

Mathematics in the Austrian-Hungarian Empire

Martina Bečvářová

Czech mathematicians and their role in the development of national mathematics in the Balkans

In: Martina Bečvářová (author); Christa Binder (author): Mathematics in the Austrian-Hungarian Empire. Proceedings of a Symposium held in Budapest on August 1, 2009 during the XXIII ICHST. (English). Praha: Matfyzpress, 2010. pp. 9–31.

Persistent URL: <http://dml.cz/dmlcz/400814>

Terms of use:

© Bečvářová, Martina

© Binder, Christa

Institute of Mathematics of the Czech Academy of Sciences provides access to digitized documents strictly for personal use. Each copy of any part of this document must contain these *Terms of use*.



This document has been digitized, optimized for electronic delivery and stamped with digital signature within the project *DML-CZ: The Czech Digital Mathematics Library* <http://dml.cz>

CZECH MATHEMATICIANS AND THEIR ROLE IN THE DEVELOPMENT OF NATIONAL MATHEMATICS IN THE BALKANS¹

MARTINA BEČVÁŘOVÁ

Abstract: From the sixties of the 19th century, the mathematical works and the number of mathematicians, teachers of mathematics and authors of mathematical monographs and textbooks rapidly increased in Bohemia. This was due to the development of mathematical education at the secondary and technical schools and to the establishment of specialized lectures at the university in Prague. During the seventies and eighties of the 19th century there were many Czech candidates of teaching mathematics and physics at secondary and technical school and university who were without regular position and income. It is not surprising that some of them went abroad (especially to the Balkans) where they quickly obtained better regular positions, and they started to play important roles in the development of “national” mathematics and mathematical education. The most important phenomena from the development of the Czech mathematical community will be discussed and analyzed and their influences on other national mathematical communities will be described.

1 Introduction

1.1 Situation in Bohemia in the first half of the 19th century

The 19th century was an important period in the development of the Czech national culture. Science had reached European standards and started to participate in the process of the international cultural and scientific development. In this period, the scientific research became an integral part of the Bohemian landscape.

In Western Europe, due to the developments in industrial production by the end of the 18th and the beginning of the 19th centuries, the role and the prestige of the science increased considerably. Moreover, owing to the rise of new relationships, the dividing lines between individual scientific disciplines slowly disappeared. At that time, mathematics developed considerably as well. By the end of the 18th century, it reached a level of knowledge well beyond the existing standards and everyday needs of the population. At the same time, it became an instrument of other exact sciences and technologies. Indeed, new problems related to new discoveries in physics, chemistry, geology and other sciences could hardly be formulated and solved without a deeper understanding of mathematics.

At the beginning of the 19th century, in comparison with Western Europe, the situation in Bohemia was quite different. Agricultural production prevailed and farming remained primitive until the mid of the 19th century. Only country estates started to apply more rational methods. The slow growth of agricultural production did not require many workers having a broader economic and agronomic knowledge. The existing methods of farming were manageable with the elementary knowledge of natural conditions. The demands on the education of workers still remained on the level of those in the second half of the 18th century.

¹ The publication was supported by grant GA ČR 409/09/0012 of the Czech Academy of Science.

A slow growth of the industrial production did not bring along a development of sciences and education. Nevertheless, Bohemia was the most developed region of the Austrian empire (after the loss of Austrian Netherlands).

1.2 The development of the education in Bohemia in the first half of the 19th century

The transition of a scattered feudal state to a centralized unit initiated a reform of the educational system. The centralized administration that had been growing since the second half of the 18th century needed educated officers, financial experts, lawyers, doctors, soldiers etc. for its proper functioning. This development required a reform of the teaching methods at the universities, and the technical, military and grammar schools.

In the 1820's, Bohemia entered into the period of industrial revolution which impacted primarily the light industry. Since necessary machinery was made abroad and imported, the local production did not require any development of the scientific research. Nevertheless, even in this period existing professions were differentiating and new ones were arising. In addition, the possibilities for people to assert themselves in various fields of both the state and the private sector, as well as in professional and national associations, grew. This differentiation was a spark for the developments in education.

At that time, Bohemia became the industrial backbone of Austria. The growing tendencies to centralize and improve industrial production in the mid of the 19th century required a rapid development of technical schools. These schools took over the mission of the old scientific academies of the 18th century. In this development an important role was played by teaching of mathematics and in particular geometry. Mathematics became an integral part of education. For, it provided means to formulate and solve the problems of the developing industry, transportation and state administration.

The expansion of the technical universities in the middle of the 19th century required a development of secondary education in view of increasing demands on the professional preparedness of the students. This pressure led naturally to a creation of a new type of secondary schools (technical secondary schools, the upper forms of grammar schools, schools of commerce) and a reform of the classical grammar schools. At the same time, it led to an increasing number of vacancies for teachers and tightening up the demands on their preparation. Therefore teaching methods at "classical" universities were reformed and focused on the education of future teachers, doctors and lawyers. The Czech society aspired after education in its mother tongue and was ready to support and finance it. Czech industrialists and businessmen understood that the existing and following development of the industrial production and the state administration would not be possible without a well prepared and educated workforce.

1.3 The development of Czech secondary schools and universities in the 19th century

In the second half of the 19th century, due to the rise of nationalistic movements, the Czech and German communities separated. This separation was also reflected in science and education. An important feature of that period was the process in which Czech science was "becoming independent". While the German speaking society gradually became bilingual, the Czech community was getting stronger and finally prevailed. This process was accompanied, on the one hand, by protracted national conflicts and, on the other hand, by expensive constructions of new schools, the establishment of new associations and the development of

the Czech scientific terminology, journals and monographs. As a consequence, finances were drained and the development of the Czech science delayed.²

In the following paragraphs we will sum up the most important aspects of the development of mathematics and mathematical education in Bohemia in the second half of the 19th century.

Up to the end of the 1850's, the education system of secondary schools and universities was solely in German. Only since 1861, the first Czech secondary schools were built. In the period between 1861 and 1865 some subjects at the state secondary schools were taught in Czech, while the teaching of others remained in German. In the second half of the 1860's the German and Czech secondary schools were coexisting with same standard. Thus, the graduates of the Czech stream of education who entered universities started to require lectures in their mother tongue.

In the 1860's, the efforts of Czech political representatives and intellectuals as well as the movement of university students to have their studies in Czech language required an establishment of Czech mathematical faculties at the Prague Technical University (1864). At first they existed in parallel with German ones that had better teachers and more funding. The arrival of better qualified Czech teachers and students who have been educated at Czech secondary schools led to the strengthening of the positions of Czech mathematical faculties at the Prague (or Czech) Technical University and the establishment of a similar faculty at the Prague University (1871). The professional standard of the Czech mathematical faculties were comparable to the German ones and even began to exceed in student enrolment. At the end of the 19th century the importance of the Czech mathematical faculties was increasing, because of the growth in the number of their teachers and students. On the other hand, the number of German students was decreasing, because most of the German professors considered Prague to be merely a temporary place on the way to Vienna or Germany.

1.4 Czech textbooks of mathematics

The above-mentioned changes in the demands on the education system and the gradual change of the language of instruction influenced also the textbooks. The tendencies to write Czech textbooks for elementary subjects of the higher classes of middle schools and the lower ones of the secondary schools were very popular between 1850's and 1860's. At first, the textbooks had a character of temporary texts. The first high-quality mathematical textbooks for secondary schools were written in the beginning of the 1860's J. Fleischer, V. Janděčka, J. Smolík, F. Šanda, V. Šimerka and D. Ryšavý. In the 1870's the efforts for improving teaching and the replacement of old textbooks by new ones that would comply with the new curricula grew stronger. These textbooks were written together by the above professors of the secondary schools and by some university professors (for example F. J. Studnička and K. Zahradník). In addition, special textbooks for schools of commerce, textbooks on the theory of determinants and various tables were published for the first time.

Czech authors wrote textbooks according to foreign models and in respect to their professional interests; they published them either at their own expense in various publishing houses or at the expense of richer booksellers. They faced not only a lot of professional problems (the absence of domestic patterns, imperfect terminology and methodology) but also financial ones – there were few readers. The activities in the 1860's and 1870's cannot be

² More about the reasons leading to the establishment of the independent Czech educational system see [4].

considered a systematic creation of textbooks, because in most cases they were mere revisions or “free copies” of older ones. It should be noted that this trend did not manifest itself only in mathematics but also in other disciplines. The situation improved in the 1880’s when textbooks were published by *Jednota českých matematiků* (The Union of Czech Mathematicians). It was the first systematic and profitable publishing of Czech textbooks for secondary schools. At the end of the 19th century the Czech textbooks for secondary schools complied with European standards.

