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WILHELM MATZKA AND HIS POSITION IN THE AUSTRO-HUNGARIAN MATHEMATICS

MICHAELA CHOCHOLOVÁ

Abstract: As a teacher and scientist Wilhelm Matzka (1798–1891) is significant for the history of mathematics and mathematical education at the time of the Austro-Hungarian monarchy. With this article we want to present his interesting personality and to demonstrate that not only well-known mathematicians with global importance were participating in the shaping of this part of history, in particular with a view on the local significance.[1]

1 Biographical data

1.1 Childhood and studies

Wilhelm Matzka was born on November 4, 1798 in the South Moravian town of Litobratřice (Leipertitz in Mähren), as the son of a sergeant of the imperial cavalry regiment. As a small boy, he moved to the North Bohemian region, where he began his educational studies by attending a primary school located near the city of Teplice (Teplitz).[2]

He started grammar school in the year 1809/1810 in Chomutov (Komotau), where he passed both elementary and higher grammar school levels. He was an excellent student, one of the best students in his class. He passed all subjects (religion, Latin, mathematics, natural science, geography, history and Greek) with excellent marks and finished his grammar studies in the year 1817.

At the age of nineteen he started his two year university education at the Faculty of Arts in Prague (1817/1818 and 1818/1819). He was an exemplary student, passed all of his examinations (religion, history, Greek, theoretical and practical philosophy, mathematics and mathematical physics) with excellent results, i.e., with 1 or E (E comes from Latin *eminente* – excellent) which was the best mark at that time.

The professors at the University of Prague were prominent scholars; W. Matzka teachers include religion Professor Bernard Bolzano (1781–1848), mathematics Professor Josef Ladislav Jandera (1776–1857) and (mathematical) physics Professor Franz Ignac Cassian Hallaschka (1780–1847).

[1] For the biography and the pedagogical activities and scientific works of W. Matzka see also [2], [3] and [4].
[2] W. Matzka attended primary schools in Malý Újezd (Kleinaugezd), Novosedlice (Weisskirchlitz) and Jeníkov (Janigg), then in Šopka near Mělník.

1.2 Military service in Vienna

After having finished his university education, he served many years in the Austrian army. His military service began in September 1819 with the 2nd artillery regiment in Vienna. In 1821, he was relocated as a bombardier to the bombardier company (das königliche kaiserliche Bombardier-Corps), also in Vienna. Subsequently he was promoted to a gunner (Kanonier), a chief gunner, and then, in early June of 1831, to a lieutenant in the bombardier company. As a lieutenant he was responsible both to keep his column in order and for the education of his men. At the same time he also was a mathematics teacher at the bombardier company school. W. Matzka served in this position until August 31, 1837; by then he had been a member of the Austrian army for nearly 18 years.

The bombardier company took care of the bombardiers' education as well, for which a special school (die königliche kaiserliche Bombardier-Corpsschule) was established, situated directly in its barracks. The main focus of the school was the practice of bombardiers' activities, such as cannon service and the production of ammunition; talented students were additionally educated in mathematics, natural and military science.[3]

As a member of the bombardier company school, W. Matzka complemented and deepened his education. He also visited facultative lectures at the University of Vienna and the Vienna Polytechnic. At the University of Vienna, he attended lectures of well--known scientists and professors. He learned higher mathematics and physics from Andreas Ritter von Ettingshausen (1796–1878), scientific and practical astronomy from Joseph Johan Littrow (1781–1840) and mineralogy from Friedrich Mohs (1773–1839), and he attended lectures on pedagogy, as well. At the Vienna Polytechnics, he went to lectures on technology by Georg Altmütter (1787–1858).

1.3 At the philosophical school in Tarnów

Since the early 1830s W. Matzka tried to obtain a chair of mathematics outside the military. He took part in a number of competitions in different places of the monarchy – at the secondary schools in Görz and Laibach, at the lyceums in Salzburg and at the Vienna Polytechnic. The most important one was the final competition at the philosophical school in Tarnów, in which he succeeded.

This competition was held on December 22, 1836, in Tarnow and twenty-five competitors participated. All papers were examined carefully by university professors from Lwów and Vienna. The elaboration of W. Matzka was considered as the best one. His paper was written with precision and elegance. In addition to this, his many years of experience in teaching mathematics as well as his brilliant teaching style were evaluated highly. On August 12, 1837, W. Matzka was appointed fulltime professor of elementary mathematics at the philosophical school in Tarnów. He stayed at this school for nearly twelve years, until May 12, 1849, when he left to Prague.

