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The studies and the history of mathematics at the university of Lithuania in 1920–1940

AT THE END OF THE SECOND DECADE of the 20th century Lithuania became an independent republic. The young republic needed to establish a national institution of higher education. In March 1, 1919 in Vilnius Lithuanian Society of Science (Lietuvių mokslo draugija, founded in 1907) initiated the foundation of the Courses of Higher Education (Aukštieji mokslo kursai), which existed until 1921, and promoted the idea of the revival of the old Vilnius University.

At the Courses the history of mathematics was taught among the other subjects related to mathematics. The lectures of the history of mathematics were delivered by Pranas Mašiotas (1863–1940), who was the first one to publish in Lithuanian "The history of the Low Mathematics" in 1919.[1] The book contained texts on numeration, the ancient origin of arithmetics, geometry and algebra, mathematics of the Middle Ages and the New Age (till 18th century). The author referred to the books by famous science historians F. Cajori, H. Henkel and M. Cantor.

When Vilnius region was incorporated again into Poland in Autumn in 1919, The Courses of Higher Education (CHE – Aukštieji kursai) were established in temporary capital of Lithuania Kaunas in January 27, 1920. Two years later CHE were reorganized into the University of Lithuania (Lietuvos universitetas, LU) (since 1930 University of Vytautas Magnus – Vytauto Didžiojo universitetas). It gave students an opportunity to study mathematics alongside with other fundamental sciences.

The mathematician Zigmas Žemaitis (1884–1969), a graduate of Odessa (Novorosiysk) University, the Head of CHE and later (in 1922) the dean of Faculty of Nature and Mathematics, put a lot of efforts organizing studies of mathematics. The studies of mathematics history were included into the curriculum of mathematics as a result of the adopted Russian and German experience while establishing the University of Lithuania.

Initially there was even an idea to found the Department of Mathematics History (this fact is mentioned in the correspondence (in 1922) of the Doctor of Honour of Mathematics the priest Adomas Jakštas-Dambrauskas (1860–1938).[2]

Although this idea was not implemented, the history of mathematics was studied in the independent Republic of Lithuania (since 1922 as a compulsory subject for two study terms, since 1934 as a recommended subject also for two terms). In 1940 when Lithuania was soviet occupied, the subject disappeared from curriculum.[3]

Scientific articles on the history of mathematics were noticeable among scientific articles on other topics in mathematicians' scientific works at the University of Lithuania. First of all, the scientific articles on the history of general mathematics should be mentioned. The following scientists published articles on the subject: Z. Žemaitis wrote about I. Newton (1927), M. Cantor (1930) and Otto Volk (1892–1989) — about I. Newton's place in the history of science (1927), Petras Katilius (1903–1995) — about the development of non-Euclid mathematics (1930), A. Jakštas-Dambrauskas — about A.J.M. Hoene-Wronski (1930), Viktoras Biržiška (1886–1964) — about the history of probability theory (1931).

We will throw the light on some of the most important works.

Professor Z. Žemaitis in his book dedicated to 200th death anniversary of the famous physician, the founder of the high mathematics I. Newton reviewed I. Newton's life and his works.[4] Z. Žemaitis, taking

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[1] See P. Mašiotas, *Žemosios matematikos istorija* (Vilnius, 1919), p. 1–56.

[2] See A. Jakštas-Dambrauskas, 08 04 1922 Laiškas (letter), *VUB RS* F.1 E306 – RŠ 1279, p. 51.

[3] See J. Banionis, *Matematikos mokslo raida Lietuvoje 1920–1940 m*. (Vilnius, 1994), p. 60–64.

[4] See Z. Žemaitis, *Izaokas Newtonas. Jo gyvenimas ir darbai* (Kaunas, 1927), p. 1–54.

into consideration the researches carried out by A. Höfler, T.S. Marvin and W. Whewd, pointed out that I. Newton achieved better results in mathematics than in any other area of science and acknowledged I. Newton's input in development of natural science and mathematics.

Another work by Z**.** Žemaitis is written on the 100th anniversary of M. Cantor's birth.[5] The book consists of three parts: 1) the historiography of mathematics, 2) M. Cantor's life, 3) M. Cantor's works and their importance in historiography of mathematics. Z. Žemaitis wrote, that

> the most important mankind prophet in the sphere of culture is Europe which has the relations of intercommunity and difference with all the parts of the world and exact sciences are almost solely those sciences on which the abovementioned relations concerning their durability and nature are built.

