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**Sergei Natanovich Bernstein in Kharkiv (1908-1932)**  
*Making the best mathematics of an unstable situation*

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**Abstract** : *The paper studies the presence of Sergei Bernstein at Kharkiv university during two decades, in the turmoil of events that happened in Ukraine in the Great War and its aftermath. The apparent refusal of emigration by the mathematician during the 1920s is examined as well as his successful career, leading to a transfer to Leningrad and Moscow in spite of his rather open opposition to some ideological aspects of the Soviet ideology. Some particularities of the local situation in Kharkiv may have played a rôle in this singular evolution.*

**Keywords** : Sergei Bernstein. Hilbert problems. Russian emigration. Soviet Ukraine. Kharkiv university. Dialectical materialism. Esperanto.

## INTRODUCTION

The mathematician Sergei Natanovitch Bernstein (1880-1968) was undoubtedly one of the most prominent figures on the mathematical scene of the last century. Beginning his professional life with a dazzling coup when he solved one of the problems presented by David Hilbert (1862-1943) at the International Congress of Mathematicians in Paris in 1900, he became a well-known scientist at an early age, thanks to his association with such emblematic scientists of the period as Hilbert and Émile Picard (1855-1941). However, his career did not take off as expected. His return to Russia after his long stay in Germany and France proved disappointing, as he failed to secure the post he had hoped for in St. Petersburg, and found himself teaching in Kharkiv, today in Ukraine, which was certainly one of the best provincial mathematical centers in the Russian Empire, but fell far short of the aspirations of a young man who had experienced Göttingen and Paris. Bernstein's eyes were now turned westwards, and he called on Hilbert to help him find a position in Germany. But he remained in the Ukraine, where his situation gradually improved with his reputation, through all the upheavals that Kharkiv experienced during the two decades he was there, before he was appointed professor in Leningrad.

Bernstein's career has already been the subject of a number of publications in Russian, Ukrainian and English. I note, however, that up to my best knowledge there does not yet seem to be an extensive biography of a figure who would certainly constitute a good subject for one. It is not impossible that one reason for this is a lack of documentation on certain periods of his life. One of the aims of this article is to provide additional elements to fill in some of the gaps, through unpublished archives that I have been able to find here and there, in often unexpected contexts.

One of the original aspects I focus on in my paper concerns Bernstein's Ukrainian period while at Kharkiv University. This period has generally been considered rather laconically in the texts I have seen, with the exception of the polemic that arose at the 1930 Congress of Soviet Mathematicians held in Kharkiv. Bernstein was attacked there for his critical stance on dialectical materialism, which was becoming the official philosophical doctrine of Soviet science. The controversy led to the loss of his post as Director of the Kharkiv Mathematical Institute and his transfer to Leningrad. In my opinion, not enough attention has been paid to the way in which Bernstein was able to benefit from the specific features of the chaotic establishment of an autonomous Ukraine in the 1920s, which enabled the Kharkiv mathematics department to follow a somewhat independent trajectory from that of Moscow. While Bernstein seems to have remained largely aloof from both strictly political debates and discussions concerning local particularities, such as the important movement of Ukrainization of teaching, he was immersed in this atmosphere and had to deal with it to get the best out of it.

In particular, in my article I raise the question of emigration, which might naturally have arisen, as it did for other colleagues, in the turbulent years following the revolutions of 1917. All the more so as Bernstein could have benefited from more favorable conditions than others through his well-established family ties in France. Yet he does not seem to have taken any steps in this direction, even when opportunities presented themselves and even if he was beginning to perceive that the situation was becoming tense with Stalin's increasingly obvious grip on the central apparatus of the Soviet state. Here again, it seems to me that the shifted perspective offered by his presence in Kharkiv is part of the explanation for what may appear to be a rather contradictory situation. In a way, certain aspects of local social and political life were sufficiently rich and complex, and the center of Soviet power sufficiently distant, for a certain illusion to exist, if not of protection, at least of relative invisibility.

The article is divided into four parts. The first looks back at some of the highlights of the mathematician's youth. The second part takes a closer look at the complicated situation in the 1920s

and some of the ways in which Bernstein tried to take advantage of his position in Kharkiv. To reinforce this presentation, the third part outlines some of the specific features of the academic scene in Ukraine in those same years, in particular the highly original discussions around linguistic issues. Finally, the fourth section returns to the dialectical materialism polemic I mentioned earlier, again introducing considerations on Bernstein linked to the local situation that I do not think I have seen mentioned in other works.

## I- An early fame

It is necessary to begin by recalling the mathematician's background, which is both typical in the late 19th century for a member of a prominent intellectual Jewish family in the Russian Empire, and exceptional for the precocious scientific talent demonstrated by the young man. This path has been the subject of a number of publications in English, Russian and Ukrainian, and has given rise to the excellent compilation (O'Connor and Robertson, 2010) from which I borrow many of the elements in this section, and to which I refer for further references.

Sergei (Sergi) Natanovich Bernstein was born on 5 March [22 February] 1880 in Odessa, a major Black Sea port, today in Ukraine, founded relatively recently, in 1794, on the orders of Empress Catherine II to establish the Russian Empire's presence against the Ottoman Empire. In the 19th century, the city expanded rapidly, becoming the Empire's fourth-largest agglomeration, thanks in particular to the influx of emigrants attracted by the great economic potential of this crossroads for the grain trade. Among them was a large Jewish population from Poland, including Natan Bernstein, the father of the future mathematician, who arrived from Galicia at the age of 17 in 1849. A brilliant high-school student, Natan was sent to study medicine at Moscow University in 1853-1858, where he was awarded a gold medal in 1857 for his graduation work entitled "Anatomy and Physiology of the Pneumogastric Nerve". In 1861, he became a consultant physician at the Odessa city hospital. He was associate editor of the Russian Jewish periodical "Sion" until its suppression by the government in April 1862 as part of the authoritarian crackdown imposed by the new Tsar Alexander III after the assassination of his father in 1861. It should be noted, however, that the magazine advocated the emancipation and assimilation of Jews into Russian society. In 1865, Natan was appointed lecturer in anatomy and physiology at the new University of New Russia in Odessa. From 1871, he taught anatomy there as an assistant professor, but was not confirmed in his position by the government.

Unfortunately for Serge, his father died when he was only eleven. After graduating from high school in 1898, his mother decided to send him and his sister Margarita, 4 years his senior, to Western Europe to pursue their higher education. Serge and Margarita's elder brother, Alexandr Nikolaïevitch (Solomon Natanovitch) Bernstein (1870-1922) had received baptism and went in 1888 to Moscow to study medicine. He became an important internationally renowned psychiatrist and at the end of his life was the director of the Moscow Research Institute of Psychiatry that he co-founded at the beginning of the 1920s.

Margarita Bernstein went first to Heidelberg together with her first husband<sup>1</sup> where she listened to Paul Erlich (1854-1915) lectures; however, as a foreign student, moreover almost the only woman in the audience, she found the atmosphere in Heidelberg painful and decided to join her brother in Paris where she obtained her *licence de sciences* et her diploma as a physician : she worked with the large

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<sup>1</sup> Margarita seems to have married the boy -- a former student in medicine who changed for studies in law and desired to go to Göttingen to improve his knowledge -- mostly for being able to travel more easily : the couple divorced a few years later.

Russian community working at the Pasteur Institute (Joukovskaïa and Gousseff, 2003). Natan Bernstein had been close to the Russian biologist Ilya Ilitch Metchnikov (1845-1916), who taught in Odessa in the 1870s and 1880s, then moved abroad in 1888 to work alongside Louis Pasteur (1822-1895) at the Institute he had just set up in Paris, partly thanks to funds donated by Alexander III following the successful cure of a group of Russian rabies patients.

As for Serge, he went to Paris to study mathematics at the Sorbonne. After a year, he decided instead to pursue a career in engineering, and entered the brand-new *École supérieure d'électricité*, founded by physicist Eleuthère Mascart (1837-1908) and the International Society of Electricians in 1894. It is possible that the young man was attracted by a comfortable career assured for a specialist in a technology that was then undergoing dazzling development. However, after graduating in 1901 (I have been unable to verify whether or not he actually obtained the title of engineer), Serge decided that he was more attracted to mathematics after all, and set off for Göttingen. He studied there for three semesters, starting in the winter of 1902, with Hilbert. This point is not insignificant. It was precisely at this time that the German mathematician published his famous list of 23 problems presented as the mathematical challenges of the new century. He had presented ten of them during the International Congress of Mathematicians in Paris in 1900, but his article (Hilbert, 1902) in the proceedings published in 1902 presents them *in extenso*.