A similar situation was in the field of textbooks for the universities. There was no book for natural science or mathematics which complied by its content and quality with the demands of a university textbook at the beginning of the 1860’s. The compendia of mathematics, physics, astronomy and chemistry available in Czech were usually addressed to the public. Most of these books were not written by independent scientists in a respective branch, but “put together” by amateurs, who wanted most probably to enrich Czech literature and make the science more popular.

The first textbooks of mathematics for the students of the Technical University were published in the mid 1860’s thanks to G. Skřivan, F. J. Studnička, Em. and Ed. Weyr. Most of them were written after the year 1871, i.e. after introducing Czech mathematical lectures at the Prague University, and especially after 1882, i.e. after establishing the Czech University.

Writing textbooks for universities took a long time, partly because there was no Czech terminology and no precedent. Some university professors – F. J. Studnička, for example – addressed existing general demand for textbooks. In fact, they often devoted to this activity not only their professional career but also their finances. However, at the end of the 19th century their sacrifice was not appreciated. The members of the younger generation, brought up by the existing Czech textbooks, considered this work to be non-contributory, insignificant and suitable for “weaker” mathematicians. They preferred their own professional activity and career.

1.5 Czech translations of “classical” and modern monographs

The first attempts to translate classical works of mathematicians and some modern monographs to Czech³ occurred in the 1860’s. The first translations of mathematical works occurred in the 1870’s.⁴ Their authors were active members of *Jednota českých matematiků* (The Union of Czech Mathematicians) who graduated at universities and started to work on their difficult work with youthful enthusiasm. Further translations occurred in the 1880’s.⁵

³ It should be noted that in those times the Czech scientists tried to translate one of Aristotle’s work on logic. A. J. Vrtátko translated in 1860 his book *Categories* and issued it under the title *Aristotle’s Categories*. For the second time this work was translated by J. Vychodil in 1918. The first complete Czech translation of Aristotle’s works on logic was carried out by K. Berka, whose translations have been published since 1958 to 1978. More details on Czech translations of mathematic works of classics and modern monographs see [4], pp. 263–279.

⁴ For example at the beginning of 1870 Emil Weyr translated two monographs by Italian geometer Luigi Cremona *Sulle trasformazioni geometriche delle figure piane* (Cremonovy geometrické transformace útvarů rovinných) and *Introduzione ad una teoria geometrica delle curve piane* (Úvod do geometrické teorie křivek rovinných), Martin Pokorný then translated the famous textbook by German mathematician Richard Baltzer *Die Elemente der Mathematik* (Dra Richarda Baltzera Základové matematiky. Díl Prvý. Prostá aritmetika) and Karel Zahradník added the translation of the important work of Italian mathematician Giusta Bellavitis *Saggio di applicazioni di un nuovo metodo di geometria analitica (Calcolo delle equipollenze)* (Methoda equipollencí čili rovní geometrických).

⁵ For example at the beginning of 1880s F. J. Studnička translated the famous article by Bernard Bolzano *Rein analytischer Beweis des Lehrsatzes, dass zwischen je zwey Werthen, die ein entgegengesetztes Resultat*

However, most of the mathematicians focused on the compilation of original works, monographs and Czech textbooks. Further translations appeared only at the beginning of the 20th century.⁶

Czech mathematicians paid particular attention to the translation of one of the most outstanding mathematical work of all time – *The Euclid's Elements* – i.e. the book that influenced developments and teachings of mathematics since the third century before Christ.⁷ In addition, sections of the work by René Descartes (1596–1650), Blaise Pascal (1623–1662) and Bernard Bolzano (1781–1848) were translated.⁸

Translation activities were moulded by the professional interests of individual translators and therefore could not be systematic. The translations of modern mathematical works were inspired above all by an attempt to make the newest results of world mathematical research accessible to readers and enrich the domestic professional literature. On the other hand, the translations of classical works were motivated by an attempt to gain personal prestige and prove that Czech mathematical terminology could compete with that of Greek and Latin. Therefore personal conflicts among individual translators interfered with these activities. At first, they appeared as a result of overestimating their own mathematical and language capabilities and skills, and later, as unwillingness to form a larger professional groups of mathematicians, philologists and historians, that would be able to translate some classical works with better style and quality as well as with commentaries. These problems resulted – and still result – in the absence of commented translations of the majority of classical mathematical works.

1.6 Czech professional associations

An interesting feature of the 19th century was a gradual formation of scientific institutions which – in spite of the initial lack of finances and a small number of experts – organised lectures and scientific discussions, published professional publications (journals, monographs and textbooks) and issued reports on various activities. Scientific associations that originated at the end of the 18th and in the first half of the 19th centuries combined Czech and German speaking specialists of various branches and were usually bilingual. Their activities were not considerably influenced by nationalistic conflicts. After the fall of Bach absolutism (1859), the Czech society formed enough space for various activities and for the formation of various associations. In the mid of the 1860's, they started to show their professional and language particularities.

gewähren, wenigstens eine reelle Wurzel der Gleichung liege (Ryze analytický důkaz poučky, že mezi dvěma hodnotami, jež poskytují opačně označené výsledky, leží nejméně jeden reálný kořen rovnice).

⁶ It was the translation of three Archimedes' works (M. Valouch: *Archimedovo měření kruhu*, Výroční zpráva c. k. státního vyššího gymnasia v Litomyšli, 1903, 25 pages; M. Valouch: *Archimeda Syrakusského Počet pískový*, Výroční zpráva c. k. státního vyššího gymnasia v Litomyšli, 1905–1906, 13 pages (reprint 1993); F. Vrána: *Archimédův výklad Eratostenovi o mechanických způsobech zkoumání*. (Z řečtiny přeložil Fr. Vrána), 3. výroční zpráva c. k. státního gymnasia v Prostějově za školní rok 1908/09, tiskem knihtiskárny Václava Horáka v Prostějově, Prostějov, pp. 2–18). More details on Czech translations of Archimedes' works see [5].

⁷ It was an unsuccessful attempt of The Union of Czech Mathematicians in 1870–1871 and Josef Smolík (1832–1915), who translated the whole *Elements* at the end of 1880s and whose translation remained in the form of a manuscript, the translation by František Fabinger (1863–1938) and František Servít (1848–1923) who translated and published the first book of *Elements* in 1903 and the successful complete Servít's translation in 1907. The journey of Euclid's *Elements* through the world from their origin up till now, the characteristics of their content, the analysis of their importance as well as the origin and fate of Czech translations are described in [12], pp. 7–111.

⁸ More about the Czech translations see [4].

The development of Czech mathematics was influenced considerably by the foundation of *Spolek pro volné přednášky z matematiky a fyziky* (The Association for Free Lectures of Mathematics and Physics). At the beginning, it brought together Czech and German university students of mathematics and physics and later, students of the Technical University became its members. It was founded in the school-year 1861–1862 by four students of the Faculty of Philosophy in Prague, Gabriel Blažek (1842–1910), Josef Finger (1841–1925), Josef Laun (1837–1915) and Josef Vaňaus (1839–1910). In 1869 this association changed into *Jednota českých matematiků* (The Union of Czech Mathematicians) and influenced Czech mathematics and physics for decades to come.⁹

The promising start of this association was possible above all because of the personal activity of the few members who founded it. The association became a convenient centre of mathematical activities that were connected closely with those of the universities and professors, and bounded together the university with the high school teachers and students, the teachers of the elementary schools and recruited new people who were interested in mathematics and physics. Nevertheless, only a few members worked in the association with full energy and without selfishness. These people devoted their time, professional career and even finances to its development and thus enabled it to expand and, in crucial times, to keep its educational, publication and popularisation activities.

It should be noted that mathematics in Bohemia were also pursued in the mathematics and natural sciences section of the *Královská česká Společnost nauk* (The Royal Czech Scientific Society, founded in 1770) and in the similar section of the *Česká akademie císaře Františka Josefa pro vědy, slovesnost a umění* (The Czech Academy of František Josef for Science, Literature and Arts, founded in 1890).¹⁰

1.7 Czech professional periodicals

The work of individual professional associations included also publication, educational and popularisation activities. Journals on mathematics and physics writing about the activity of the *Union* influenced the development of Czech mathematical terminology and teaching for many years. They described the main trends in mathematics and opened the room for publications, reviews and educational activities of members of the Union, amateur mathematicians, teachers and students.

