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Under the protection of alien wings

Mathematicians in the Russian emigration in inter war France: A general picture and two case studies of Ervand Kogbetliantz and Vladimir Kosticyn

Laurent Mazliak and Thomas Perfettini[1]

INTRODUCTION

'To emigrate is to commit suicide while counting on the arrival of the ambulance,' said the Russian dissident Dimitri Petrovitch Savitsky (1944-2019) after arriving in France in the 1980s. What indeed strikes first in the phenomenon of emigration is the renunciation, the tearing away from a familiar environment, the one in which one has lived the first years of one's life, or even sometimes almost all one's life when the emigration process occurs late. But even when this emigration was unavoidable because violent outbursts had physically threatened the exiles and forced them to a more or less precipitate departure, one is surprised to observe that the country of origin often keeps a protective aspect. This aspect is sometimes real (especially when the emigrant had to abandon privileged living conditions) and sometimes somewhat fantasized through an a posteriori reconstruction of a land that had never really existed. The emigrant is thus always torn between two poles: otherness and assimilation. In his penetrating essay[2], Nouss rightly observes that the exilic condition is a full identity that is claimed by the migrant: on it, he bases his subjectivity as well as the foundation of his rights; on it, the migrant nests his memory and installs its future. The exile 'fits in the in-between of a non-place'[3]: this is one of its specificities.

> 'Where and when does emigration begin?' asks Anouche Kunt.[4] 'Is it at the instant when the shoreline recedes, arousing conflicting emotions: pain, relief, apprehension, or feeling of freedom? At that moment, however, the experience is perceived as a temporary separation, waiting for a return. Can a departure, thought of as a temporary shelter, be an emigration? Or, even more, be an exile? It is necessary to admit the disjunction between the analytical grids of the historian, to whom it is permitted to retroactively identify a departure to a final rupture, and those of the actor who is always unaware of the outcome of the events taking place.'

Fifteen years ago, the approach of the centenary of the Great War, and its commemoration led to revisit the historiography of the First World War[5]. More interest was displayed for parts that had been often left

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[2] Nouss (2015; 40)

[3] Nouss (2015; 109)

[4] Kunth (2017a)

[5] Prost and Winter (2005)

in the dark, with a closer look at the defeated countries[6] but also more generally at the continuation of the conflict under other forms. It is now generally admitted that November 1918 marked a natural limit only on the Western front, and that the period extending until 1923 or 1924 saw a regain of unprecedented violence and terror.

> 'It was in this period that a particularly deadly but ultimately conventional conflict between states – the First World War – gave way to an interconnected series of conflicts whose logic and purpose was much more dangerous. Unlike World War I, which was fought with the purpose of forcing the enemy to accept certain conditions of peace (however severe), the violence after 1917–18 was infinitely more ungovernable. These were existential conflicts fought to annihilate the enemy, be they ethnic or class enemies – a genocidal logic that would subsequently become dominant in much of Europe between 1939 and 1945.'[7]

While the last decade has undeniably seen the development of important research on the migratory waves that followed the Great War, much remains still to be done to get a finer understanding of this complicated phenomenon. This is in particular the case when it comes to emigration from the former Russian empire after the Bolshevik revolution, and especially the emigration to France, a privileged destination in the inter-war years. In France, in the 1920s, the originality of this colorful emigration, and the disarray and fear in front of the new kind of political regime that had provoked it, generated some compassion and curiosity as shown, for instance, by early texts such as Gobron (1925) and Ledre (1930). But after this first reaction of curiosity, apart from rare exceptions such as Doré (1947), the studies concerning the phenomenon of the Russian emigration after the revolution were mostly conducted from inside, written by Russian exiles or by their descendants desiring to maintain the memory of the Russian society in France. This was often done during the 1970s or 1980s: time had passed and the assimilation process, so powerful in France, had gradually dissolved the community. These years marked the end of an era. The work done by the local historians of the Russian community was besides sometimes of good quality. See for instance the book edited by P.E. Kovalevskij, which contains a chapter dedicated to scientists,[8] or the book by Nikita Struve,[9] which offers a large perspective on the phenomenon of the Russian emigration. However, these studies were unavoidably submitted to a bias generated by the fact of voluntarily limiting the study to a community with imprecise contours. 'Who can be defined as Russian' is not so simple a question to answer. Retaining strong symbolic marks like the Russian language or the Orthodox confession cannot necessarily be sufficient for claiming that someone belongs to an alleged Russian community, all the more in the eyes of the French Republic where communitarianism has a bad reputation. It was sometimes said that the story presented by these communitarian historians was the somewhat artificial narrative of a canned Russia. Moreover, we shall see later when examining the case of a refugee from the Russian empire but with an Armenian backgroud that the identity of the exile was not always unique, making the definition of the community still more problematical.

After 1985, the *Perestroika* and then the collapse of the USSR in 1990 undoubtedly created a completely renewed situation. It generated a surge of interest for the history of those who arrived from Russia in the West after 1917. This interest was in particular boosted by the discovery of an ocean of unknown

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[6] Gerwarth (2017)

[7] Gerwarth (2017)

[8] Kovalevskij (1971)

[9] Struve (1996)

archives in Russia that became accessible after decades of silence. Some studies were carried out in France: one can cite the panoramic synthesis of Hélène Menegaldo[10] and, above all, Catherine Gousseff's important collection of works on the topic. The book Gousseff (2008) certainly represents the most successful synthesis on Russian emigration in France to the date. These studies have made it possible to get a more reliable perspective on a phenomenon that had been interwoven with so many legends in the past. This is the case for instance when one considers its dimension. As Gousseff (2008; 9) writes, the number of Russian refugees in France was probably around 75,000: this is an important figure for sure, but considerably lower than the 400,000 (or even more) that many actors had mentioned with some greed in the past. Such studies were also conducted about populations coming from specific territories of the old empire: it is notably the case for the Armenians, divided between the Russian and the Ottoman empires, whose emigration was the result of both the extermination policy of Constantinople government and the Bolshevik takeover in the 1920s.[11]

In Russia a lot of curiosity was shown after 1990 for the 'compatriots in exile': the large number of books and articles (academic or intended for a general audience), as well as radio or television programs, which have been devoted to them for thirty years, tends to support this impression. A special accent is often put on members of the former intelligentsia forced into exile, in particular on scholars. Several recent Russian PhDs are related to that topic. We can for instance mention Bojchevskij (2006) and Efremenko (2008) devoted to the activity of scientific and cultural associations in France born within the Russian exiles, or also Voloshina (2012) who considers how Russian emigrants have coped with scientific and cultural habits abroad. While these works provide a lot of relevant insights into several aspects of the intellectual life of the time, a fact is striking: not only they do not refer to any recent study on the subject conducted outside Russia, but, even stranger, they do not base their conclusions on any French archival source. Efremenko's just mentioned 2008 dissertation for instance has not been fed by any search for primary sources in France. This gives rise to the ambiguous impression of a somewhat forced 'national' vision of the Russian community, obtained by neglecting the fact that many of the exiles, caught up in the struggle for their day-to-day livelihood, have been tossed about between an attachment to their original identity (their 'otherness') and their desire of assimilation to their new environment.

The case of scientists, and especially of mathematicians, is thus interesting to study in a finer way than in the somewhat narrow framework of a 'national' perspective. We want to illustrate in the present chapter how Russian scientists in exile -- in particular the two mathematicians whose trajectory we present in detail in the sequel -- were both refugees like the other ones, and had specificities due to their scientific activity. Efremenko (2008) (for example p.45 et seq.) rightly emphasizes the great material and administrative difficulties encountered in France by most emigrants from the former Russian empire (including the scholars), after being deprived of their Russian citizenship. As it is known, this fact encouraged the League of Nations in 1921 to follow Fritjof Nansen's advice and to create a special passport for the refugees fleeing the Russian empire. Many of them obtained it. However, Efremenko gives little importance to a turning point: the French government's recognition of the USSR in 1924, forcing many refugees to gradually give up any hope for returning home and encouraging them to seek their naturalization as French citizens. This major fact is generally neglected by the Russian dissertations or studies about the emigration due to the lack of consideration for French sources already underlined and hence for the French situation of the time. The case of Ervand Kogbetliantz studied below provides an example of this situation. Then a new question occurs: once the French citizenship was acquired, the relevance of belonging to a specific 'community' was at stake, all the more in a country marked by a

[10] Menegaldo (1998)

[11] On this, see for instance Kunth (2017b).

strong pressure for integration and oblivion of origins: it is well known that French national practice on that respect is very different from that of other countries such as the United States for instance. Efremenko (2008) provides on one hand a useful record of the many cultural and educational achievements in the Russian emigration. On the other hand, he has too little consideration for the possible existence of connections with the corresponding French institutions, maintaining thus the rather artificial image of a Russian village living in autarky. On this prospect, Gousseff's view is much more convincing, concluding to a rather massive 'francization' of the emigrants from Russia in the 1920s, even if 'an unstable balance between surprise and familiarity, between distancing and identification' often persists in the migrant.

The Russian historian of mathematics Natalia Ermolaeva has spent much energy in studying the Russian scientific emigration. She provided a lot of rich papers on several scientists, based on the extensive exploration of Russian archival sources. In particular, she considered the case of the two mathematicians that we follow later in this chapter and we in fact rely heavily on her work for the description of their trajectory. But Ermolaeva, too, does not seem to have worked on French archival sources. Hence several gaps in her description of the trajectories after the departure from Russia and some biases in the interpretations. Sometimes Ermolaeva tends to over-size particularism and to under-dimension the will of the emigrants to fit into the French scientific space. Hence the aim of the present chapter is certainly not to contradict, but mostly to complement the already existing works, by examining the trajectories of exiles from a different angle that helps to reveal their complexity.

The present chapter is organized as follows. In the first part, we shall consider the general situation of Russian emigrates after the revolution and try to understand what kind of specificities mathematicians (or more generally scientists) could have among them. This requires in particular giving some information about the social and intellectual Russian scene in the first years following the revolution, before attempting to provide a classification of the various situations of the exiled scholars in France. We also give some basic information about the mathematicians we have spot in the so-called Russian community. The second and third parts are devoted to the particular cases of two actors, Ervand Kogbetliantz and Vladimir Kosticyn. Their trajectories, beyond their great originality, illustrate a variety of aspects met by intellectuals when they are transplanted in a new territory.

PART 1: A MATHEMATICAL ROAD TO EXILE

In this first part, we examine some general questions concerning the situation and emigration of scientists in the first years after the Bolshevik Revolution and we have a closer look at the specific situation of Russian emigrant mathematicians in France in the 1920s.

1- To leave or to stay? A shaky timeline and rare departures

The first question that arises is naturally to try to perceive the dimension of the phenomenon of the emigration of scientists. It is not such surprising that it appears very limited. Firstly because, as it has been mentioned, the phenomenon of Russian emigration on the whole was less massive than it was often said in the past. But, mainly, because among the intelligentsia, scientists probably considered themselves less immediately threatened than other specialists. Few were those scientists who belonged to the highest aristocracy; few were those whose fortune was so considerable that they might be the targets of the anti-exploiters Bolshevik slogans. On that basis, the case of the mathematician-physicist Dimitri Pavlovich Riabuskinskij (1882-1962) seems quite exceptional. Member of a family dynasty that had made a fortune in trade and banking during the accelerated Russian industrial development in the 19th century, founder in 1904, on his own money, of the world most modern institute of aerodynamical

studies in Kuchino near Moscow, an institution headed by the great physicist Nikolai Egorovich Zhukovskij (1847-1921), Riabushinskij settled permanently in France as soon as 1919 on almost conquered ground, especially since he had participated in the war effort of the Eiffel laboratory.[12]
Few in fact were those scholars whose academic activity put them directly at odds with the orientations of the new regime. It is nevertheless true that on the whole, the relationship between the Bolshevik regime and the Intelligentsia had been complicated very soon after the conquest of power in 1917. To the eyes of the sectarian Bolsheviks this was a typical conflict of classes, insofar as the Intelligentsia, with its bourgeois way of living and thinking, was viewed as a product of the old czarist society. One of the most crucial aspects of the Bolsheviks' stance was the total defiance of the Intelligentsia's way of dealing with the education of youth. Ultimately, during the harsh period of war communism this led the brutal decision to 'proletarize' the whole scientific and technical system. The People's Commissioner for Education, A.V.Lunacharskij did not hide his hostility, regularly reminding academics of their 'old sins': 'Almost all of you have met the popular revolution with a harsh condemnation. It is only when the scientific intelligentsia, through its activity, demonstrates to the proletariat that its today's program is science for the people that the working class will be grateful to you.'[13]
The Agitprop (Office for Agitation and Propaganda) was founded in 1920 in order to 'organize, unite, and direct the oral and written work of propaganda and agitation' within the party, and this political propaganda was highly concerned with educational issues. New educational institutions were created in parallel with the old 'bourgeois' institutes and universities, in order to educate 'red' specialists and proletarize the universities. The Socialist Academy was thus created in 1919 and by the end of 1923 it became the Communist Academy. Moreover, these decisions were often accompanied by political violence. There were press campaigns and show trials with members of the Intelligentsia as targets. The GPU, the state police, established strict surveillance of scientific technicians who were often accused of sabotage.

The period saw a drastic silence imposed upon academic specialists who were considered as bourgeois representatives responsible for damaging socialist edification. As Kazanin (2007; 165-166) mentions:

> The creation of workers' faculties and the policy of class selection for admission to universities, and even more the pressure coming from an atmosphere of intolerance towards faculty members among activists of workers' or peasants' origin, stimulated by numerous articles of the central press of the Party, contributed to the continuation of class struggle within the walls of higher education. This was the reason for the preservation of much tension between the authorities and the communist activists on the one hand, and the university professorship on the other. Following the logic of class struggle, the authorities tried to give a political meaning to the conflicts that inevitably arose from this situation.