Clearly, the young Bernstein was impressed by this *tour de force*, and decided to tackle the 19th problem, which concerned a question of analysis. Hilbert's presentation of the problem began as follows : "I regard it as one of the truly most remarkable facts of the elements of the Theory of Analytic Functions that there are partial differential equations whose integrals are all necessarily analytic functions of independent variables, or, to abbreviate the language, that there are partial differential equations which are susceptible only to analytic solutions." Hilbert pointed out that the most important examples of such equations came from problems arising from the Calculus of Variations "which play a principal role in Geometry, Mechanics and Mathematical Physics" and added that one is therefore led to ask whether all solutions of regular problems of the Calculus of Variations are always necessarily analytic functions, even though on the contour of the domain the function is continuous, but non-analytic. Hilbert also pointed out that recent progress had been made by Émile Picard for certain linear equations in the 1890s, especially (Picard, 1895). In (Bernstein, 1904b), Bernstein explains that it was Hilbert who had "personally recommended this interesting subject to him". A tempting hypothesis is that Bernstein, who had spent time in Paris and was impressed at the Sorbonne by the young, burgeoning French school of mathematical analysis (Picard in particular had recently published the first two volumes of his monumental *Traité d'Analyse* (Picard, 1891)), was all the more attracted by a theme then in vogue in Paris. Moreover, a number of works had just been completed on this type of question. In 1902, Hilbert's student Georg Lütkemeyer had defended a thesis in Göttingen entitled "On the analytic character of the integral of a partial differential equation" (Lütkemeyer, 1902). And Swedish mathematician Erik Holmgren (1872-1943) published an extension of these results in 1903 (Holmgren, 1903).

In any case, it was at the Sorbonne that Bernstein decided to present a doctorate in mathematical science, based precisely on the solution of Hilbert's 19th problem, which opened with a certain panache with the assertion that "[t]oday all mathematicians and physicists agree that the field of applications for mathematics knows no limits except those of knowledge itself". Like Lütkemeyer and Holmgren, Bernstein applied Picard's method of iteration, but "suitably modified to get to the point". The thesis was preceded by the publication of two notes in the *Comptes-Rendus de l'Académie des Sciences de Paris* (Bernstein, 1903), (Bernstein, 1904a) and defended in the spring of 1904 at the Sorbonne before a jury comprising no less than Henri Poincaré (1854-1912), Jacques Hadamard (1865-

1963) and Picard, who, as president, wrote the report (Picard, 1904). It was published almost immediately, no doubt thanks to Hilbert, in the *Matematische Annalen* (Bernstein, 1904b).

Bernstein left Paris to attend the International Congress of Mathematicians in Heidelberg between 8 August and 15 August 1904 and remained at Heidelberg until the spring of 1905 when he went to St Petersburg. There he had the disappointment to learn that his foreign qualification was not accepted to apply to a university position so that he had to start a doctoral program again. It seems that he passed his master examination in 1906 with some difficulty as he did not use classical methods for resolving some differential equations which was severely judged by Chebyshev's successor in Petersburg Aleksandr Nikolayevich Korkin (1837-1908). Unable to obtain a position at the university, Bernstein began to teach in the recently founded Women's Polytechnic College. He taught during the year 1907 but, desiring a post in a university where both teaching and research were valued, he moved to Kharkiv in 1908 where, thanks to his past work, he obtained a position.

Kharkiv was not just any town. Between 1861 and 1917, its population increased almost sixfold, from 50,000 in 1861 to 297,000 in 1917. It was an important center of the Ukrainian political movement, where in 1900 the first Ukrainian political party was founded. Kharkiv also had a good reputation as an emerging mathematical center. In 1879, one of the first mathematical societies of the Russian Empire was founded there and some outstanding mathematicians worked at Kharkiv university such as Aleksandr M. Lyapunov (1857-1918) between 1885 and 1902, Vladimir A. Steklov (1864-1926) who has been lecturer from 1891 to 1906 and Dimitri A. Grave (1863-1939) between 1899 and 1901. For Bernstein's destiny, the most important personality in Kharkiv was however the mathematician Antoni-Bonifatsi Pavlovich Psheboriski (1871-1941), whose life and activity is described at length in (Steffens, 2006) from which I extract a few elements.

Born into a Polish family near Kyiv in 1871, Psheboriski studied mathematical analysis there, winning a prize for his dissertation on elliptic functions. He received his habilitation from Kyiv University, but his commitment was refused by the authorities because of his Roman Catholic faith. He moved to Kharkiv in 1898 to teach at the Technological Institute (Харьковский практический технологический институт), which had just been renamed after Alexander III when the curriculum was overhauled to increase theoretical teaching. In 1899, Psheboriski became Privatdozent at Kharkiv University, conducting research into approximations in the functional field. An essential moment in his career was his mission to Germany in 1904 and the dazzling discovery of Göttingen, where he studied under Hilbert and Felix Klein (1849-1925). In the report he wrote on his return to Russia (Psheboriski, 1906), Psheboriski was quick to criticize the Czarist bureaucracy in comparison with the academic freedom enjoyed in Germany. He wrote, for example

The complete trust and the veneration that the teaching staff enjoys in the eyes of the students are a consequence of the conviction that an independent [...] professoriate that stands without pressure from outside can take between them only a worthy member, a person who devotes his power to the greatest deity -- the science whose veneration made Germany one of the most cultivated states" (quoted in Steffens (2006), p.170).

Bernstein, who had spent almost two years in Göttingen and had, since his return to Russia in 1905, encountered many disappointments, was largely as convinced as Psheboriski of this state of affairs, and this explains why he appealed to Hilbert to get him out of a situation he considered "awful" despite its apparent stabilization. He asked the German mathematician if he thought it possible to use his influence to have him recruited at some university where he could continue to devote himself to his research (Letter from Bernstein to Hilbert, 17 (30) September 1909 in Steffens (1999), p.507). Hilbert's actions are unknown, but in a later letter (17 (30) January 1910 in Steffens (1999), p.511), Bernstein mentions having received a letter from the American mathematician William Fogg Osgood (1864-

1943), who was a former student of Hilbert, probably inviting Bernstein in the United-States. In the spring of 1910, Bernstein went to Göttingen to talk to the American mathematician Dunham Jackson (1888-1946) from Harvard who was visiting Göttingen from Harvard and had specialized in approximation theory (On Jackson and his work, see (Steffens,2006), p.160]). Anyway, Bernstein did not seem enthusiastic about the prospect of leaving for America (or about the offers made to him) and the invitation was not followed up. He returned to Kharkiv, where his prestige was enhanced in 1911 by a prize awarded by the Belgian Academy. In 1903, the Belgian mathematician Charles-Jean de La Vallée Poussin (1866-1962) had proposed to the Académie in Brussels to offer a prize for a work about the possibility of approximating the function  $|x|$  on the interval  $[-1,1]$  by a polynomial of degree  $n$  with an error of less than  $1/n$ . Bernstein gave a complete solution in 1911, introducing what are now called Bernstein polynomials and giving a constructive proof of Weierstrass's 1885 approximation theorem that a continuous function on a finite subinterval of the real line can be uniformly approximated by a polynomial. He sent his proof to the Belgium Academy of Science and was awarded the prize (published as (Bernstein,1912)). In his work, Bernstein makes a significant general comment on his philosophy of mathematical research: "The example of the problem of the best approximation of the function  $|x|$  posed by de la Vallée-Poussin reaffirms, once again, the fact that a well-posed specific question leads to theories of a much more general significance." On the basis of this same work, translated in Russian, the mathematician was candidate for a doctoral grade. Bernstein defended his doctoral thesis on 19 May 1913 before a committee chaired by Psheboriski. The latter did not hide in his report (Psheboriskij, 1913) that Bernstein had been rather sloppy in the translation process as he mentions the "large carelessness of the present work which often has the character of a manuscript written for himself" (quoted in Steffens (2010), p.184). However, the importance of Bernstein's achievements was doubtless and he was finally awarded a doctorate from Kharkiv University. Bernstein gave lectures at Kharkiv Women's College until 1918 (when women were admitted to universities) and, from 1912 to 1918, he also lectured at Kharkiv Commercial University. In fact, he only became an ordinary professor at Kharkiv University in 1920.