In 1871, the *Union* published its first summary under the title *Zpráva o činnosti Jednoty českých matematiků v Praze za první a druhý ročník* [The Report on the Activity of the Union of Czech Mathematicians in Prague during the First and Second Year]¹¹ in which it informed about its professional and cultural activities. One year later, the report *Zpráva o činnosti Jednoty českých matematiků v Praze za třetí ročník* [The Report on the Activity of the Union of Czech Mathematicians in Prague during the Third Year] followed up.¹² In the period between 1873 and 1875 the association published its bulletin *Věstník Jednoty českých matematiků* [The Bulletin of the Union of Czech Mathematicians] that provided information

⁹ More about the foundation of *The Association for Free Lectures of Mathematics and Physics* see [13].

¹⁰ More about the Czech scientific association see [4] (pp. 263–279).

¹¹ *Zpráva o činnosti Jednoty českých matematiků v Praze za první a druhý ročník, totiž od 14. října 1869 do 15. října 1871*, nákladem Jednoty českých matematiků, Praha, 1871, 23 pages.

¹² *Zpráva o činnosti Jednoty českých matematiků v Praze za třetí ročník, totiž od 15. října 1871 do 7. července 1872*, nákladem Jednoty českých matematiků, Praha, 1872, 38 pages.

about all its activities and contained summaries of the most important recent Czech and foreign scientific literature. In 1878, the bulletin was replaced by *Annual Reports*.¹³

In 1869, when the original association changed into the *Union*, it was a question of time before a regular Czech mathematical-physical periodical would start to be published. It occurred in November 1869 thanks to F. J. Studnička and K. Zahradník who submitted a proposal to the *Union* to issue its own journal. However, after long discussions the proposal was rejected. Nevertheless, the members of the *Union* decided that they would issue its *First Report* at the beginning of the year 1870, if the sale of half of the copies could be guaranteed. They succeeded thanks to finances of F. J. Studnička. In 1870–1871 the *Union* published three reports that included professional articles.¹⁴ They received a wide acceptance among the Czech professors of mathematics and physics at the secondary schools, as well as among the students at the universities and secondary schools, and became a model for future mathematical journals. It must be noted that the authors of individual articles were Czech beginners in physics and mathematics who were engaged significantly in the development of the Czech science.

Since no financial difficulties occurred in the course of the publishing of the *Reports*, the *Union* decided (in February 1872) to publish its *Časopis pro pěstování matematiky a fyziky* (The Journal for Cultivation Mathematics and Physics) whose first copy appeared in March. Its content fully complied with the atmosphere of the Czech National Revival and the attempts to create a scientific awareness in the Czech nation and to support culture. The *Journal* which was the first mathematical-physical periodical on the territory of the Austrian-Hungarian Empire faced a lot of problems for several years, especially financial ones resulting from the lack of regular subscribers. Nevertheless, it has always been a wide field for the activity of Czech authors, students and teachers of the secondary schools because of its policy to address a broad audience of readers. In addition, the contributions of the best mathematicians were published there.

During the boom of the *Union* in 1875 a significant change occurred. The role of the “professional” journal was taken over by a new international periodical called *Archiv matematiky a fyziky* (The Archive of Mathematics and Physics). It focused exclusively on topics important for the students of the secondary schools – elementary mathematics, physics, history and didactics – and tried to take into account the interests of students and teachers and broaden its constituency. However, it became clear very soon that the editors of the journal overestimated both their possibilities and the interest of the Czech society in mathematics and physics. This is why the journal ceased to exist in 1878 after the publication of only two copies. After that, the journal returned to its original objective, i.e. publishing professional, educational, didactic and informative articles. It kept this function up to the end of the 19th century.¹⁵

¹³ They have been published every year in the extent of 10–15 pages.

¹⁴ *První zpráva Jednoty českých matematiků* [The First Report of the Union of Czech Mathematicians], tiskem by dr. E. Grégra, nákladem Jednoty českých matematiků, Praha, 1870, 86 pages. It was edited by Mírulim Neumann and Karel Zahradník. *Druhá zpráva Jednoty českých matematiků* [The Second Report of the Union of Czech Mathematicians], tiskem dra E. Grégra, nákladem Jednoty českých matematiků, Praha, 1870, 96 pages + 1 tablet; M. Neumann and A. Pánek were their editors. *Třetí zpráva Jednoty českých matematiků* [The Third Report of the Union of Czech Mathematicians], tiskem dra E. Grégra, nákladem Jednoty českých matematiků, Praha, 1871, 96 pages + 1 tablet which was edited by M. Neumann and A. Pánek.

¹⁵ It must be noted that this journal is still published. In 1991 it changed its name to *Mathematica Bohemica* with the subtitle *The Journal for cultivation of mathematics*. It is published in English and has exclusively professional character.

The *Journal* made every effort to broaden the horizon of mathematical education. It initiated professional and educational activities and informed about the activity of the *Union*, concerning meetings, lectures and the number of members. As a result, the interest in active participation in the *Union* increased. In addition, the *Journal* was a link between the Czech intellectuals scattered all over Austria and Hungary and the Prague centre of the *Union*.

It should be remarked that Czech mathematicians also tried to publish their original scientific works in foreign languages in international magazines and periodicals of various scientific corporations both in Bohemia and abroad.¹⁶

1.8 Czech professional mathematical works

For more than three decades in the second half of the 19th century, Czech mathematicians tried to show that they can compete with the German mathematicians and even surpassed them in many respect. These efforts required a lot of time and energy. Not until the last quarter of the 19th century did the works of Czech professional mathematicians reach a standard where they were able to keep up with the individual trends of science and also understand them and contribute to the global scientific research. The number of persons who taught mathematics, tried to solve its problems by themselves and applied mathematical results in practice (in industry, banking, state administration etc.) increased. Since the 1880's Czech mathematical works have specialised in individual branches and approached more critically the subjects of research. Our mathematicians paid attention to the newest results in descriptive and projective geometry, the theory of matrices and determinants, quadratic forms and analysis and from the beginning of the 20th century they started to contribute to the development of individual mathematical disciplines (for example M. Lerch, K. Pelz, J. Sobotka, F. J. Studnička, Em. Weyr, Ed. Weyr, K. Zahradník).

It should be pointed out that some Czech mathematicians (for example M. Lerch, K. Pelz, J. Sobotka, F. J. Studnička, Em. Weyr, Ed. Weyr, K. Zahradník) took care of the language in which they published their professional articles and monographs. They published their important results in foreign languages (German, French and even Italian) to make them accessible to the European mathematical community. On the other hand, they published Czech versions of their works that appeared in a foreign language, as well as informative, popularising or methodological articles in the local journals.¹⁷

2 Czech mathematicians abroad

One of the main aims of teaching mathematics at the Prague University was the preparation of future teachers of secondary schools. The rigid state control of their education and the well worked-out and thought-out educational system enabling their professional development and career contributed in two first decades of the second half of the 19th century to the improvement of the teaching of mathematics and natural sciences as well as to the development of the secondary schools and the education of our population. Nevertheless, the rules that satisfied the needs of the third quarter of the 19th century when there was a shortage of teachers ceased their validity at its end and in fact brought the development in this field to a standstill. Since the end of the 1870's the number of members of the Czech mathematical community increased in contrast with the shortage of jobs at the Czech universities and secondary schools. In that period many good teachers could not find

¹⁶ For more information see [4].

¹⁷ For more information see [4].

work as professors at the secondary school level and they often worked as supply-teachers for five to ten years. As a result, many teachers changed jobs or went abroad.

Many first-class Czech teachers went to South-East Europe to other countries that were part of the Austrian-Hungarian Empire – such as modern day Croatia and Slovenia and other Balkan countries later Serbia, Bosnia, Herzegovina, Bulgaria, Romania etc. where they contributed to the development of national science and education that – in comparison with that in Bohemia – were lagging.

After their arrival, they learned the respective foreign language and began to create curricula for the teaching of mathematics and descriptive geometry at the secondary schools and universities (for example T. Monin, J. Pexider, G. Skřivan, F. V. Splítek, V. Šak, A. V. Šourek, K. Zahradník). They participated actively not only in the development of regional educational systems, but also in the scientific work in mathematics and in forming the first local scientific communities.