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[3] The bombardier company school was organized into seven classes. The main attention was paid to the teaching of mathematics and natural science; furthermore e.g. military geography, military tactics, history and French were taught. For more details about the history and organization of this school see [5].

1.4 The degree of Doctor of Arts and Philosophy

While he was active in Tarnów, W. Matzka decided to take a doctoral examination. In August 1843, he underwent rigorous tests at the University of Olomouc, he passed the obligatory exams in general history (August 8) and general philosophy (August 16) and gained the degree of Doctor of Arts and Philosophy.[4]

1.5 At the Prague Polytechnic

After Christian Andreas Doppler (1803–1853) had left the Prague Polytechnic, the position of professor of elementary mathematics and practical geometry became free in 1847.[5] The competition was held on February 5, 1848 and there were six candidates.

W. Matzka asked if he could undergo the examination in Tarnów, where he was teaching at that time. His request was accepted; a committee of six professors was appointed for this occasion and a sealed paper was sent. The committee wrote a detailed report about the examination process and sent it, together with the written elaboration, to the Prague Polytechnic, where all elaborations were examined by its professors.

The paper of W. Matzka was undisputed the best one. It was detailed and with deep explanations to the questions, also well-arranged and clear. In addition, his many years of professional experience were regarded as especially valuable. He was appointed to full professor of elementary mathematics and geometry in the German language at the Prague Polytechnic on April 8, 1849.

1.6 At The University of Prague

Since 1848 it was no longer necessary to undergo a competition to become a professor; now professors were suggested by the collegium of professors, according to their professional abilities. W. Matzka was appointed full professor of mathematics in the German language at the University of Prague on April 9, 1850; after only one year of teaching at the Prague Polytechnic. He taught there for more than twenty years, until 1871.[6]

W. Matzka was also concerned about the administration of the University of Prague and the Faculty of Arts. He was dean and vice dean of the collegium professors of the Faculty of Arts and dean of the collegium of doctors of the Faculty of Arts several times. From the beginning of the 1850s he also was a member of the committee for candidates for secondary school teachers of mathematics in the Czech countries, which was established at universities according to the law since 1848.

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[4] It was sufficient to pass successfully rigorous tests for graduates of philosophical studies to get the degree of Doctor of Arts and Philosophy. Such an examination generally contained three parts: 1. theoretical and practical philosophy, 2. general history, and 3. mathematics and physics; until 1872 it was not necessary to write a scientific doctoral work. W. Matzka did not undergo an exam in mathematics and physics; he had it forgiven probably because of his longtime pedagogical career in this field.

[5] For the history of the Prague Polytechnic and W. Matzka's pedagogical activities there see [1] and [8].

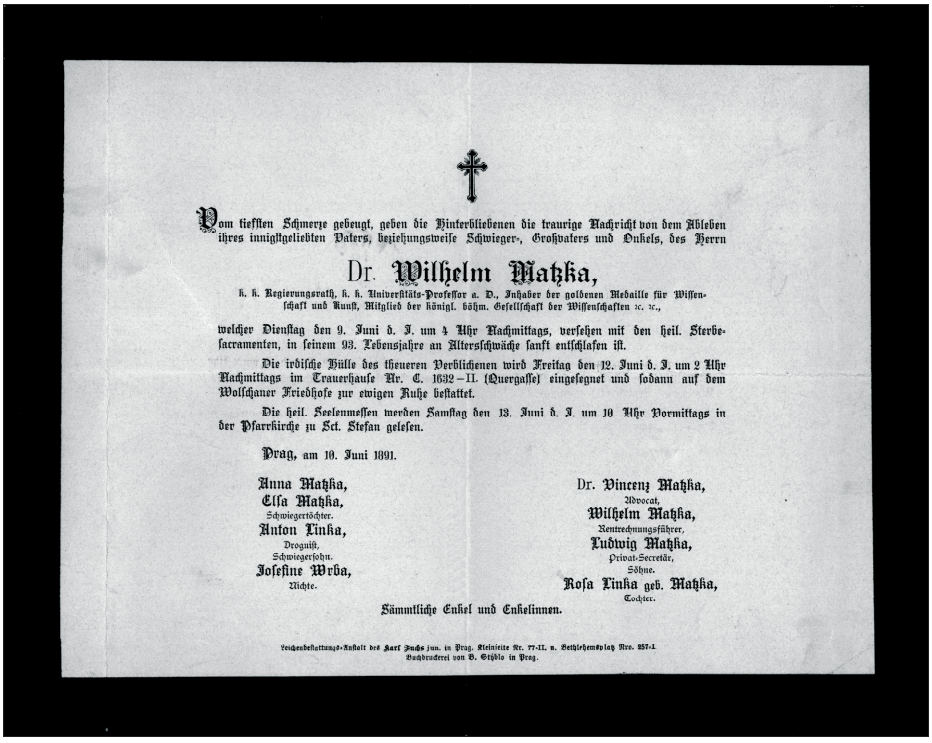
[6] For more about the history of the Prague University and pedagogical activities of W. Matzka and his contemporaries there see [1] and [6].