## II - The 1920s

The years between the Russian revolutions of 1917 and the stabilization of Bolshevik power around 1922 were a turbulent time in the territory of the former Russian Empire. With the signing of the separate peace of Brest-Litovsk in March 1918, the Soviet government accepted the loss of immense territories in the west. Shortly afterwards, civil war broke out with the intervention of foreign expeditionary forces supporting the White armies, leading to a never-ending cycle of violence (Gewarth, 2016; Moffat,2015; Marples, 2014).

### a - A difficult situation in Kharkiv

Ukraine was particularly hard hit by the tornado, and saw the clash between Reds and Whites superimposed on local specificities in the hope of regaining an independence lost more than two centuries earlier (Ford, 2007). On 10 June 1917, the assembly (Central Rada) of Kyïv proclaimed the autonomy of Ukraine within the Russian bloc, and on November 7th, the independence of the Ukrainian People's Republic (Українська Народна Республіка - UNR) proposing their attachment to the governments of Ekaterinoslav, Kharkiv, Kherson, Podolia, Poltava, Tauride, Chernigov and Volhynia.

As already mentioned, Kharkiv was an important political center of the Ukrainian movement. Moreover, during the First World War, a number of educational and industrial establishments were evacuated from the Empire's western provinces to Kharkiv and settled there permanently, reinforcing the city's economic and cultural importance: agricultural institute, power plant, garment workshops. Until December 1917, power in Kharkiv was in the hands of the Provisional Government and the

democratic institutions that had emerged from the February Revolution, such as the Provincial Commissar, the City Duma and the Zemstvos. On 2 December 1917, the Kharkiv Duma voted overwhelmingly in favor of joining the UNR and recognized the authority of the Central Rada. Ukrainian regiments were also stationed in Kharkiv. But the weakness of the local forces could not oppose Red Guards and heavily armed sailors from the Baltic region arriving in Kharkiv at the end of November 1917: between December 8 and 10, 1917, the city was taken by the Bolsheviks. After the failure of the Bolshevik coup in Kyïv, some of the delegates from the All-Ukrainian Congress of Peasants', Workers' and Soldiers' Soviets of 1917 moved to Kharkiv, where they held their own congress on 24-25 December 1917, proclaiming the Ukrainian People's Republic as a federated part of the Russian Soviet Republic and creating their own executive bodies. After Brest-Litovsk, in February-March 1918, an attempt was made to create a Soviet Republic with its center in Kharkiv, but on 8 April 1918, the city was occupied by the Germans and, from 1 May 1918, the hetmanate regime was introduced. After the German defeat in the west, on 18 November 1918, UNR jurisdiction was proclaimed over Kharkiv, but on 3 January 1919, Bolshevik troops again entered the city. On 25 June 1919, Kharkiv was occupied by white units of General Anton Denikin's Armed Forces of Southern Russia, headquartered in the Noble Assembly building. After Denikin's final defeat on 12 December 1919, Bolshevik troops entered Kharkiv for the third time, and the city was designated capital of the Ukrainian Soviet Socialist Republic.

In her biography of Jerzy Neyman (1894-1981) who had been in Kharkiv from 1912 to 1921, Reid (1982) describes how the young mathematician faced the chaotic situation through a lot of picturesque and often tragical details. As he entered Kharkiv university in 1912, Neyman had several occasions to follow Bernstein's lectures, though he was never very close to him.

#### b - The temptation to emigrate?

This time of chaos saw population movements Europe had never seen before. The flight of tens of thousands of former nationals of the Russian Empire in the face of the advancing Red Army, and more generally from the combat zones, was one of the most striking events of the period immediately following the First World War in Europe. This mass exile to Europe, whose final destination was often France (at least for the intellectuals), has been brilliantly studied in various publications such as (Gousseff, 2008) or (Kunth, 2016).

In the chapter (Mazliak and Perfettini 2021), we examined the specific situation of mathematicians who emigrated from the former Czarist empire to France in the 1920s, and found that while they were in fact very few in number, their situation is interesting in that it combines general characteristics with specificities linked to their quality as mathematicians, particularly in terms of their interaction with the local professional community. One question that immediately springs to mind is how to explain Bernstein's failure to emigrate, when he seemed to have stronger assets in hand than some of the figures we followed in our study. All the more so since his location in the southwest of the Empire might at first glance seem favorable. Bernstein was 38 in 1918 and, as we have seen, he was a mathematician with a well-established international reputation. According to the *Zentrablatt*, between 1904 and 1918, he had published several dozen articles, almost all in French, and 22 of them in French journals, including 19 notes in the *Comptes-Rendus* of Paris Academy of sciences presented by Émile Picard. Knowing Picard's hostility to the Bolshevik revolution, it is likely that he would have helped the brilliant young mathematician whose thesis he had chaired fourteen years earlier.

But it was above all Bernstein's family facilities that made his apparent choice to stay in Kharkiv vaguely surprising. Indeed, his sister Margarita, with whom he had made the journey to Paris at the end of the 19th century, was now settled in the French capital, and very well off after her marriage to



a prominent figure, the physician Vladimir Aïtoff (1879-1963). Son of Russian revolutionary emigrant and Freemason David Alexandrovitch Aïtov (1854 - 1933), Vladimir first made a name for himself by winning the gold medal at the 1900 Paris Olympics with the Racing Club de France rugby team. In 1905, Vladimir moved to St. Petersburg as a doctor at the French hospital. At the outbreak of the First World War, he became a non-commissioned officer with the French military mission in Russia. In the dossier for the Légion d'Honneur awarded to him in 1920, the French ambassador to Russia, Maurice Paléologue, was full of praise for his fervent commitment. In the 1910s, Vladimir had married Margarita Bernstein: I have not been able to locate the date and place of the marriage, nor how the couple met, but their first child André-Serge was born in St. Petersburg in 1913.<sup>2</sup> On their return to France, Vladimir became a prominent hepato-gastroenterologist at Paris Hospitals, specializing in alcoholology at Kremlin-Bicêtre, and involved in the fight against prostitution and alcoholism (together with Germaine Champion (1905-1998) and André-Marie Talvas (1907-1992), he was later one of the founding members of the anti-addiction movement *Vie Libre*). Margarita was a biologist at the Pasteur Institute. The Aïtoff couple live on rue Vital in the affluent Paris district of La Muette.

Bernstein resumed contact with his French colleagues as soon as possible, since a note to the Comptes-Rendus was presented in 1922 (Bernstein,1922), followed by several others in 1923 on questions of polynomial approximation of functions, which extended his 1911 results, or other questions of analysis. These were presented by various mathematicians (Hadamard, Lebesgue... ), a probable sign of the author's desire to multiply his contacts. Moreover, since his arrival in Kharkiv, Bernstein had been interested in the calculus of probability, which he had initially considered from a purely analytical angle, a legacy of the work of the St. Petersburg probabilists (notably Markov and Lyapunov) with whom he had contacts on his return to Russia. He had published in 1911 the paper (Bernstein, 1911) on the use of Laplace approximation in probability. By 1917, Bernstein, always attentive to Hilbert's problems as we have seen, had turned his attention to the 6th and proposed one of the first axiomatic systems for the theory of probability (Von Plato, 1994). He could not have been unaware that, in France in the early 1920s, the only authoritative mathematician interested in a discipline little appreciated on the Parisian scene was Émile Borel (1871-1956), especially as the same year, 1923, saw the publication by Gostizdat of the Russian translation of Borel's bestseller "*Le hasard*" (Randomness) in an edition commented by V.A.Kosticyn (Mazliak and Perfettini, 2021). It was therefore quite logical that Bernstein turned to Borel to publish his first notes to Paris Academy on probabilistic questions about genetics (Bernstein, 1923a; Bernstein, 1923b), whose applied character could only satisfy Borel's vision of the importance of the calculus of probabilities as the foundation of mathematical statistics (Catellier and Mazliak, 2011).