These words urged scientists to take interest in historiography of mathematics science. Further the author explains with much regret that the history of mathematics was given a proper attention too late, and the reason is the low level of historians' and mathematicians' knowledge of mathematics. There were few people among mathematicians who wanted to study the old authors' works in mathematics.

Besides, in 17–19th centuries with a rapid advance of mathematics and the spheres of its application the history was not paid a proper attention. Presumably, the idea that studies of the old ideas and methods is a handicap for creating something new and innovative prevailed among mathematicians. After amplifying M. Cantor's merits and explaining circumstances under which he worked Žemaitis noticed that the German scientist M. Cantor

> finished integration period in the history of mathematics and set the stage for the following period, i.e. differentiation of historical materials.

The author gave prominence to M. Cantor's fundamental work *Vorlesungen über Geschichte der Mathematik* and noted that this work fostered the history of mathematics to become an independent branch of science (at the end of the 19th century).

In the article "Newton's role in the history of science" O. Volk, a German mathematics professor from Munich University, who worked in Kaunas in 1923–1930, wrote about the great Englishman's merit in mathematics, especially applied mathematics (analytical mechanics, theoretical physics and theoretical astronomy).[6] After ranking his achievements in pure mathematics the author pays attention to the following things Newton contributed to: calculating infinities, notion of speed and binom lines. It is worth noticing that at the end of the article O. Volk gives an explicit list of the books about I. Newton.

A. Jakštas-Dambrauskas wrote an explicit article "A.J.M. Hoene-Wronski — mathematician" where described in detail a Polish mathematician's and philosopher's merits in establishing the basics of algorithmy philosophy.[7] The author expressing approval of A.J.M. Hoene-Wronski's ideas noticed that

> Mathematics was not … the main aim [for Wronski], but the means to achieve higher aims. That is why he went to mathematics for the sake of philosophy.

Other two university mathematicians wrote significant articles. Associate professor P. Katilius reviewed the development of geometry from Euclid to D. Hilbert.[8] While working on the 5th Euclid's postulate P. Katilius distinguished two epochs of non-Euclid geometry. The first one is represented by C.F. Gauss, N.I. Lobachevski and J. Bolyai. The representatives of the second epoch are G. Riemann, H. Helmholtz and E. Beltrami. P. Katilius made a conclusion that

[5] See Z. Žemaitis, "Matematikos istoriografija ir Moritz Cantor", *LU MGF darbai*, 1930, t. 5, sąs.1, p. 177–219.

[6] See O. Volk, "Newton vieta mokslo istorijoj", *Logos* 1927, Nr.1, p. 68–82.

[7] See A. Jakštas-Dambrauskas, "J.M. Hoene-Wronskis matematikas", *Užgesę žiburiai* (Kaunas, 1930; Roma, 2nd ed. 1975), p. 395–422.

[8] See P. Katilius, "Neeuklidinių geometrijų plėtojimasis", *Kosmos*, 1930, Nr. 8/12, p. 234–243.

> on the one hand, general geometry is close to both philosophy defining the notion of space and its main objects and to natural sciences applying its conclusions; on the other hand, non-Euclid geometry in its turn has influence over philosophy and natural sciences.

Professor V. Biržiška, a graduate of Petersburg University and Petersburg Technological Institute, described the development of probability theory from its origin, namely Justian's ruling years (since 528) till development of the theory in the Russian scientist A.A. Markov's works.[9] In 1931 the author noticed, that application of probability theory in statistics and biology sciences became wider during the last 85 years. It is important that V. Biržiška accumulated and discussed the knowledge of probability theory of the recent decades of that time. V. Biržiška in his work summed up that

> the current period of scientific ideas development is characterized by necessity to introduce the notion of probability while defining elementary laws of nature.