1.7 Scientific activities, distinctions, end of life

In Prague, the scientific activities of W. Matzka were also valued highly. He was elected an external member of the *Königliche böhmische Gesellschaft der Wissenschaften* [the Royal Bohemian Society of Sciences] on February 9, 1845 and a regular member on January 2, 1850. From the beginning, he was active and took part in the sessions of the society, lectured on mathematical and physical topics and published his contributions in its journals regularly.[7] For more than 30 years, since 1852, he also acted as a cashier of this society and served in this position strictly and carefully. In 1884, he retired from this function due to health problems but supervised it until his death.

During the time he spent in Prague, he was also graced with a gold medal *Literis et artibus* [in science and art] in 1850 and later with the title *Regierungsrat* ["a court-councellor"] which was given to public servants for their important achievements.

W. Matzka died on June 9, 1891 in Prague, nearly 93 years old. He was buried at the Olšany cemetery.



Vom tiefsten Schmerze gebeugt, geben die Hinterbliebenen die traurige Nachricht von dem Ableben ihres innigstgeliebten Vaters, beziehungsweise Schwieger-, Großvaters und Onkels, des Herrn

Dr. Wilhelm Matzka,

k. k. Regierungsrath, k. k. Universitäts-Professor a. D., Inhaber der goldenen Medaille für Wissenschaft und Kunst, Mitglied der königl. böhm. Gesellschaft der Wissenschaften ꝛc. ꝛc.,

welcher Dienstag den 9. Juni d. J. um 4 Uhr Nachmittags, versehen mit den heil. Sterbesacramenten, in seinem 93. Lebensjahre an Altersschwäche sanft entschlafen ist.

Die irdische Hülle des theueren Verblichenen wird Freitag den 12. Juni d. J. um 2 Uhr Nachmittags im Trauerhause Nr. C. 1632–II (Quergasse) eingesegnet und sodann auf dem Wolschaner Friedhofe zur ewigen Ruhe bestattet.

Die heil. Seelenmessen werden Samstag den 13. Juni d. J. um 10 Uhr Vormittags in der Pfarrkirche zu Sct. Stefan gelesen.

Prag, am 10. Juni 1891.

Anna Matzka,
Elsa Matzka,
Schwiegertöchter.
Anton Linka,
Drogist,
Schwiegersohn.
Josefine Wrba,
Nichte.

Dr. Vincenz Matzka,
Advocat,
Wilhelm Matzka,
Rentrechnungsführer,
Ludwig Matzka,
Privat-Secretär,
Söhne.
Rosa Linka geb. Matzka,
Tochter.

Sämmtliche Enkel und Enkelinnen.

Leichenbestattungs-Anstalt des Karl Fuchs jun. in Prag, Kleinseite Nr. 77-II, u. Bethlehemsplatz Nro. 857-I.
Buchdruckerei von B. Stybló in Prag.

Picture 1: Obituary notice of W. Matzka

[7] *Abhandlungen der königlichen böhmischen Gesellschaft der Wissenschaften* [Proceedings of the Royal Bohemian Society of Sciences] and *Sitzungsberichte der königlichen böhmischen Gesellschaft der Wissenschaften* [Minutes of Assemblies of the Royal Bohemian Society of Sciences].

2 Pedagogical activities

2.1 In Vienna and in Tarnów

As mentioned previously, the pedagogical activities of W. Matzka were closely connected with three important places in the Austro-Hungarian Empire – Vienna, Tarnów and Prague. Unfortunately, there are no original archival sources describing details of his pedagogical activities in Vienna and Tarnów. We know only the following basic data from secondary sources and literature.