It was certainly Borel who Bernstein relied on to be invited in France. Having embarked on a national political career with the radical-socialist alliance *Cartel des Gauches* in 1924, and even holding the ministerial portfolio for the Navy in two governments of his friend the mathematician Paul Painlevé (1863-1933) during 1925, Borel's authority had grown considerably. A police file at French National archives (AN 19940434/289/24095) reveals that Bernstein, together with his wife Liubov and their son German (who was besides born in Paris in 1905) came to Paris in May 1927 for a 3 month stay (in fact 6 months for German). The indicated motivation for the mathematician is "scientific works", while for German it is "scientific studies". The Bernstein family stipulates that they will stay

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<sup>2</sup> André-Serge Aïtoff (1913-1940) entered the Ecole Polytechnique in 1933 and worked for the ministry of finance for a short period. He was killed in action in June 1940 during the battle of France. His mother Margarita (Bernstein's sister) wrote a vivid and moving manuscript about her son. It was not published but was fortunately given to the *Association pour l'autobiographie et le patrimoine autobiographique* in Amberieu-en-Bugey where I have consulted it.

at the Aïtoff's house during their stay in France. They also indicate that their warrants in France are Borel and Hadamard. On Bernstein's visa form, the police officer in charge added the handwritten mention : "Well-known scientist" to have the application granted.

In 1928, Borel had used his visibility on the national political scene to bring to fruition an ambitious scientific project: the opening in Paris of an institute dedicated to research and the transmission of knowledge on the calculation of probabilities and mathematical physics. The Institut Henri Poincaré -- on the IHP, from its genesis to its influence, see the important thesis (Cléry, 2020), a brief summary of which can be found in (Cléry and Mazliak, 1922) -- opened in November 1928, and from that moment on, Borel took advantage of the opportunity to help foreign colleagues facing political difficulties in their own countries, through various types of invitation: this was notably the case for his great friend the Italian mathematician Vito Volterra (Goodstein, 2007; Guerraggio and Paoloni, 2013), and after 1933 for a number of German mathematicians (Siegmond-Schultze, 2009). IHP archives show that the institute was also used to facilitate the travels of Soviet mathematicians, occasionally enabling them to emigrate as well, as in the fascinating case of Vladimir A. Kosticyn (1883-1963) studied in (Mazliak and Perfettini, 2021).

Bernstein played an important role at the Bologna International Congress in September 1928, where, largely thanks to him, the new field of study of Markov chains emerged through the meeting of various related probabilistic themes (on this subject, see the brilliant article (Bru, 2003). See also (Mazliak, 2015) ). While Borel was not in Bologna (Capristo, 2016), Maurice Fréchet, to whom Borel would entrust the probabilistic leadership of his new Institute, was. On 10 December 1928, Bernstein was elected Correspondent of the Paris Academy of Sciences by 46 votes to Birkhoff's 3 and Castelnuovo's 3.

Bernstein came back to France in April 1929 for two months, as is indicated in the police file (AN 19940434/289/24095), invited by the Committee of scientific relations with the purpose of giving two scientific conferences. This time he was probably alone. I have not been able to find information about the conferences, but it seems that during this stay in Paris, Bernstein met Borel who proposed to him to come the next winter to give a cycle of talks at the IHP. An official invitation, from Borel, was sent to Bernstein by the secretary of the IHP on 17 May 1929, to give 6 or 10 lessons on probability calculus and in particular on Markov chains. Due to an accident that prevented him from writing, Bernstein had his sister Margarita reply on May 24th that he agreed in principle. In the meantime, Borel sent him his best wishes and said he hoped to see him at the Paris Academy session on June 10th, but the Comptes-Rendus for that day do not mention his presence so I suspect he did not go.

Things afterwards turned out to be more complicated than expected. Having returned to the USSR, Bernstein was unable to obtain authorization to return to Paris. Cléry (2020) describes (p.444-445) the rather desperate joint efforts of Borel and the IHP management to get the Soviet mathematician back, despite the fact that the border was becoming increasingly impenetrable, as evidenced by Bernstein's insistent comments on the difficulties of obtaining the necessary authorizations, without success.

#### b - creation of the Kharkov Mathematical Institute

It is not impossible that in the second half of the 1920s, Bernstein, while legitimately wishing to be able to travel more easily, wished to remain in Kharkiv, where his professional situation was improving. All the more so as the NEP years enabled the new capital of the young Ukrainian SSR to undergo major industrial and academic development, logically accompanied by significant demographic growth (Maslijchuk, 2013). A modern housing complex, including Europe's first

reinforced concrete skyscraper, was completed in 1929 (*Derzhprom*). A number of technical schools were opened, covering aviation, road construction and various engineering and economics institutes. Ukraine's first radio station was opened in Kharkiv in 1924. Bernstein was elected a member of the Ukrainian Academy of Sciences in 1925.

As the capital of Soviet Ukraine at the time, Kharkiv was also its main scholarly center. In 1920 the university of Kharkiv was reorganized into various institutes such as the Academy of Theoretical Sciences, which became in 1921 the Kharkiv Institute of People's Education, the Kharkiv Medical Institute (reorganized from the former faculty of medicine and Kharkiv's Women's Medical Institute), and the Kharkiv Institute of National Economy on the basis of the former faculty of law merged with Kharkiv Commercial Institute. These structural changes were caused partly by ideological considerations (the mistrust by the Bolsheviks of the pre-revolutionary academic institutions) and partly by the low educational level of the majority of incoming students as the children of workers and peasants were now preferred to those belonging to other social groups (Bakirov, 2013).

In 1928, the Ukrainian Institute of Mathematical Sciences (later called the Ukrainian Research Institute of Mathematics and Mechanics) was created on the basis of the mathematical research departments. Bernstein was appointed Director. In 1929, he was elected a member of the USSR Academy of Sciences. A mark of his personal success was the decision to organize the first All-Soviet Congress of mathematicians in Kharkiv, on 24-29 June 1930, with Bernstein as the main organizer (Lapko and Lusternik, 1957; Tokareva, 2001). There were 471 participants. Bernstein wanted to bring in foreign colleagues: while Borel declined due to meetings scheduled at the SDN's International Institute for Intellectual Cooperation in Geneva, as did Czech mathematician Bohuslav Hostinský (1884-1951), there were 14 foreign representatives from five countries: five French (Paul Montel (1876-1975), Elie Cartan (1869-1951), Arnaud Denjoy (1884-1974), Hadamard and Szolem Mandelbrojdt (1899-1983), four Polish (including Jerzy Neyman), three Germans (Leon Liechtenstein (1878-1933), Otto Blumenthal (1876-1944) and Wilhelm Blashke (1885-1962)), one English and one Latvian. It is also interesting to note that while Moscow and Leningrad sent the largest contingent (206 participants), representatives from Ukrainian cities (notably Kharkiv, Kyïv and Odessa) numbered over a hundred, indicating an active mathematical life in the Ukrainian SSR. As we shall see later, the congress proved to be more eventful for Bernstein than he had anticipated.

### III - Ukrainian specificities

It is worth spending a few moments examining some of the peculiarities of the Ukrainian situation within the Soviet bloc under construction in the 1920s, as they probably contributed to the interest Bernstein saw in the development of the Kharkiv institute, which was both close enough to the Moscow center to play a visible role at the level of the USSR, and far enough away to benefit from a certain form of autonomy. As far as I know, there is no record of the mathematician's opinion on the political and social developments around him, either in the short period of independence or during the Soviet period. His public declarations, some of them rather thundering as we shall see in the next section, were related to the academic life. It is therefore difficult to say precisely to what extent he was in favor of strong Ukrainian autonomy. It is interesting to note, however, that he always located Kharkiv in Ukraine in his publications and correspondence, without always mentioning the USSR.

#### a - A rebellious Sovietization : Skrypnik's attempts

It is beyond the scope of this article to present more than a few brief elements on the establishment of scientific education and research institutions in Ukraine in the 1920s. I merely wish to illustrate the complex mix of aspiration for autonomy, support for the Ukrainian language spoken

by the majority of the less privileged social classes, ideological discourse marked by Bolshevik propaganda and convinced internationalism among which Bernstein evolved in Kharkiv.

