Czech and Polish Mathematicians Facing the Choice Between Transnational and Slavic Contacts

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Čeští a polští matematici na křižovatce transnacionálních, či slovanských kontaktů

Abstract: The paper examines the forming of national academic communities in successor states and in the situation after the First World War when scholars (mainly those working in life sciences) participated in the scientific legitimisation of the emerging states. The young generation of scientists faced the question of how prestigious the tradition of contacts with Slavic scholars was and if it was justifiable to limit contacts with German scientists. The author points out the need for examining academic networks, social interaction of scholars, and the transfer of scientific knowledge to qualitatively assess the development of different disciplines of science. Using the example of Czech mathematicians, the author demonstrates their efforts in establishing professional and social contacts with German mathematicians, although in the academic world after the First World War these relations were otherwise officially limited. Czech mathematicians, however, did not want to stay behind in the dynamic development of new theoretical disciplines (e.g. non-Euclidean geometry or topology) and limit the relations to those with their Slavic counterparts, even though the cooperation with the Polish School of Mathematics was still valuable to them. The author of the paper asks to what extent this was the case of the generation of scientists starting their career in the interwar period, namely Václav Hlavatý or Eduard Čech, and concludes that in the history of science it is necessary to distinguish between strategies and social communication of scholars in the disciplines of formal and natural science. The subject is approached from the perspective of transnational history and the formation of Czech and Polish academic networks.

Keywords: academic networks; international congresses; generational consciousness; history of science; Czech mathematics; Polish School of Mathematics; Lwów School of Mathematics

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Introduction

Scholars in Central and Eastern Europe wanted to build their national academic communities which could equal those in Western Europe. Traditionally, since the 19th century, national science meant having their own terminology, academic journals, institutions (academies of sciences) etc. Publishing academic findings in foreign languages was becoming prestigious publicity abroad rather than an interest in transnational cooperation. In the Bohemian Lands there had been a focus on the cooperation with Slavic scholars since the 19th century even though Pan-Slavism did not have a clear concept and Neo-Slavism as a political programme did not gain definite acceptance before the First World War. While French and German historiography criticised the participation of scholars in the First World War (see the term *der Krieg der Geister*), Central- and Eastern-European war experience was different. As Maciej Górny rightly pointed out [*Górny 2013: 13*], historiography

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emphasised scholars' contribution to the forming of the successor states, which legitimised the discourse of national science. It was again confirmed after the experiences of the Second World War, even in the Communist discourse (e.g. Zdeněk Nejedlý's focus on Czech national tradition in his science policy or the importance of science and technology for renewal of the centralised economy).

In this context, I would like to point out several issues. The concept of Slavism in relation to academic work is not clearly defined. How did the opportunities of scientists to participate in the politics of science depend on their loyalty to the government? Did various science disciplines have an equal share in building a national state?

While the development of historical science and other social sciences after the First World War focused on co-operation with Slavic countries, which had a long-time tradition, the situation in natural and formal sciences was somewhat different. Some of the physical sciences also focused on the Slavic contacts professionally, socially, and, especially, politically. The disciplines with direct relation to Earth and soil (geography, geology etc.) provided young academic elites with necessary arguments for justifying the borders of the newly formed countries. Some of life sciences (botany, zoology etc.) offered similar solutions and helped to find both common and differing features of the natural borders between the countries [*Górny 2017*; *Vácha 2012*]. This was also the path chosen by anthropologists or ethnographers who organised exhibitions of Czech and South Slav art and folk culture at the National Museum.[1] The scientists studying nature used Darwin's theory of evolution and transferred its ideas about the natural selection of species to the social relations of their national community, while looking for a way to make their nation a strong species, able to compete with other countries. Such a biology-based doctrine was successfully applied by the Polish politician Roman Dmowski who had a degree in biology. In his concept of the Second Polish Republic, he advocated building a strong Polish nation that minorities would have to integrate into [*Brykczyński 2017: 120–123*]. In the interwar Czechoslovakia, similar nationalist stances in politics were held by the botanist Karel Domin, zoologist Bohumil Němec and others [*Janko – Martínek 2010: 304–306*; *Tomeš 2016: 161–182*; *Koutecký 2004: 80–92*]. In his book "Wielka wojna profesorów", Maciej Górny similarly described the construction of the national organism by Slavic geographers, anthropologists, and psychiatrists [*Górny 2014*]. But what was the role of formal sciences?

However, representatives of some natural sciences, namely chemistry, pharmacy, and biochemistry, decided it was necessary to focus on intensive cooperation with Western Europe. They did not gather collections or organised exhibitions but dealt with laboratory research and development of technology [*Štrbáňová 2016: 45–60*]. The necessity to form transnational (and not only Slavic) contacts, was definitely most prominent in mathematics, physics, and astronomy.

The aim of this paper is to examine the importance of academic networks, the social interaction of scholars, and the transfer of scientific knowledge in order to qualitatively assess the development of individual disciplines. In this perspective the approach of historical sociology and traditional history of science differ widely. On the example of Czech mathematicians, we can observe their efforts to make professional and social connections

[1] For example, the exhibition work of the ethnographer Drahomíra Stránská (1899–1964) is described by Woitschová – Jůn [*2019: 301–302*].

with German mathematicians in Prague and Brno and, of course, in Germany. They did not want to limit their contacts to mathematicians from Slavic countries only, even though the contribution of Poles (especially the Lwów School of Mathematics) and Soviets was highly inspiring already in the period between the world wars [*Duda 2007: 37–61*]. Czech and Polish mathematicians traditionally focused on cooperation with scientists and schools in Western Europe and there was small interest for exclusive connection to Slavs on the professional level.