From 1832 to 1837 W. Matzka taught as a rofessor of higher mathematics at the bombardier company school in Vienna. He taught talented corps members on algebra, analytical geometry, differential and integral calculus and higher mechanics. During the period of 1837 to 1849, he taught mathematics at the philosophical school in Tarnów, which was newly established as a two-year, higher philosophical course that prepared students for university studies.

2.2 At the Prague Polytechnic

In the academic year of 1849/1850 W. Matzka was a full professor of elementary mathematics and practical geometry in the German language at the Prague Polytechnic.

In the 1850s preliminary education for polytechnic students was still on a low level. For that reason, teaching elementary mathematics and practical geometry was concentrated on completing and deepening (in today's conception: it included rather secondary school's learning), and played a very important role in the educational system at the Prague Polytechnic.

Elementary mathematics with five lessons and practical geometry with three lessons a week included higher arithmetic, algebra, plane and solid geometry, trigonometry, the binomial theorem, the principles of probability calculus, the theory of equations and the principles of analytical geometry. W. Matzka also helped to teach higher mathematics, preparing for geodesic surveys, and attended the geometrical cabinet in addition.

2.3 At the University of Prague

During the period from 1850 to 1871, W. Matzka taught as a professor of mathematics in the German language at the University of Prague. He was chosen not only as an experienced professor for this prestigious position, but also as a person who was interested in science and the development of mathematics, and also for his own activities, the publishing of scientific works and textbooks.

He was expected to be more than a good professor. In particular, his task was to raise the level of mathematics at the newly organized Faculty of Arts, to contribute by way of his scientific activities and to educate a new generation of secondary school teachers of mathematics. He did exactly that. All these aspects characterized his longtime activities at the University of Prague, one of the main educational centers in the empire.

After 1848/1849 many important changes were made at the newly organized Faculty of Arts. One of them was to teach new topics, which started to appear during mathematical lectures next to the ordinary lectures of algebra, analysis and analytical mechanics. Mostly, W. Matzka devoted special attention to geometry. Rarely, he lectured on probability calculus, number theory, higher equations and the theory of surfaces, as well. Most of these topics were completely new for the university students. Moreover, since 1855/1856 he gave lectures on mathematical physics regularly, in which he dealt e.g. with statics, dynamics, optics, acoustics, magnetism and electricity.

His lectures were evidently of a very high level, as during his activities the level of mathematics at the University of Prague progressed noticeably. Certainly, the main reason was that he put much emphasis on geometry and the introduction of new current topics into mathematical lectures, as well as W. Matzka himself, as a kind but exacting and strict teacher.

Gabriel Blažek (1842–1910), one of W. Matzka's students wrote about him in his memories:

At that time professors Kulik and Matzka taught mathematics at the University of Prague. ... Wilhelm Matzka was about 61 years old, robust and stout, he had keen insight and took pride in his similarity to Gauss. ... Matzka took strange notice of correct form. He always prepared his lecture so that it was completely contained and well-arranged on the blackboard, for which purpose he let acquire three large blackboards for the mathematics classroom in the Clementinum. When he wrote a fraction, he wrote a fraction line at first, then a denominator and a numerator, in this order; these formalities he demanded strictly of his students as well. He lectured monotonously; half on the blackboard where he always compared results with his prepared notations. He erased some casual miscalculation with his fingers, and in the case there was a piece of stone in the chalk, he threw it away in a big arch above the students' heads to the left corner of the classroom. We attributed this to his many years of standing in the bombardier company school.[8]

As a result of the revolutionary reforms in 1848/1849, the Faculty of Arts was reorganized as well and its main function became the education of secondary school teachers. There were also new strict rules for secondary school teacher candidates. Such students had to undergo very hard examinations of teachers' competence. W. Matzka was regularly a member of the examining committee for candidates for secondary school teachers of mathematics from the beginning of the 1850s. He was known as a very strict and feared examiner.

Not only W. Matzka's pedagogical activity at the Faculty of Arts, but also his long lasting function in the examining committee demonstrates, that he took special care of the instruction given to mathematics teachers at secondary schools and shows how noticeably he influenced the level of mathematics education in the Czech countries.

[8] Freely translated from the Czech original [7], page 2 and 3.