Emblematic in these respects is the career of Mykola Oleksiyovych Skrypnyk (1872-1933), a convinced Bolshevik and friend of Lenin, who sent him to Ukraine as early as 1918, and who in the 1920s took on several posts as People's Commissar of the Ukrainian SSR, most notably in 1927 at the Department of Public Education (Soldatenko, 2018). From the outset, Skrypnyk was a resolute advocate of a high degree of autonomy for Ukraine. In 1921, he was appointed People's Commissar for Internal Affairs. In addition, he headed the All-Ukrainian Commission on the History of October Revolution and Communist Party of Ukraine (Istpart), the Main Archive Directorate of the People's Commissariat for Internal Affairs (Glavarkhiv), the Central Council for the Protection of Children, the Ukrainian Commission for the Management of Displaced Persons (Evakkom), directed the work of a number of other public organizations, and was a member of many responsible institutions and commissions. He became a member of the Presidium of the All-Ukrainian Central Executive Committee and took an active part in meetings of the Council of People's Commissars. In April 1922, he was transferred to the post of Ukrainian Justice Commissioner. From January-February 1923, he held the post of General Prosecutor of the Republic, while remaining Justice Commissioner. Finally, in 1927, he became the People's Commissar for Education, actively promoting the Ukrainianization of education. (Liber, 1982; Danilenko and Vermech, 2003).

The Soviet government supported his policy of Ukrainianization in the 1920s for several reasons. A hope to neutralize emergent Ukrainian nationalism by encouraging the development of Ukrainian culture which had been frequently repressed by the Czarist regime. This was a way to demonstrate the superiority of the Soviet system, not only to the large Ukrainian diaspora but also to other populations, in particular in the restive Asian parts of the USSR. Another aim was to prepare the population for the impending modernization of the USSR as it was much easier to educate the new cadres in their native language. In fact, the Ukrainianization policy produced mixed results. An article in the 9 January 1925's issue of the newspaper *Izvestiya*, for example, highlights the complexity of the situation in the Kharkiv region (*Izvestiya*, 1925). The "struggle against illiteracy" was besides not completely successful and if the number of literates increased during the 1920s, it was at a slower pace than Skrypnyk anticipated. The attitude of the literate population, especially the large totally bilingual (Russian-Ukrainian) population, toward the Russian and Ukrainian languages was ambiguous. Local officials and party leaders, among whom there were few ethnic Ukrainians, were the most resistant. They saw Ukrainian culture as rural and Russian culture as advanced.

Almost until the end of 1920, the All-Ukrainian Academy of Sciences (VUAN - Ukrainian: BYAH) maintained a certain degree of autonomy and pursued a scientific policy of its own, including exchanges with foreign countries (on the history of VUAN, see (Shpak and Yurkova, 2010)). On 14 June 1921, the Council of People's Commissars of Ukrainian SSR adopted a decree "Resolution on the Ukrainian Academy of Sciences" (UAS), according to which the Academy was recognized as the highest scientific state institution and subordinated to the People's Commissar of Education. The Academy was renamed from UAS to VUAN underlining its meaning for the Ukrainian territories located in Poland, Romania and Czechoslovakia and declaring its intentions to unite within one organization the scientific intelligentsia of all Ukrainian lands. The relationship between the members of VUAN and the Soviet authorities soured. Between 1919 and 1930, 103 academicians were elected to the Academy. In 1924-25, the Academy held its first election for foreign members but none of the candidates was approved by the People's Commissar of Education. In 1928, the academician Danilo K. Zabolotny (1866-1929), a renowned bacteriologist and epidemiologist, was elected President of VUAN, the same year that VUAN's first five-year work plan was drawn up in connection with the

Ukrainian SSR's five-year plan for the development of the national economy. In 1928, VUAN had 63 full members, 16 corresponding members, 111 full-time and 212 part-time scientists.

From 1929 onwards, the Soviet government gradually took control, transforming VUAN into a Soviet institution with a binding ideology in the spirit of Marxism-Leninism. In place of the Plenum, VUAN's representative body became the Council, which included representatives of the People's Commissariat for Education. The number of vacancies on the VUAN Council was also considerably increased, so that in addition to scientists, party candidates could be introduced into the governing bodies. Three People's Commissars were elected to the Presidium, including Skripnik, as well as a number of party candidates and the head of the USSR State Planning Committee, Gleb Maximilianovich Krzhizhanovsky (1872-1959). In the summer of 1929, two Academy members, Vice-President Sergiy O. Efremov (1876-1939) and historian Mykhailo E. Slabchenko (1882-1952) and 24 VUAN employees were arrested, falsely accused of belonging to a counter-revolutionary organization known as the "Ukrainian Liberation Union" and sentenced to long terms of imprisonment during a show trial held from March 9 to April 19 at the Kharkiv Opera House (Sullivant, 1962; 174-177).

b - Internationalism and linguistic issues: the singular case of Esperanto.

The attitude of Soviet cultural policy towards Esperanto is fairly typical of the complexity of these turbulent years. It has been the subject of several recent publications, notably the two books (Lins, 2016) and (O'Keeffe, 2021). We shall see later that Bernstein, though to my best knowledge he was not interested in Esperanto, was involved in an unexpected way.

The Komintern's founding in 1919 came as welcome news to the Esperantist movement in Soviet Russia as it was only logical that a Communist International would need an international language. Esperanto, it was hoped, was the only language available to the Komintern that would free the world's workers from the chains of linguistic chauvinism that were symptomatic of "bourgeois" international relations. In Czarist Russia, as elsewhere in the world's imperialist centers, the bourgeois elites and aristocrats had mastered French, and sometimes spoke it even more fluently than their own national tongue. Esperanto provided a means for the international proletariat to surpass the chauvinism of using a national language as their shared language of communication. It's no coincidence that the proliferation of Esperanto groups took place at the same time, between 1917 and 1921, when the so-called movement for proletarian culture was also developing. As V. P. Artiushkin-Kormilitsyn argued, without Esperanto, "*Workers of the world, unite* is and will remain an empty phrase, a futile appeal" (Artiushkin-Kormilitsyn, 1919).

At the beginning of June 1921, the Third Esperantist Congress of Russia was held in Petrograd, the first after the revolution. Some 160 delegates took part. The result was the creation of the Soviet Esperantist Union (SEU - *Союз эсперантистов советских республик*). The SEU's action program was to recruit the Soviet public around the usefulness of Esperanto. The obstacles, which had to be taken into account, were considerable. Before and just after the Revolution, pro-Esperanto Bolsheviks were not numerous: during a visit to the USSR by the Esperantist activist Eugène Lanti (1879-1947), the Hungarian Komintern delegate Matyas Rákosi (1892-1971) warned the visitor that he personally gave no credence to Russian Esperantists, many of whom would be "counter-revolutionaries". Lanti himself observed that Communist Esperantists were ashamed to be Esperantists, and feared to compromise themselves by propagandizing in Communist circles. He speculated that the strict discipline of the Communists stifled enthusiasm and fervor for Esperanto in many of them.

The situation in the republics of the Union where the working classes were not Russian-speaking, first and foremost Ukraine the most populous of them all, was a particular terrain where a

form of competition arose between Ukrainization and Esperanto, and Skrypnyk, the People's Commissar for Education, played a leading role in this debate. As we have seen, he was a supporter of Ukrainian cultural autonomy from the outset. He had always followed his friend Lenin's line that the class struggle was an international phenomenon, and that national feelings and antagonisms were detrimental to the forward march of the proletarian revolution. He therefore opposed Great Russian chauvinism, especially in the Ukraine, but also Ukrainian nationalism, if it threatened to weaken the solidarity between the Soviet republics. He was particularly suspicious of Stalin's policy on the national question, and as early as 1923 was already criticizing Stalin for neglecting the battle against "Great Russian chauvinism". Another paradox, the a-nationalist theories of the Esperantists were condemned by Skrypnyk as a petty-bourgeois deviation from the true Communist policy of nationalities, but he also recognized that this language had its value as a means of international communication, and drew attention to the fact that it was often through Esperanto that information about Ukraine's cultural progress penetrated abroad. Significantly, he also had a committed Esperantist at his side as secretary, and a Kharkiv educational journal, the monthly "*La Vojo de Klerigo*" (The Way of Instruction), had begun publication in January 1926 under the aegis of the People's Commissariat for Education, and thus with Skrypnyk's approval. The magazine featured Esperanto translations of selected extracts from recent issues of the Commissariat's official organ. In fact, it was the longest-lived Soviet publication specializing in an international language. By the end of 1932, 69 issues had been published, but the magazine did not survive Skrypnyk's demise (Klimenko, 2016).

