

# Mathematics and Culture in Russia

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## Russia and modernity

In order to understand the general characteristics of the Russian philosophical and scientific thought, one has to take into account its peculiar character which makes it unique in the general panorama of European culture: its being placed entirely in the modern age, both chronologically and in terms of the constitutive process marking its origin. In fact, its history is brief: all scholars, whether Russian or not, agree that in Russia it took hundreds of years of “prehistory”, up to the eighteenth century, for philosophy to reveal itself as an “autonomous discipline”, with its own subject and problems as well as with its own specific language.

Such a long prehistory was defined as a “centuries-old silence” by one of the major scholars of Greek patristics, G. Flovorskij. Some, such as P. Ja. Caadaev, attribute it to the tight connection with the Byzantine cultural heritage, *miserable Byzance*, which was considered sterile in terms of speculation and unable to produce creative results within it. Others, such as Flovorskij himself, attribute it to the incapacity of Russian Byzantinism to take in and grasp the very rich stimuli that could be inferred from the research spirit and the intellectual curiosity typical of Byzantine culture.

What is certain, however, is that, through Byzantium, Russia was christianised but not Hellenised: the “pagan” philosophical heritage of ancient Greece, which Byzantine culture never forgot, even in its period of decline, did not significantly affect the thinking of the Russian people, who always saw the Greek-Byzantine heritage only as a tool of faith and never of creative energy.

This caesura with respect to the great tradition of western thought should be attributed also to the Paleoslavonic language or “ancient ecclesiastical Slavonic”. Introduced in Moravia by Cyril and Methodius, the two saints who evangelised the Slavonic peoples,

and later developed in Bulgaria, which had been converted before Kiev. It was later taken to the Russian lands, through translations of texts with a primarily moral character such as liturgical, apocryphal texts, saints' lives, anthologies, collections of famous quotes by scholars such as Socrates, Plato and Aristotle. Although a great means to evangelise people, this language ended up by separating the Russian people from Latin, the language of western culture. What resulted was a progressive consolidation of what Ivan Vasil'evic Kireevskij, one of the fathers of Slavonic studies, called "the Chinese wall" standing between Russian and Europe: a wall in which Peter the Great managed to open a few significant breaches and openings and which, after him, has been deteriorating on a daily basis, but has nevertheless continued to exist.

### **Peter the Great's "Revolution from the Top"**

In this situation, Peter the Great's actions constituted a moment of total interruption, which started a major and controversial process of forced "modernisation" aimed at building a bridge between Russian culture and society and Western Europe. Central to this process was the rebuilding of Saint Petersburg, that from the very moment of its foundation became not only one of the biggest metropolises in Russia, contending the political and cultural supremacy with Moscow, but above all a *symbol*, the concrete realisation of a dream, a project and an almost obsessive idea.

The dream, the project and the obsessive idea belonged to Peter I the Great. It was he who, in 1703, initiated the building of a new town in the swamp where the Neva river pours the waters of the Ladoga Lake into the Gulf of Finland and flows into the Baltic Sea. The tsar saw the new city as a "window on Europe", in both a physical and figurative sense. Physically, it had been thought out and built as a naval base and, at the same time, a commercial centre and therefore – par excellence – a place for exchanges to take place and a communication junction. Such a place was meant to be able to grasp and condense all the cosmopolitan stimuli that might turn up following the increase in communications with other countries in the European continent. Figuratively, through its very birth, the new city was meant to signify that Russian history had to start again from the

beginning, regenerate itself, detach itself from all the stratified native traditions accumulated by the Russian *narod* (people) of which it was the expression. Moscow had always been the sacred symbol of purity of the blood and the land, exactly because located and deep-rooted in the heart of Russia. In order to further strengthen this symbolic function of the new city, Peter the Great decided to make it totally different from Moscow and all other Russian cities, aiming in particular to avoid disorganised and chaotic agglomerates of winding streets. The map of the new city was designed as a system of islands and canals, with the city centre placed opposite the harbour. It was the geometric and rectilinear model that had been typical of western town planning since the Renaissance: for its realisation, foreign architects and engineers were called in from Italy, France, Holland and England.

The effort of preparation, planning, organisation and construction was really immense: within ten years from the beginning of work, as many as thirty-five thousand buildings had been built in the swamps; two decades later, there were almost one hundred thousand people and Petersburg was already one of the biggest metropolises in Europe. The city, both in its town-planning and architectural structure, bore marks of the project that had led to its foundation and of its cultural and symbolic function as bridge towards the West. Large spaces, big city structure, classical symmetrical perspective, baroque monumentality, typically western facades, with no concessions to the traditional Russian styles, strictly-followed ratios (of 2:1 or 4:1) of the streets width to the height of the buildings, so as to give the overall panorama the aspect of an infinite horizontal plane: everything helped to give the idea of a space use which had been accurately planned, according to an order which left little or no room to chance or improvisation.