This sometimes provided an opportunity to dismiss politically objectionable teachers, as well as to take decisions unpopular among professors without any public protest. The targets were in the first place specialists in the humanities: historians, economists, or philosophers - not to speak of theologians - judged beyond conversion by the Bolsheviks. Trotsky declared that there was not sufficient pretext to shoot them but it was no longer acceptable to bear them, and many of the most renowned academics in these domains were expelled in 1922.[14] The government, however, did not hesitate to expel scientists

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[12] On Riabushinskij, consult the works of Claudine Fontanon in particular Fontanon (2017).

[13] Quoted by (Kazanin, 2007; 93).

[14] It was for instance the famous episode of the philosophers' ship. See Chamberlain (2007).

who had shown too much hostility to the soviet policy. Thus, in 1922, the astronomer Vsevolod Viktorovich Stratonov (1869-1938), despite the fact that he was at this precise moment the architect of an ambitious institute of astrophysics at Moscow University, was also arrested and expelled to the West for having organized a teachers' strike to protest the government's political interference in academic affairs. Kazanin (2007) emphasizes that one of the most effective means of pressure used to transform intellectuals into pariahs dependent on the regime's goodwill was to forbid their children to study in universities or institutes.

It is likely that members of the scientific intelligentsia, perhaps many of them, caught in the nightmare of war communism and civil war between 1919 and 1921, thought to flee abroad. Of course, though, the geographical location of the candidate to exile played a fundamental role in such a decision. In the chaos of the moment, being in Moscow, far from the borders, was a very different situation compared to being on the frontiers of the empire - as in Ukraine or in the Caucasus, or in a port on open sea. In line with Doré (1947)'s early research, Gousseff (2008) presents a very complete picture of contrasting situations, particularly from the point of view of socio-cultural belonging, of Russian emigrants in France: those who succeeded in fleeing from Moscow for instance were limited to persons with a high socio-cultural background whereas those who came from the south of the country showed a greater variety. On the whole, as Kazanin (2007; 74-75) rightly points out, the Russian intelligentsia in its great mass did not have the financial means to flee Russia and to secure a decent existence abroad. It clung to the hope that its potential would eventually be exploited by the new power, and that showing its good will to work in exceptionally difficult material conditions, its sacrifice in the service of the homeland, would be eventually appreciated at a fair height by the Bolsheviks. What could comfort the intelligentsia in this idea after 1922, once the Bolshevik power consolidated, was that Lenin imposed the New Economic Policy (NEP) and a partial return to free market economy to reconstruct a worn-out country. This was accompanied by a notable change of attitude towards the academic specialists formed during the old regime, especially scientists that the country needed to accompany its technical and industrial reconstruction.

This radical change allowed liberal communists to decree a series of reforms, including a relaxation of the politics of 'class selection', leading to a normalization of the situation of the Intelligentsia — and, especially, that of engineers and scientists. It appeared of vital importance to highlight the technical qualifications of specialists and to relegate the question of their political orthodoxy in the background. It was mentioned that the state must use qualified experts, even among those hostiles to the Bolsheviks, because the state apparatus could currently not do without them. Tensions between the authorities and scientists were gradually smoothed in order that the old specialists would be in a position to prepare future executives, coming from a workers' or peasants' background. The years of the NEP were an occasion filled with great political pragmatism. In August 1925, a report sent to the Central Committee proposed measures designed to establish suitable conditions for a harmonious collaboration between the new executives and the former specialists, thereby guaranteeing a transfer of experience that could be realized only under the supervision of the old specialists.[15] The NEP years postponed the departure from USSR of some scientists, as it was the case for Kosticyn that we study in detail in the third part of the present paper.

[15] Consult Mazliak (2018) on some aspects of mathematical life at the time of the NEP, and its brutal stopping in 1928 at the moment when the great Stalinist turn began. The reader curious of recent works on this crucial moment of the history of the USSR can profitably refer to Khlevniuk (2015) and Sletzkine (2017).

2- A disciplinary sociability: academic networks and mathematics.

As has been said before, the mathematicians in the emigration were confronted with many of the difficulties met by all the ancient subjects of the czar of all Russia. A problem is to understand if their professional background has offered them an easier integration into the new environment.

A first point, shared with any other members of the intelligentsia, comes immediately to mind: language. Russian novels by Tolstoj or Dostoevskij familiarized us with the picture of a perfectly francophonic high Russian aristocracy; it is obvious that most academics, accustomed to international exchanges, knew several languages in addition to Russian. It is legitimate to think that German was the most common working language for many scientists of the moment, but French was undoubtedly largely widespread. A convincing and touching testimony of that fact is given by the excellent French in the correspondences of many Russian mathematicians (and more generally members of academic bodies) of the time. A quantitative study conducted by Gousseff (2008; 45) on the questionnaires kept by the Russian refugees office in France shows that one-third of the refugees from Petrograd and one quarter of the Muscovites spoke at least English or German (the questionnaires did not ask about French because French was not a foreign language but one can safely assume that its knowledge was almost systematic). In this respect, at least, settling in France had been relatively easy for those refugees. It should also be noted that the habit of traveling - for example to attend international congresses, whose practice had grown exponentially at the end of the 19th century, or for research stays abroad - had led quite a few scientists to earlier visit to Western Europe and often to France. Recall that for mathematics, the first international conference of mathematicians took place in Zurich in 1897: 12 participants from the Russian empire were present (out of 204 delegates), a significant number if one thinks that only 3 British mathematicians made the trip. The development of intellectual sociability, and hence of networks of exchange that could eventually become networks of mutual aid, played a central role in many trajectories of emigrant mathematicians as the cases of Kogbetliantz and Kosticyn will illustrate.

As early as 1921, some political and academic leaders in exile began to set up several community structures designed to allow their colleagues to resume the academic work and the students torn from their studies to continue their learning. Establishing indispensable bridges with the French academic system soon completed these objectives. On student networks, Nicolas (2004)'s study presents the role of the Central committee for patronage of the Russian youth abroad, established in Paris in 1922. It is however especially the Russian Academic Group (GAR), created in Paris on November 18, 1920 as a non-profit association devoted to 'bringing together Russian and French academics'[16] that played a key role in these missions.[17] The priority of the GAR was to provide academic and practical support to Russian academics based in Paris on the one hand and to offer courses for Russian students whose studies had been interrupted on the other. To meet this dual objective, the GAR created three Russian sections within the Sorbonne, with the support of the Council of the University of Paris and the Ministry of Foreign Affairs, which awarded a credit of 50,000 francs a year. The opening of the lectures took place on January 17th, 1921: the lectures essentially fulfilled two distinct functions. On the one hand, they allowed Russian students who had interrupted their studies when they left Russia to take them over and complete their training. On the other hand, they provided the teachers selected the opportunity to find an audience and ensure their material living without resorting to another kind of activity. On January 30, 1922, the 'Commission for the Organization of Russian Education in France' (COERF) was created at the Institute of Slavic Studies of the University of Paris, whose members were French and

[16] Journal Officiel de la République française, 18 novembre 1920, p 18597.

[17] A detailed study of the GAR activity is found (among others) in Bojchevskij (2008), Efremenko (2008) and Perfettini (2020).

Russian academics.[18] The purpose of this commission was 'to promote the scientific activity of Russian professors in France, as well as secondary or higher education to be given to Russian youth'. Since the Russian members of the COERF were mostly linked to GAR, it allowed the GAR to enjoy more legitimacy for organizing the academic life of the community while maintaining relative independence. Each year, some of the scientists members of the section even had the possibility of devoting themselves exclusively to the research they conducted in different laboratories of the Sorbonne or the Pasteur institute without providing any teaching, as proved by the annual reports of the GAR activity. For the school year 1923-1924 for instance, only four members of the Science Section provided lectures for Russian students at the University of Paris on a total of at least eight members. The two mathematicians of the section, Kogbetliantz and Savitch (see below) taught for many years without ever being affiliated with any scientific laboratory. Gousseff (2008; 150-151) has already pointed out the very singular role played by an institution such as the Pasteur institute in Paris. Since the 1880s, a lot of Russians biologists had come there for a research stay (for instance Ilya Metchnikov who received the Nobel Prize in 1908 for his work on immunity). In the 1920s, Institut Pasteur was thus a natural destination for many emigrants. If one cannot find a strict equivalent for mathematics, we can however emphasize the significant role played by a specific mathematical topic: the theory of functions. The exchanges in the 1910s between the Moscow school of function theory and the French creators of measure theory such as Henri Lebesgue, Jacques Hadamard, Maurice Frechet and, above all, the omnipresent Emile Borel, created the conditions for a proximity that proved to be crucial afterwards. The two main leaders of these exchanges on the Russian side were Dmitrij Fedorovich Egorov (1869-1931) and his student Nikolai Nikolaevich Luzin (1883-1950).[19] Egorov came several times to Paris at the beginning of the 20th century and maintained good relations with different mathematicians of the Parisian scene, such as Paul Appell, the dean of the faculty of science (who was besides Borel's father-in-law). As for Luzin, having been a little too close to the 1905 revolutionaries, he had been sent by his master Egorov to Paris in 1906 to regain some virginity in the face of the stiffening tsarist police. From the 1910s, Egorov and Luzin, followed by young mathematicians like Suslin or Alexandrov and many others embarked on the study of functional analysis extending the work of the French analysts Borel, Baire, Lebesgue, Frechet, Fatou, Denjoy. Much energy was devoted to the properties of functional spaces studied through measure theory and orthogonal families. Just before the revolution they founded the famous Luzitania working group, a nursery for Soviet mathematics of the 1920s and 1930s, where a future star like Andrei Nikolaevich Kolmogorov was trained.[20]

It is worth observing that for the sake of scientific internationalism, many of the French mentioned above were also careful to maintain as much as possible a link with their colleagues in Soviet Union during the 1920s and 1930s. Hadamard and Borel for example frequently presented notes of Soviet mathematicians at Paris Academy of Sciences. Borel's strong presence on the Soviet mathematical scene in the 1920s has already been observed in Mazliak (2018). Borel, a man of action who was just beginning his political career at the time seems to have been intrigued by the project of state scientific policy in the USSR on which he made a contrasted (and rather critical) analysis in Borel (1922). In the 1930s, Jacques Hadamard participated (with Cartan, Denjoy and Montel) in the first congress of

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[18] The mathematician Paul Appell (1855-1930) Rector of the Academy of Paris, was appointed president of the COERF.

[19] Observe that both men remained in Soviet Russia after 1917: the first, condemned to an internal exile at the end of the 1920s, died of deprivation in 1931; the second barely escaped physical annihilation in 1936 after a terrible campaign of slander that was stopped at the last moment by order of Stalin. On these subjects see Ford (1991), Graham and Kantor (2009) and Demidov and Lëvshin (2016).

[20] The Soviet historian of mathematics A.P.Yushkevich had collected memories of this period of some mathematicians such as Dmitry Evgenevich Men'shov in Menshov (1983). Men'shov evoked a passage through Paris by many members of the Moscow School (himself in particular) during the 1920s.

mathematicians of the USSR in Kharkov and returned to Moscow in 1934: he presented a report to the Paris Academy of Sciences on the scientific life in USSR. As for Fréchet, he was in the 1920s one of the main interlocutors of Soviet analysts such as Alexandrov, Krylov or Urysohn, and, in the 1930s, of probabilists such as Khinchin, Kolomogorov and others. He met them when they came to France before the travels gradually stopped when the Stalinist dictatorship took root. Borel and Hadamard were elected (as well as Lebesgue) in 1929 as foreign members of the Academy of Sciences of the USSR.[21]

It was in fact mostly in the 1930s that new French institutions were able to help mathematicians in exile. This help concerned in the first place scientists fleeing the Nazism, (many found refuge in France after 1933) but some Russians also had their share. The Poincaré institute (IHP) opened in 1928 and was used by Borel and Fréchet to provide a shelter to mathematicians in exile. The success of the operation relied on the important international network of these two mathematicians.[22] From 1933 on, the creation of the National Fund of Sciences (Caisse Nationale des Sciences - CNS) and in 1939 of the CNRS also enabled to give some relief to mathematicians refugees by offering them a temporary situation under the form of research grants.

Finally, note that other sociabilities may have played a role. Such is the case of Freemasonry, fairly present in the Russian elites during the last years of the old regime and which grew in the conditions of exile in France during the inter-war period. It is the object of the study Startsev (2007) extending the work of Berberova (1986). Blokh and Rikun (2015; 71) mention (unfortunately without providing their source) that Kogbetliantz for some years was a member of the masonic lodge 'Free Russia' created in 1931 and affiliated with the *Grand Orient de France*. Blokh and Rukin (2015; 72) mention moreover that other members of the small Russian colony of La Favière in the Var department, to which the Kogbetliantz belonged, became freemasons.[23] We report these facts mainly as a curiosity because of the few sources we have consulted on this matter.

3- A typology of Russian mathematicians in exile in Paris

In this last section, we try to provide a quick synoptic picture of the Russian mathematicians in exile in Paris in the 1920s. Of course, as we have already pointed out, the smallness of the concerned sample makes it difficult to homogenize the wide variety of the individual trajectories, making each one a special case. This fact would justify a detailed study of each, and in the following two parts of this chapter, we shall precisely follow two of them. Nevertheless, it seems possible to roughly divide the whole sample into three categories that make it possible to better understand the specificities of their situation.

The young scientists still in formation compose the first group. When the 1917 revolutions broke, they had to stop their studies, and once they settled down abroad, they first wanted to complete these studies and to graduate. As said before, one of the main goals of the GAR in Paris was to provide support to Russian students in Paris helping them in the administrative procedures of academic inscription. The Group had the ability to provide official French translations of Russian diplomas or qualification and certificates allowing students to apply to the adequate level of studies. A central issue is to understand

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[21] On the question of the inter-war relations between French and Soviet mathematicians, one can consult the ample description proposed by Demidov (2009). Fréchet, in 1935, made an important trip to Central and Eastern Europe, including Soviet Union (Fréchet's daughter lived in Leningrad at this moment). About this journey, consult Cléry and Perfettini (2016).

[22] On this, see Cléry (2020)'s PhD.

[23] On La Favière, consult Dupouy et al. (2004).

how those mathematicians in formation made a living: what kind of grant or financial help did they receive and what contacts did they develop with their French counterparts? These young students mostly received their higher education in France and therefore one should think that they would be treated on the same foot as any other graduating student. It is therefore significant to understand to what extent the help provided by Russian associations such as the GAR, played a role for them.