For their colleagues-teachers, they wrote the first methodological manuals about the teaching of mathematical subjects in their mother tongues. For their pupils they created the first brief teaching manuals and collections of mathematical exercises (at first published in the lithographical form or within the annual reports of the secondary schools – see for example J. Pexider, A. V. Šourek, K. Zahradník). During the few first years, they translated Czech textbooks of mathematics and descriptive geometry to other languages (for example A. V. Šourek and V. Šak). They set a form for the first generations of students educated in their mother tongues. In the second phase of their “mission” – usually at the end of the first decade of their stay – they were inspired by Czech models and wrote new textbooks for the secondary schools and universities (for example V. Láska, F. V. Splítek, V. Šak, A. V. Šourek, Em. Weyr, K. Zahradník). These textbooks were widespread and used until the end of the World War I. Thanks to their quality education, high professional standard and all around activities they contributed to the creation of the mathematical terminology that has been used – except for a few modifications – until today (for example A. Studnička, A. V. Šourek, K. Zahradník). On the basis of their good experience from Bohemia they led local mathematical communities to the unification of professional associations (for example J. Finger, A. V. Šourek, K. Zahradník) and initiated publishing professional, educational and popularisation periodicals (for example F. V. Splítek, A. V. Šourek, K. Zahradník). In addition, they participated in the international promotion of the results of professional and pedagogical research (A. V. Šourek, Em. Weyr, K. Zahradník).

All their activities were inspired by those developed in our country in the 1860's and 1870's. On one hand, the Czech society lost some quality experts, but on the other hand, the Czech teachers at the secondary schools and universities contributed to the birth of the national mathematics in the Slavonic countries in Southern Europe.

During their active life they kept in contact with their Czech colleagues. They were founders or correspondents of *Jednota českých matematiků* (The Union of Czech Mathematicians, for example J. Finger, J. Laun, T. Monin, J. Pexider, C. Plch, A. V. Šourek, J. S. Vaněček, Em. Weyr, K. Zahradník), kept an eye about the development in Bohemia and in professional periodicals of their new homeland informed regularly about the activities of the *Union*, Czech textbooks, monographs and journals. In addition, they wrote reviews and contributed to the *Časopis pro pěstování matematiky a fyziky* (The Journal for Cultivation of Mathematics and Physics, for example C. Plch, T. Monin, K. Zahradník), *Zprávy Královské*

české společnosti nauk (The Reports of the Royal Czech Scientific Society, for example Em. Weyr, K. Zahradník) or *Rozpravy České akademie věd* (The Transactions of the Czech Academy of Sciences, for example K. Zahradník).

3 The most prominent Czech personalities in the Balkans

In the following text we shall mention only the Czech mathematicians who translated Czech or German textbooks to other languages or, being influenced by the Czech literature, wrote textbooks in them, created mathematical terminology and gained recognition for the development of the regional secondary schools and universities. We shall prove that they contributed to the birth of modern national mathematics in the Slavonic countries of Southern Europe.¹⁸

Croatia

Teacher	Place	School	Period
Jan Pexider ¹⁹ (1831–1873)	Zagreb	Secondary school (gymnasium)	1864–1873
Josef Laun (1837–1915)	Rijeka Zagreb	Secondary school (gymnasium)	1864–1868
Karel Seeberg (1835–?)	Vinkovci, Sinj	Secondary school (gymnasium)	1865–1867
Josef Silvestr Vaněček (1848–1922)	Osijek	Real school (reálka)	1873–1875
Karel Zahradník (1848–1916)	Zagreb	University	1875–1899

Slovenia

Teacher	Place	School	Period
Rudolf Schnedar (1828–1862)	Ljubljana	Real school (reálka)	1860–1862
Josef Baudiš (1825–1898)	Gorizia (Italy, today)	Secondary school (gymnasium)	1860–1864
Josef Finger ²⁰ (1841–1925)	Ljubljana	Real school (reálka)	1870–1874

¹⁸ More about the development of the mathematical community in the second half of the 19th century see [4].

¹⁹ Jan Pexider devoted his life to work in Croatia. As one of the first Czechs he began to translate from German to Croatian language the textbooks of mathematics and physics for secondary schools. Because of his premature death he did not influence the development of the teaching of these branches in Croatian language in a significant way. For more information see *Věstník Jednoty českých matematiků* 1(1873), nr. 1, pp. 5, nr. 4, pp. 35, 41, 50, 51, and 2(1874), nr. 1, pp. 13–14; *Program gimnazije u Zagrebu 1864–1873* and [1], pp. 28.

²⁰ Josef Finger became in 1870 a professor of mathematics and physics at the technical secondary school in Ljubljana. After 4 years he left Slovenia and went to the grammar school in Hernalds in Vienna, where he started to teach in 1876. In 1876–1878 he taught at the secondary school in Leopoldstadt near Vienna. In 1876 he became a private docent at the Vienna University where he gave lectures until 1890. In 1878 he was promoted to an external and in the year 1884 an ordinary professorship of mechanics and graphic static at the technical University in Vienna, where he has taught until his retirement in 1911. In 1905 he became a protector of the first mathematical associations of students founded at the Vienna technical University. Its aim was to support students' publications and lectures in mathematics and natural sciences. It is probable that J. Finger influenced significantly the activity of this association. And it should be noted that Czech mathematician Gabriel Blažek,

Bosnia a Herzegovina

Teacher	Place	School	Period
Cornelius Plch (1838–1889)	Travnik (today Tornik in Serbia)	Secondary school (gymnasium)	From 1870s up 1889
Alois Studnička (1842–1927)	Sarajevo	Technical school	1893–1907

Bulgaria

Učitel	Place	School	Period
Antonín Václav Šourek (1858–1926)	Sliven	Secondary school	1880–1881
	Plovdiv	Secondary school	1881–1890
	Sofia	University	1890–1926
František Vítězslav Splítek (1855–1943)	Svitov	Secondary school	1880–1883
	Salonica	Secondary school	1883–1888
	Sofia	Secondary school	1888–1889
	Gabrovo	Secondary school	1889–1891
Theodor Monin (1858–1893)	Plovdiv	Secondary school	1891–1915
	Sliven	Secondary school	1881–1886
Vladislav Šak (1860–1941)	Sofia	University	1889–1891
	Sliven	Secondary school	1882–1886
	Sofia	Secondary school University	1886–1907 1891–1894, 1907–1908

3.1 Croatia

In 1875, the Czech mathematician **Karel Zahradník** (1848–1916)²¹ went to Zagreb to the new University of František Josef. Until 1890, he was the only professor of mathematics there. He taught the Croats algebra, differentials and integrals, geometry, numbers theory, probability and complete analysis.²² He focused above all on the education of future teachers at the secondary school level. After his arrival to Zagreb he formulated the first mathematical curricula and rules for individual examinations including the final one. He supervised examinations of teachers of all mathematical subjects at Croatian schools where the Croatian language was used. In the course of all these activities he was inspired by the work of his teacher and friend František Josef Studnička (1836–1903), whom he considered to be his mentor. He tried to follow F. J. Studnička's Prague activities.

In 1896–1899 Karel Zahradník worked as a director of the mathematical institute at the university. Since 1886 he was the head of a “mathematical seminar” for talented students. It was here that the first professional works of Croatian mathematicians originated. In 1893 he

one of the founders of the *Association for Free Lectures on Mathematics and Physics*, tried to establish a similar association in the school-year 1863–1864 at the Vienna University. More about Finger's life see [4] and [13].

²¹ As for his life, see [4], [8] and [9].

²² Not until 1890 the teaching of mathematics had another mathematician. Since this year D. Segen (the first Zahradník's one about to take a doctor's degree) began to give lectures on geometry. V. Varičák, the scholar of Zahradník, started to give lectures on mathematical analysis four years later.

established a “mathematical collection” of mathematical teaching aids and models. During his more than twenty-year stay in Zagreb he educated the first Croatian teachers and mathematicians of the secondary schools and prepared some to take a doctor’s degree. In addition, he wrote the first Croatian mathematics textbooks for secondary schools and universities.

In the 1870’s, he translated his papers published in journals to the Croatian language; later he also published in this language his original results and wrote textbooks for the secondary schools and universities. In 1878 he published in Zagreb his book *O determinantih drugoga i trećega stupnja. Za porabu viših srednjih učilišta* [On Determinants of Second and Third Order. For Higher Classes of the Secondary Schools]²³ which he translated to Czech the next year and published in Prague under the new title *Prvé počátky nauky o determinantech. Pro vyšší střední školy* [The First Start of the Theory of Determinants. For Higher Classes of the Secondary Schools].²⁴ The booklet was based on his lectures in 1876/1877 for the university freshmen. For the Czech students he wrote the textbook entitled *Analytická geometrie v rovině* [The Analytical Geometry of the Plane] but it was not well received nor widely published in Bohemia.²⁵ At the end of the 19th century, his lectures *O determinantima. Predavanja u zimskom semestru godine 1897/8* [On Determinants. Winter Semester 1897/8]²⁶ and *O plohama i o krivuljama u prostoru. Predavanje u ljetnom semestru godine 1898* [On Planes and Curves in the Space. Summer Semester 1898]²⁷ were published in the Croatian language. These were the first Croatian textbooks of mathematics.