Science popularization articles formed another group of articles, which were aimed at introducing the history of mathematics and the scientists working in this field to the public. For example, the first graduate of mathematics in LU Paulius Slavėnas (1901–1991), who maintained his PhD dissertation at Yale University in the USA, discussed the interrelation between mathematics and natural sciences (1936), as well as the origin of arithmetics (1939). In his first work P. Slavėnas noticed that all natural sciences started to acquire mathematical features, and he singled out autonomy as the main feature of the science of the day. P. Slavėnas made a conclusion that

> the development of mathematics is a constant getting rid of content and penetration into abstract and formal reasoning, where some place is left for concrete things.[10]

Associate professor Otonas Stanaitis (1905–1988) presented retrospection and future of mathematics (1938). Being interested in basics of mathematics he wrote an article "Mathematics in near past and today", where he characterized 15th century mathematicians as universal people, highlighted 18th mathematicians' independence from belonging to a particular nation, underlined the influence of the 19th century French Revolution over differentiation and specialization of sciences. The author pointed out that applying mathematics, which separated into independent science from mathematics, "should be a kind of internal linkage among branches of mathematics".[11]

In another article "A new point of view towards exact natural sciences and mathematics" O. Stanaitis considered dependence of mathematics works upon the author's outlook and race. It is natural that this question rose as the result of nationalsocialism which gained ground in Germany in 1933. While criticizing extreme L. Bieberback's outlooks of race and blood influence over mathematical works O. Stanaitis was in favour of differentiation of the nations as far as the way of their thinking. According to O. Stanaitis

> Lithuanian mathematicians should be allied to East Prussian mathematicians, who belong to more logically thinking type of nations.[12]

A. Jakštas-Dambrauskas's work dealt with three questions of old mathematics (1924), namely three well-known tasks: quadrature of the circle, duplication of the cube, and trisection of the angle.[13] The author persuaded mathematics lovers that searching for the exact solutions of the aforementioned tasks has no sense.

P. Katilius presented infinity in mathematics to the public in 1931. P. Katilius and R. Lakovski explained Fermat's problem (1937). The main works introducing the greatest mathematicians were written for their remembrance or anniversaries. O. Volk wrote about J. Kepler, B. Pascal (both works in 1924), H. Seeliger, F. Klein, E. Kant, F. Lindeman (all works in 1925), V.A. Steklov, C. Runge (both in 1927), M. G. Mittag-Leffler (in 1928). Z. Žemaitis introduced C.F. Gauss (1927) and N.I. Lobachevski

[9] See V. Biržiška, "Tikimybių teorijos plėtojimasis, *Kosmos*, 1931, Nr. 4/6, p. 81–104.

[10] See P. Slavėnas, "Matematika ir gamtos mokslai", *Kosmos*, 1936, Nr. 7/12, p. 293–303.

[11] See O. Stanaitis, "Matematika netolimoj praeity ir šiandien", *Kosmos*, 1938, Nr. 1/3, p. 1–3.

[12] See O. Stanaitis, "Naujas požiūris į egzaktinius gamtos mokslus ir matematiką", *Kosmos*, 1939, Nr. 7/9, p. 217–224.

[13] See A. Jakštas-Dambrauskas, *Trys garsiausieji matematikos klausimai* (Kaunas, 1924), p. 1–134.

(1931), O. Stanaitis wrote about H. Minkowski (1939), P. Dovydaitis — about L. Da Vinci (1922), S. Antanaitis — about J. Kepler (1933) and Archimedes (1939).

By the World War II Saliamonas Antanaitis (1894–1973), who had maintained licentiate in Fribourg, had written a monograph *Archimedes. The Great Greek Scientist*.[14] Due to the war the publication was lost, so S. Antanaitis emigrated to the West, and in 1955 in Torino he republished the monograph. The biggest part of the book deals with Archimedes' works and highlights his merit in algebra and geometry. While writing, S. Antanaitis referred to numerous German, Russian, French and English writings in the history of science.

Besides that the graduates in mathematics used to choose diploma papers on the history of mathematics, for example, in 1936 professor Z. Žemaitis supervised a diploma paper "Infinite smallness analysis in 18th century".[15]

In conclusion, the presented facts say that the history of mathematics played an important role in the studies of mathematics at the University of Lithuania, aroused the greater interest in these studies and fostered the spread of mathematics in Lithuania.

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[14] See S. Antanaitis, *Archimedas.Didysis graikų mokslininkas* (Torino, 1955), p. 1–183.

[15] See J. Banionis, *Matematikos mokslo raida Lietuvoje 1920–1940 m* (Vilnius, 1994), p. 74.