In his study of the scientific activity in the Russian emigration, Efremenko (2008; 250) has identified five PhD in mathematics defended in France by Russian exiles between 1922 and 1939. Due to a somewhat narrow concept of nationality, at least one name has not been included in the list: Kogbetliantz, probably because Efremenko considered him not as a Russian but as an Armenian. Anyway, among the five individuals on the list, only four were young students (the fifth, and first on the list, was Riabushinskij whose particular situation we have already mentioned): Vassili Demtchenko, Samuel Cholodenko, Nikolai Stoyko and Vladimir Bernstein. For completeness, we briefly give some information about each of them below. Along with the aforementioned observation that the geographical origin was a major factor regarding the possibility of emigration, it is remarkable that all four came from a place close to a border.

Vassili Grigorevitch Demtchenko, born in 1898 in Kiev lived from 1920 to 1925 in Belgrade in Yugoslavia. After 1925, he settled in France and defended a PhD in 1928 in Paris about the study of hydrodynamic problems for solids shaped in different forms and dived into liquid. Demtchenko's works were in continuity of Riabouchinskij's studies in fluid mechanics. Demtchenko used a method developed by Riabouchinskij to find an approximate solution to a study of ellipsoidal cavitations.[24] In 1925, he entered the organization of the GAR and he was the official delegate of the Group in the International Congress of Mathematicians in 1928 and 1932. In Bologna, he gave a talk in which he presented a new category of integral invariants for some equations of mechanics. Demtchenko obtained the French nationality in 1929. In 1938, he joined the industry as an engineer in the Society of the carburetor Zenith, where he designed and conceived motors for cars and planes. He spent the rest of his career in this company until he retired in 1955 after reaching the position of director of aeronautical studies.

The next name in Efremenko (2008)'s list is Samuel Cholodenko. We have little biographical information available about him. His refugee file[25] indicates that he was born in 1902 in Odessa; his father's file is also available (with the name spelled Holodenko). We can therefore assume that the family fled, taking the opportunity of its residence in a port of the Black Sea. Cholodenko's thesis is anyway devoted to the study of some properties of set measure, and was defended in May 1930 at the Sorbonne. In the document Cholodenko presents himself as an electrical engineer. The PhD is dedicated to Léopold Leau, an analyst from Nancy who is best known for his linguistic activity in developing international languages such as Esperanto. Up to now we did not find the connection between both him and Cholodenko. Leloup (2009; 454) points out that Cholodenko's thesis is not referenced in the Jahrbuch but is closely related to other publications of the period on the same theme.

The third student mentioned is Nikolai Mikhailovich Stojko (1894-1976). Born into a wealthy peasant family in the Odessa region, graduated in 1916 from Novorossisk University, he was supposed to begin lecturing at that university's chair of astronomy and geodesy at the time of the Bolshevik turn. Probably taking advantage as Cholodenko of his geographical position on the Black Sea, he quickly fled to

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[24] Demtchenko and Riabuchinskij were connected not only professionally but also by their desire to cultivate Russian culture in France: Demtchenko became the secretary of the Russian society of philosophy of sciences created by Riabouchinsky in 1930. It was also Demtchenko who was in 1954 the organizer of Riabouchinsky's scientifical jubilee.

[25] Archives OFPRA, Samuel Cholodenko.

Bulgaria and remained there until 1924 before joining Paris. Stojko defended his PhD[26] at the Sorbonne in 1931. It was devoted to the measurement of time. Stojko was an expert astronomer in this field for forty years in the international bureau of the hour. Stojko was the last acting President of the GAR in France from 1962 to 1976.

Finally, the trajectory of Vladimir Bernstein (1900-1936) constitutes another singular case, described in detail in Finzi (1936). Born in 1900 in St. Petersburg, Bernstein entered the local university when he was 17 to specialize in mathematics and became close to Yakov Viktorovich Uspensky (1883-1947).[27] Taking advantage of the proximity of the border, he decided to emigrate during the winter of 1919 by reaching Vyborg on the other side of the Gulf of Finland. Unfortunately, he was seriously wounded by bullet before arriving there, and he never fully recovered from this injury that led to his premature death in 1936. Arrived in France in the mid-1920s after a stay in London, he entered the Sorbonne and in 1930 defended a PhD on the singularities of Dirichlet series, dedicated to 'his master Paul Montel'. The lectures that Vladimir Bernstein presented at the Collège de France that same year on Dirichlet series were published in 1933 in the Borel series of monographs on the theory of functions as Bernstein (1933). The book was introduced by a very laudatory preface by Hadamard. It was in Italy, however, that Bernstein decided to settle down (he had already published several papers in Italian journals). He obtained Italian citizenship in 1931 and was responsible for teaching superior analysis in Milan and analytical geometry in Pavia.

As already mentioned, some gaps in Efremenko (2008) come from the fact that the author seems not fully aware of the French academic situation at the time. Interestingly, the newcomers have sometimes seized an opportunity offered in newly created institutions, probably yet no so well known to the French students, to obtain a high-level degree. Let us add to our first group the case of Maxim Evgrafovich Kovalevskij (1903-1988). He belonged to a family from the high nobility in Kharkov and was very young (17 years old) when he arrived in France in 1920, having not even completed his secondary studies. Kovalevskij was admitted to the Faculty of Sciences of Paris in October 1920 and began to study mathematics. Maybe advised to do so by Borel, he completed his higher education by entering the newly created Statistical Institute of the University of Paris (ISUP) from which he graduated in 1928 as a professional statistician. The same year, he was hired in the actuarial department of the insurance company *Soleil et Aigle* for which he was going to work for 40 years. A detail is worth noticing: students in the final year of ISUP had to present a personal research work (called 'ISUP dissertation' though it had only a symbolic academic value). Kovalevsky chose to present a memoir devoted to a statistical analysis of the results of the French highly symbolical *baccalauréat* examination between 1904 and 1927: this choice may be a good hint of Kovalevskij's desire to assimilate the surrounding culture, though he remained also deeply attached to his Russian origins all his life.[28]

In opposition to this first group, the second category of Russian emigrants in Paris includes the oldest ones, the ones who had almost lived their whole professional career in Russia, possibly in high academic positions, and were in the 1920s in the last segment of their professional life. A central issue is to understand what they did and how (and if) they succeeded in using their mathematical expertise in Paris. This second category of mathematicians is in fact quite reduced as we found only one example in Paris.

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[26] The transliteration of his name on the PhD was Stoyko.

[27] This distinguished specialist in analytic number theory, professor at the University of St. Petersburg, was hostile to the approach of analysis proposed by the Moscow School. He too emigrated in 1929 to join his American wife in the United States. We will cross his path again in the part devoted to Kosticyn.

[28] When he retired in 1968, Maxim Kovalevsky gave up all scientific activity and devoted his time to music - he is now mainly known for his implication into liturgical music and Orthodox life within the Russian emigration, being an active member of a catholic-orthodox association founded by his brother the priest Eugraph Kovalevsky.

Observe however that others may be found in other important places for the Russian emigration such as Belgrade or Prague: this is for instance the case of the celebrated statistician Alexandr Alexandrovich Chuprov (1874-1926) who had an important scientific activity in Prague.[29] Our man is Serguei Evgenievitch Savitch (1864-1946) who was 55 when he arrived in France. Born in 1864, he had studied, lived and worked in Saint Petersburg. After his graduation in mathematics, Savitch became particularly interested in the actuarial field and published several works on this matter. He attended many International Congresses of Actuaries and acted as their vice-president, for instance in 1895 in Brussels, in 1898 in London or in 1900 in Paris. Being the son of a high level officer, he prefered to flee Russia after 1917. In a letter contained in his refugee file[30] Savitch mentioned that before obtaining a Nansen passport, he had a consulate passport issued in Stockholm in October 1918. Maybe this is a hint that he left Russia as soon as that very early date, maybe because he was frightened of the explosive situation in Petrograd. His moment of arrival in Paris is not absolutely certain but it was certainly before 1922 as he was on the lists of the GAR that same year, and lectured on differential and integral calculus - a course he had kept afterwards for several years (as mentioned above, he and Kogbetliantz were the two mathematicians teaching for the GAR). From 1924 to at least 1939, he served as vice-president of the GAR and, in 1932, he was one of the GAR's delegates to the International Congress of Mathematicians. However, though Savitch seems to have been quite implicated into the Russian emigration, he apparently stopped any scientific research as we could not find any publications after his departure from Russia: for instance he simply attended the eighth International Congress of Actuaries in London in 1928 or the Zurich 1932 ICM apparently without giving any talk.

The last and third group is the one that raises the most important questions as it includes mathematicians in the middle of their career. The issue of continuities and ruptures in their works is central for the analysis of the effect of their emigration. Did these mathematicians stay in their original mathematical field? Or on the contrary, did they choose to - or had to - embark themselves in a totally or partially new field of research? Observing the trajectory of these emigrant mathematicians also raises the question of the possible existence of a transfer of mathematical technology from Russia to France. More generally speaking, is it possible to evaluate what these mathematicians brought to French mathematics? For the (otherwise bigger) case of the inter-war USA, Siegmund-Schultze (2009) dedicated a whole chapter to this fundamental point.

> `Undisputedly, writes Siegmund-Schultze, the impact of mathematical immigration (not only restricted to German-speaking immigrants) to the United States was of great importance, arguably even more than in other sciences. (...) However evaluating gains and losses during emigration, one has to be careful not to fall into the post hoc, ergo propter hoc trap, that is, to claim that developments in the host countries (the gain) would not have taken place without immigration. The opposite assumption—that these developments would have taken place in the country of origin as well (the loss)—is equally illegitimate. This also shows that research on emigration cannot evade the dilemmas of "counterfactual" historical claims, which can only be handled with extreme care in a historical investigation.'

The remaining of our chapter is devoted to the study of the two main representatives of this third group, Ervand Gevorgovich Kogbetliantz and Vladimir Alexandrovich Kostizin. We try to understand how their particular trajectories fit into the contrasting landscape of Russian emigration in France that we

[29] On Chuprov, consult (Sheynin, 2010).

[30] OFPRA Archive. OR019

have outlined. For the comfort of the reader, at the cost of a few short repetitions, we have tried to make the two parts that follow independently readable one of the other.

PART 2- ERVAND KOGBETLIANTZ: THE RANDOMNESS OF A WALK

The second part of the present chapter is devoted to a study of Ervand Kogbetliantz who left the territory of the old Russian Empire in 1921 and arrived in France the same year.

1- Early years

Most of the information we give about the first part of Kogbetliantz's life comes from Ermolaeva (1997), often taken up and completed in Blokh and Rikun (2015). These authors consulted Kogbetliantz's student file at the National Archives in Moscow.

Ervand Gevorgovich Kogbetliantz was born in 1888 in Nakhichevan-on-Don, a city founded in 1779[31] next to Rostov-on-Don, at the extreme south of Russia, by an Armenian population deported from Crimea on empress Catherine II's order. According to Ermolaeva (1997), Ervand's grandfather was one of the founders of the city. More than 30,000 inhabitants lived in this important crossroads at the turn of the century. It was a living center of Armenian culture with many institutions: cultural (an important library, a theater), spiritual (many churches and monasteries) as well as educative with several schools. In 1906, Ervand graduated from high school with a silver medal. Ermolaeva (1997) and Blokh and Rikun (2015) indicate that Kogbetliantz afterward had spent a year in Paris at the Sorbonne to start higher studies in mathematics, studies that he had to interrupt, because of the impossibility for his family to face the expenses of such a stay. He came back to Russia and, as he had in Moscow some family with whom he could live, he became a student of mathematics at Moscow University. It has so far been impossible to find a trace of this early stay in France: not only the aforementioned texts do not indicate an archivial source on this matter, but Kogbetliantz himself never evoked this trip in later documents (where it would have been natural enough to do so, for instance when he applied to become a French citizen). Ermolaeva (1997) may have referred to the Jahrbuch edition of 1932 where the short biographical note on Kogbetliantz (p. 1360) briefly indicates its presence in Paris and Moscow between 1905 and 1907. The information thus remains questionable.[32]
Kogbetliantz was anyway enrolled in 1907 at the University of Moscow and received there a very comprehensive training in mathematics. During these years, he became close to Egorov, attending his seminar on trigonometric series. It is on this topic that he carried out a study devoted to the application of the Borelian methods of treatment of divergent series to the decomposition of functions in trigonometric series, a memoir that earned him a gold medal in autumn 1911. In the spring of 1912, Ervand graduated from university. He was then married for a few months and a first child was born in December of the same year probably forcing him to earn some money. According to Bloch i Rukin (2015; 67), this situation probably explains why he had to wait until 1916 to obtain his diploma of magisterium under Egorov's direction and get the possibility of becoming a Privat-Dozent at the university in September 1916. At this same moment, his first publications appeared, devoted to the decomposition of the functions in series. Paul Appell presented several notes to the Paris academy of

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[31] Its original name was Nor Nakhichevan - the new Nakhichevan.