3 Scientific works

3.1 Mathematical treatises

W. Matzka developed his scientific interests through his whole live. Since the early 1830s he was regularly publishing more or less extensive treatises, mostly on geometrical themes, in the scientific journal *Archiv der Mathematik und Physik* [Archive of Mathematics and Physics]. From his works at least a few, such as *Berechnung des Körperinhaltes der Prismen* [Calculation of the volume of prisms],[9] *Elementare Darstellung einer höchst einfachen Berechnung des Kreisverhältnisses* [Elementary description of a very simple calculation of the circle proportion][10] and *Ueber die Möglichkeit, einem Pyramidenstumpfe ein Prisma ein- oder umzuschreiben* [How to circumscribe or inscribe a prism to a truncated pyramid],[11] should be mentioned here. We do not find many original methods or ideas in these works which would develop mathematics in general. They rather include solutions to very concrete cases arising from mathematical lectures and they thus provided an inspiration for other teachers of mathematics, and for talented and interested students.

W. Matzka was elected a regular member of *Königliche böhmische Gesellschaft der Wissenschaften* [the Royal Bohemian Society of Sciences] shortly after he came to Prague. From the very beginning he published his mathematical contributions in his journals *Abhandlungen der königlichen böhmischen Gesellschaft der Wissenschaften* [Proceedings of the Royal Bohemian Society of Sciences] and *Sitzungsberichte der königlichen böhmischen Gesellschaft der Wissenschaften* [Minutes of Assemblies of the Royal Bohemian Society of Sciences]. That he concentrated on geometrical themes all the time, as well as on some problems associated with infinitesimal calculus, was probably connected with his academic career. His articles *Zur Lehre der Parallelprojection und der Flächen* [Theory of parallel projection and of surfaces][12] and *Über fundamentale Functions-Grenzen der Analysis* [On fundamental limits of functions in analysis][13] are to be mentioned in this context.

3.2 Mathematical monographs

W. Matzka made himself scientifically acquainted with the field of algebra. Many parts of it, such as the theory of linear equations, determinant and matrix theory, or the theory of complex and hypercomplex numbers developed rapidly and were very popular in Czech countries at that time.

In particular, complex numbers, higher order equations and determinants were important for W. Matzka's scientific works. The result of his detailed studies and the deep interest in these themes were extensive treatises published in the journals of the Royal Bohemian Society of Sciences and finally published separately as monographs. The following can be mentioned as the most remarkable: *Versuch einer richtigen Lehre von der Realität der vorgeblich imaginären Grössen der Algebra, oder einer Grundlehre von der Ablenkung algebraischer Grössenbeziehungen* [An attempt of a true theory of the

[9] In *Archiv der Mathematik und Physik* **6**(1845), page 113–123 + 1 page of graphics.
[10] In *Archiv der Mathematik und Physik* **9**(1847), page 74–82 + 1 page of graphics.
[11] In *Archiv der Mathematik und Physik* **11**(1848), page 434–437 + 1 page of graphics.
[12] In *Abhandlungen der königlichen böhmischen Gesellschaft der Wissenschaften*, VI. Folge, **7**(1874), 70 pages.
[13] In *Sitzungsberichte der königlichen böhmischen Gesellschaft der Wissenschaften* 1878, page 262–272.

reality of the supposedly imaginary numbers of algebra, …][14], *W. G. Horner's eigentliche Auflösungsweise algebraischer Ziffergleichungen – Eine literärgeschichtliche Studie zu deren Verdeutlichung und Würdigung* [W. G. Horner's method to solve algebraic number equations – a historical study of the literature…][15] and *Gründzüge der systematischen Einführung und Begründung der Lehre der Determinanten, vermittelst geeigneter Auflösung der Gruppen allgemeiner linearer Gleichungen* [Principles of the theory of determinants, using suitable solutions of general systems of linear equations][16].

Generally, in his (just mentioned) mathematical monographs W. Matzka first of all, aimed to explain new problems in an understandable (but not primitive) way. Due to this, all of them were highly valued and used by mathematicians interested in the current topics, and they were a motivation for university students. Although, W. Matzka's monographs remind people a little of textbooks, these were not classical textbooks. They usually contained ample historical notes, and even more, W. Matzka always tried to contribute his own ideas and solutions of special problems, to improve and to extend the topics as well. In these aspects his works provided new inspiration for many others who became interested.

Two examples can be mentioned here, which illustrate the originality and individuality of W. Matzka's approach to determinants and complex numbers.