For the students of the Czech Technical University in Brno he modified and published his Croatian lectures of analytic geometry.²⁸ Thanks to him *Kapesní logaritmické tabulky F. J. Studničky* [Studnička’s Pocket Logarithmic Tables] were published in Croatian. At the end of the 1870’s he started to translate Studnička’s textbook *Algebra pro vyšší třídy středních škol* [Algebra for Higher Classes of the Secondary Schools]²⁹ for the secondary schools, but the Croatian government did not allowed its publication.³⁰

Karel Zahradník laid the foundations of Croatian mathematics and contributed significantly to the development of the Croatian mathematical community. He participated in the mathematics and natural sciences section of the Croatian Academy of Sciences, where he gave professional and popularisation lectures and published his works. He influenced also the development of the mathematical section of the journal *Rad Jugoslavenske akademije znanosti i umjetnosti u Zagrebu* [The Transactions of the Yugoslavian Academy of Science and Arts in Zagreb]. While his work is still recognized and his name still well-known in

²³ Zagreb, 1878, 39 pages.

²⁴ Praha, 1879, 48 pages.

²⁵ Praha, 1883, 142 pages.

²⁶ Zagreb, 1898, 112 pages.

²⁷ Zagreb, 1898, 152 pages.

²⁸ Firstly his lectures named *Analytická geometrie v rovině. Přednášky z vyšší matematiky I. běh* [The Analytical Geometry in the Plane. Lectures on the Higher Mathematics. The First Part] (Brno, 1903–1904, 198 pages), then his lectures *O determinantech. Přednášky z vyšší matematiky I. běh, část úvodní* [On Determinants. Lectures on the Higher Mathematics. The First Part, the Beginning] (Brno, 1903–1904, 62 pages), and at the end his lectures *Přednášky o integraci diferenciálních rovnic obyčejných. Letní semestr 1904* [Lectures on the Differential Equations. Summer Semester 1904] (Brno, 1904, 174 pages) were published.

²⁹ Studnička’s textbook was firstly published in 1877, secondary in 1879. In 1878 and 1879 F. J. Studnička published German version of his textbook.

³⁰ More about this affair can be found in Zahradník’s letters deposited in the F. J. Studnička’s estate in Literary Archives of the Treasure of National Literature in Prague. For more information see [14].

Croatia,³¹ he is almost forgotten in Bohemia, though he cooperated with *The Union of Czech Mathematicians* until the end of his life.



O PLOHAMA

I

KRIVULJAMA U PROSTORU.

PREDAVANJA

u ljetnom semestru godine 1898.

od

Dr. K. ZAHRADNIKA.



Zagreb.

3.2 Bosnia and Herzegovina

In 1893 **Alois Studnička** (1842–1927), a secondary school teacher of drawing and geometry and the brother of university professor of mathematics F. J. Studnička went to Sarajevo; he was invited by the government of Bosnia and Herzegovina to help create an educational system for cabinet-makers, kettle-smiths, locksmiths and other professions. He became the director of the Crafts School which he headed until his retirement in 1908. In Sarajevo, where he worked until the end of his life, he elaborated the curricula for similar schools in Sarajevo, Mostar, Celovac (Klagenfurt) and Linz. He influenced significantly the development of the Serbian educational system and helped the birth of technical terminology in cabinet-maker trade, draughtsmanship and black-smith trade. His activity in this field contributed to the creation of the large collection of technical teaching aids for various crafts. This collection was deposited in the Vienna Technical Museum.³²

3.3 Bulgaria

In 1880's Bulgaria got rid of Turkish hegemony and began to build its own educational system. Czech mathematician **Teodor Monin** (1858–1893) spent a few years of

³¹ His portrait was on diplomas granted by the Croatian Ministry of Culture and Sports to the best participants of the Mathematical Olympiad in 2000.

³² As for his life, see [14], pp. 11–14.

his life there; in 1881–1886 he taught at the grammar school in Sliven. He came back to the Czech Technical University in 1886 and became the assistant of professor František Tilšer (1825–1913) in the department of descriptive geometry. However, in the next year the Bulgarian government called him to the new university in Sofia and he became the first Bulgarian university professor of mathematics. He started to develop mathematics at the Bulgarian university with a great fervour, but unfortunately he fell seriously ill in 1891 and had to return to Bohemia. That is why he was not allowed to accomplish his plans, namely to write several Bulgarian mathematical textbooks.³³

After completing his studies at the secondary technical school in Písek and at the Technical Universities in Vienna and Prague **Antonín Václav Šourek** (1858–1926), another Czech mathematician, he became a professor of mathematics at the grammar school in Sliven in 1880. However, he spent only one school year there and then he went over to grammar school in Plovdiv, where he remained for 9 years. In 1890, he was promoted to the professorship of mathematics at the grammar school in Sofia and at the same time to the external professorship of mathematics at the Sofia University. In 1893, after the death of professor Teodor Monin, he was relieved from his duties at the above-mentioned secondary school and devoted all his time to the university, where he was appointed to the ordinary professorship in 1898 and where he stayed until 1914. In this period, namely in 1893, he also became a professor of descriptive geometry at the Military Academy in Sofia (he taught there for 9 years) and he started to give lectures on the same subject in the courses for the headquarters in 1895 as well. In the years between 1895 and 1912 he lectured on perspective at the Academy of Painting in Sofia. His bad health forced him to leave Sofia and to move to Rome in 1914. There he became an unsalaried secretary of the military attaché and at the beginning of 1916 he went to Bern where he took care of Bulgarian war prisoners. He returned to the Sofia University in 1921 and continued to teach there until his death.³⁴ During his whole life he was in close contact with Czech mathematicians and their *Union*. Since his arrival to Bulgaria he had contributed to the development of Bulgarian mathematics and its teaching at secondary schools and universities and the application of Czech experience and models. He remained in close contact with Czech mathematicians and their *Union* and during his whole life tried to apply the Czech experience and connections to the development of Bulgarian mathematics and to the educational process at secondary schools as well as at universities.

Šourek's literary activity was very extensive. He published his first Bulgarian textbooks in 1880 and covered several branches of mathematics, namely plane trigonometry (1883)³⁵ and solid geometry (1883),³⁶ analytic geometry (1885),³⁷ spherical trigonometry (1889)³⁸ and descriptive geometry (1888, 1889).³⁹ The textbooks were complemented by methodological annuals, collections of algebra exercises (1885, 1886)⁴⁰ and some smaller works. In the course of their writing, he was inspired by Czech textbooks written by F. J. Studnička, J. Smolík, E. Taftl, A. Strnad, F. Hromádka etc.

³³ As for his life, see [3], [4], [6], [11] and [19].

³⁴ For more information see [3], [4], [11], [17], [19] and [22].

³⁵ Ch. G. Danov, Plovdiv, 1883, 128 pages, 54 pictures.

³⁶ Ch. G. Danov, Plovdiv, 1883, 123 pages, 116 pictures.

³⁷ Litographie, Plovdiv, 1885, IV + 154 pages, 250 pictures.

³⁸ Plovdiv, 1889, 97 pages, 49 pictures.

³⁹ First part, Plovdiv, 1888, IV + 237 pages, 367 pictures, 6 tablets and Second part, Plovdiv, 1889, IV + 197 pages, 342 pictures, 11 tablets.

⁴⁰ Plovdiv, 1885, IV + 120 pages; Plovdiv, 1886, IV + 86 pages.

His teaching texts for his university students were written and published in the 1890's; they covered the field of analysis (1890–1891), analytic geometry (1891, 1892, 1894), algebra (1891–1892), synthetic geometry (1891–1892) and descriptive geometry (1893–1894).⁴¹ Czech textbooks by F. J. Studnička, Eduard and Emil Weyr certainly served as an inspiration. The Military Academy in Sofia published in 1895 his work about projection methods in geometry named *Учебник по начертателна геометрия. Част I. Ортогонална и котирана проекция* [Textbook on Descriptive Geometry. The First Part. Orthogonal and Orthogonal One-Plane Projection].⁴²

At the beginning of the 20th century, A. V. Šourek decided to revise and extend his Bulgarian lectures and they were subsequently published in the lithographic form (projective geometry (1909), differential geometry (1911) and analytical geometry (1912, 1914)).⁴³ He also published the monograph *Учебник по дескриптивна геометрия* [Textbook on Descriptive Geometry]⁴⁴ (1914) that was an extended and complementary version of his university lectures. Unfortunately, he did not live sufficiently long to see his last monograph *Основи на проективната геометрия. Част първа: Проективност, колинеарност и реципрочност на геометр. форми от трите разряда* [Elements of Projective Geometry. First Part. Projection, Colinearity and Reciprocity of Geometrical Figures of the Third Orders]⁴⁵ published in 1926 which summarised and extended his university lectures.