[32] If it is true that many Caucasian students went to Western Europe to circumvent the numerus clausus imposed in the universities of the capitals of the empire, but one would rather expect to see an apprentice mathematician leaving for Germany. On the students of the Caucasus in Germany one can consult Mouradian et al. (1992). In her study on the Armenians of France, Ter-Minassian (1988; p.193) emphasizes that before 1914, Paris was a natural destination more for Armenians coming from the Ottoman Empire.

science. The explanation given by Blokh and Rikun (2015) is that Paul Appell had been very impressed by the (18 years old!) young man during his alleged stay in Paris ten years earlier: this seems rather fanciful. It seems much more likely that Egorov, during a year 1916 when the inner Russian situation was deteriorating, could have asked his French colleague, then the dean of the Faculty of Sciences of Paris and an eminent member of the Academy of Science, to kindly present the work of his young protégé.[33]

2- In the turmoil

Kogbetliantz was in Moscow during the whirlwind of events of 1917, but managed to leave the capital in 1918, probably to reach his native region in the south. For a time he taught at the Don University which had been formed from the former Warsaw University, evacuated during the German advance of 1915. In July 1919, he was appointed as a lecturer at the Kuban Polytechnic Institute in Ekaterinodar. The town was still part of an area controlled by the opponents to Bolsheviks and the white armies.[34] During the collapse of Denikin's white armies in Kuban and the panic that followed in March 1920, it is not clear where Kogbetliantz was, but at this point his road to the south took an unexpected direction that allowed him to avoid the terrible evacuation scenes evoked by Gousseff (2008; .29). Kunth (2016, chapter II in particular) explains how during a few months the Caucasus was a fragile shelter for those fleeing the Bolsheviks. Since the summer of 1918, an independent Armenian republic was born. The Allies, anxious to obtain a lasting dismantling of the Ottoman Empire, supported it. They occupied the capital Constantinople in October 1918 and the French army also occupied the north of Cilicia from 1919 to 1921. Public opinion was shocked by the news about the extermination of the Armenian populations led by the Turks in 1915, and, in line with the support to national regroupings which formed the Wilsonian philosophy in the aftermath of the conflict, the victors were inclined to accept, not without skepticism, the constitution of a large independent Armenia including Trebizond and with a wide access to the Black Sea.[35] As such, the planned project in the Treaty of Sèvres never came to fruition under the joint blows of the Turkish reconquest in the south under the leadership of Mustapha Kemal (Atatürk) and the advance of the Soviet troops in the north, blows made easier by a change of attitude of the Allies, anxious to spare their future relationship with Turkey. In 1922, the Soviet Republic of Armenia was constituted on a third of the surface envisaged by the treaty of Sèvres and, in 1923, the Allies and Turkey signed the Treaty of Lausanne that consecrated the victory of the Kemalist reconquest.

For two years, however, in 1919 and 1920, the young Armenian republic did its best to establish a more or less viable democratic state. On the history of the Armenian Republic one can consult the monumental sum in four volumes Hovannisian (1971-1996) or the more concentrated book Ter-Minassian (1989). Both insist on a kind of building euphoria that accompanied the year 1920 in Armenia. Hovannisian (1996, volume III, p.10) emphasizes that the excitement in January 1920 was particularly intense on the occasion of the opening of the Alexandropol State University, as 'the result of sheer determination ', soon followed by an expansion project with a transfer to a new campus in Yerevan

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[33] It is also possible that the wave of sympathy in France towards the Armenians, who had just faced the genocide of 1915, could have played a role, as Paul Appell's humanitarian commitments are well known.

[34] It may seem surprising that at a time when violence was raging in the north and the situation of the population of large cities like Moscow or Petrograd was hopeless, university life could have followed a seemingly normal course in the south. In fact, as Gousseff (2008; 35) points out, the relative abundance and peace prevailing in the south offered a violent contrast with the chaos and terror that engulfed the capitals.

[35] See MacMillan (2001; in particular chapter 26) Margaret Mc Millan. Peacemakers. J.Murray, London, 2001 or Ter-Minassian (1988; 196-197).

in the autumn of 1920. Ter-Minassian (1989; 185) points out that the university comprised five faculties: history, philology, law, medicine and physics. In the absence of more precise documentation on the subject, it may be supposed that the project of physics faculty also included a teaching of mathematics and that attributing it to Kogbetliantz had been thought of. The latter always indicated after having spent the academic year 1920-1921 as professor of analysis at the Yerevan State University, but the information on his duties remains very imprecise. It is in fact not proved that the teaching in question took place, since Yerevan was taken by Bolshevik troops as soon as December 1920. Nevertheless, Kogbetliantz was always keen to display his presence alongside the young republic during this difficult year. A touching testimony is found in the dating of an article which later constituted his Parisian PhD (see below): he wrote on the last page (63) of Kogbetliantz (1923) the mention 'Dara-Tchitchague (Valleys of Flowers), August 10, 1920 ', thereby wanting to emphasize his presence at the time in one of the strongest symbolic places of Armenian culture with the monastery of Kecharis.[36]

Since 1919, Kogbetliantz, who had divorced his first wife in 1918, lived in the company of Evguenya Georgievna Krasilnikova, daughter of a wealthy businessman from Nakhitchevan-on-Don,[37] whom he married a few years later in Belgium.[38] The financial means of the couple certainly facilitated the new departure of Kogbetliantz and his family, this time to the West. There is also a lack of precise information about the time of departure and the route followed, but most likely it is that they crossed the Black Sea to arrive, like thousands of other refugees fleeing Soviet armies victorious on all fronts, in the congestion of Constantinople. In any case, in July 1921, Kogbetliantz sent a message to Appell, now the rector of the Paris Academy, to ask him to intervene with Aristide Briand, president of the council and minister of foreign affairs, in order to authorize his emigration to France. In the message sent by Appell to Briand,[39] Appell recommends Kogbetliantz to the attention of the Minister by presenting him as a 'young very distinguished Russian mathematician' of which he had presented several notes at the Academy of Sciences. It is difficult to know whether Appell's letter had any real effect, but we note on the document the handwritten mention 'we are dealing with the case at the moment'. Kogbetliantz and his family arrived in France in the weeks that followed, either by boat by Marseille or by train to Paris, as the better off usually did, according to Kunth (2016).

3- The beginning of a French career

In his book on Armenian exiles, Kunth (2016) emphasizes the administrative singularity of the Armenians who fled the Caucasus in these difficult years, because their exile had a double dimension: they could simultaneously be considered as nationals of the old Russian empire or as citizens of the vanished Republic of Armenia. One is struck, when one follows the trajectory of Kogbetliantz in France, how much he could play of the two sides (for example by locating his place of birth sometimes in Russia, sometimes in Armenia) probably choosing on the moment what seemed to him the more favorable choice. This instinct, this 'cunning intelligence' following the well-chosen expression by Kunth (2016) was certainly not completely unjustified. In his study on foreigners in France, Mauco (1932) did not fail to make a distinction, ethnicist or even somewhat racist, between Russians and Armenians, to the clear advantage of the former. Similarly, the book Banine (1968) shows how much the author, who came from a wealthy Azerbaijani family, puts forward her belonging to the Russian

[36] This is the present town Tsaghkadzor.

[37] Blokh and Rikun (2015; 69)

[38] According to his file in the OFPRA archives, the marriage was celebrated on 6 September 1930 in Ixelles.

[39] July 1921; OFPRA Archives, Kogbetliantz file.

community. The Kogbetliantzs, who also seem to have benefited from a reasonable economic situation on their arrival in France[40] clearly displayed themselves as members of the Russian community in France. In his academic life, Kogbetliantz was also able to play of his affiliation to the University of Yerevan, which he regularly recalled later, and of that, no doubt more prestigious, at the University of Moscow. One remains impressed by the ability with which he could be very quickly integrated into existing academic structures in France. In January 1922 he was recruited by COERF to teach general mathematics in one of the Russian sections at the Sorbonne. Unfortunately, there are no details regarding the contents of the lectures that Kogbetliantz read for more than ten years (referring to the annual accounts of the GAR.[41]

Thanks to the constant support of eminent members of the French mathematical community, Kogbetliantz was able to pass the naturalization process to become a French citizen. It was requested in 1926 and obtained in 1931.[42] The consultation of the naturalization file[43] leaves little doubt on this point: it contains letters of support from Appell, Hadamard, Maurain. It mentions Borel, Montel and others. Hadamard and Maurain emphasize the services rendered and the interest for the country to acquire such a first rate scientist. The least one can say is that the newcomer did not lack support.

However, Kogbetliantz's outsider position on the mathematical scene does not seem to have helped him much to find a university job, at least along his taste. As he had to earn a living, he then got closer to the industry and was recruited by the Compagnie Française des Pétroles (CFP), the French Oil Company at the very moment of its creation in 1924.[44] Due to a lack of documents, one cannot say by which way Kogbetliantz, who does not seem to have shown prior knowledge of geophysics, had been approached: industrial network introduced or not into Russian or Armenian emigration circles? Mathematical network of which an eminent representative, Paul Painlevé, was now president of the Chamber of Deputies and another one, Emile Borel, had become a deputy? Perhaps, too, an attractive hypothesis, an Armenian network when one thinks how the businessman Calouste Gulbenkian (1869-1955) played an important role in attracting European countries to Middle East oil after the First World War? The archives of the CFP show that the discussions with Gulbenkian in the first years of the company, before obtaining a satisfying agreement, were complicated: maybe Kogbetliantz was involved in this process? It would be interesting to clarify this point. Kogbetliantz was attached to the CFP for three years. In 1926, he devised a three-weighted torsion balance allowing the estimation of the second derivatives of the potential of the gravitation force at one point: as Kogbetliantz explained later in Kogbetliantz (1962), the knowledge of these derivatives, and thus of the variations of gravitation, makes it possible to quickly draw conclusions on the tectonic nature of the subsoil. Kogbetliantz patented his system in France, Germany, Great Britain and the United States. During summer 1926, Kogbetliantz proposed to the British company Oertling to build a prototype along his patent, but the latter was skeptic about the

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[40] This is shown for example by the fact that, as early as 1926, they were owners of their Paris apartment located Boulevard Brune (AN, BB / 11 / 8778).

[41] This went on even after the split of the GAR, which held in March 1925 for political reasons and which led to the creation of the Russian Academic Union in France led by the historian and former KD leader P.N.Miliukov, to which Kogbetliantz was affiliated.

[42] This was a normal, or even rather short, delay as the process included several steps.

[43] AN, BB / 11 / 8778.

[44] The negotiations of Poincaré during the establishment of the CFP to favor certain private interests in the supply of oil from France are exposed in Nouschi (2001). The CFP was officially established in March 1924, just before the Cartel des Gauches came to power in May 1924, but the leftist new government accepted the fait accompli and oversaw the practical organization of the Company.

feasibility and refused. Therefore, in 1927, Kogbetliantz persuaded the CFP to support the creation of a small subsidiary company, the company for geophysical prospection (SPG), with the help of funds from the Banque de Paris et des Pays-Bas, in order to realize experiments and exploit this patent. One of the administrators of the SPG was Henri Galbrun, another important figure of the Borelian network in the 1920s, who had been recruited by Horace Finaly to set up an actuarial service at the Banque de Paris et des Pays-Bas.[45] The archives of the CFP show that the direction of the company was confident about the future results of Kogbetliantz's invention, and the archives of the SPG (of which Kogbetliantz had been logically chosen as the first director in June 1927) document how things went on. The mathematicians organized a board of scientific advisers including Léon Brillouin, Charles Maurain and the geologist Léon Bertrand. On the paper, the beginnings seemed promising but the results proved in fact to be somewhat disappointing. Kogbetliantz ordered a prototype of the balance from the German company 'Askania Werke' but a lot of practical problems appeared during the experiments. Moreover, in March 1928, the company Oertling produced its own balance using the same kind of principles as in Kogbetliantz's patent. The SPG considered suing but the numerous exchanges with a British defender showed that the situation was delicate, as the company Oertling was not disposed to admit being guilty of a plagiarism, and Galbrun became quite worried about the possible financial consequences. At the same moment, another device for prospection using Dufour[46]'s oscillograph seems to have given convincing results. As the original capital of 1 million francs was exhausted, the Banque de Paris et des Pays-Bas, probably advised to do so by Galbrun, accepted to raise the capital to two millions francs, but asked that Kogbetliantz would not be in charge with the company's destiny. On the basis of some maybe slightly exaggerated accusations of bad administration, Kogbetliantz, was properly fired on October 1928 from his manager position (he remained in the SPG as a simple engineering adviser until 1933).

Some years later, Kogbetliantz proposed to use the same kind of considerations on the measurement of gravitation he used for his balance for a check of the validity of general relativity, a raging debate at the time. In 1931 he published an article in the Annals of Physics Kogbetliantz (1931) where he proposed a laboratory experiment based on the same principles through the construction of a kind of giant three-weighted torsion balance. In 1940, the CNRS director Charles Jacob asked Dufour[47] to write a report on Kogbetliantz's work in physics. Dufour did not hide his major skepticism about the feasability of realizing in practice Kogbetliantz's experiments (CNRS, Kogbetliantz file). Even later, in 1951, another acerbic report, still for the CNRS but this time by the geophysicist Louis Cagniard,[48] led to similar conclusions: 'Mr Kogbetliantz is a valuable mathematician since his work on divergent series was appreciated by Appell and Lebesgue (...). Unfortunately this mathematician wanted to do applied geophysics, hoping to find there more material satisfaction than in the summation of divergent series (sic). He absolutely could not succeed in that domain, any more than in physics (...) because he totally lacks the sense of realities and a spirit of fineness.'

Kogbetliantz carefully always made sure to continue to be considered as a mathematician by mathematicians. For his participation to the International Congress of Mathematicians in Zurich in 1932,

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[45] On this, consult Bustamante and al. (2015).

[46] Dufour was the inventor of the cathodic oscillograph. See (Dufour, 1920).

[47] We do not know if Dufour and Kogbetliantz had had previously exchanges at the SPG. A mention in Dufour's letter to Jacob ('M.Kogbetliantz will hate me but he must understand that there is no parti-pris on my side') may indicate that both scientists were in contact.

[48] Louis Cagniard had also been recruited as an expert physicist by the SPG in 1927, and he attended several experiments when Kogbetliantz was director. Hence his poor opinion of the practical aptitudes of his colleague was certainly considered to have some relevance.

he thus presented two talks: one on the summability of series Kogbetliantz (1932a), the other on the project of laboratory experiment to measure the changes of gravitation Kogbetliantz (1932b).