I have formulated a few interconnected questions, which are viewed mainly from the perspective of transnational history and the angle of forming Czech and Polish academic networks [*Middell 2006*]. In what context did Slavic contacts form a natural academic network with a tradition going back to the 19th century? In which cases was Slavic cooperation deliberately favoured with the aim of blocking the older (and stronger) German science? For example, after the First World War, the Czech geographer Jiří V. Daneš, a key figure in the Czech-Serbian cooperation, deliberately promoted Slavic contacts. As a scientist, he claimed that based on objective scientific arguments, the existing German research, trade, and market, should be replaced by that of the successor Slavic states [*Pavlíček 2017: 507*].

At first glance, there is no direct relation between cooperation on scientific research and political beliefs. But seen from the cultural perspective, purely scientific work is closely connected to social contacts between scientists. Here, I would like to return to the original idea of historical experience of scientists. Did various fields of science have an equal share in the formation of the national state, or was the role of formal sciences principally different? I presume that it would be difficult to verify the comparisons between different disciplines so I will use the methods of historical sociology, which uses the generational point of view. How much did individual fields change due to the generational replacement of professors? What were the different expectations of science in different generations? How was the experience of formation of national states different for the generation from before the First World War and the next generation?

The concept of generation is treated in this paper as a sociological and historical category, which emphasises a shared experience of one generational unit, defined as a group of people who were born within 5 to 8 years from each other and were socialised in very similar conditions. A generational unit is collectively coherent, not only based on similar age, but also because its members define their situation in a similar way and share a similar response to the issues of their generation. Two assumptions are necessary for a formation of a generational experience: priority of the generational context and the significance of the youth stage, including, besides adolescence, university studies. According to Karl Mannheim, "The young experiencing the same concrete historical problems may be said to be part of the same actual generation" [*Mannheim 1972: 304*]. Mannheim's definition is further developed by a German historian Michael Corsten, who says that a generation is identified and set in historical processes by self-thematization, identifying the patterns of its interpretation, and validation of collective experience in the discourse [*Corsten 1999: 261*].

This point of view raises new questions: Why are the representatives of the same generation inclined to work closer together? What is the significance of passing on international contacts and including younger scientists in the network? And, finally, to what extent did the scientists in Central Europe participate in the post-war euphoria, which promised to establish national scientific schools and scientifically confirm the borders of the successor

states? [*Borodziej – Górny 2018*]. Was Slavism a natural connector or a pragmatic tool for establishment of one's own scientific school? How were the academic contacts from the interwar period confirmed or refuted by the subsequent historical events? Did formal scientists also need Slavism? Before presenting specific examples, I would like to emphasise that the First World War brought ground-breaking results also for communities of mathematicians, physicists and astronomers in the Western European countries of the Entente. Although the process of formation of their countries had already been completed, after the war there was a fierce discussion about the importance of science and the use of scientific work for the society or war interests. Connected to this are the opinions of the pacifists of the period, who during the war accused mathematicians of enabling, with their calculations, the construction of more precise heavy artillery or developing air force. Especially the French voiced a lot of reproach against German mathematicians, physicists, and engineers [*Aubin – Goldstein 2014: 1–56*].[2] This illustrates the attitude in Europe concerning German science and technology.

Mathematics, Geometry, and Theoretical Physics – the Efforts to Unify the Research

Czech mathematics in the 19th century, in an effort to become a discipline independent of German mathematics, started to stay behind the current scientific development. The production of Prague geometric school recorded a huge progress only in geometry [*Folta 1982: 31–49*]. It was the interwar generation of mathematicians that managed to catch up with the development. The ideal example of this is the Czech mathematician Václav Hlavatý (1894–1969), who started his studies at the Czech Technical University in Prague in 1913 and at Charles-Ferdinand University in 1914. He completed his studies, interrupted by the war, in 1920 [*Durnová – Kotůlek – Žádník 2017: 8*]. In his career, he gradually moved from the post of a secondary school teacher in Louny to Prague, where he completed his habilitation at the Faculty of Science at Charles University in 1925 and became an ordinary professor of geometry in 1931. He studied under Bohuslav Bydžovský, but during his stay in the Netherlands he was also significantly influenced by Jan Arnoldus Schouten or by Tullio Levi-Civita (Rome), Élie Cartan (Sorbonne), Oswald Veblen (Princeton). Hlavatý made an effort to develop international contacts. He was invited to speak at the International Congress of Mathematicians twice (in Bologna in 1928 and in Oslo in 1936) and regularly participated in other congresses. After the Second World War, he became involved in politics (as a deputy of the Czechoslovak Interim National Assembly) and in 1948 emigrated to the U.S., where he worked, among others, with Albert Einstein. He gained international recognition in the field of differential geometry and solved difficult equations relating to Einstein's unified field theory [*Kowalski 1993: 79–81*].

Hlavatý, who had an extraordinary international career, is a good example of a member of the generation of Czech mathematicians which also includes Eduard Čech (1893–1960, studied at the Faculty of Arts from 1912, habilitation in 1922), Vojtěch Jarník (1897–1970, studied at the Faculty of Arts from 1915, habilitation in 1925) or a little younger Otakar

[2] The authors quote Jeanne Alexander, sister of the sociologist Maurice Halbwachs, who said on 9 February 1916: "Our true adversaries in today's war are mathematics professors at their tables and physicists and chemists in their laboratories" [*Aubin – Goldstein 2014: 1*].