First, let us demonstrate the original way that he used in his work to introduce the readers to determinants. At the beginning a set of equations is proposed for solution, in which by multiplying and subtracting the unknown x is eliminated between every adjoining pair.

$$\begin{aligned}
&a_1x + b_1y + c_1z + d_1t + e_1u + f_1v + \ldots = m_1\\
&a_2x + b_2y + c_2z + d_2t + e_2u + f_2v + \ldots = m_2\\
&a_3x + b_3y + c_3z + d_3t + e_3u + f_3v + \ldots = m_3\\
&a_4x + b_4y + c_4z + d_4t + e_4u + f_4v + \ldots = m_4\\
&\ldots
\end{aligned}$$

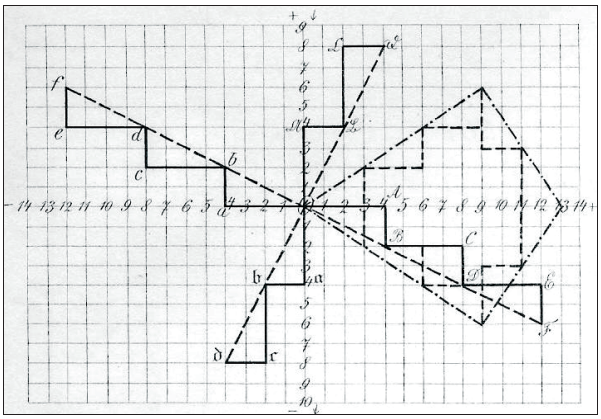
Then the determinant of the second order is defined by the product difference $a_1b_2 - a_2b_1$ by unknown y after the elimination of x and Laplace's notation is used for it $a_1b_2 - a_2b_1 \equiv (a_1b_2)$. From the second set of equations, the unknown y is eliminated in the same manner, which gives the definition of the determinant of the third order as $(a_1b_2)c_3 - (a_1b_3)c_2 + (a_2b_3)c_1 \equiv (a_1b_2c_3)$ etc.

[14] In *Abhandlungen der königlichen böhmischen Gesellschaft der Wissenschaften*, V. Folge, **6**(1848–1850), 180 pages + 3 pages of graphic.
[15] In *Abhandlungen der königlichen böhmischen Gesellschaft der Wissenschaften*, VI. Folge, **5**(1871–1872), 47 pages.
[16] In *Abhandlungen der königlichen böhmischen Gesellschaft der Wissenschaften*, VI. Folge, **9**(1877–1878), 61 pages.

$$
\begin{aligned}
(a_1b_2)y &+ (a_1c_2)z + (a_1d_2)t + (a_1e_2)u + (a_1f_2)v + \ldots = (a_1m_2)\\
(a_2b_3)y &+ (a_2c_3)z + (a_2d_3)t + (a_2e_3)u + (a_2f_3)v + \ldots = (a_2m_3)\\
(a_3b_4)y &+ (a_3c_4)z + (a_3d_4)t + (a_3e_4)u + (a_3f_4)v + \ldots = (a_3m_4)\\
&\ldots
\end{aligned}
$$

The main purpose of this was to introduce determinants and to lead their characterization by means of their natural appearance in an algebraic system, stressing the common origin.

In the context of W. Matzka's work on complex numbers, his interesting approach to their geometrical interpretation, a problem frequently discussed at that time, deserves to be mentioned. He used the following scheme to represent complex numbers and calculations with them as line segments. In his approach, the complex number $4-2i$ is represented by the line segments $\overline{OAB}$; next the product $(4-2i)\cdot 3$ can be represented by three possibilities, namely by the line segments $\overline{OABCDEF}$, by the line segments $\overline{O(12)F}$ or by the "vector" $\overline{OF}$.

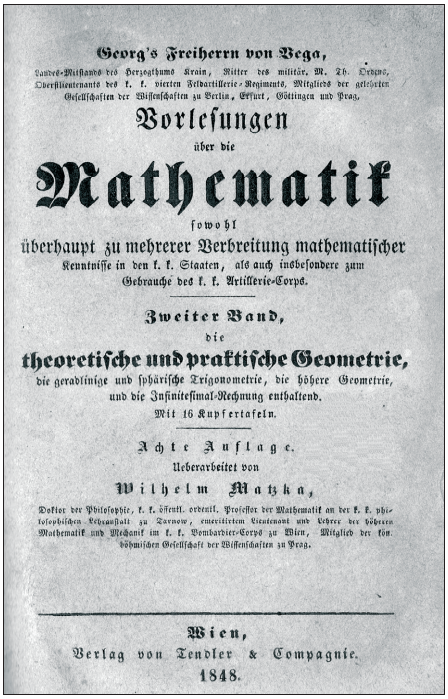


Picture 2: Geometrical interpretation of complex numbers in W. Matzka's monograph (picture 23)