A. V. Šourek also translated Studnička's logarithmic tables from Czech to Bulgarian and furnished them with a detailed explanation of the rudiments of algebra; they were published in 1882.⁴⁶ Finally, he also translated to Bulgarian Strnad's textbook *Geometrie pro vyšší třídy reálných gymnázií* [Geometry for Upper Classes of Grammar Schools] and Taftl's textbook *Algebra pro vyšší třídy středních škol* [Algebra for Upper Classes of Secondary Schools] at the end of the 1890's.⁴⁷

⁴¹ *Analytická geometrie roviny spolu s křivkami. Přednášky A. V. Šourka prosloužené roku 1891 na univerzitě v Sofii*, Sofie, 1891, IV + 321 pages; *Analytická geometrie prostoru. Přednášky A. V. Šourka prosloužené roku 1892 na univerzitě v Sofii*, Sofie, 1892, 187 pages (second print, Sofie, 1894, VI + 334 pages); *Přednášky z vyšší algebry. Přednášky A. V. Šourka prosloužené roku 1891/1892 na univerzitě v Sofii*, Sofie, 1892, IV + 180 pages; *Přednášky ze syntetické geometrie. Přednášky A. V. Šourka prosloužené roku 1891/1892 na univerzitě v Sofii*, Sofie, 1892, IV + 238 pages; *Přednášky z deskriptivní geometrie. Přednášky A. V. Šourka prosloužené roku 1893/1894 na univerzitě v Sofii*, Sofie, 1894, IV + 334 pages.

⁴² Dvorská tiskárna, Sofie, 1895, IX + 271 pages, 349 pictures and 69 pictures on the 12 tablets.

⁴³ *Projektivní geometrie. Litografované přednášky A. V. Šourka konané ve školním roce 1909 na univerzitě v Sofii*, Sofie, 1909, 512 pages, 581 pictures; *Přednášky z diferenciální geometrie. Litografované přednášky A. V. Šourka*, Sofie, 1911, 317 pages; *Analytická geometrie přednášená A. V. Šourkem. První část: Bod, přímka a rovina. Druhá část: Křivky druhého stupně. Přednášky A. V. Šourka prosloužené na univerzitě Sofii*, Nakladatelství I. Georgiev a K. Minkov, Sofie, 1912, IV + 93 pages, 49 pictures; *Přednášky z diferenciální geometrie. Přednášky čtené na Sofijské univerzitě A. V. Šourkem*, Sofie, 1914, 320 pages.

⁴⁴ Univerzitní biblioteka č. 3, Nakladatelství Sofijské univerzity, lexikographie, Sofie, 1914, XXIV + 616 pages, 846 pictures.

⁴⁵ Univerzitní biblioteka č. 56, Nakladatelství I. K. Božinov, Sofie, 1926, XVIII + 313 pages, 338 pictures.

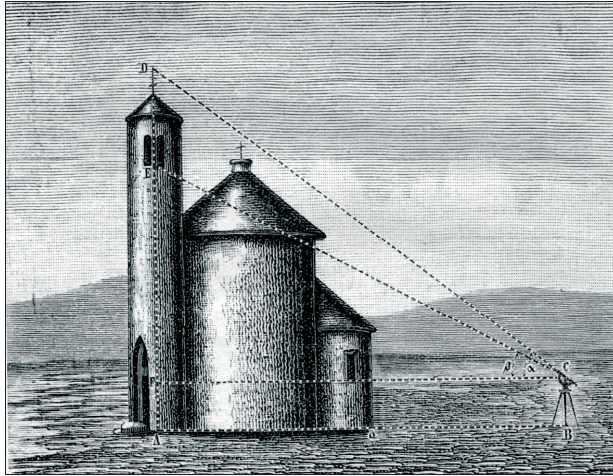
⁴⁶ The second edition of these tables is from 1888 and the third one from 1895. Studnička's tables (either in Czech or Bulgarian version) were used at Bulgarian secondary schools even in the first half of the 20th century.

⁴⁷ Alois Strnad (1852–1911) was a brilliant Czech secondary school teacher, an active member of *The Union of Czech Mathematicians* and an author of successful Czech textbooks for secondary schools. See A. Strnad: *Geometrie pro vyšší třídy reálných gymnázií*, I–IV. volume, Ch. G. Danov, Plovdiv, 1896, 161 pages, 122 pictures, 74 pages, 22 pictures, 96 pages, 32 pages.

Emanuel Taftl (1842–1920) was a secondary school professor of mathematics and physics. He taught at secondary schools in Hradec Králové and Klatovy. He became famous by the above textbook that had six editions. See E. Taftl: *Algebra pro vyšší třídy gymnázií*, Ch. G. Danov, Plovdiv, 1899, 412 pages.

A. V. Šourek was one of the most renowned “Bulgarian” mathematicians between 1850 and 1930. He contributed significantly to the establishment of the *Физико-Математическото Дружество в София* [Physical and Mathematical Society in Sofia, founded 1898] and together with a few colleagues played a very important role in its birth and in the development of its activities. He also helped in the foundation of the *Списание на Физико-Математическото Дружество в София* [The Journal of Physical and Mathematical Society in Sofia] in 1904. This journal played an important role in the development of Bulgarian mathematics and physics because it stimulated the scientific activity of the younger generation and allowed its members to present their professional works. A. V. Šourek is also considered to be the founder of the Bulgarian terminology in descriptive geometry. Thanks to his good knowledge of Bulgarian and other languages (Czech, German, French, Italian), his deep sense of syntax, close cooperation with philologists and above all to his perfect knowledge of descriptive geometry itself, he developed a very successful system of the essential terms with wide possibilities of a more detailed evolution. Thanks to his method and prestige among the members of the Bulgarian mathematical community, most of his terms are still used without any change or at most with only small modifications.





Q 1949

*Новителни работи
проф. Др. Фр. Шпитек
откакто му е дъщеря и
научник.*

УЧЕБНИКЪТЪ

ПО *Проф. А. В. Шоурекъ*

НАЧЪРТАТЕЛНА ГЕОМЕТРИЯ

Съставилъ

АНТ. В. ШОУРЕКЪ,

Преподавателъ въ Висшето Училище и въ Военното въ София.

Шпитек

И.

ОРТОГОНАЛНА И КОТИРАНА ПРОЕКЦИЯ.

Съ 240 фигури въ текста и 60 фиг. на 12 фото-авто-графически табелици.



СОФИЯ

Собствено издана на Военното Училище
Предмета Печатница.
1896.

УНИВЕРСИТЕТСКА БИБЛИОТЕКА
Книга 3.

УЧЕБНИКЪТЪ

ПО

**ДЕСКРИПТИВНА
ГЕОМЕТРИЯ**

ЛЕКЦИИ

ЧЕТЕНИ ВЪ СОФИЙСКИЯ УНИВЕРСИТЕТЪ,

ОТЪ

Проф. А. В. ШОУРЕКЪ

Съ 846 фиг. въ текста.



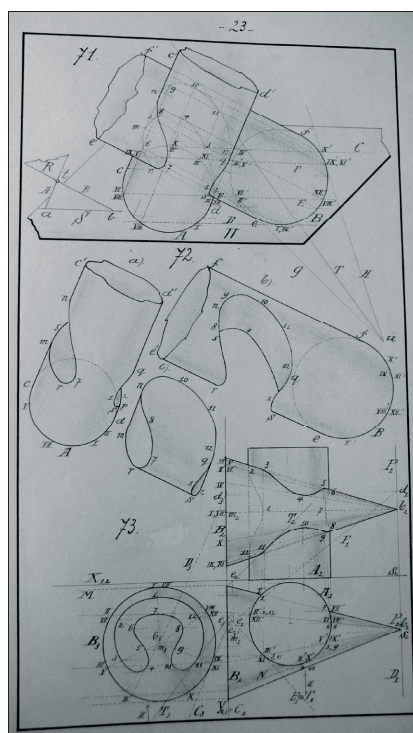
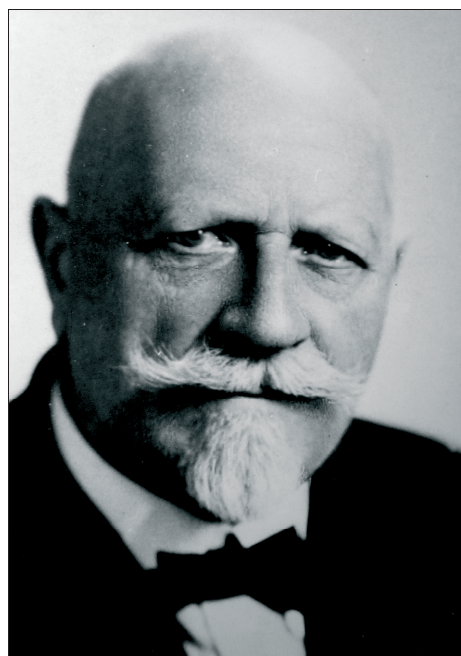
1914.