Borůvka (1899–1995, studied at the Czech University of Technology in Brno from 1918 and the Faculty of Natural Sciences of Masaryk University, habilitation in 1928) and a little older Miloš Kössler (1884–1961, completed his studies in 1908, habilitation in 1920). All of them also had valuable international contacts and won the Rockefeller Scholarship. Eduard Čech, a genius, studied under Guido Fubini in Torino and published together with him. During the war he got an exemption of being conscripted into the army. He had a huge head start in his career becoming an extraordinary professor of mathematics in 1923 at the Masaryk University in Brno before he was thirty. Vojtěch Jarník studied under Edmund Landau in Göttingen, Otakar Borůvka under Wilhelm Blaschke in Hamburg and Élie Cartan in Paris. By comparing selected data, we can prove that the experience of this generation was similar. They experienced an interruption in their studies during the First World War, but despite that, they succeeded in restoring the level of Czech School of Mathematics to the international standard after it had stayed behind it the 19th century. Polish mathematicians tried to catch up with the European standard even harder, starting in 1915, when Warsaw University was restored [*Duda 2007: 24–26*]. A characteristic feature of the early 20th century was gradual independence and starting new mathematical disciplines. Members of the abovementioned generation devoted their whole lives to these disciplines, and after the First World War gradually filled the posts at the newly formed departments of these disciplines. This was the main motivation for scholar entanglements; not Slavic tradition or closer territoriality between Czechoslovakia and Poland. Especially theoretical mathematics and logics in Poland could mean deeper interest by Czech (and Slovak) mathematicians, astronomers, and philosophers. The father of the famous Lwów-Warsaw School of Logics Kazimierz Twardowski had studied under Franz Brentano in Vienna. The pre-war tradition of scholar contacts among Vienna, Prague, Kraków, and Lwów was still strong.[3]

But why did the efforts of the pre-war teachers generation to establish a nationally emancipated science do more harm than good to mathematics? Czech mathematician community (represented in the late 19th century by František Josef Studnička and Eduard Weyr) focused more on providing mathematical texts in Czech language than on the development of new disciplines. Such a nationalist approach had a decelerating effect on mathematics [*Folta 1982: 47*].[4] The differences are apparent also in the choice of scientific subjects among Czech and German mathematicians. While German (and world) mathematics were preoccupied with a discussion of non-Euclidean geometries and the set theory, the first work on non-Euclidean geometry in the Bohemian lands was published in 1903 in a philosophical journal *Česká mysl*.[5] The author, Vilém Julius Hauner (1877–1941),

[3] Brentano had huge influence on T. G. Masaryk, E. Husserl and other philosophers, logicians and mathematicians from Bohemian Lands. See Jan Woleński, The Lvov-Warsaw School and the Vienna Circle, in: A. Szaniawski (ed.), *The Vienna Circle and the Lvov-Warsaw School*, Boston: Kluwer Academic Publisher, 1989, pp. 443–453.

[4] Folta mentioned the limits of pre-war generation of mathematicians: only one university in Bohemian Lands and publishing in Czech: "Vedle toho zde na rozvoj okamžitého vědeckého bádání negativně působí i oproti jiným zemím opožděné rozvíjení matematiky v národním jazyku, tj. v češtině, jež stálo značnou energii prvou generaci česky vyučujících matematiků."

[5] Vilém Julius Hauner, Geometrie neeukleidovská a její poměr k teorii poznání, *Česká mysl* IV, 1903, pp. 13–22, 89–110, 161–174, 256–269, 348–357, 410–428; V. J. Hauner, Geometrie neeukleidovská II.: Theorie Riemannova, *Česká mysl* IX, 1908, pp. 170–185.

a graduate of Oxford and Cambridge, was not even a mathematics professor, but an assistant of the Astronomical Institute at the (Czech) Faculty of Arts in Prague.[6]

After Studnička and Weyr's sudden deaths in 1903, a new generation, represented by Karel Petr, Bohuslav Hostinský, and Jan Sobotka, emerged [*Schwarz 1960: 598–603*]. But even they were not interested in the latest developments in the European mathematics. Hostinský, who taught differential geometry, was known for his dislike of Einstein's theories. On the other hand, Hlavatý and other members of the youngest generation (still at university) were fascinated by Einstein. They were supported by Bohumil Bydžovský, their exceptional teacher with broad horizons and international contacts that he shared with his students [*Durnová – Kotůlek – Žádník 2017: 21*]. This is when the phenomenon of double mentorship in the field of formal sciences started. A young scholar, beside a Czech teacher, had a foreign mentor, with whom they studied or worked abroad. As mentioned above, the generation of Czech mathematicians who became professors during the interwar period, underwent part of their education under two or more teachers.[7] Generally, the number of Czech students at Charles University in Prague who got a doctorate in mathematics increased. Ninety-seven doctoral dissertations were submitted at the Faculty of Science in the years 1920–1939 (ten of them written by female scientists) while in the period of 1882–1920 only sixty-two dissertations had been submitted, because PhD students from the Bohemian Lands had usually studied abroad [*Bečvářová 2019: 25*]. In the interwar period, both Czech and German mathematicians had a higher chance of working in the academic field than before.

German mathematicians in Prague who tried to keep in step with the development of mathematics in Germany had a different career trajectory. The most prominent examples are Phillip Frank (Einstein's successor on the *Lehrstuhl* of theoretical physics in Prague), Wilhelm Blaschke, Gerhard Kowalewski, Ludwig Berwald [*Bečvářová 2016: 72–90*]. Theoretical physics in Prague was generally better off than mathematics because Philip Frank started lectures on Einstein's theory relativity at the German university and František Záviška did the same at the Czech Charles-Ferdinand University as early as the academic year 1913–1914[8] [*Těšínská 2012: 146–168*].

After the formation of Czechoslovakia, a certain animosity existing between Czech and German academic community also affected mathematicians, as recorded in the memoirs of Gerhard Kowalewski (1950), who was teaching in Prague until 1920 [*Durnová – Kotůlek – Žádník 2017: 41*]. But the younger generation, not so dependent on their teachers, wanted to free themselves from nationalist prejudices and the reluctance to communicate in foreign languages. Czech students of differential geometry were able to learn from a group

[6] Hauner completed his doctoral thesis in 1900 under professor Studnička, who sent him to Cambridge. Hauner was the uncle of the astronomer Luboš Perek (1919–2021), who, after Hauner had been arrested by the Gestapo in 1941, inherited his English mathematics textbooks and studied them on his own during the Second World War. See T. W. Pavlíček, Rozhovor s Lubošem Perkem, 6 December 2016. Masarykův ústav a Archiv AV ČR [further MÚA AV ČR], collection Luboš Perek, not sorted, transcription of an interview.