At the beginning of 1933, a new opportunity arose. The Caisse Nationale des Sciences (CNS), created in France in 1930, set up a system of research grants to promote young researchers. Our hero could hardly fit into this category but, perhaps encouraged to do so by his high ranked contacts who presided over the selection commissions, on March 25, 1933, he sent an application[49] for a three-year research grant to the Minister of Public Instruction (in fact it had been renamed Ministry of National Education in 1932) who was the official head of the CNS. He stressed his desire to 'continue to deepen his research on function theory' and to complete a volume for the Borel collection of monographs about the use of orthogonal families. Kogbetliantz wrote he had had to join the industry in 1924 to support his family because he did not get an academic job, and mentioned that the SPG warned him that it would soon terminate his contract. On July 20th, the ministry informed the candidate that he was awarded a grant for one year from October 1, 1933 to September 30, 1934. However, Kogbetliantz's career was going to take an unexpected direction. In 1928, the Persian physicist Mahmoud Hessabi (1903-1992) convinced the education minister of the new Pahlavi regime in Tehran to reorganize higher education in Persia, and to create an Ecole Normale Supérieure. In Hessabi's mind, this institution was to be considered less a place to train teachers than as an embryo of a modern science and letters faculty in a future university of Tehran. To achieve these goals, Hessabi suggested, it would be appropriate to call on the help of renowned scientists from the major Western university centers, primarily French: Hessabi just returned to Persia after a long stay of study in Paris which was concluded in 1927 by a PhD on electricity under the direction of the physicist Aimé Cotton.

The French Ministry of Foreign Affairs was seduced by helping Hessabi's projects, thus consolidating the French soft-power in Persia, and entrusted the University of Paris with organizing the sending of French teachers to Tehran. The archives of the University of Paris[50] give information about this mission. A document dated June 4, 1932, states that Tehran's Ecole Normale Supérieure wanted to recruit a professor of mathematics and a professor of botany for the next academic year. The late date obliged to postpone the answer to the next academic year. In 1934, the University of Tehran was inaugurated, and European aid was again required.[51]
Had Hessabi known Kogbetliantz during his stay in Paris? The latter was proposed to hold a chair of mathematics in the new university and the Tehran Ecole Normale. The case took some time to conclude despite the strong support expressed by members of the French mathematical community as Maurain, Villat and Hadamard (no less !) to this application. The archives of the mission[52] contain an interesting confidential document: on April 21, 1933, the embarrassed ministry wrote to the Paris academy rector Sébastien Charléty to mention that the Kogbetliantz's appointment would probably fail because the legation of Perse in Paris reported to prefer a 'French-born candidate'. We do not really know the dealings that followed, perhaps with the Hessabi's intervention, but on June 15, 1933, the Legation

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[49] CNRS Archive, Kogbetliantz career file.

[50] AN, AJ / 16/6982

[51] The case was taken quite seriously, as shown by a letter of the French delegate in Persia (AN, AJ / 16/6982). No doubt sending academics to Tehran would ensure a French presence in an area dominated by British influence. Also, the delegate expressed the fear that the German cultural sphere could find there a great opportunity for expansion because (dark irony!) of the number of available Jewish professors -- especially professors in medical specialties -- on the market after having been expelled from German universities on Hitler's access to power.

[52] AN, AJ / 16/6982

warned Kogbetliantz that he was invited to take the post of Professor of Analysis at the Ecole Normale in Tehran. On August 3, he warned the Ministry of National Education that he would probably have to give up the CNS research allowance but asked the Minister to wait for his contract to be signed in Tehran before being erased from the lists. A final letter sent by the mathematician as late as October 24 warned the CNS about the eventual signing of a two years contract in Tehran, and therefore about his renunciation to the grant. Cautious, Kogbetliantz nevertheless added that he intended to renew his application for a grant in 1935 in case of non-renewal of his contract in Persia.
What encouraged our hero to embark in such a trip is not perfectly clear. Naturally, the prospect of building a modern university from none was a project that could arouse enthusiasm, especially since the new regime of the Shah, leading a strong-willed policy of modernization of the country, promised substantial resources. On the other hand, it is possible that Kogbetliantz had the information concerning Tehran before that of the CNS grants, and in any case, permitting himself to choose one or the other increased his chances of having a source of income during the next years. Another hypothesis: oil. Even though Iran's wells were under British control, being present in an area where thousands more discoveries could be made and where he could also have opportunities to experiment new geophysical techniques may have seemed an interesting prospect. But it is likely that a completely different factor also played a role: the presence in Tehran of a strong Armenian minority, dynamic and rather prosperous because deeply engaged in trade.[53] Perhaps Kogbetliantz did have some family in Tehran? In any case he remained in Iran (the new name for Persia) until 1938. In a biographic record written in 1951 for the CNRS,[54] the mathematician detailed his activity in the Iranian capital: he taught there first mathematical analysis, then organized a laboratory of applied geophysics and gave lectures on magnetic and gravimetric methods. In 1936, he attended the International Congress of Mathematicians in Oslo as an official delegate of Tehran University alongside Mahmoud Hassabi. In Oslo, Kogbetliantz gave a talk[55] emphasizing the merits of his three-weighted-torsion-balance. He also participated in the dissemination of scientific culture in Iran by publishing papers on sunspots in the French language local newspaper *Journal de Téhéran* and by giving popular lectures ans he did in early 1937 in Tehran house of techniques (Dar-ol-Fonoun) on the role and importance of mathematics in social life.[56]

The archives do not document the reasons that decided the mathematician to return to Paris and not to ask for the renewal of his contract. This renewal, moreover, was perhaps not proposed to him, even if this seems slightly surprising in view of the various testimonies of great satisfaction expressed to the French legate in Tehran by the Iranian Minister of Education and the fact that the Iranian government decorated him in 1938 with the medal of the scientific merit (Nchan Elmi). Tehran's climate may have become heavier as the Shah regime flirted more and more with Nazi Germany.[57] Finally, it is not impossible that Kogbetliantz was warned of the occurence of a new opportunity in France. In March 1938, in the context of rising tensions in Europe and under the impetus of Jean Perrin, the National Center for applied scientific research (CNRSA) was created, and this could undoubtedly open up new opportunities. On March 10, 1938, while still in Tehran where the academic year's end was approaching,

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[53] On this community and its great involvement in the socio-economic life local economy, in spite of not always simple relations with the authorities, one can consult Chaqueri (1998; 131-137).

[54] CNRS archive, Dossier Kogbetliantz.

[55] Kogbetliantz (1937)

[56] http://www.teheran.ir/spip.php?article394#gsc.tab=0

[57] This was besides not without consequences for the Armenian minority, according to Chaqueri (1998) (in particular 136).

Kogbetliantz sent a request for reallocation of the research grant he had renounced in 1933.[58] This letter seems to have remained unanswered so that Kogbetliantz reiterated his request in early May, attaching an biographic record describing his career and a letter from the head of the French legation in Iran expressing the satisfaction of the Iranian government for his work. Elie Cartan reported on the application for the mathematical section of the CNS: Cartan actually wrote only a few lines to recommend re-appointing Kogbetliantz as research fellow for one year. It is unclear whether Cartan was really convinced by Kogbetliants's file as he said nothing about it. Maybe he above all considered it fair to give back a grant his colleague had voluntarily given up five years earlier. In August 1938, Kogbetliantz was appointed for the second time research fellow.

As this position was not a permanent one, Kogbetliantz planned to obtain eventually a university position in France. There was an administrative difficulty, as the law of July 19, 1934 required a 10-year delay for naturalized French persons before they could be appointed to a post of the public service of State. Kogbetliantz sent a letter to the Ministry of Justice to request a reduction to 7 years of the waiting period, enabling thus him to obtain immediately, occasion permitting, to a public position in France. Kogbetliantz supported this request by mentioning an article of the law authorizing this reduction for naturalized foreigners already employed in a public educational establishment before 1924: Kogbetliantz argued that having been sent to Tehran in 1933 by the French Government, he considered having served in public education. The naturalization file[59] documents this new fact that reminded Kogbetliantz that he arrived in France 'only' seventeen years earlier. This time, despite the support of the demand by the rector Gustave Roussy and even the favorable opinion expressed by the Minister of Education Jean Zay to the Minister of Justice Paul Reynaud, the request was rejected. The naturalization file contains the convoluted answer of the Ministry of Justice to Roussy, explaining to have refused the reduction of the deadline because Kogbetliantz did not have any French titles allowing access to public education: 'licence, diplôme d'études supérieures, agrégation': Kogbetliantz must wait the normal delay until 1941 before being able to claim for a public job. The just created CNRS renewed Kogbetliantz's research grant in 1939 following a new report by Georges Valiron,[60] and in 1940 following a second report of Cartan (even shorter than that of 1938). This last report was dated May 11, 1940, the day after the German attack on the western front marking the end of the phoney war. One wonders if the members of the commission really had their minds about what they were doing...

PART 3. VLADIMIR KOSTICYN: THE DEPARTURE'S SORROW

The contrast between Ervand Kogbetliantz's trajectory and that of Vladimir Kosticyn that we are now going to consider is striking, if only because both mathematicians arrived in France within a few year distance that is enough to place them worlds apart. Kogbetliantz, arrived with the first wave of emigration that followed the Bolshevik takeover, had never experienced, so to speak, the new regime in its day-to-day life. On the contrary, Kosticyn, who arrived in 1928 after having held important positions on the Moscow scientific scene, had witnessed and acted this life. Both of them started therefore their life in exile from a very different angle. In a sense, the trajectory of Kosticyn, who passed from Russia to France, and even more specifically from Moscow to Paris, appears substantially more linear than that of his compatriot. But the devil is in the detail: in addition to retracing the path of the mathematician, the present part wants to emphasize how both mathematicians, beyond their disparity, shared certain aspects of the common destiny of the exiles of this time. Ermolaeva devoted several important articles to

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[58] CNRS archive, Dossier Kogbetliantz.

[59] AN naturalization Kogbetliantz.

[60] On a new biographic record, Kogbetliantz indicated that he gave a course at the Sorbonne between March and June 1939 on his methods of interpreting geophysical observations for prospection. We did not find any details about this point.

Kosticyn's biography, beginning with the rich paper Ermolaeva (2001). More recently, Blokh and Rikun (2015) proposed a new text, considerably enriched by the discovery a few years ago of unpublished memoirs written by Kosticyn in the last ten years of his life. Some of these memoirs have now been published by V.L.Genis (who has issued several intermediate articles during his exploration of the manuscripts) in 2017 in Moscow as Genis (2017). As we have already said, in addition to these different texts, the examination of numerous sources of archives found in France improve a lot our understanding of the complexity of the trajectory of our mathematician.

1 - A production of the Moscow school

As mentioned above, we give here only a few milestones about Kosticyn's initial training on which Ermolaeva (2001) and Blokh and Rikun (2015) provide a very detailed study. Vladimir Alexandrovich Kosticyn was born in 1883 in Efremov, in the Tula region 200 km south of Moscow. His father was a teacher of Russian language and his mother was the daughter of a district priest. Very early the family moved to Smolensk where Vladimir entered high school. According to Ermolaeva (2001; 129), he excelled particularly in science. His admission in 1902 to the Faculty of Physics and Mathematics of Moscow ensued logically. As already mentioned, the undisputed leader of the Moscow mathematical life of the moment was Dmitri Egorov and Kosticyn, a gifted student, was soon part of the circle his close students, along with other prominent personalities like Pavel Alexandrovich Florenskij[61] and Nikolai Luzin. Luzin and Kosticyn were both involved in the animation of the mathematical circle of students that the specialist in aerodynamicics Nikolai Zhukovskij had set up in 1902 at the mathematics department. In a letter to Florenskij, Luzin mentions that Kosticyn was a 'good worker who has ideas'.[62] Luzin later told Krylov that with Kosticyn they had even lived some months together in the same room and they unceasingly debated the merits of empirical and idealistic logics during the night.[63]

In the spring of 1905, the revolutionary wave that swept Russia fell on the Moscow University, where lectures stopped. As did Luzin, Kosticyn participated in various protest movements. It seems that Kosticyn went much further than his fellow student, approaching much closer the Bolsheviks. At this occasion, he would have met Natalia Krupskaya, Lenin's wife and participated in barricades.[64] As was already mentioned earlier, fearing that the very promising Luzin would have troubles, Egorov strongly urged him to leave for a time to study in Paris where a young and dynamic school of analysis was in full swing with personalities like Borel, Lebesgue or Fatou. Kosticyn remained in Moscow: when the troubles started again in the spring of 1907, he was arrested and remained imprisoned in St Petersburg more than a year, despite the eager intervention of Egorov.[65] In these years of stiffening of the tsarist regime, this implied that he lost the possibility of pursuing his studies in Moscow. Like his friend Luzin, Kosticyn also went abroad. First in Vienna,[66] then to Paris. In 1910, he was admitted at the Sorbonne where he spent two years before obtaining his *licence*, as he had to follow the curriculum from the beginning because Moscow University had not sent the certificate that he passed several exams in

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[61] On Florenskij now exists a vast literature. Here are several texts offering various perspectives on this amazing character. See for instance Žust (2002), Betti (2009) (Antonova, 2010), (Graham and Kantor, 2009).

[62] Demidov (1989; 130).

[63] Ermolaeva (1989; 205).

[64] On that topic see a note by S.S.Demidov in Ermolaeva (2001; 131).]

[65] Ermolaeva (2001; 132)

[66] Blokh and Rikun (2015; 34)

Russia.[67] Kosticyn graduated in fact at Paris University in July 1912 after two tries. He passed the examination for the three usual certificates: 'differential calculus', 'rational mechanics' and 'superior analysis'. Despite this little administrative inconvenience, Kosticyn admitted[68] that it was a great luck to have been in Paris at a particularly brilliant moment of its mathematical life. This prompted him to embark on a research project with great enthusiasm. Egorov, who was following the progress of his protégé by far, published in Matematicheski Sbornik his first article Kosticyn (1912), soon followed by a second Kosticyn (1913b), devoted to the study of some properties of orthogonal systems of functions using set measure techniques.

