in the history of descriptive geometry in Slovakia. These fields look for their research worker. It can be stated with pleasure that the first young enthusiasts have entered this way.

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