[7] Hlavatý with J. A. Schouten, Jarník with E. Landau, Čech with G. Fubini, O. Borůvka with E. Cartan; likewise astronomers: J. M. Mohr with prof. F. Gonnessiat in Algeria, B. Šternberk with P. Guthnick.

[8] Another characteristic feature of that period was also an increasing ratio of female students at the German university, which became open to women studying. However, it was still conservative when it came to female students getting doctorates [*Bečvářová 2019: 227*].

of German (and Jewish) mathematicians led by professor Berwald [*Šimůnek – Kostlán 2013: 18–24*].

In Poland, a similar, or even stricter, approach was manifested by the Polish academic community in Poznań, which on 11th November 1918 formed a Committee for Founding a Polish University and afterwards supported the exile of Germans from the Poznań region [*Matusik 2019: 41*]. The new Polish university took over the main buildings previously used by the Prussian administration (the castle, the seat of the Prussian Settlement Commission, the building of the Reiffeisen bank etc.). But mathematicians were not among the activists involved in the process.

What was the situation of German mathematicians in Czechoslovakia immediately after the First World War? They stopped studying abroad for their doctoral degrees and wrote their dissertations in Prague due to strict rules regarding the nostrification of foreign degrees. At the same time, many mathematicians of different nationalities (often Jewish) came to Prague from Eastern European countries. German University and German Technical University in Prague offered them studies with many renowned professors, including the already mentioned Berwald, Georg Alexander, Rudolf Carnap, Carl Isidor Cori and others [*Netuka 1999: 227–232*] who, along with their French and Italian colleagues, represented top scientists in the world. But after the Paris Peace Conference, the International Mathematical Union (IMU) and the International Research Council (IRC) excluded members who were from the Central Powers. This restriction thus affected not only German, but also Austrian, Hungarian and Bulgarian(!) scientists until they were able to return to international congresses in 1926 [*Lehto 1998*].

Mathematical Congresses and the Intention to Cross the Borders of States, Nations, and Disciplines

Another issue of the disadvantageous unilateral scientific cooperation were the first congresses after the war. The ban on the participation of German (and other) scientists in the international congresses was perceived by some of the neighbouring partners (like the Dutch or Czechs) as a mutually harmful isolationism. How was Czech community to develop Einstein's non-Euclidean geometry if the contacts with German mathematicians had stopped? Did the isolation affect all mathematicians or only the interwar generation (Czech mathematicians and physicists who had studied before the war with Czech and German teachers, both at home and abroad)? German and Austrian mathematicians dealt with this situation by organising their own congresses. In September 1921, the German Mathematical Society (Deutsche Mathematiker-Vereinigung) and the German Physics Society (Deutsche Physikalische Gesellschaft) organised a congress in Jena. Among the participants were Dutch scientists, e.g. Jan Arnoldus Schouten and Dirk Jan Struik from Delft, who were interested in further cooperation. The academic community in the Netherlands openly criticised the exclusion of German science. This congress became especially important as it lay the foundations of applied mathematics and mechanics. This is when Gesellschaft für angewandte Mathematik und Mechanik was founded and the journal *Zeitschrift für angewandte Mathematik und Mechanik* first appeared [*Eckert 2005: 100–101*].

Dutch mathematicians developed contacts with their German colleagues and invited them to the 1st International Congress on Applied Mechanics in Delft in April 1924.

Among the participants were the Prague physicist Philipp Frank from the German University and Theodor Pöschl, the rector of Prague German Technical University. It was easier to invite the German mathematicians through Schouten's wife, who was German. Participation of wives in the cultural programme of such congresses was not just a way of filling free time but enabled the organisation of social and charity events and expressed an important symbolic capital of the scientists [*Löwe 2015: 39–62*]. Apart from Schouten, a member of the organisation board, among the present was Struik with his wife Sally Ruth, the first woman to earn a PhD degree in mathematics at the German University in Prague [*Bečvářová 2019: 342–348*]. The employment of women in the academic field was still a precarious subject, and the congresses offered a new path to the scientists' wives who were scholars themselves. At the Delft congress, Hlavatý was the only Czech who witnessed the successful cooperation between Dutch and German scientists. His travel expenses were covered by the Second Department of the Czech Academy of Arts and Sciences. After his return to Prague, Hlavatý wanted to take part in a meeting of three mathematical societies in Innsbruck in September 1924: the German Mathematical Society, the Austrian Mathematical Society and the Society for Applied Mathematics and Mechanics. He was not able to do so because he did not get the time off from his secondary-school teaching job [*Durnová – Kotůlek – Žádník 2017: 43–46*].

At that time, the contacts between Einstein's theory of relativity and the modern differential and non-Euclidean geometry were considered extremely productive. It was typical for the young Czech mathematicians not to publish in established journals edited by the older generation (*Časopis pro pěstování mathematiky a fysiky*), but in philosophy journals (Hauner in *Česká mysl*, Hlavatý in *Ruch filosoficky*). Hlavatý's unique effort to start cooperation with foreign scholars and bring new methods of debating current scientific topics to teaching in Prague became evident. He organised special lectures called "Conversations about the newest trends in mathematics". Despite all that, could the Slavic contacts also have some kind of individual benefit for young Czech mathematicians? There was at least one opportunity for that. Because of a limited number of lecturing posts at universities in Czechoslovakia, it was possible to apply for a job in Zagreb. Both Borůvka and Hlavatý did so. The team of professors at the Zagreb Faculty of Arts and the university senate voted for Hlavatý to become a professor there in 1927, but he never took the post due to finances and accommodation issues in Zagreb [*Durnová – Kotůlek – Žádník 2017: 57*].