Scudo and Ziegler (1976), who first brought Kosticyn to the surface again, discussed the possibility of Kosticyn and Lenin meeting in Paris, where Lenin stayed between 1908 and 1912. Kosticyn's memoirs confirmed this hypothesis. As Blokh and Rikun (2015; 36) tell us, Kosticyn, Lenin and Krupskaia did indeed spend the summer of 1910 together in a villa in Pornic on the Atlantic coast. In 1913, Kosticyn was still in Paris and Picard presented a note to the CRAS (Kosticyn, 1913a), collecting the results of the Russian paper (Kosticyn, 1913b) in January 1913. At the outbreak of the First World War in August 1914, Kosticyn was not immediately mobilized, perhaps because the Russian government did not want to bring back a turbulent opponent. Perhaps he could have also asked to stay in France to watch over his first wife, the revolutionary activist Serafima Ivanovna Nadeina, who died of tuberculosis the following year. We do not know what were the livelihoods of the couple. As Ermolaeva (2001; 135) rightly pointed out, the publication of two articles in Paris in 1916, (Kosticyn, 1916a), note to the CRAS presented by the astronomer Pierre Puiseux, and (Kosticyn, 1916b) in the bulletin of the observatory of Paris, both concerning astronomy themes (solar activity and the distribution of stars) may suggest that he had been recruited to work at the Observatory. In a 1923 letter to which we return later, Kosticyn mentions an 'unforgettable' service which Paul Appell, then dean of the Faculty of Science, had returned to him in 1915, without any further details. Ermolaeva (2015; 37) mentions that in August 1916 Kosticyn was finally mobilized in Russia. He first spent time in an emergency aviation battalion before being sent to a training school for airforce officers.

2 - On the soviet stage

Kosticyn was there when the revolution of February 1917 broke out. Appointed auxiliary commissioner on the southwest front by the provisional government between March and October 1917, Kosticyn participated in the repression of armed uprisings, both monarchist and Bolshevik. He was thus in a delicate situation when Lenin seized power and he remained for some time in hiding at Zhitomir in Ukraine before returning to Moscow, having declared his loyalty to the new government.

The coming to power of the Bolsheviks led to a fundamental reorganization of the country's administration, replacing the plethoric Tsarist administration with a no shorter list of new institutions, designated by more or less barbaric acronyms. Kosticyn, now close to the new power, found his way in many of them. The reorganization of the educational system led to the creation of the People's Commissariat for Education (Narkompros) under the leadership of A.V.Lunacharskij and the National Scientific Council (GUS) under the leadership of M.N.Pokrovskij. Kosticyn became a member of the GUS in 1919, and then a member of the direction of the scientific and technical sector of Narkompros in 1920 to which he belonged without interruption until 1927. In 1922 he became a leader of the section of GUS supervising the edition of textbooks. Ermolaeva (2001; 136) notes that it is difficult to know what were the opinions expressed by Kosticyn (or in fact by the most members of the commissions) in these

[67] Ermolaeva (2001; 134)

[68] Blokh and Rikun (2015; 34)

various positions because the reports of the meetings are extremely brief and do not reproduce the discussions. In 1922, the Narkompros created a special direction dedicated to the organization of scientific institutions, the Glavnauka. The scientific and technical section was under the direction of the mathematician Otto Yulievich Shmidt.[69] Kosticyn belonged to the Glavnauka immediately, and was appointed a member of its direction in 1926.

During these years, alongside tedious bureaucratic work, taking seriously the large-scale scientific dissemination projects promoted by the government,[70] Kosticyn devoted a lot of time to the publication of 'intermediate' texts or papers with a philosophical orientation on various subjects. Questions of astronomy (such as considerations on the stars or on various cosmological hypotheses) or geophysics (with for example several texts on magnetic anomalies) dominate. This mixture of scientific research and popularization, marked by a hyper-rationalist tendency (sometimes inspired by a Leninist materialist ideology), is very typical of the beginnings of Soviet science, as can be seen in the articles of the Great Soviet Encyclopedia whose project was launched by Shmidt in 1925. [71] Kosticyn wrote many reviews of foreign publications at the request of the Glavnauka, and in 1922 he sustained the idea that it would be desirable that for some of them Russian translations were available. Thus, the following year, Kosticyn published the translation Borel (1923) of Borel's book *Le hasard* (randomness) in a series he managed (Contemporary Problems of Science). The singular presence of Borel on the Soviet scene of those years has already been mentioned above. His second wife Julia Ivanovna, née Grindberg, whom he married in 1919, did the translation.

In addition to his numerous scientific dissemination works, Kosticyn pursued his research work. In early 1919, he was appointed assistant professor at Moscow University where he gave his first lecture in May.[72] An active member of the Moscow Mathematical Society from that same year, he joined Egorov and Luzin on the editorial board of Matematicheskij Sbornik. In 1920, the Institute of Mathematics and Mechanics of the Moscow University was created, of which Egorov became director in 1924, Luzin Deputy Director and Kosticyn Scientific Secretary. In the same period, he was also a member of the Institute of Astronomy and Geodesy as well as the Institute of Geophysics. In 1919, at the request of the Narkompros, together with the geophysicist Pietr Petrovich Lazar'ev, Kosticyn had resumed an in-depth examination of a major natural phenomenon, the magnetic anomaly of Kursk, whose study had just been interrupted by the sudden death of the geophysicist and professor at the Moscow University Ernest Egorovich Lejst. Ermolaeva (2015) describes the large-scale research of Kosticyn and Lazar'ev in this field. In 1926 or 1927, Kosticyn was appointed director of the Institute of Geophysics.

Kosticyn chose a main mathematical theme on his return from France: the study of integral equations and their applications, including the mechanical problem of hysterisis. If we do not know precisely why he was seduced by this theme, we can reasonably advance the hypothesis that it was during his stay in Paris that he had discovered it. This happened perhaps by attending the courses the main specialist of the domain at the time, the Italian mathematician Vito Volterra, had given to the Sorbonne in 1912, invited

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[69] On Shmidt and on the Glavnauka, one can refer to Mazliak (2018) and to the included references.

[70] On the conception of science in Soviet society of the 1920s, see Mazliak (2018) and the numerous references mentioned there.

[71] See Mazliak (2018) and the references included about the GSE, in particular Kassof (2005).

[72] Blokh i Rikun (2015; 37)

by Borel and Hadamard.[73] In his paper Kostitsin (1916b) Kosticyn already used integral equations of Volterra type to formulate a problem of astrophysics.[74] In the 1920s, Kosticyn published a series of works on integral equations. He studied the questions from a strictly mathematical point of view, or for application to hysterisis problems. This was the case, for example, in the article Kostitzin, (1924a) 'remarks on the mathematical theory of hysterisis' published in the Matematicheskij Sbornik in 1924 and presented the same year at the Toronto International Congress (to which we return later) as (Kostitzin, 1924b). In an popularization article rather typical of the moment,[75] Kosticyn wrote that

> '[g]eophysics can satisfy a person who engages in pure science, as well as one who engages in applications. Both attitudes are equally legitimate; both are equally necessary for humanity. Earth science is one of the few sciences in which the combination of the two engagements is not only possible, but is unavoidable. This is where its power and its success reside.'[76]

The picture presented so far may give the impression that on the whole, Kosticyn had found a comfortable place in the early years of Soviet power. Through his scientific career, both at the Moscow University and in the governing bodies where his activity was intense, he was a leading player in Soviet science. Reality was more complex.

In 1922, worried about the consequences of an interruption of trade with the West, the Narkompros sought to facilitate the access of Soviet scientists to the world's scientific literature first by turning to Germany,[77] who had just recognized the USSR by the Treaty of Rapallo.[78] Taking advantage of this opening, Kosticyn tried to return to Paris in 1923 by sending a letter to Paul Appell,[79] now the Rector of Paris Academy to which he pointed out that some Russian scientific institutions were going to send him abroad to renew scientific relations, organize the exchange of scientific editions and obtain books and equipment indispensable to the scientific work.

> Now, wrote Kosticyn, 'as a pupil of the French School, it is in France that I would like to go first and take my wife with me. That is why I ask you to interfere on our behalf with the Minister of Foreign Affairs so that the right of entry is granted to both of us. I would like to believe that you remember me a little. I am the one to whom you have rendered an unforgettable and unequaled service in the most painful moment of my life, in the autumn of 1915. I send you a few copies of my works and an issue of the journal

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[73] On the influence of Volterra on the Parisian mathematical scene, one may consult Mazliak (2014), Mazliak (2015) and (Brechenmacher et al., 2016).

[74] Ermolaeva (2001; 143) suggests that contacts between Kosticyn and Volterra could have started in 1916: although the hypothesis is not unreasonable, it seems surprising that the name of the Russian mathematician does not appear in Volterra's exchanges with any other correspondent before 1930. We can also note in the inventory of Volterra's correspondence that it includes very few Russians.

[75] Kosticyn (1926)

[76] Cited in (Ermolaeva, 2015; 41)

[77] On that, see for instance Mazliak (2018; 9).

[78] On the Treaty of Rapallo, see Buffet (2003).

[79] (AJ 16 6945-6996)

Mathematical Collection of the Moscow Mathematical Society, which I manage, by the same mail.'

Appell was eager to help and immediately wrote to Raymond Poincaré, the French President of the Council and Minister of Foreign Affairs. The latter objected categorically to the reception of the Russian mathematician, especially because of the recent Caucasian events (those were consequences of the 1920-1921 Soviet conquest already mentioned in Kogbetliantz's story). Poincaré wrote

> I have the honor to inform you that because of the attitude taken by the Russian Soviet power towards the French of Russia and in particular the recent expulsions of Mr. Coutant, Director of the French School of Tiflis and Mr. Polette, it is not possible to accept requests for entry into France for Russian nationals belonging to official organizations operating in Soviet Russia.

Arrived in Berlin in August, Kosticyn wrote again to Appell, asking him to try another intervention. Appell again contacted Poincaré, putting forward the more precise argument of a risky Franco-German competition:[80]

> If, wrote Appell, no negative information has been provided to you about Mr. Kostitzin's personal feelings, about his political attitude, and about possible underpinnings of the European journey of this Russian scientific personality, I take the liberty of asking you whether you believe you must maintain your opposition to his entry into France. I hasten to add that it does not enter into my mind to discuss the reasons for your decision in principle, I only wonder if, in stopping in Germany a scientist who comes to us - being very much understood that he comes to us only for a really and purely scientific purpose - we do not risk to fix him definitively at his Berlin stage.

On August 14, Kosticyn was allowed an eight-day stay in Paris. Writing to Appell to thank him warmly for his intervention, he added

> I am a little saddened by seeing myself treated as a half-enemy of France, and yet as a pupil of the French school I was always a sincere friend of your country and your people. (...) From the political point of view, the present Government of Russia treats me as an enemy, and there are good reasons for that, and therefore I must not be seen as a Bolshevik danger.

In fact, thanks to a new intervention of the decidedly involved Appell, Kosticyn and his wife could stay in Paris until the beginning of the year 1924. In a letter at the end of August 1923, Kosticyn wrote to Appell an alarmist letter:

> It is only in France that I could refresh my knowledge and rest a little of all the physical and especially moral sufferings of life in Russia which you fortunately have no idea of. [...] So that you can understand what is the atmosphere in which we are forced to live and work, one fact is enough: in December the Moscow Mathematical Society got the order from the Commissariat of Interior to exclude two of its members - the Vice President of the Society Prof. D. Th. Egoroff and the editor of the `Mathematical

[80] On the subject of the instrumentalisation of the Franco-German rivalry, one can consult (Rjeoutski, 2011).

> Collection' - Prof. V. A. Kosticyn. The Moscow Astronomical Society obtained a similar order concerning me a few days before my departure from Russia. Despite everything, we work and do not despair. The Moscow Institute of Mathematics has asked me to pray you to become a member of the Scientific Committee for the edition of Lobachevsky's Complete Works. This committee is chaired by Prof. D. Th. Egoroff with Prof. A. V. Vassilieff as vice-president and Prof. B.T.Kagan as secretary. Only with the help of our foreign colleagues will we be able to accomplish this great job. Help us!

In October, Kosticyn met in Paris the biologist Vladimir Ivanovich Vernadski, sent to France in 1922 by the Soviet government in order to work at the Museum of Natural History and the Institut Curie.[81] After the visit, Vernadski wrote to his daughter how Kosticyn had painted a dark and pessimistic picture of the Soviet situation. Nevertheless, Kosticyn does not seem to have thought about staying in France at that moment. The news from Moscow, where the NEP was beginning to restore a normal life and where the government was gradually adopting a more relaxed stance towards intellectuals (see Mazliak (2018)) may have allowed him to look at the future with greater serenity. No doubt also that the question of material means may have prevented it from seriously considering the question.

In the summer of 1924, Kosticyn had the opportunity to go on a mission to attend the international congress in Toronto. The Soviet delegation consisted of four other members: W. Steklov, N. Gunther and A. Vasiliev, to whom was added Krylov as delegate of Ukraine. Kosticyn was designated as a representative of the Geophysical Institute of Moscow, the Mathematical Society of Moscow, and the University of Moscow. In addition, Uspenskij was present at the congress, but without official position.

During the congress a strange incident happened which was described in 1951 by the communist French biologist Marcel Prenant (in a quite typical style of the Stalinist propaganda)

> In 1924, an International Mathematical Congress was held in Toronto, Canada. A Soviet delegation attended, consisting of the academicians Steklov, Uspensky, Krilov, and professors Günther and Kostitzin. The Canadian press was unleashed against them, for the Soviet Union had only recently been liberated from foreign intervention and blockade. They were denied one of the vice-presidencies of the Congress, which was entitled to return to Steklov; and as the Italian mathematician Severi asked for explanations, his Belgian colleague De la Vallée-Poussin, in the midst of vociferations and insults thrown at Soviet scholars by other delegates, including the French ones, replied that the Soviet Union did not belong to the League of Nations. As a result of these incidents, one of the Soviets proposed to his colleagues to leave the Congress, but he was alone in his opinion, and when the delegation returned to its country and made his report, it was congratulated for having remained in spite of everything, for it had acted with coolness, for the greater good of science and peace.[82]

We were in fact unable to check Prenant's comment of what really happened in Toronto. The only thing we could find is a letter signed by Stekloff, Kosticyn, Gunther as Russian delegates, Krylov as Ukrainian delegate and Uspenskij, addressed to the newspaper *Toronto Star* that published it on 18 August 1924.

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[81] Vernadsky remained in Paris until 1926 and then returned to Moscow.

[82] Prenant (1951).