In June 1930, *Komunist*, the organ of the Communist Party of Ukraine, published the text of a speech by Skrypnyk under the title "Esperantization or Ukrainization? In it, he discussed progress and obstacles in the process of spreading the Ukrainian language in Ukraine - a process by which the centuries-old legacy of Russification would be overcome. Speaking of obstacles, Skrypnyk dealt extensively with the theory of a-nationalism and criticized the fact that Esperanto was taught and presented as an alternative to Ukrainian in some schools. For him, the existence of the mother tongue of millions of workers was thus ignored, and that compromised the practical task of raising their cultural level with the help of the language spoken by the masses. Skrypnyk accused those who advocated the compulsory introduction of Esperanto into schools of having a petty-bourgeois desire to escape Ukrainization. A particular international and anti-national culture, opposed to the national culture of the masses, was neither proletarian nor communist nor international, but reactionary and false. Presumably, another attack against "the intention [of some people] to move directly to a unitary language" was a hidden declaration of war against Great Russian chauvinism, which seemed more than ever a threat to Ukrainian autonomy.

That same year, at the 16th Congress of the Communist Party in Moscow, Stalin was blowing hot and cold as usual, condemning Great Russian chauvinism as the most dangerous form of nationalist deviationism, but also accusing those who thought the time had come to switch to "internationalism" of disobeying Lenin's instructions. In this way, Stalin reassured the non-Russian members of the Party, who were worried by the centralizing and assimilating tendencies they perceived to be gaining ground. For Soviet Esperantists, there was a clear link between Skrypnyk's warning against Esperantization and Stalin's opposition to premature internationalism. In 1930, the SEU's theoretical organ published a series of articles on the theory of an international language written by the Belarusian journalist and Esperantist activist Efim Feofanovich Spiridovich, which appeared in book form the following year (Спиридович, 1931). In line with Stalin's theory that the maturation of nations creates the conditions for their withering away, Spiridovich asserted that the development of national languages that the USSR had experienced in the 1920s constituted a dialectical premise for the emergence in the future of a unitary universal language for the a-national society of the Communist era.

#### IV - Controversy

The late 1920s saw a bitter debate crystallize around the role of dialectical materialism (*diamat*) in the scientific method. It opposed what came to be known as the mechanists, who defended an approach specific to each science, against Marxist philosophers led by Abram Moïsseïvitch Deborine (1881-1963), for whom *diamat* enjoyed a position of universal supremacy. At the Second All-Union Conference of Marxist-Leninist Scientific Institutions in April 1929 Deborinists triumphed, but this was a short-term victory as at the beginning of the 1930s, Stalin whistled for the end of the game and imposed to everyone his conception of *diamat* (Joravsky, 1962; Graham, 1987). I have studied in (Mazliak, 2018) how certain aspects of this debate affected the mathematical community. Bogolyubov and Rojenko (1991) rightly point out that the real objective gradually became that of power within the mathematical community. The history and philosophy of mathematics, as well as teaching methods, became a systematic angle of attack to criticize ideologically "incorrect" or "apolitical" positions. The accusation of idealism, used in particular against "old professors", became systematic in the writings of activists claiming to be fighting against the vestiges of reactionary, bourgeois worldviews harmful to the working class.

As mentioned above, the organization of the first full congress of Soviet mathematicians in 1930 in Kharkiv revealed the importance Bernstein had acquired on the Soviet mathematical scene. It was at this congress, however, that serious troubles began for him, which nevertheless ended in a far happier way than for countless compatriots. During one session of the congress, the suitability of the concepts of dialectical materialism in the history of mathematics and as a method of validating mathematical results was debated, as was the introduction of this method into mathematical research itself. Bernstein declared that, in his opinion, there were no points of contact between dialectics and mathematics, and found himself violently opposed by the mathematician-ideologist Mikhail Krisafonovitch Orlov (Kagan) (1900-1936) (Rublyov and Fel'baba, 2000; Voykov, 2009).

Kagan was born in Kyïv in 1900 into a Jewish bourgeois family. After having been an activist on the left of the SR party, he became a member of the Bolshevik party in 1919 and was soon appointed head of the Central Committee's scientific department. In 1920, he took the name Orlov and became head of the Ukrainian Communist Party's provincial committee in Poltava. In 1924, he graduated from the Kyïv Institute of Public Education, where he had studied under Grave. He then began teaching mathematics at Kyïv University and the following year, in 1925, at Kyïv Polytechnic Institute. In 1928, he was appointed candidate of sciences for his work on methods of approximating the solutions of external ballistic equations.

In (Reid, 1982), Neyman, who attended the conference -- it was his first return to Kharkiv after his 1921 escape to Poland -- and especially the agitated session in which Bernstein was attacked (it seems Neyman precisely chaired the session), gives a vivid picture of Bernstein's stoic attitude in these difficult days. Neyman describes Bernstein as "a gentleman" facing the hysterical vociferations of his opponents. Neyman also briefly mentions that Bernstein was a definite opponent of the Ukrainization of teaching and that he stubbornly refused to give lectures in this language : Neyman's is in fact the only testimonial I found about this and it might have been slightly exaggerated in Neyman's memory (Neyman, as a Pole who must flee the anti-Polish violence in Ukraine at the beginning of the 1920s certainly did have a depreciative vision of this evolution in the town of his youth). Bernstein published a few papers in Ukrainian between 1928 and 1932.

Anyway, following the altercation with Orlov, Bernstein was dismissed as director of the Kharkiv Institute and Orlov replaced him. But as Bernstein remained a professor and thus had access to the Institute's internal journal, he published an article protesting that the spread of the dialectical method in mathematics was leading to a dead end. The content of this article is known only through the vigorous reply Orlov subsequently published (Orlov, 1931), as such a scathing attack could not go unanswered. For Bernstein, it might be possible to accept the dialectical method if, with its help, a mathematical problem could be solved in a way that proved more effective than strictly mathematical

methods. Such an assumption seemed absurd to him: mathematics, unlike philosophy, has specific working methods. He argued that the incessant philosophical discussions he observed showed above all that philosophy had neither unity nor a clear line of thought, so that the introduction of a philosophical method inspired by dialectical materialism into mathematics would be sterile. Moreover, for Bernstein, mathematics was independent of questions of class and politics, so that mathematicians belonging to different spheres could perfectly well work together on identical problems and complement each other.

Orlov wrote: "Academician Bernstein leads an active struggle against Marxism-Leninism, hiding behind the slogans of apolitism and non-partisanship. But, as always in such cases, these slogans conceal a political line that is hostile to us. Indeed, in justifying apolitical, non-partisan and supranational mathematics, Academician Bernstein is taking a clear-cut ideological stance, characterized by a reactionary philosophy of militant eclecticism. As early as the All-Russian Mathematical Congress in 1927, Academician Bernstein had already expressed his strongly anti-Marxist methodological views. But it was in an article sent to the Kharkov Institute journal in early 1931 that he formulated them most clearly." Orlov asserted the universal value of dialectics, which is therefore appropriate to mathematics. The party spirit of mathematics is illustrated by the examples of Hilbert's "idealist" mathematics and Brouwer's "subjectivo-idealist" theory.