Congresses of Slavic Mathematicians

Congresses of Slavic mathematicians were another opportunity for using Slavic contacts. They started a few years later than similar congresses of Slavic geographers or ethnographers, when German scientists could again participate in international congresses, while "national" mathematical societies had gradually been established in Central and Eastern Europe. Polish Mathematical Society (Polskie Towarzystwo Matematyczne) was founded on 2 April, 1919. Over the next ten years the Lwów School of Mathematics reached the top of the field, especially in the functional analysis and topology. The same goes for the Polish School of Logic in Warsaw [*Duda 2009: 241–279*].

The first congress of Polish mathematicians took place in Lwów on 7–10 September 1927. Václav Hlavatý was one of the foreign speakers. Apart from the discussion on the

organisation of mathematical research, the congress adopted a resolution to initiate congresses of Slavic mathematicians, with the first one planned for 1929. It took place in Warsaw on 23–27 September 1929 and there were 70 participants from Poland, Czechoslovakia, Yugoslavia, Bulgaria and Romania. The president of the International Mathematical Union, W. H. Young, was also present [*Leja 1930*]. Czechoslovakia was represented by Bydžovský (Hlavatý was missing as he was going through a divorce). The congresses of Slavic mathematicians also invited scientists from Western Europe as speakers wit the aim to present outstanding results before the whole Europe.

The second congress did exactly that. It took place in Prague on 23–28 September 1934 under the patronage of T. G. Masaryk and was organised by the Union of Czechoslovak Mathematicians and Physicists. The chairman was Karel Petr, and the secretary at first Hlavatý and then Miloslav Valouch. Besides Czech and Slovak mathematicians, there were also Poles, Bulgarians (G. Maneff, K. Popoff, L. Tchakaloff, I. Tzénoff), and Yugoslavs (e.g. J. Karamata, M. Petrovitch, T. Peyovitch, M. Radojčić, N. Saltykow, V. Varićak, V. S. Vrkljan, V. Žardecki) [*Zpráva 1934: 181–182*]. German colleagues, among them Berwald, were also asked to speak at the congress. From the content, it is apparent that the organisers wanted to present themselves in front of their colleagues from Western Europe. Maurice Fréchet was one of the speakers.

We know the list of Polish mathematicians who were supposed to speak at the Prague congress.[9] However, it had not been clear why the Polish government stopped most of them from attending by refusing to issue their passports. The report of the Polish Mathematical Society just states that "Polish mathematicians could not participate for reasons beyond their control and not connected to science in any way" [*Congrès Polonais de Mathématiques 1937: 185*]. Duda does not make it clear either [*Duda 2019: 228*]. The reasons were long-existing and affected by the personal tension between Piłsudski's colonels and the former Prime Minister of Poland Kazimierz Bartel, who in the 1930s returned to the Lwów Technical University as a professor. Bartel criticised the Sanation and distanced himself from Piłsudski, at least in front of his fellow professors [*Kuratowski 1981: 97*]. But a real storm in the Polish academic education was caused by the radical reform of education introduced by the Minister of Religion and Education Janusz Jędrzejewicz in the academic year 1932–1933, which limited the autonomy of universities, a step criticised namely by the Lwów professors. Leon Kozłowski who became the Prime Minister in 1934, did not take into consideration John Casimir University in Lwów, where he was a professor of archaeology, and openly supported the authoritative tendencies of the Sanation colonels, although he did not belong to this group [*Jastrzębski 2013: 109*].

[9] For comparison, see the list of announced speakers: S. Mazurkiewicz, Sur la pétrisation de l'espace de continus; K. Borsuk – S. Mazurkiewicz, Sur les retractes absolus; W. Sierpiński, Les superpositions des fonctions; S. Dickstein, Adam Adamandy Kochański, matematyk polski; S. Fogelson, Sur la méthode d'inversion en statistique mathématique; F. Leja, Les suites de polynômes et la représentation conforme; T. Ważewski, Sue les équations aux dérivées partielles du premier ordre essentiellement non linéaires; S. Zaremba, Un théorème général relativ aux équations aux dérivées partielles du second ordre, linéaires et du type hyperbolique; A. Rosenblatt, Sur le équations aux derivées partielles du type parabolique à deux variables indépendantes; E. Stamm, Józef Naroński, matematyk i kartograf polski XVII stulecia; K. Matulewicz, Rola sześcianu w nauczaniu początków systematycznej stereometrji; L. Chwistek, Nouvelles recherches sur les fondements de la métamathématique rationelle; Une remarque sur les fondements de la relativité [*Zprávy 1935: 267–272*].

The government then, in September 1934, stopped some of the mathematicians from going to Prague (S. Banach, A. Łomnicki, H. Steinhaus and others from Lwów, mainly critics of Józef Beck's foreign policy). According to the congress proceedings, some of the Warsaw scholars still participated (Dickstein, Hoborski, Leja, Mazurkiewicz, Straszewicz, Tarski, Ważewski, Zygmund) [*Duda 2019: 228*]. The tension between the academic networks and politics was apparent. The introductory speech by the chairman of the congress, Professor Petr, included these words: "We regret that many Polish mathematicians could not participate in the congress. We are convinced that it happened against their will and for external reasons and we remember them warmly" [*Zprávy 1935: XXXVII*].[10] The refusal to let the Poles attend the congress confirmed the mathematicians' belief that political decisions limit the scientific development.