> To the Editor of the Star.
> Dear Sir: The undersigned members of the Russian delegation to the International Mathematical Congress now being held in Toronto have noticed an article in the Daily Star of yesterday concerning the present state of affairs in Russia, and purporting to be an interview with one of the members of the delegation. May we be permitted to say that no one of us has given an interview to any reporter. Some unauthorized person had unfortunately been presuming to speak for us.
> It is evident that this is so from numerous inaccuracies in the report itself, which could not have originated with any of us. The number of Russian delegates, for example, is five, and no one of us could have spoken of eleven. Further we have such high regard for each other, scientifically and personally, that no one of us could possibly suspect another of being a spy. Our loyalty to our country and our sense of responsibility as delegates from Russia would effectively prevent any one of us from speaking in the manner indicated in the interview. If you would publish this statement from us we believe that it would do much toward counteracting any inaccurate impressions, which the article have inspired. Yours very sincerely.

Unfortunately, we could neither locate the incriminated interview in the *Toronto Star* nor identify the 'mole' evoked in the letter. At least, this letter gives an indication of a somewhat tense climate in the Russian delegation.

In the spring of 1927, the Kosticyn were able to return to France for 3 months. On May 23, the presence of Vladimir is reported at the meeting of the Paris Academy of Sciences where President Charles Barrois introduced him as director of the Institute of Geophysics of Russia and where Hadamard presented his note on singular integral equations of Volterra.[83] Kosticyn did not return to Moscow until September after Julia had decided to stay in Paris during the academic year 1927-28 to study zoology at the Sorbonne. Blokh i Rikun (2015) mention, like Kosticyn himself on several occasions, that Julia's fragile health, heart and rheumatism, made her presence in France desirable. In November, however, he wrote to Vernadski[84] that the reason why she stayed in Paris was strictly academic, because the teaching of biology in France seemed much more effective than in Moscow. Should we see this as a first concrete step towards the heavy decision to emigrate? What can make this hypothesis reliable is that, in 1927, the climate became considerably tense on the Moscow scientific scene, and especially in the circles frequented by Kosticyn as Joravsky (1961; 83) already noted. The proponents of a supervision of science by Marxist philosophy and strict dialectical materialism took advantage in their struggle against the so-called mechanists; in view of his scientific conceptions, Kosticyn was close to the latter. In the letter to Vernadski we have just mentioned, he added: 'with all the crap I am subjected to here (and there is a lot of it), I am happy that Julia Ivanovna is in Paris.'

In March 1928, elections were held at the Academy of Sciences of the USSR. The name of Kosticyn was mentioned and the consulted GPU (the political police) expressed the following opinion on the mathematician: 'Since 1925, he has significantly moved towards the left and at the moment he is considered, if not a leftist, at least as an academic perfectly loyal in his behavior to the Soviet power.' Nevertheless, Kosticyn was considered too close to Egorov, who was beginning to be treated as a plague victim because of his political and religious opinions, and his candidacy was rejected. Nevertheless, the

[83] Kosticyn (1927)

[84] Quoted in Gelis (2017).

chairman of the commission for cultural ties abroad (VOKS), F.V.Linde, agreed to help Kosticyn return to France. On April 28, 1928, he sent the following message to the Narkompros

> Vladimir Alexandrovich Kosticyn, professor at the Moscow University and director of the Institute of Geophysics of the USSR received an invitation from the director of the Mathematical Institute of Strasbourg M.Fréchet who asks him to come at the end of May to Strasbourg in order to read a series of lectures on his research in the field of mathematics. Professor Fréchet reports that two prominent mathematicians, among them Professor Krylov, a member of the Ukrainian Academy of Sciences, came to Strasbourg last year, where they read their lectures with great success. He asks Professor Kosticyn to come at the end of May because on the 15th of June the spring semester will already be ended.

Was Fréchet's invitation purely formal? In any case, we did not find anywhere a mention of it and the meanders of the Soviet bureaucracy could not of course have allowed Kosticyn to go to Strasbourg before June 15th. Nevertheless, he managed to leave Moscow, apparently by mentioning the worsening of his wife's health: on 14 August, the French Embassy in Moscow handed him his visa[85] and the next week, he was at the biological station of Roscoff in Brittany where Julia had asked to have an internship during the summer.[86] It was there that he received a telegram from Glavnauka[87] on October 3rd, enjoining him to return to Moscow before one week, order reiterated on October 10th, threatened to be considered as an emigrate with all the due consequences.[88] However, this time, Kosticyn remained in France. In the letter he sent ten years later to obtain the status of Russian refugee, Kosticyn wrote that his final decision to emigrate was taken on that moment. The account of the events that followed in Moscow, considerably detailed in Gelis (2017) with the support of Russian archives, shows a more ambiguous situation. Kosticyn, far from cutting off the bridges with Moscow, tried at first by all means to negotiate a change in his situation, notably by obtaining an formalization of his mission, or a leave for sickness. He was naturally gradually relieved of all his duties. However, one is slightly surprised by the fact that it took several years before the Soviet authorities considered him as definitively passed `on the other side'. Perhaps it was politically unbearable for them to show that a high dignitary of Soviet science had become a defector. In 1932, a document mentioned Kosticyn to be part of 'white emigration'. We shall not follow here the events of Moscow (described elsewhere in great detail, for example in Ermolaeva (2001)) but we shall have a closer look at what happened in France.

3 - The Road to Calvary

At the beginning of the academic year 1928-29, the Kosticyn were therefore in France but they do not seem to have asked for any particular status. Their passport was in good standing, they were Soviet citizens: Julia was a student at the Sorbonne, and her husband, a leading Russian scholar, was on a scientific mission to France. Yes, but how to eat? For years they experienced the difficult life of refugees, forced to accept many 'odd jobs' to make ends meet.

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[85] Diplomatic Archives, Nantes, Consular Office Moscow.

[86] Archives Station Marine, Roscoff.

[87] OFRA, Kosticyn file.

[88] Kosticyn made this mention in the letter he sent to the Office of Russian Refugees in 1939. (OFPRA Archives, Kostitzin file).

Kosticyn, however, had a chance that seems not only to have played a leading role in his scientific life, but also to have opened up different opportunities for him to make a living. His arrival coincided with a major event of the Parisian scientific scene, the opening of the Institut Henri Poincaré under the direction of Borel in November 1928.[89] What is more, it is precisely for this opening that Borel managed to have Fréchet transferring from Strasbourg to Paris to help manage the house. It seems that several French mathematicians have been made well aware of the difficult situation of their Russian colleague.

For at least three years, between 1931 and 1933, Fréchet recruited Kosticyn to write bibliographic records at the IHP library. The archives of the institute keep various correspondences concerning the remuneration exchanged between Fréchet, the secretary of the IHP, G.Fournier, and Kosticyn, in order to accelerate the payment. Moreover, in his report for 1930 on the activity of the Institute of Earth Physics,[90] its director and creator Charles Maurain, also dean of the faculty of sciences, mentioned the work of corrections of the gravity measurements made by Kosticyn for the institute, probably the object for a gratification. All this did not lead however far. In November 1933, a rather desperate Kosticyn wrote to Volterra:

> And now, allow me, dear Master, to draw your attention to my personal problem. I have behind me, as you may know, a fairly important scientific, educational and administrative experience; I love science and science work above all else and I can provide a useful return. However, since my expatriation I cannot (for various reasons) get out of the material dead-end which obliges me to execute all the works which fall to hand and to consider me still very happy when some possibility of this kind presents itself; but it does not show up every day. My desires are not excessive: I want to be able to live and work and rationally exploit my knowledge and energy. And I am asking you to kindly think of me if there's an opportunity that comes up. I would not go on wasting valuable years unnecessarily.[91]

The fairly numerous moves of the couple from an apartment to another during these years could be related to their financial problems. Until 1937, it is actually Julia who seems to have had the most stable situation by being recruited as a laboratory technician at the Sorbonne and the Faculty of Medicine. In his letter of 1939 to the Russian Refugee Office,[92] Kosticyn proudly states that Julia had become "one of the best histologist technicians in Paris". She also did (probably paid) internships during the holidays, for example at the experimental station of Richelieu in central France in 1935 as Kosticyn wrote to Volterra (Israel and Millan-Gasca, 2002; 230). It was not until 1936 that the financial situation of the Kosticyns improved significantly. In 1936, the biochemist Louis Rapkine created the French Committee for the Reception and Organization of the Work of Foreign Scholars whose primary purpose was to help German Jewish university refugees; Kosticyn, however, received a sum of 12,000 francs from the committee for the year 1936, which seems quite comfortable compared to the 5000 francs won by Julia as a technician at the Sorbonne. The situation remained precarious, however, and the opening of CNS

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[89] On the project of the IHP one can consult Siegmund-Schultze (2001), Catellier and Mazliak (2012) and especially Cléry (2020).

[90] Ann Univ Paris, 5, 1931, 391.

[91] Israel and Millan-Gasca (2002; 226).

[92] OFPRA Archives, Kostitzin File.

research grants in 1937 was an unexpected opportunity for Kosticyn. In June 1937 he begged Borel to help him get an allowance:

> Minister and dear master,
>
> After an interval of eight years I come to remind you of my existence. Believe me this need to always disturb others deeply disgusts me, and if I kept silent during those years that do not mean that my life was easy: on the contrary. In any case, I never lost courage and I worked. It is now a matter of continuing my work and that is why I dare to worry. (...) To carry out this work I need a scholarship or a grant allowing me to exist modestly without thinking of the day of today and without looking for the temporary, rare and very poorly paid jobs. That is why I am asking you to intervene on my behalf with the Caisse des Recherches.

Borel transmitted the letter to Fréchet,[93] and it was not in vain: from 1937, Fréchet faithfully supported Kosticyn every year, first to obtain research grants, then to be recruited as a CNRS fellow.[94]

However, it is mainly on the scientific level that the IHP was for Kosticyn a prime opportunity. On its first year, Borel put a series of conferences of Kosticyn in the program of the IHP (which were paid to him 2000 francs). They took place in May 1929 and were published in the first series of Annales de l'IHP in 1931.[95] These conferences dealt with applications of the linear integral equations of Volterra's 'hereditary physics',[96] which aims at summing up the traces of the actions suffered by a system. Admitting that Kosticyn (1931) faithfully reproduces the conferences of the previous year, we must conclude that the mentioned applications were quite virtual: the article, rather full of technicalities, actually demonstrates how in a large number of cases, the solutions of `hereditary ' linear equations can be obtained as a development in series through an iteration method inspired by the one Volterra introduced at the beginning of his work on the problem of inversion of integrals in 1896.[97] Kosticyn further shows that in some cases the uniqueness of the solution is not assured, and that there may even be infinity of them. At the end of his article, as a good student of Leninist materialism, Kosticyn embarks on a rather long philosophical commentary (p.201) on whether this infinity condemns the connection of the equation to reality or not. Based on a thought of Hegel that assert all that everything reasonable is true, Kosticyn defends the idea of a fit between the mathematical analytic apparatus, 'a superior product of biological evolution and of social life of humanity', and reality. Observe that at this very moment, the guardians of the ideological purity of dialectical materialism began to treat such a conception as idealistic in the USSR. Kosticyn's presence in the first steps of the IHP gave him the opportunity to meet Volterra and, above all, to take an interest in the studies in mathematical biology

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[93] It is in Fréchet's archives that we found it (Archives of the Academy of Sciences, Paris, Fonds Fréchet.

[94] Kosticyn's career record at the CNRS shows that until his death in 1963 (at the age of 75!) Kosticyn's grant was regularly renewed, defended first by Fréchet and then by his successors at the IHP, Darmois and Fortet, the latter charging Daniel Dugué of the contact with the Russian mathematician. Sadly enough, the last document in the file, countersigned by Daniel Dugué, announces after several months, the non-payment of the due term of 1963 because of the death of the recipient, which seems to have gone unnoticed.

[95] (Kostitzin, 1931)

[96] On Volterra's line functions and their relation to the problem of hysterisis, see Guerraggio and Paoloni (2013), (Brechenmacher et al, 2016), Jaeck et al. (2019).

[97] On this subject, one can consult Jaeck et al. (2019) section K.

Volterra presented at the IHP in January and February 1929. This new subject became the almost exclusive topic of the Russian mathematician's later work. Israel and Millan Gasca (2002) provide a very rich study on Volterra's network on mathematical biology issues. It includes the important correspondence exchanged over seven years with Kosticyn: we refer the reader to that book to get an overview of Kosticyn's work in the field.

Kosticyn had many reasons to be attracted to such a topic: the omnipresent phenomena of biological inheritance made it possible to envisage the use of the technical arsenal of the integral equations which he had been dealing with for ten years. Moreover, having an interlocutor like Volterra was obviously a great luck. Moreover, Kosticyn probably knew that Volterra was beginning to be seriously threatened in Italy as an opponent to Fascism and hoped he would see Volterra regularly in Paris where his friend Borel could offer a temporary shelter at the IHP. Another important factor was the complete novelty of the topic in France where the only applied mathematics to really have good press had been those concerning physics. Finally, this was an opportunity to work with Julia, and more generally with the biologists around her such as those at the Roscoff marine station. The director Charles Pérez, with whom Julia worked, and the deputy director Georges Teissier, became his interlocutors like their young colleague Philippe Lhéritier, who returned to France in 1932 after a two-year research trip to the United States, and began to introduce genetics. It is quite touching to note that the first publication of Kosticyn in the biological field is a note to the CRAS co-signed with Julia and presented by Hadamard,[98] devoted to a study of the growth of parasites in hermit crabs based on statistics recorded at Roscoff station. In the years that followed, Kosticyn published about twenty articles, most often at the CRAS, on biological themes centered on population growth. There was in particular the booklet Kostitzin (1934) published in the series on biometry and biological statistics edited by Teissier; in this work, Kosticyn had an occasion to present a first synthesis of his mathematical theory of evolution based on the formulation of systems of equations representing the joint evolution of various species (as Kosticyn himself mentions, he thus follows Lotka and Volterra's approach).