In Orlov's rhetoric, one recognizes the type of argumentation orchestrated in different campaigns conducted at the same time. Mazliak (2017) examined the campaign led by Kolman and Yanovskaya around the Great Soviet Encyclopedia. The regime's ideologists demanded that mathematics be oriented towards the practice of socialist construction. They asserted that the future would reveal a clear link between the various specialties of mathematics, even the most seemingly distant... As the authors of the brochure "*On Leningrad mathematical front*" wrote, "all our work must be imbued with the Leninist principle of party in science, and the method of dialectical materialism must be the only method. Only then will we succeed in liberating Soviet mathematics from the ideological captivity of bourgeois science" (Leifert, Segal and Fedorov, 1931; p.3). Bogolyubov and Rojenko (1991) mention the attacks on Leningrad mathematician Stepan Alexandrovitch Bogomolov (1877-1965). The report of a special session examining "the work and activities of Professor S.A. Bogomolov" contained the following comments: "After the victory of the October Revolution, while continuing to occupy the chair at the Leningrad Pedagogical Institute, Professor S.A. Bogomolov did not write a single scientific article defending and justifying the educational and methodological reforms in the field of mathematics carried out by the Soviet authorities [...] He publishes [popular] works [...] in order to promote more widely idealist doctrines in the analysis of geometry and to disseminate idealist conceptions on questions relating to the history of mathematics. Here again, he gives free rein to his desire to lead the reader through mathematics, through the detachment of theory from practice, directly into the embrace of mysticism". Bogolyubov was forced to be "self-critical". In (Leifert, Segal and Fedorov, 1931), a letter from Bogolyubov to the editor of the journal "*For a Communist Education*", dated 18 September 1931, was published, in which the mathematician wrote:

In order to participate in the construction of socialism, I renounce my former idealist position and pledge to apply the principles of dialectical materialism both in teaching and in my scientific work, criticizing my former attitude in the process. This will be reflected in my future work. In short, I take the path most favorable to the building of socialism in the U.S.S.R. and I fight against everything that stands in its way.

While in Moscow and Leningrad, closer to the center of Soviet power, the year 1931 marked the regime's turn to impose its philosophical approach to mathematics, the debate still seemed to agitate a more distant center like Kharkiv in 1932, and through original channels, since even Esperanto was exploited. At the end of 1931, two Kharkiv University philosophers, Yakov Semenovitch Blyudov (1897-1984) and Semen Yiuliovitch Semkovskij (Bronstein) (1882-1937), published an article in the



journal of the People's Commissariat for Education, which was reprinted in the Esperanto monthly "*La Vojo de Klerigo*".

Semkovskij, né Bronstein, was born in 1882 into a Jewish bourgeois family in Mogylëv in Belarus (Semkovskij, 1967). He was the cousin of Lev D. Trotskij (1879-1940). A member of the Social Democratic Party since 1901, he soon became a member of the central committee of the Menshevik faction. He studied law and philosophy in St.Petersburg. Living in exile in Vienna after 1907, he wrote regularly for the Vienna Pravda (directed by Trotskij) and was regularly criticized by Lenin for his opportunism and eclecticism. He only returned to Russia in February 1917 and became a Menshevik-internationalist. After the Bolshevik coup, he moved to Kyïv and taught at the university until 1920. In March 1920, along with a group of Social Democrats, he was arrested by the Kyïv Extraordinary Revolutionary Court for collaborating with the White Guards, but was released at the end of 1920 and broke with the Mensheviks. From 1920, he was professor of philosophy at Kharkiv University, where he held the chair of dialectical materialism and examined, among other things, its relevance to contemporary science. He was a rare example of an academic in the USSR who maintained that Einstein's relativity and quantum theory did not contradict diamat (Vizgin, 1999).

The article's other author, Blyudov, has a rather different profile (Blyudov, 2024). He was born into a working-class family near Kharkiv in 1897. At the age of 14, he himself was hired in a mine, then worked in a locomotive depot in Svatovo. A Bolshevik after the October 1917 coup d'état, he became secretary of the Svatovo revolutionary committee and Red Guard headquarters, and railroad commissioner. In 1923, he studied at the Communist University of Artem, graduating in 1926, then at the philosophical and sociological department of the Ukrainian Institute of Marxism-Leninism, graduating in 1929. He was then a researcher at the Research Institute of Philosophy and Natural Sciences of the All-Ukrainian Association of Marxist-Leninist Institutes (VUAMLIN), editor-in-chief of the journal "*For a Marxist-Leninist Natural History*" and member of the editorial board of the journal "*Under the Banner of Marxism-Leninism*". In 1929-1930, he was Rector of the Kharkiv Institute of Public Education and became Professor of the Department of Dialectical and Historical Materialism at the Kharkiv University Institute of Physics, Chemistry and Mathematics. In 1932, he was appointed Director of the Red Professorship Institute.

I have not been able to determine whether the *Vojo* article (reproduced in Appendix 1) is a rejoinder to the same Bernstein article as Orlov (1931), or whether Bernstein himself had proposed another response to the latter. But whatever the case, the content must have been quite similar. The authors viciously attack the mathematician, accusing him of being a reactionary disguised as an apologist. One of the central points of their "demonstration" rests on Bernstein's assertion that mathematics is a matter of idiosyncratic method, not a form of universal offered by dialectical materialism. This is a late resonance with the 1920s debate between mechanists, mentioned above.

Semkovskij and Blyudov were undoubtedly stung to the core by Bernstein's assertion that "none of the classics of dialectical philosophy was a mathematician", and they assert that "without dialectics, one absolutely cannot study mathematical problems [...] for dialectics is a general scientific methodology for all branches of knowledge and action." In a striking reversal of Bernstein's plea for the independence of the scientific method, they accuse him of revealing himself to be a bourgeois mathematician: "[A]cademician Bernstein's main considerations on the problem of training specialized cadres, where he contrasts his idealist principles with Marxism [...] do they not show clearly enough that Academician Bernstein's 'out-of-class' approach has a strongly asserted class character?" Before concluding with the assertion that the alliance of theory and practice achieved by dialectical materialism is the "revolutionary methodology" that will enable the proletariat "to accelerate the whole subsequent evolution of science by its conception of the world and its method".

The choice of publishing Semkovskij and Blyudov's article in Esperanto raises questions about the intended readership. As we saw above, the merit of publishing in the international language was that it enabled elements of Soviet life to be made known abroad, and we can therefore assume that it was also a question of informing foreign readers about the debate concerning the importance of the method of dialectical materialism in contemporary science. Of course, it's difficult to know how widely the journal *Vojo* was distributed outside the USSR (and even in the USSR, in fact), and to what extent the article on Bernstein may have fueled the debate there. The latter remained fairly lively abroad, notably in Trotskyist circles where it had been launched by the publication in 1927 of the book (Eastman, 1927) by American activist Max Eastman (1883-1969), in which the author condemns dialectical materialism as a pseudo-scientific swindle (Diggins, 1974).

### **Conclusion:** A surprising outcome

In mid-1932, Bernstein was appointed professor at the St. Petersburg Polytechnic Institute, where he remained until his appointment in 1939 to Moscow University, and in 1944 to the Institute of Mathematics and Mechanics, certainly the most prestigious mathematical institution in the USSR. As seen, the mathematician enjoyed a rather strong support from the academic authorities throughout the most terrible years of Soviet history, even if he was perhaps slightly overshadowed by the two emblematic probabilists of the period, Aleksandr Ya. Khinchin (1894-1959) and, above all, Andrei N. Kolmogorov (1903-1987). Another remarkable circumstance, according to the minutes of the meeting held at the Academy of Sciences in July 1936 to deal with the Luzin case, which was subject to a smear campaign that could have ended very badly (as had been the case with Egorov five years earlier), Bernstein, unlike several eminent mathematicians, vigorously defended his Moscow colleague, not hesitating to use the latter's reputation in the West as a powerful argument (Demidov and Levshin, 2016).

One can only wonder, then, what kind of protection Bernstein seems to have enjoyed, to explain why he was able to emerge unscathed from so many liberties taken with more or less public expression at a time when the Stalinist ice age was imposing its grip on every aspect of Soviet society. It would obviously be interesting to find documentation on these points, which seem to me to be generally alluded to very laconically in secondary literature. All I can do is formulate a few hypotheses that deserve to be better substantiated, or contradicted.

Of course, as Bogoliubov and Rojenko (1991) point out, Bernstein was not just anyone. We know that Stalin's policy on all fronts was very often marked by pragmatism, and the mathematician's international fame must have weighed heavily against attacking him personally. Indeed, it was largely this point that saved Luzin's head in July 1936, when it seems that a personal intervention by Stalin brought the case against him *in extremis* to a close. Luzin besides never really recovered, and remained a semi-pariah until his death in 1950. But we know of other cases where, famous or not, the affair ended tragically, the most well-known case being of course that of Nikolai Ivanovich Vavilov (1887-1943), a resolute opponent of the anti-genetic theories of Trofim Denisovich Lyssenko (1898-1976), who was arrested in 1940 despite worldwide fame (Krementsov, 1993). So why was Bernstein able to speak as he did in the late 1920s and after with impunity?