Karel Petr, a prominent figure of Czech interwar mathematics, went on to emphasise in his speech that mathematics is a discipline which has a unifying effect: "In the Czechoslovak state, many of the residents are Germans. Czech and German mathematicians in Czechoslovakia worked side by side in friendly atmosphere. This is nothing strange, given that the only difference between them is the language, which for a mathematician is no difference at all. It was then natural for us to ask them to co-organise the congress, to which they readily agreed." This belief was taken over by the post-war generation [*Kurzweil 2013: 311*].

The interest in German mathematics was not limited to non-Euclidean geometry or applied mathematics and mechanics. When it comes to algebra, Vladimír Kořínek spent the academic year 1929/1930 at the university in Hamburg with professors E. Artin and E. Hecke, studying abstract algebra and working with the theory of hypercomplex numbers and the theory of associative algebras [*Kohoutková – Bečvář 2005: 13*]. His professor Karel Rychlík was very interested in the findings from Kořínek's studies with Artin. On the example of Hlavatý, we can see an equally great interest in the congress of the German Mathematical Society in Düsseldorf in 1926, as well as an interest in attending the first congress of Polish mathematicians in Lwów in the spring of 1927 and the second one in 1931 in Vilnius, which signified a willingness to cross the borders of national states. So is the professional interest more important or does scholarly work adapt to the current political needs of a nation? In the Czech case the academic field looked coherent in comparison to Poland in the 1930s, where aggressive behaviour of politically radical students against their Jewish schoolmates caused problems and threats for professors.

Slavic and Czech Geographers, Geologists, and Botanists

Another example in this paper are Slavic, or, more accurately Czech, geographers, geologists, and botanists and their academic networks. In the interwar period, they had distinctly differing interests. Some of them took part in scientific justification of Czechoslovakian borders as experts of the Czechoslovak government Office for Preparation of the Peace

[10] Specific documents from the Second Congress of Slavic Mathematicians or the correspondence with Polish mathematicians are not in the personal collection of Miloslav Valouch at the MÚA AV ČR. The collection consists mainly of archival items from the period after the Second World War.

Conference or were Beneš's advisers at the Paris Conference.[11] Others started a career in diplomatic service. Geographer Daneš in the euphoria after the war expected the emerging Central European countries to exclude Germany from the overseas trade. As the first Czechoslovak consul in Sydney, he was actively involved in liaising Czech or South Slavic producers with salespeople in Australia, thus reducing the existing German contacts.[12]

Czech geography was strongly based on historical arguments for the placement of the Czechoslovak borders and it focused its research on defining the typical climatological features of the Czech or Slavic territories. Botanist Karel Domin, on the other hand, emphasised typically Bohemian and Moravian flora [*Domin 1918: 19–24*]. Geographer Viktor Dvorský in his 1918 book *Území českého národa* defined unique Czech geological features. The Czech people were supposed to be bound by these features to the Bohemian Lands as their only righteous owners. After the formation of the Czechoslovak Republic, the phrase "Czech people" was easily replaced with "Czechoslovak people" in the original texts with an explanation that Czechs and Slovaks had more things in common than they had differences [*Dvorský 1918: 31–35*]. Other handwritten scientific texts, found in personal collections, also confirm the conviction about the need for and the involvement in the matter of justifying Czechoslovak borders and common characteristics of the Slavic territory, in which ethnic Slavs reside.[13] Thus defined academic cooperation is the focus of Maciej Górny's research. Górny has analysed the works of Polish geographers, such as Eugeniusz Romer, Stanisław Zakrzewski, Józef Rostafiński, and others. According to Romer, a typical feature of autochthonous Slavic settlements were beechwoods, which stretch from the foot of the Carpathian Mountains to the banks of the Dniester. Romer's Ukrainian colleague Stepan Rudnyc'kyj, professor of geography at the Lwów university, was of similar opinion and determined the area of Eastern Europe or Ukraine specifically based on botanical and climatological phenomena [*Górny 2019: 195–203*].

Another common feature scientifically substantiating the borders of the emerging countries were the Carpathian Mountains and the Slavic mountain culture (as opposed to the uncultured population of the Alps). Scientific research of the Carpathians and the cooperation on establishing national parks on both sides of the borders was especially successful between Czech and Polish geologists. Radim Kettner and Walery Goetel became the initiators of the Congress of Slavic Geologists and the foundation of the Carpathian Geological Association (in 1922 at an international geological congress in Brussels) [*Laskosz – Chodějovský 2019: 30*]. Kettner also regularly attended the Congress of Slavic Geographers and Ethnographers (1924 Prague, 1927 Cracow, 1930 Belgrade, 1936 Sofia). In Kettner's case, it is clear that he saw the foundation of Czech (Czechoslovak) school of geology as necessary for modern research on the territory of the new country.[14] A more

[11] For example, a legal historian Jan Kapras was among the contributors to the maps of future borders of Czechoslovakia. Members of other committees included Viktor Dvorský, Karel Chotek, Radim Kettner, Adolf Černý, Lubor Niederle, Jan Koloušek [*Vácha 2012: 37–50*].

[12] In Australia, "everybody knew that, although formally I was a subject of Austria-Hungary, I was even then anti-German" [*Daneš 1926: 109–118*].

[13] Personal collection of V. Dvorský has very few of his works, but there are some shorter texts in the collection of Karel Domin. MÚA AV ČR, f. Karel Domin, inv. č. 85, 94, 155, 173.