ИЗДАНИЕ НА СОФИЙСКИЯ УНИВЕРСИТЕТЪ

Bulgaria was a place of work also for Czech mathematician **František Vítězslav Špítek** (1855–1943). After his graduation at the Czech Technical University in Prague in 1880 he accepted an offer from the Bulgarian Ministry of Education to help in the development of Bulgarian secondary schools. First he taught in Svistov, then he became a teacher in Salonica (today's Thessaloniki in Greece) in 1883, but he had to leave it for

political reasons in 1888. He wrote two mathematical textbooks named *Аритметика* [Arithmetics] (Plovdiv, 1885) and *Геометрия с чртание в четире степени ...* [Geometry with Drawing at Four Levels. The First Level. Geometric Figures in the Plane and Their Ornamental Drawing] (Plovdiv, 1886) for Salonica students.⁴⁸ He returned to Bulgaria in the same year and became a professor at the grammar school in Sofia. He also taught at the grammar school in Gabrovo in 1888–1889 and as a professor at the state secondary school in Plovdiv in 1891–1915. He wrote very successful and popular textbooks on technical drawing for the students of the lower classes of Bulgarian secondary school (*Руководство по геометрическо чртание* [Instruction for Geometric Drawing] (Plovdiv, 1895), *Геометрия с геометрическо чртание за основните училища* [Geometry with Drawing for Primary Schools.] (Plovdiv, 1895), *Учебник по геометрия и геометрическо чртание. I. степен* [Textbook on Geometry and Drawing. The First Level] (Plovdiv, 1896) and *Учебник по геометрия и геометрическо чртание. II. степен* [Textbook on Geometry and Geometric Drawing. The Second Level] (Plovdiv, 1897)). He rejected the proposed professorship at the Sofia University because he thought that he was not sufficiently qualified for it.

His pedagogical and cultural activities outside the school in Svistov and Plovdiv were known and popular. He founded two special associations, which joined teachers from primary and secondary schools as well as people from different cultural and political spheres. Thanks to his activities, a new Bulgarian journal for pedagogy, education and school problems and laws was founded.⁴⁹



⁴⁸ E. Dionne, Plovdiv, 1886, 106 pages + 163 pictures, 1 tablet Plovdiv, 1885.

⁴⁹ For more information see [3], [4], [7], [11] and [24].

The educational system at Bulgarian secondary schools was influenced significantly also by Czech mathematician and geometer **Vladislav Šak** (1860–1941). He obtained an ordinary professorship at the grammar school in Sliven in 1882. He then moved to the grammar school in Sofia in 1886 and taught there until 1907. He was also a private docent at the Sofia University between 1891 and 1894. He lectured on spherical and analytic geometry, analysis and algebra. Finally, he was professor of mathematics at the Sofia University for the 1907/8 school year. He then came back to Prague and started to teach mathematics and Bulgarian at the Czechoslovak School of Commerce. During the first Balkan War, he was a war reporter in Bulgaria and the Austrian police held him in prison between 1916 and 1917 because of his cooperation with Tomáš Garrigue Masaryk (1850–1937) and Edvard Beneš (1884–1948). After the war he filled important functions in Bulgarian diplomacy. In 1920–1922 he was an honorary consul and in 1922–1932 a general consul of the Bulgarian Kingdom.⁵⁰

He translated two Czech textbooks *Algebra pro I., II. a III. třídu reálných gymnázií a trojtřídní měšťanské školy* [Algebra. Textbook for 1st, 2nd and 3rd Classes of Grammar Schools] (Plovdiv, 1886)⁵¹ written by Václav Starý and *Deskriptivní geometrie pro vyšší třídy reálných gymnázií* [Descriptive Geometry for Upper Classes of Secondary Schools] (Plovdiv, 1896)⁵² written by Čeněk Jarolínek to the Bulgarian and they were used at Bulgarian secondary schools until the World War I. In addition, he wrote one of the first articles named *Няколко думи върху изучаването по дескриптивната геометрия* [Some Thoughts of Teaching Descriptive Geometry] (1897/98) about the methodology of teaching descriptive geometry.⁵³ He had a wide range of interests – he wrote poems, libretti, short stories, feuilletons and critical articles about the state of Bulgarian politics and economy. He also issued Bulgarian-Czech and Czech-Bulgarian Dictionaries and Bulgarian Grammar in Czech language for Czech students.⁵⁴ In addition, he translated the works of Bulgarian writers and poets for Czech readers.

It should be noted that at the end of the 1870's and the beginning of the 1880's a lot of Czech engineers, doctors, teachers, natural scientists, lawyers and even artists went to Bulgaria. They participated there in the building of the new Bulgaria that did its best to free itself from Turkish influence and approached European traditions.

4 Other places of work of Czech mathematicians

Some Czech mathematicians and physicians went also to other Western Europe and countries of the Austrian-Hungarian Empire. They were searching for better career, broadening the horizon of their knowledge and contacts with the best mathematical centres of Western Europe, as well as possibility to publish their scientific and popular works there. They usually came back after some time and worked as professors at prestigious secondary schools or universities.

⁵⁰ For more information see [3], [4], [11] and [19].

⁵¹ The translation of Václav Starý textbook, Plovdiv, 1886 (translators: V. Šak and T. P. Šiškov).

⁵² The translation of Čeněk Jarolínek textbook, Plovdiv, 1895 (translators: V. Šak and T. P. Šiškov).

⁵³ Druhá výroční zpráva Sofijského státního chlapeckého gymnázia za školní rok 1897–1898, Sofie, 1898, pp. 40–56.

⁵⁴ *Bulharsko-český slovník*, J. Otto, Praha, 1911–1914, 647 pages; *Česko-bulharsko slovník*, J. Otto, Praha, 1911–1914, 1071 pages; *Knih bulharsko-české konverzace*, J. R. Vilímek, Praha, 1914, 325 pages.

Czech mathematicians, who were employed at German schools in Germany, Switzerland or other countries of the Austrian-Hungarian Empire, taught, researched and published their professional works, because they were in a much more developed and cultural environment than their colleagues who stayed in the Balkans. Nevertheless, they kept contacts with the Czech mathematical community, monitored vacancies and in many cases returned to Bohemia and tried to find good jobs there, relying on their contacts abroad and their wide experience.

Galicia

Teacher	Place	School	Period
Čeněk Hausmann (1826–1896)	Lvov	Technical University	1852–1857
Václav Láska ⁵⁵ (1862–1943)	Lvov	Technical University	1895–1911

Hungary

Teacher	Place	School	Period
Johann Josef Partl (1802–1869)	Budapest	Real school (reálka)	1851–1861
Čeněk Hausmann (1826–1896)	Budapest	Technical University	1857–1863

Austria

Teacher	Place	School	Period
Josef Šetlík (1833–1860)	Klagenfurt	Secondary school	1856–1858
Gustav Skřivan (1831–1866)	Vienna	Secondary school	1858–1863
Johann Josef Partl (1802–1869)	Vienna	Secondary school (gymnasium)	1862–1867
Čeněk Hausmann (1826–1896)	Graz	Technical University	1864
Vavřinec Jelínek (1844–1898)	Baden Wiener Neustadt	Secondary school Secondary school	1872–1873 1873–1883
Jan Marek (1834–1900)	Wiener Neustadt	Secondary school	1874–1889
Emil Weyr ⁵⁶ (1848–1894)	Vienna	University	1875–1894

⁵⁵ Renowned Czech geodesist, astronomer and mathematician Václav Láska started in 1895 to teach geodesy and astronomy at the Lvov University. After a short time he was appointed a director of the astronomical and seismological observatory there. In Lvov he wrote several very successful German monographs and lectures on mathematics, applied mathematics and astronomy in Ukrainian language. In 1911 after his come-back to Bohemia he promoted to the professorship of applied mathematics at the Czech University in Prague. For more information see [4].