In 1937, Kosticyn published the first French textbook on mathematical biology, introduced by a warm preface by Volterra. At the beginning of the book, he describes it as a 'mathematical study of biological problems', very different from the usual 'mathematical textbooks for biologists'. Exposing his conception of what he calls the mathematization of a science, in the lineage of his master Volterras's famous prolusione in 1901,[99] Kosticyn presents this mathematization as an inevitable step: also, just as it had been the case for physics or mechanics in the past, biology, in order to develop, has to go through this stage. Nevertheless, some dangers exist because a series of operations and hypotheses, apparently logical and acceptable, can lead to a mathematically correct but biologically incoherent result. The author invokes a 'long daily collaboration between mathematicians and biologists', taking advantage of the past experience of physics and mechanics for a correct mathematization of the natural sciences. This mathematization can be done through statistics in the first place, but on this point Kosticyn is categorical; the statistical method, useful for 'clearing the ground' must necessarily give way to an analytical method which alone can eventually answer the given problems.[100] To corroborate his point of view, he mentions the example of the study of the refraction of light made empirically by Ptolemy; the figures obtained by Ptolemy are, in Kostitzin's opinion, quite sufficient to confirm Descartes' law. But,

[98] Kostitzine and Kostitzin (1931)).

[99] See, in this regard, Durand and Mazliak (2011).

[100] It is rather ironic to note that in 1942, the academy of sciences awarded Kosticyn the Montyon prize for 'his work and his work in mathematical biology' precisely in the category 'Statistics' and that Fréchet asked him in 1943 to participate in his projected aide-mémoire of statistics. On this see Mazliak (2018b).

conversely, if from the figures of Ptolemy one builds by interpolation a polynomial reproducing them with the correct precision of the probable errors, this formulae of adjustment would have played a disastrous role and 'Descartes acting as a statistician would have never discovered the law of refraction'. Was Kosticyn marked by the hot discussion that had invaded Soviet science in the 1920s over the mathematics of randomness that Marxists regarded with suspicion?[101] Gustave Malécot, who was working at that moment on a PhD about the random modeling of genetic evolutions under Darmois at the IHP, seems at least to have thought it was the case, maybe because Malécot was horrified by the dramatic evolution of genetics in the USSR in the 1930s, of which it was nevertheless difficult to accuse Kosticyn. Anyway, Malécot rejected Kosticyn's deterministic analytical approach as a whole. In his study of Kosticyn, Araujo (2007; 16) precisely detected in the Russian mathematician's approach, as well as in some of his colleagues', a strong Marxist assumption of determinism that put him in frontal opposition to a Malécot type approach. Perhaps it was at Malécot that Kosticyn was aiming in a letter he wrote to Volterra in June 1937:[102]

> There are biologists (as there are physicists) who find that the analytical method is much less important than the statistical method. Without any desire to denigrate probabilism, I believe that, for example, the statistical study of the floods in Paris, with the demonstration of their Gaussian distribution, is worth much less than the study of their causes with the prediction, even bad, of these calamities.

In 1937, Kosticyn wrote the script for a scientific film aimed at a general audience by Jean Painlevé, the mathematician's son, a film director who specialized in spectacular science documentaries using very modern techniques. Several films devoted to biological questions were shot in Roscoff.[103] The film with Kosticyn, entitled `Mathematical Images of the Struggle for Life ', presents, in a simplified but rather suggestive way, the mechanistic theories of the prey-predator type cycles that led to Volterra's first biological studies. The film was ordered for the inauguration of the Palais de la Découverte in 1937, on the sidelines of the Paris Universal Exhibition. Jean Perrin, under-secretary of state for scientific research in the Léon Blum's government wanted to highlight the achievements of the French science. The file about the making of the film[104] gives information on its slightly tense genesis. A sore point was the pecuniary question because Kosticyn did not seem to expect his participation to be on a voluntary basis. Kosticyn further wanted to have the endorsement of Volterra, whose name was to be mentioned in the documentary, and sent him the script to learn his opinion. Volterra in his turn sent it for advice to his son-in-law and colleague, the biologist Umberto d'Ancona, who made some vitriolic comments:

> I remained horrified. If it's a parody, maybe it can go as it is, but surely not as a serious thing. (...) This is one of those examples of popularization that has discredited the theory of evolution. (...) Mr. Kostitzin obviously remains in the immediate post-Darwinian period. (...) For what concerns me, please ask him not to include my name and I advise you not to put yours either.[105]

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[101] On this subject see Mazliak and Perfettini (2020) and Mazliak (2018).

[102] Israel and Millan-Gasca (2002; 239)

[103] The extraordinary conference hall in Roscoff is now called after Jean Painlevé. The company 'Les Documents Cinématographiques' in Paris has published a number of his documentaries on DVD.

[104] Jean Painlevé Archives, Les Documents Cinématographiques, Paris.

[105] Israel and Millan-Gasca (2002; 186).

Volterra transmitted the criticisms of his son-in-law to Kosticyn, though probably in a milder tone. In his answer (Israel and Millan-Gasca, 1937, 238), he proposed some small amendments to the original script, which were included in the final version of the film. In his next letter Israel and Millan-Gasca (1937; 239), Kosticyn did not hide that the birth of the film had not been painless!

CONCLUSION

In the epilogue of her extensive study of Russian emigrants, Gousseff (2008) explains that she chose the date of 1940 as her chronological upper limit, as we do in this article. The reason for this choice is not uniquely based on the correspondence with the events of the general history. The outbreak of the Second World War does not necessarily mark a boundary, a terminus ad quem for every historiography. But for the Russian exiles in France, and more generally for almost all foreigners present on the French soil at that time, the collapse of the Third Republic and the establishment of Pétain's Etat Français, along with the beginning of the occupation and administration of a large part of the territory by the Germans, would bring about major upheavals. If France had been relatively welcoming since 1919 (only relatively, since the period between the two wars knew significant fluctuations in the policy towards foreigners), the new masters of the country were much less accommodating. As soon as the summer of 1940, both in the occupied zone and in the Vichy-controlled zone, a tightening of screws was given to reinforce control and to begin organizing the sorting of new arrivals. Among the first measures of the Laval government, the systematic revision of naturalizations and, of course, the promulgation of a statute for the Jews in October 1940, set the tone of these new orientations.

As far as Russian refugees are concerned, the year 1941 was marked by a further turning point, with the Nazi Germany attacking the USSR in June, placing many of the refugees in an at least ambiguous situation, between a more or less avowed hope to see the Bolshevik regime collapse under the shock, and a patriotic surge at the side of the savagely attacked country. The Germans besides did not miss to be worried about the party that the old nationals of the Russian empire could choose to take. On June 22, 1941, in full trigger of the operation Barbarossa, they decided to arrest numerous Russians present in the Occupied zone, and to confine them at the Compiègne concentration camp, 60 kilometers north from Paris. They released the prisoners gradually, but the situation remained tense. Basically, the sinuous behavior of the 'French of the troubled years', to quote the Pierre Laborie's nice expression,[106] was quite logically mirrored by the sinuous behavior of the Russian refugees in troubled years. From 1942, some of them chose to enter frankly in the way of collaboration (for instance those managing the pro-Nazi newspaper Парижский вестник); others came into resistance: here we can recall the activity of Boris Vildé and Anatole Lewitsky in the so-called network of the *Musée de l'Homme* and the Christian action of Mother Marie Skobtsova, who would lead the first to be arrested and executed in 1942, the second to deportation and death in concentration camp; of course, the majority decided to dig in, trying somehow to survive to the storm.[107] At the end of the conflict, the refugee community, which did not already shine by its unity before the war, appeared broken up into a multitude of contradictory destinies. Moreover, the unprecedented dimension of the human tragedy resulting from the new conflict led to a proliferation of inextricable problems related to displaced populations, in various European places and on a much larger scale than in 1918. Those who had been refugees caused by the First World War were now considered as something belonging to the past. They were in fact no longer really looked at as refugees, but rather as curious vestiges of another time ... Symbol of this evolution, with the end of the

[106] Laborie (2001).

[107] On the particular situation of the Russians present in France during the war, we can consult the interesting work of Anastasia Pavlova (2015).

League of Nations in 1945, the Nansen passports, which had been a key element in the definition of the refugee's administrative status in the inter-war period, lost their validity and were replaced by various technical devices. Another aspect was the fact that the USSR had won its place at the table of the winners at the price of immeasurable sacrifices, and this reinforced the not comfortable situation of persons whose status designated them as irreducible enemies of the recent brother of weapon. This was particularly the case in a France where the communist party enjoyed a great aura. To complicate matters further, Stalin's charm offensive after the conflict tried to bring back to Russia former emigrants. They were promised full amnesty. This unexpected proposal stirred consciences and a significant number of refugees decided to return. One knows that it was not long before most of them were sent to the Gulag.

On this complex background, it is enlightening to compare the trajectories of the two mathematicians we have followed, which, again, highlight important differences between them.

In September 1939, Kogbetliantz, though he was 51, decided to join the active army. According to his military file[108] on December 5, he was sent to work in the Technical Section of Artillery in General Dufrenois' service, and demobilized after the capitulation on 23 June 1940. At the end of 1940, Kogbetliantz saw his naturalization confirmed by Vichy,[109] as well as his commitment as a researcher at the CNRS, after it was approved by the mathematics section, despite the already mentioned very negative report written by Dufour about Kogbetliantz's physical works. The same commitment was renewed in 1941. In 1942, Kogbetliantz managed to be registered on the 'Rapkine list of scientists' whose departure for the United States was to be urgently facilitated.[110] It is not clear how this surprising fact happened as Kogbetliantz obviously was not directly threatened by the regime, contrary to Jewish scientists as Hadamard or political opponents as Jean Perrin. Besides, far from being clandestinely organized, this departure was announced by Kogbetliantz himself in a letter to the CNRS director Charles Jacob on May 14, 1942.[111] He mentioned there having been recruited by Lehigh University in Bethlehem, Pennsylvania as a mathematics teacher, probably in relation with his interest in application (such as geophysics) as Lehigh University was specialized in engineering. It was thus across the Atlantic that the subsequent trajectory of Kogbetliantz went on (he came back to France later but this is a different story)...

For Kostistyn, things went very differently. When the war broke out, he was first recruited in September 1939 for various tasks in one of the services engaged in the scientific mobilization at the IHP, probably in the computing laboratory run by Fréchet, as seems to prove his own mention of three secret research reports in a letter to Jacob dated 23 November 1940.[112] Kostitzin also saw his research grant renewed every year of the conflict by the mathematics section, thanks to Frechet's unwavering support. One can notice that very few traces concerning his wife are available during this period so that one can think that she tried to be particularly discreet. On June 22, 1941, Kosticyn was arrested and interned in Compiègne. He left an important and living testimony of this difficult period.[113] Frechet, from the beginning, tried to intervene relentlessly with the Prefecture of Police to obtain his colleague's release.

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108 SHD Vincennes, Dossier Kogbetliantz.

109 AN, naturalization Kogbetliantz.

110 On this subject, see Dosso (2006).

111 CNRS Archives, Kogbetliantz file.

112 CNRS Archives, Kostitzin file.

113 Genis (2009).

In particular, he sent a letter[114] to testify to hostile positions against the Russian government by the Russian mathematician. Kosticyn, however, was not released until March 23, 1942 and resumed his Parisian life, assisted by Fréchet. The latter made him award the Montyon prize for statistics for 1942 (along with a retribution of 1000 francs) already mentioned before, and wanted to recruit him as an author for his project of aide-mémoire of statistics that he launched in 1943 (see Mazliak (2018b)). Kosticyn mentioned having engaged together with Julia in the resistance action against the occupant; both Ermolaeva (2001) and Blokh and Rikun (2015) echo this fact. The Kostitzin in particular may have given a shelter to their friend the biologist and communist militant, Marcel Prenant; they had known him in 1928 in Roscoff, where he supervised experiments in the laboratory, before he was appointed professor at the Sorbonne. During the Occupation, Prenant was a head of the clandestine forces FTP; he was thus threaten by the Gestapo and eventually arrested and deported to Neuengamme in 1944.[115] Up to now, we have little archival evidence about Kosticyn's participation to the resistance: due to the clandestine character of this activity, this obviously does not mean that it did not take place. In any case, the Kosticyn's underground disappearance was very late. The Renseignements Généraux (RG) in January 1943, in charge with the control of all foreigners on the French soil, declared after investigation that Kosticyn, although still officially a Soviet citizen, was a very reliable person who did not have any political activity. In July 1943, Kosticyn wrote to Fréchet about his aide-memoire, and in November of the same year, Fréchet still had him officially as one of the authors. As late as January 26, 1944, Kosticyn sent his biography to the CNRS for the renewal of his allowance. It was only on February 19, 1944, that the Prefecture of Police reported the disappearance to the RG. The latter, on 8 March, indicated that they had lost all trace of the Kosticyn pair. In March 1945, Fréchet wrote in his report to the CNRS that 'Mr. and Mrs. Kostitzin had to escape to escape the Gestapo this year; after several months spent in anxiety, traveling, and without books, M. Kostitzin resumed his activity immediately after the Liberation'. In 1946, Kosticyn attempted a rapprochement with the Soviet embassy, to which the latter opposed a categorical refusal, considering perhaps this former defector more cumbersome than useful to the Soviet cause.[116]

As we can see, both mathematicians found themselves in the aftermath of the war in quite different situations. In a sense, this illustrates the multiplicity of life courses followed after 1945 by those who came to France a quarter of century before. Despite the great disparities that existed before the Second World War, we have tried to show in this article that through communitarian charity or administrative associations, through cultural commitments or reminiscences of the pre-revolutionary period, one could find some dashed lines on the horizon of which the destinies of the refugees intersected. In the aftermath of the new conflict, as time passed, these dashed lines had almost disappeared and no longer seemed able to explain in a meaningful way the trajectories that were followed afterwards...

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[114] October 6, 1941. Archives Préfecture de Police Paris, Surveillance des étrangers. Dossier Kostitzin.

[115] Prenant miraculously survived the terrible conditions of detention and resumed his activity in Paris afterwards.

[116] Regarding Kosticyn's attempt for reconciliation with the USSR, see Ermolaeva (2001).

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