[14] He is also the author of the text which defines the interwar aims of the Czech geological school. MÚA AV ČR, collection Radim Kettner, inv. č. 2069, manuscript Vývoj československé geologie a příbuzných věd od r. 1918, 15 pages.

extensive development of geological disciplines after 1918 was possible due to practical economic reasons, as well as the fact that new institutions were needed in order to conduct the geological research on the territory of independent Czechoslovakia. The revolutionary event of the formation of Czechoslovakia played a significant role. The president of the Czechoslovak Academy of Arts and Sciences, a mineralogist Karel Vrba, held a meeting on 13 December 1918, where a project to found a National Geological Institute (NGI) of the Czechoslovak Republic was approved. Along with Vrba, its authors were Prof. Cyril Purkyně, Prof. František Slavík, Dr. Karel Hinterlechner and a young assistant Kettner.[15] The Slovenian Hinterlechner was chosen by his Czech colleague as a vice-president of the NGI thanks to his knowledge of the central institution and his interest in the study of the crystalline basement of the Bohemian-Moravian Highlands. However, his involvement was not possible because of an agreement between Czechoslovakia and Yugoslavia not to take away talented experts from each other. The tension between the professional interest and state policy was evident.

Conclusion

The paper focuses on the question whether in natural science there is a unique relation to Slavic context and what the uniqueness consists in. This does not mean excluding formal sciences, but rather the uniqueness of academic contacts in relation to the field of study – the subject's problems and methods, or the common territories or natural and cultural characteristics. It can be concluded that in the transnational history of science it is necessary to more accurately distinguish between strategies and social communication of scientists from the fields of natural and formal sciences. To what extent is it a process applying to only one discipline in a given generation? Wasn't the process of defining new disciplines within a field of study in the end more important than Slavic or non-Slavic contacts? It is obvious that mathematicians tended to form their own networks at the expense of other disciplines.

The questions posed in the conclusion present an important perspective and context of the subject, since the original conditions and general geopolitical assumptions changed significantly after the Second World War, even among the generation presented in this paper. In the late 1930s and during the Second Word War, Czech mathematicians (and of course not only them) tried to provide help or safety for their German Jewish colleagues or those who sought political asylum in Czechoslovakia. After the Second World War, this generation was much more focused on the renewal and expansion of the cooperation with Polish and Soviet mathematicians and in this spirit practically, but sometimes ideologically, raised their students. The common experience of this generation and their teachers was the closing of Czech universities in 1939 and the interruption of high school studies due to forced labour [*Pavlíček 2020: 110–114*]. The generational break in education was a real problem for preparing a future professorship. For acquisition of smart students of mathematics, a mathematical olympiade has been founded in Poland in 1949 according to Soviet inter-war example. The olympiade was quickly transferred to Czechoslovakia (1951) and then to other countries.

[15] Ibidem, pp. 1–2.

Let us once again consider the meaning of adolescence as a stage of life at which basic *social circles* are formed and the generational self-definition takes place [*Corsten 1999: 261*]. The main experience of an adolescent is taking over the responsibility for oneself and the sign of modern times is the ability to create a primarily individual identity, different from the social identity defined by conventional methods such as role expectations etc.

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Bibliography

Archive sources

Masarykův ústav a Archiv AV ČR, v. v. i. (henceforth MÚA AV ČR), collection Luboš Perek, not sorted, transcript of an interview with Luboš Perek by T. W. Pavlíček, 6 December 2016.

MÚA AV ČR, collection Miloslav Valouch, korespondence.

MÚA AV ČR, collection Karel Domin, inv. č. 85, 94, 155, 173.

MÚA AV ČR, collection Radim Kettner, inv. č. 2069, rukopis Vývoj československé geologie a příbuzných věd od r. 1918, typescript, 15 pages.

Literature

Aubin, David – Goldstein, Catherine [2014]. Placing World War I in the History of Mathematics. In. Aubin, David – Goldstein, Catherine (eds.). *The War of Guns and Mathematics. Mathematical Practices and Communities in France and Its Western Allies around World War I* [History of Mathematics, Vol. 42]. USA: American Mathematical Society, pp. 1–56.

Bečvářová, Martina [2016]. *Matematika na Německé univerzitě v Praze v letech 1882–1945*. Praha: Karolinum.

Bečvářová, Martina [2019]. *Doktorky matematiky na univerzitách v Praze 1910–1945*. Praha: Karolinum.

Borodziej, Wlodzimierz – Górny, Maciej [2018]. *Der vergessene Weltkrieg. Europas Osten 1912–1923*. Darmstadt: Theiss.

Brykczyński, Paweł [2017]. *Gotowi na przemoc. Mord, antysemityzm i demokracja w międzywojennej Polsce*. Warszawa: Wydawnictwo Krytyki Politycznej.

Congrès Polonais de Mathématiques [1937]. *Annales de la Société Polonaise de Mathématique* 16: 182–212.

Corsten, Michael [1999]. Time of Generations. *Time & Society* 8 (2): 249–272.

Daneš, Jiří Viktor [1926]. *Tři léta při Tichém oceáně. Díl I.* Praha: Fr. Borový.

Domin, Karel [1918]. Odlišnost květeny. In. Dvorský, Viktor. *Území českého národa*. Praha: Český čtenář, pp. 19–24.

Duda, Roman [2007]. *Lwówska szkola matematyczna*. Wrocław: Wydawnictwo Uniwersytetu Wrocławskiego.

Duda, Roman [2009]. Polskie Towarzystwo Matematyczne na tle dziejów. *Wiadomości Matematyczne* 45 (2): 241–279.

Duda, Roman [2019]. *Historia matematyki w Polsce na tle dziejów nauki i kultury*. Warszawa: Instytut Historii Nauki PAN.

Durnová, Helena – Kotůlek, Jan – Žádník, Vojtěch [2017]. *Václav Hlavatý (1894–1969). Cesta k jednotě*. Brno: Masarykova univerzita.

Dvorský, Viktor [1918]. Česká půda a lid. *Národopisný věstník československý* 13 (1): 31–35.

Eckert, Michael [2005]. *The Dawn of Fluid Dynamics. A Discipline Between Science and Technology*. Berlin: Wiley-Vch Verlag.

Folta, Jaroslav [1982]. *Česká geometrická škola. Historický analýza.* [Studie ČSAV, č. 9/1982] Praha: Academia.