⁵⁶ Emil Weyr, the best Czech surveyor, promoted after a few years at the Czech Polytechnical University to the ordinary professorship of mathematics at the Vienna University, where he has given lectures on mathematics and geometry until his death. When he moved to Vienna, he ceased to play an important role among Czech mathematicians. Nevertheless, he still played this role in the international mathematical community. In the

Karel Pelz (1845–1908)	Graz	Secondary school and Technical University	1875–1896
Josef Finger (1841–1911)	Vienna	Secondary school and University Technical University	1876–1878 1876–1890 1878–1911
Emanuel Czuber ⁵⁷ (1851–1925)	Vienna	Technical University	1891–1925
Jan Sobotka ⁵⁸ (1860–1931)	Vienna	Secondary school Technical University	1894–1896 1896–1899

Switzerland

Teacher	Place	School	Period
Matyáš Lerch ⁵⁹ (1860–1922)	Freiburg	University	1896–1906

5 Conclusion

The Czech mathematical community that was formed and kept developing since the middle of the 19th century was able to export its successful and versatile activities out of the Czech territory, particularly to the Balkans where the nationalistic movements began with a delay of about twenty years. As we have described, the Czech mathematicians played an important role in the development of the “national” mathematical communities, scientific societies, and educational systems.

international bibliographic congress of mathematical sciences in Paris in July 1889 he was elected a vicechairman and charged with managing bibliographic activities in Austria. Due to these efforts in the international field the journal *Revue semestrielle des publications mathématiques* issued by *Société mathématique d'Amsterdam* was published. Emil Weyr had written papers about the works of Czech mathematicians for *Bulletin des sciences mathématiques et astronomiques* (he was mentioned on the title page as a contributor to this journal) and for *Jahrbuch über die Fortschritte der Mathematik und Physik*. In 1890 he founded along with Escherich (1849–1935) the journal *Monatshefte für Mathematik und Physik* that has been published up till now under the name *Monatshefte für Mathematik* (from 1952). For more information see [2], [4], [10], [15] and [16].

⁵⁷ After the graduation at the Prague University Emanuel Czuber (Cubr) taught at the German Technical University in Brno and since 1891 at the Vienna Technical University. He was a Czech native and an active member of The Union of Czech Mathematicians, an expert in the system of insurance and an author of many textbooks for universities. As he did not find an adequate job at any Prague university, he leaned towards German nationality and culture. As for more information about his life, see [18], [20], [21], [23] and [25].

⁵⁸ Jan Sobotka stayed in Vienna only a short time. In 1894–1896 he taught mathematics at a German technical secondary school, from which he moved to the Technical University where he began to give lectures on descriptive and projective geometry and graphic counting. In 1899 he promoted to the ordinary professorship of descriptive geometry at the new Czech Technical University in Brno and linked his career as a pedagogue with universities in Brno and Prague. For more information see [4].

⁵⁹ It is regrettable that Matyáš Lerch, the most important Czech mathematician at the turn of the 20th century, did not find an adequate job in Prague. He gave lectures at the Catholic University in Freiburg in Switzerland (1896–1906) from which he moved to the Technical University in Brno. His works influenced significantly mathematics all over the world. For more information see [4].

References

- [1] Bečvář J. (ed.): *Jan Vilém Pexider*. Edition Dějiny matematiky, volume 5, Prometheus, Praha, 1997.
- [2] Bečvář J., Bečvářová M., Škoda J.: *Emil Weyr a jeho pobyt v Itálii v roce 1870/71*. Edition Dějiny matematiky, volume 28, Nakladatelství ČVUT, Praha, 2006.
- [3] Bečvářová M.: *České kořeny bulharské matematiky*. Edition Dějiny matematiky, volume 40, Ústav aplikované matematiky FD ČVUT, Matfyzpress, Praha, 2009.
- [4] Bečvářová M.: *Česká matematická komunita v letech 1848–1918*. Edition Dějiny matematiky, volume 34, Ústav aplikované matematiky FD ČVUT, Matfyzpress, Praha, 2008.
- [5] Bečvářová M.: *Archimédovy práce česky*. In Bečvář J., Bečvářová M. (eds.): 29. mezinárodní konference Historie matematiky, Velké Meziříčí 22.–26. 8. 2008, Matfyzpress, Praha, 2008, 92–102.
- [6] Bečvářová M.: *Teodor Monin (1855–1893) – první vysokoškolský profesor matematiky v Bulharsku*. Homo Bohemicus, Izdanie na Bochemija klub, volume 1, 2008, 5–14.
- [7] Bečvářová M.: *František Vítězslav Splítek (1855–1943) – zapomenutý učitel, matematik, etnograf a spisovatel*. In Grigorov D., Černý M. (eds.): Úloha české inteligence ve společenském životě Bulharska po jeho osvobození, Velvyslanectví Bulharské republiky v České republice, Praha, 2008, 185–201.
- [8] Bečvářová M.: *Život i djelo Karela Zahradníka*. In Mardesić S. (ed.): Karel Zahradník 1848–1916, Hrvatska akademija znanosti i umjetnosti. Spomenica preminulim akademikima svezak 134, Zagreb, 2007, 9–36.
- [9] Bečvářová M.: *Life and Work of Karel Zahradník (1848–1916)*. In Motlíček T., Rechcigl M. (eds.): Moravia from World Perspective, 22th World Congress of Czechoslovak Society of Arts and Sciences, volume 2, Ostrava, Repronis, 2006, 276–283.
- [10] Bečvářová M.: *Emil Weyr and some his activities*. In Binder Ch. (ed.): Proceedings of the conferece VIII. Österreichisches Symposion zur Geschichte der Mathematik in Miesenbach, Von der Tontafel zum Internet, Der Einfluss des Mediums auf die Entwicklung der Mathematik, Technische Universität Wien, Wien, 2006, 150–159.
- [11] Bečvářová M.: *Kořeny bulharské matematiky*. In Bečvářová M. (ed.): 27. mezinárodní konference Historie matematiky, Velké Meziříčí, 25. 8.–29. 8. 2006, sborník sylabů, Praha, 2006, 14–16.
- [12] Bečvářová M.: *Eukleidovy Základy, jejich vydání a překlady*. Edition Dějiny matematiky, volume 20, Prometheus, Praha, 2002.
- [13] Bečvářová M.: *Z historie Jednoty (1862–1869)*. Edition Dějiny matematiky, volume 13, Praha, Prometheus, 1999.
- [14] Bečvářová-Němcová M.: *František Josef Studnička (1836–1903)*. Edition Dějiny matematiky, volume 10, Prometheus, Praha, 1998.
- [15] Bečvářová M., Bečvář J.: *Emil Weyr e Luigi Cremona*. Bollettino di Storia delle Scienze Matematiche 26(2006), 245–261.
- [16] Bečvářová M., Bečvář J., Škoda J.: *Emil Weyr und sein italienischer Aufenthalt*. Sudhoffs Archiv, 92(2008), Heft 1, 98–113.

- [17] Dolapčiev B.: *A. V. Šourek (1857–1926)*. Pokroky matematiky, fyziky a astronomie 8(1963), 168–170.
- [18] Einhorn R.: *Vertreter der Mathematik und Geometrie an den Wiener Hochschulen 1900–1940*. Verband der wissenschaftlichen Gesellschaften Österreichs, Wien, 1985 (Ph.D. thesis).
- [19] Hineva S., Tzenova I.: *Čeští geometři na sofijské univerzitě*. Pokroky matematiky, fyziky a astronomie 36(1991), 237–242.
- [20] Málek K.: *Případ Emanuela Czubera*. Pojistný obzor 1(1922/3), 94–98.
- [21] Ottowitz N.: *Der Mathematikunterricht an der Technischen Hochschule in Wien 1815–1918*. Verband der wissenschaftlichen Gesellschaften Österreichs, Wien, 1992 (Ph.D. thesis).
- [22] Sobotka J.: *Vzpomínka na Antonína V. Šourka*. Časopis pro pěstování matematiky a fysiky 56(1927), 1–6.
- [23] Stark F., Gintl W., Grünwald A.: *Die k. k. Deutsche Technische Hochschule in Prag 1806–1906*. Prag, 1906.
- [24] Šedivý J.: *Učitel F. V. Splítek*, Matematika a fyzika ve škole, 13(1982/3), 69–70.
- [25] Šišma P.: *Matematika na německé technice v Brně*. Edition Dějiny matematiky, volume 21, Prometheus, Praha, 2002.

Address

Doc. RNDr. Martina Bečvářová, Ph.D.
 Institute of Applied Mathematics
 Faculty of Transportation Sciences
 Czech Technical University
 Na Florenci 25
 110 00 Prague
 Czech Republic
 e-mail: nemcova@fd.cvut.cz, becvamar@fd.cvut.cz

Doc. RNDr. Martina Bečvářová, Ph.D.
 Department of Mathematics Education
 Faculty of Mathematics and Physics
 Charles University
 Sokolovská 83
 186 75 Prague
 Czech Republic
 e-mail: nemcova@fd.cvut.cz, becvamar@fd.cvut.cz