3.3 Mathematical textbooks

As a consequence of W. Matzka's huge attention to teaching mathematics, he also was an author of many classical mathematical textbooks. The most remarkable textbook he wrote is called *Vorlesungen über die Mathematik* [Lectures on mathematics], originally written in four volumes by Georg Vega (1756–1802) during the period of 1782 to 1800. This textbook was written especially for teaching at the bombardier company school in Vienna, whose participants were educated in military science but also in mathematics (volume I and II) and physics (volume III and IV). This textbook was rewritten, complemented and extended several times, finally by W. Matzka during the period from 1835 to 1850.[17]

[17] Matzka W.: *Georg Freiherrn von Vega, Vorlesungen über die Mathematik sowol überhaupt zu mehrerer Verbreitung mathematischer Kenntnisse in den k. k. Staaten, als auch insbesondere zum Gebrauche des*



Georg's Freiherrn von Vega,

Landes-Mitstands des Herzogthums Krain, Ritter des militär. M. Th. Ordens, Oberstlieutenants des k. k. vierten Feldartillerie-Regiments, Mitgliedes der gelehrten Gesellschaften der Wissenschaften zu Berlin, Erfurt, Göttingen und Prag,

Vorlesungen

über die

Mathematik

sowohl

überhaupt zu mehrerer Verbreitung mathematischer Kenntnisse in den k. k. Staaten, als auch insbesondere zum Gebrauche des k. k. Artillerie-Corps.

Zweiter Band,

die

theoretische und praktische Geometrie,

die geradlinige und sphärische Trigonometrie, die höhere Geometrie, und die Infinitesimal-Rechnung enthaltend.

Mit 16 Kupfertafeln.

Achte Auflage.

Ueberarbeitet von

Wilhelm Matzka,

Doktor der Philosophie, k. k. öffentl. ordentl. Professor der Mathematik an der k. k. philosophischen Lehranstalt zu Tarnow, emeritirtem Lieutenant und Lehrer der höheren Mathematik und Mechanik im k. k. Bombardier-Corps zu Wien, Mitglied der kön. böhmischen Gesellschaft der Wissenschaften zu Prag.

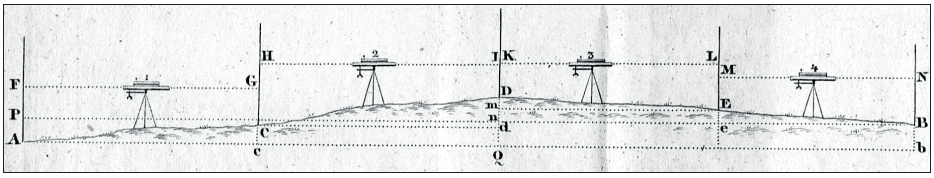
Wien,

Verlag von Tendler & Compagnie.

1848.

Picture 3: The title page of the second volume of *Vorlesungen über die Mathematik* [Lectures on mathematics] rewritten by W. Matzka in the year 1848

It was written as an elementary textbook, even though it includes an extensive spectrum of mathematical fields. The first volume contains, very detailed, arithmetic, algebra and functional theory (624 pages), the second volume includes geometry, trigonometry, infinitesimal calculus and solving differential equations (660 pages). The aim was to give an explanation of quite complicated topics for mathematical "beginners". There are hardly any definitions in today's sense; new ideas are explained intuitively, with the help of demonstrations and a number of examples which practice each topic, proceeding from the simple to the difficult parts.



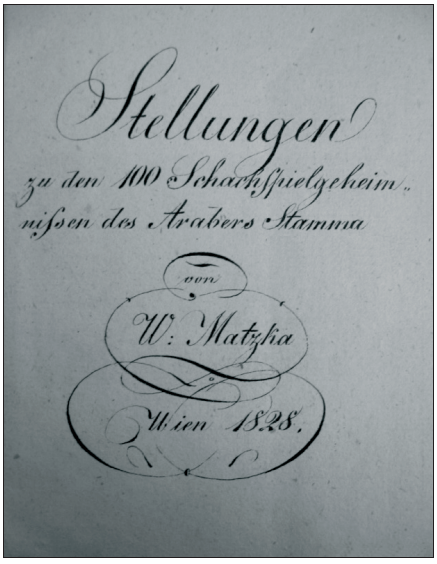
Picture 4: Illustration to the solution of exercise on geometric measurement (volume II, picture 170)