Górny, Maciej [2017]. *Kreślarze ojczyzn. Geografowie i granice międzywojennej Europy. Metamorfozy społeczne*, tom 11. Warszawa: Instytut Historii PAN.

Górny, Maciej [2019]. Die Grenzen in Schrift. Wissenschaften vom Menschen und die Anfänge der Tschechoslowakei. In. Hanyš, Milan – Pavlíček, Tomáš W. (eds.). *Dějiny, smysl a modernita. K 75. narozeninám Miloše Havelky*. Praha: Masarykův ústav a Archiv AV ČR, v. v. i. – Fakulta humanitních studií UK, pp. 195–203.

Janko Jan – Martínek, Jiří [2010]. Domin Karel. In. *Biografický slovník českých zemí 13*. Praha: Libri, pp. 304–306.

Jastrzębski, Jarosław [2013]. *Państwowe Szkolnictwo Akademickie II Rzeczypospolitej. Zagadnienia systemowe*. Kraków: Księgarnia Akademicka.

Kohoutková, Zdeňka – Bečvář, Jindřich [2005]. *Vladimír Kořínek 1899–1981*. Praha: Ústav soudobých dějin AV ČR.

Koutecký, Josef [2004]. Přírodovědec Bohumil Němec. In. Šmahel, František (ed.). *Učenci očima kolegů a žáků*. Praha: Academia, pp. 80–92.

Kowalski, Oldřich [1993]. Věnováno Václavu Hlavatému. *Pokroky matematiky, fyziky a astronomie* 38 (2): 65–81.

Kuratowski, Kazimierz [1981]. *Notatki do autobiografii*. Warszawa: Czytelnik.

Kurzweil, Jaroslav [2013]. Medailon o Vojtěchu Jarníkovi (1897–1970). *Pokroky matematiky, fyziky a astronomie* 58 (4): 311–314.

Laskosz, Joanna – Chodějovský Jan (eds.) [2019]. *Korespondence Waleryho Goetela s Radimem Kettnerem. Korespondencja Walerego Goetla z Radimem Kettnerem*. Praha – Kraków: Masarykův ústav a Archiv AV ČR – Archiwum Nauki PAN i PAU.

Lehto, Olli [1998]. *Mathematics without borders. A history of the International Mathematical Union*. New York: Springer.

Leja, Franciszek (ed.) [1930]. *Sprawozdanie z I Kongresu Matematyków Krajów Słowiańskich*. Warszawa.

Löwe, Benedikt [2015]. Die ersten beiden Hamburger DMV-Jahresversammlungen 1901 und 1928. In. Löwe, Benedikt – Niehaus, Hendrik (eds.). *Jahrestagung der Deutschen Mathematiker-Vereinigung, Freie und Hansestadt Hamburg, 21. bis 25. September 2015*. Hamburg: Verein zur Ausrichtung von Tagungen am Fachbereich Mathematik der Universität Hamburg, pp. 39–62.

Mannheim, Karl [1972]. The Problem of Generations. In. Kecskemeti, Paul (ed.). *Essays on the Sociology of Knowledge*. Routledge, pp. 276–322.

Matusik, Przemysław [2019]. Miasto i Uniwersytet. In. *Kronika miasta Poznania, Uniwersytetowi na stulecie* (1): 37–60.

Middell, Matthias [2006]. Transnationale Geschichte als transnationales Projekt: zur Einführung in die Diskussion. *Historical Social Research* 31 (2): 110–117.

Netuka, Ivan [1999]. Georg Pick – pražský matematický kolega Alberta Einsteina. *Pokroky matematiky, fyziky a astronomie* 44 (3): 227–232.

Pavlíček, Tomáš W. [2017]. Kulturní výměna a zprostředkování obrazu Nového Zélandu. Fotografie českého geografa J. V. Daneše. *Český lid* 104 (4): 495–511.

Pavlíček, Tomáš W. [2020]. Rozhovor s prof. Jaroslavem Kurzweilem. *Pokroky matematiky, fyziky a astronomie* 65 (2): 90–117.

Schwarz, Štefan [1960]. Desiate výročie smrti prof. Karla Petra. *Pokroky matematiky, fyziky a astronomie* 5 (5): 598–603.

Šimůnek, Michal V. – Kostlán, Antonín (eds.) [2013]. *Dusappeared Science. Biographical Dictionary of Jewish Scholars from Bohemia and Moravia – Victims of Nazism, 1939–1945*. Červený Kostelec – Praha: Pavel Mervart – Kabinet dějin vědy ÚSD AV ČR.

Štrbáňová, Soňa [2016]. *Holding Hands with Bacteria. The Life and Work of Marjory Stephenson*. Berlin: Springer.

Těšínská, Emilie [2011]. Profilování teoretické fyziky na pražské univerzitě a vazby s pražským působením A. Einsteina před 100 lety. *Pokroky matematiky, fyziky a astronomie* 57 (2): 146–168.

Tomeš, Josef [2016]. Benešův prezidentský protikandidát: politický profil profesora Bohumila Němce (1873–1966). *Moderní dějiny: časopis pro dějiny 19. a 20. století* 24 (2): 161–182.
Vácha, Zdeněk [2012]. *Žádám Vás jako vynikajícího odborníka… Organizace odborných prací pro československou delegaci na mírové konferenci v Paříži v letech 1918–1919*. Praha: Masarykův ústav a Archiv AV ČR.
Woitschová, Klára – Jůn, Libor [2019]. *Národní muzeum v éře Československa*. Praha: Národní muzeum.
Zpráva. Druhý sjezd matematiků zemí slovanských v Praze [1934]. *Aktuárské vědy* 4 (4): 181–182.
Zprávy. Druhý sjezd matematiků zemí slovanských [1935]. *Časopis pro pěstování matematiky a fysiky* 64 (6): 267–272.

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