Two elements that have been little emphasized so far seem to deserve more attention. Firstly, the fact that his opposition to the Ukrainian academic authorities in the early 1920s, and in particular to Skrypnik (who supervised the publication of "*La Vojo*" - which, as already mentioned, did not survive his disappearance), when the latter was about to fall into disgrace and commit suicide in 1932,

may paradoxically have played in his favor by exfiltrating Bernstein just as Moscow took control of the situation and the policy of terror descended on Ukraine, in particular on Kharkiv University (Glibitzka, 2019).

Another aspect that may have played a part in leaving Bernstein alone was his special relationship with France through his sister Margarita. In general, such a family tie with a close émigré could have been fatal. Moreover, I was surprised to discover in a police file at the French National Archive (AN 19940432/74/7038) that Margarita was the vice-president of the so-called "Committee to assist needy Russian students", whose aim was to help Russian student refugees. The document from the French security department describes this association to have a decidedly anti-Bolshevik orientation. Moreover, her husband Vladimir during his permanence in Russia during the Great War, expressed an unambiguous hostility towards the Bolshevik as is reported by the famous French Slavacist Pierre Pascal in his journal (Pascal, 1975 ; 282).

However, Margarita was not married to just anyone. In the mid-1930s, when Stalin was seeking closer ties with the Western democracies, it might have been ill-advised to attack someone from the family of a French notable who was very well introduced in diplomatic circles (as already mentioned Vladimir Aïtoff was notably close to Maurice Paléologue, the last French ambassador to St. Petersburg).

It is besides worth noting that, while in Kharkiv, Bernstein was systematically refused permission to go to France to give lectures at the IHP, in November 1935 he was able to take part in the delegation to Paris for the Franco-Soviet Scientific Week, organized on the initiative of the Soviet authorities as part of the geopolitical rapprochement with France to counter the Nazi peril (Rjeoutski, 2011; Mazliak, 2024). On this occasion, he gave a lecture at the Poincaré Institute.

Unquestionably one of the most inventive mathematicians of the 20th century, S.N.Bernstein remains a figure about whom several questions remain unanswered. A closer look at these questions would certainly reveal a great deal more about the turbulent history of the Soviet mathematical scene between 1917 and 1940.

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**Appendix 1:** Y.S.Blyudov and S.Y.Semkovskij. *Academician Bernstein attacks Marxism. La Vojo de Klerigo*, January-February 1932. English version from the translation Esperanto/French by Raphaël Petit.

Even today, our scientists often not only fail to understand the meaning of the method of dialectical materialism applied to the natural and exact sciences, but even show violent enmity due to obvious class considerations. A recent example is the Ukrainian mathematician Bernstein's charge against the monopoly of dialectical philosophy.

Academician Bernstein accuses Marxists of striving to "wipe out" mathematics, "of having a very low level of mathematical science nowadays". Academician Bernstein has simply detached himself from factories and plants - otherwise, he would know that in the Soviet Union, too, there has been a gigantic development of the sciences (including mathematics) among the broadest strata of the working world and workers in general. Academician Bernstein writes: "Unfortunately, none of the classics of dialectical philosophy was a mathematician. This led to the conclusion that mathematics should be

abolished or, what amounts to the same thing, that the mathematical method should be replaced by the dialectical method." This accusation of obscurantism is very typical of the bourgeois philistines who, up until now, have led the Western charge against the "Bolshevik barbarians" "exterminating" the sciences, the fine arts, etc....

From a theoretical point of view, it is particularly deplorable that Academician Bernstein should confuse "mathematical" and "dialectical" methods. It is even more naive to think that mathematics obeys a mathematical method, botany an obviously botanical method, political economy an economic method, and so on... And this is Academician Bernstein's most important argument! He has simply confused method as the set of methods proper to any science, and methodology as the complex set of basic principles determining the main objectives of any science and guiding it in problem-solving. Precisely, dialectics is the methodology capable of advancing the exact sciences, and among them mathematics, freeing them from any weight hindering their development. It is also clear that the dialectical method, for example in mathematics, must absorb all the concrete originality of mathematics as a science. It follows that to oppose the dialectical method to the mathematical method is absurd.

Academician Bernstein bluntly draws the mathematical method against the dialectic, while remaining silent on the struggles between the main schools of mathematics. Academician Bernstein's method is indeed brilliant in its simplicity: he keeps silent in advance about his relationship to the main schools of mathematics. Does he recognize mathematics as the product of "a process of free creation of the mind?" Does he lean towards formalism, intuitivism or conventionalism in understanding the nature of mathematics? Does he accept or reject Russell's principles that "mathematics can be defined as the science in which we never know what we are talking about, nor whether what we are talking about is true"? Does he accept or reject the main principles of Peano, Gilbert, Brouwer, Poincaré, etc.? After borrowing from all these schools a general set of specific elements of method characteristic of mathematics as a particular science, Academician Bernstein sets his mixture against dialectical materialism.

It is in vain that the Academician Bernstein strives to free himself from philosophy, for in solving problems such as, for example, the nature of the microcosm, he himself is forced to find teachings in it, but which one does he choose? Not the philosophy of dialectical materialism, but an idealist philosophy opposed to the sciences. For example, the Academician Bernstein writes that "the problem of the structure of matter is not yet completely solved because the formal methods of mathematics must still be perfected so that we can adequately reflect all that we can perceive that is unattainable for our concept of the microcosm". From this we see that, according to our idealist, the main obstacle to solving the problem of the structure of matter lies in the imperfection of the "pure forms" of the mathematical theory of groups, which can obviously be deduced intellectually *a priori* and which only need to be "further perfected".

"You can't dictate the methodology of these sciences from the outside," writes Academician Bernstein. But does that mean dictating dialectics from the outside? If Academician Bernstein were to approach Marxism in a less unfriendly way, he might read Engels' words: "My task was not to import the laws of dialectics into nature from outside, but to find them in it and develop them from it".

Every great new conquest of bourgeois science is necessarily accompanied by clamor and crisis. Here, for example, is the electrical theory of matter causing a "crisis" over the disappearance of matter; the theory of relativity is followed by a "crisis" of space and time; wave and quantum mechanics have been followed by a "crisis" of causality, etc... On the soil of "crises" flourishes various species of idealist anti-scientific philosophy, above all Kantianism and Mach's philosophy. But at all stages of the modern revolution in physics, it has always been clear to us that formally logical methods are not sufficient,

and that the only science capable of advancing science is the method of dialectical materialism. And mathematics is certainly no exception.

In general, "removing" the dialectic from mathematics is a totally hopeless task. It suffices to show the contradiction between absence of finality and finality. Is not the dialectical law of transition from quantity to quality regularly attested in geometric analysis? Did not the fact of dialectical contradiction between totally continuous geometric quantities and particular discrete numerical quantities follow the invention of the analysis of small infinite quantities? And does not this dialectical contradiction run through the entire history of mathematics, right up to the present day? From this we can see that without dialectics, it is absolutely impossible to study mathematical problems. And this is perfectly understandable, since dialectics is a general scientific methodology for all branches of knowledge and action.

Finally, Academician Bernstein endeavors to "break" the Marxist dogma of the class character of science, and mathematics in particular: "it is time to recognize that the internal logic of the development of the mathematical sciences completely transcends all class contradictions". Attesting to particular famous mathematicians from different classes, Academician Bernstein completely forgets that it is not particular mathematical doctrines that make classes, but the main methodological principles themselves, linked to the general conception of the world. Who, for example, can deny that the struggle between idealism and materialism in philosophy and the sciences (including mathematics and physics) is a complete reflection of the class struggle in society? What about Academician Bernstein's main considerations on the problem of training specialized cadres, where he contrasts his idealistic principles with Marxism - does not this show clearly enough that Academician Bernstein's "out-of-class" approach has a strongly asserted class character? The proletariat of the USSR is building socialism under the guidance of the party of scientific communism, under the guidance of Marxist-Leninist theory. The Marxist-Leninist unity of theory and practice has ensured the victory of the proletarian revolution. The working class that has come to change the old world naturally brings its new revolutionary worldview, its new revolutionary methodology. This has always been the case in history. Now, all over the world, the new class - the proletariat - is called upon to accelerate the further evolution of science with its worldview and method.

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