k. k. Artillerie-Corps. – Erster Band. Rechenkunst und Algebra. Edition 6., Vienna, 1838, 612 pages. Edition 7., Vienna, 1850, 624 pages. – *Zweiter Band, die theoretische und practische Geometrie, die geradlinige und sphärische Trigonometrie, die höhere Geometrie, und die Infinitesimal-Rechnung enthaltend*. Edition 7., Vienna, 1835, 712 page + 16 pages of graphic. Edition 8., Vienna, 1848, 660 pages + 15 pages of graphic.

3.4 Other scientifical works

In addition to nearly fifty mathematical works, including brief articles and commentaries, numerical tables, scientific treatises, monographs and textbooks, W. Matzka worked in many others fields. His interests included physics and astronomy, as well as chronology, geodesy and music in mathematics, in which areas he published about twenty more or less extensive works.

In the areas mentioned above he published, for example, the scientific treatises *Allgemeine Berechnung der Stromstärken in Galvanometern* [General calculation of amperage in galvanometers][18] and *Natürlichste Berechnung musikalischer Tonleitern* [Most natural calculation of musical scales],[19] an extensive monograph, *Die Chronologie in ihrem ganzen Umfange, mit vorzüglicher Rücksicht auf ihre Anwendung in der Astronomie, Weltgeschichte und Urkundenlehre, nebst einem Vorschlage zu einer streng wissenschaftlich geregelten Zeitrechnung; durch höhere Arithmetik begründet und erläutert* [Chronology to its full extent, with special regard to its applications in astronomy, world history and diplomatics, … established and explained with higher arithmetic],[20] his manuscripts *Stellungen zu den 100 Schachspielgeheimnissen des Arabers Stamma* [Positions to the 100 chess secrets of the Arab Stamma][21] and *Tafeln der Zeitgleichungen oder der Zeit-Intervalle zwischen dem wahren und mittleren Mittage für den Wiener Meridian* [Tables of time equations or time intervals between the true and the ordinary midday for the Viennese meridian].[22]



Picture 5: The title page of manuscript on chess of W. Matzka

[18] In *Archiv der Mathematik und Physik* **34**(1860), page 33–72 + 1 page of graphics.
[19] In *Abhandlungen der königlichen böhmischen Gesellschaft der Wissenschaften*, VII. Folge, **2**(1887–1888), 19 pages.
[20] Wien, 1844, VIII + 543 pages.
[21] Wien, 1828, 100 pages.
[22] Wien, 1828, 15 pages.

References

[1] Bečvářová M.: *Česká matematická komunita v letech 1848–1918*. Edition Dějiny matematiky, volume 34, Matfyzpress, Praha, 2008.

[2] Chocholová M.: *Prague University Professor Wilhelm Matzka*. In Šafránková J., Pavlů J. (ed.): WDS 07 Proceedings of Contributed Papers, Part I, Matfyzpress, Praha, 2008, 241–245.

[3] Chocholová M.: *Wilhelm Matzka (1798–1891) and his Algebraical Works*. In Barbin E., Stehlíková N., Tzanakis C. (ed.): History and Epistemology in Mathematics Education, Proceedings of the 5th European Summer University, Vydavatelský servis, Plzeň, 2008, 845–853.

[4] Chocholová M.: *Wilhelm Matzka and the Historical Development of Complex Numbers*. In Šafránková J., Pavlů J. (ed.): WDS 08 Proceedings of Contributed Papers, Part I, Matfyzpress, Praha, 2008, 38–42.

[5] Gatti F.: *Geschichte der k. und k. Technischen Militar-Akademie; zweiter Teil: Geschichte des k. k. Bombardier-Corps, der k. k. Artillerie-Hauptschule und der k. k. Artillerie-Akademie 1786–1869*. Wien, 1905.

[6] Kafka F., Petráň J. (ed): *Dějiny Univerzity Karlovy 1348–1990*, I.–IV. Univerzita Karlova, Karolinum, Praha, 1995–1998.

[7] Posejpal V.: *Dějepis Jednoty českých matematiků*. JČM, Praha, 1912.

[8] Velflík A. V.: *Dějiny technického učení v Praze*, I., II. Unie, Praha, 1906, 1909.

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