But the new city on the Neva was not the only product of this massive effort of modernisation, which was wanted and imposed from above, by a tsar who was determined to change the destiny of his country. Peter I realised that the new Petersburg he had conceived and realised only made sense and, above all, would only be able to carry out its role as a bridge towards Europe which he had wanted for it, if accompanied and supported by industrial development and a new lay culture able to impose itself on traditional culture. Otherwise, it might have remained victim to its radical heterogeneity, compared to the rest of the nation, both from a point of view of location and from a social and ideological viewpoint. This heterogeneity could have provoked such a violent resistance and reaction that

people might have perceived it as a foreign body, to be isolated and rejected because of its wide and seemingly unnatural dimensions.

### **The industrialisation process in Russia**

Before Peter I rose to the throne, there had been little industrialisation: the process had been hindered by the lack of qualified labourers as well as of an internal market and capital. The first factories started appearing sporadically after 1650, when tsar Alexis – inspired by the protectionist attitude adopted by western sovereigns towards industry – introduced the cultivation of cotton and mulberry. The year 1681 saw the foundation of a velvet factory that, however, soon closed down and, in 1684, a Dutchman opened a factory for the production of cloth in Moscow.

The accession to the throne of Peter the Great marked a new wave of interest in industry. The new tsar built a large number of ironworks in the Urals and Siberia: production increased by so much that, in 1716, Russia started to export iron. After the end of the war with Sweden, Peter turned his attention to increasing exports: between 1722 and 1724 five new factories were built in the Urals, of which four were destined to the production of copper. In Siberia a steelworks factory was built in Irkutsk, employing also the Swedish prisoners of war. Finally, there were 38 foundries in the governorate of Kazan, just as many in Petersburg, 39 in Moscow and 70 on the Volga and Oka. In 1718 production was reported to have reached a global volume of just over 25,000 tons.

Although the number of installations was high, these factories lacked equipment and, above all, specialists, which is why the quality of production remained rather low. To solve this problem, foreign specialists, mainly French and Dutch, were called in from Western Europe: with their technical know-how, innovations and capital to invest, they carried out a prominent role in Russia's development and modernisation. Even though the tsar intended foreigners to bring in just their capital of technical knowledge, rather than financial capital, soon the two functions started to converge, because of the connections between technical innovation on the one hand and venture capital and management on the other. Thanks partly to their contributions to the textile sector, large factories with up to five hundred looms were created; in 1702 a factory for the

production of linen for sails was built and more factories for the production of fabric followed in 1705. By the time Peter the Great died, there existed about ten cloth factories and about as many linen ones, as well as a dozen factories for the production of silk items. Trimmings, stockings, hats and tapestry were also produced. As to shipyards, the tsar's interest in this sector was legendary: during his reign, Petersburg became the most important dockyard in Russia. It became the place where ships were built after the Dutch models that he had been able to study during his visit to the Zaandam dockyards.

Overall, it is estimated that, during the reign of Peter the Great, at least 118 (according to some calculations as many as 233) new factories were built.

To boost and ensure the continuity of this massive process of industrialisation, not only did Peter the Great attract specialists from western and central Europe, but he also tried to create favourable conditions to the birth and development of a new scientific and technical culture in Russia: his aim was to provide a basis for the blossoming of the necessary expertise to ensure a solid development of the industrialisation process in his country.

### **The monopoly of the Orthodox clergy on school and culture**

This aspect of the situation was far from satisfactory. In Russia, the art of reading and writing had spread only in the seventeenth century, with the beginning of schools, mostly thanks to the work of the orthodox clergy. For a long time, the orthodox clergy remained at the centre of the educational system because it had a large network of elementary schools, but also owned the only secondary and specialist schools in existence at the time of Peter the Great. From this viewpoint, Kiev preceded Moscow both chronologically and qualitatively. In particular, the schools run by Polish Jesuits appeared as an exemplary model, because the Orthodox Church saw teaching as the best weapon to fight Calvinism and Catholicism that were spreading in the Polish-Lithuanian reign at the time.

The most famous Orthodox school in Kiev was modelled after colleges opened in Poland by Jesuits, who, as is well known, had a near monopoly in the teaching arena in Europe from the seventeenth to the eighteenth century. The school was founded by Pëtr Mogila (or Mohila, according to Ukrainian pronunciation) in 1632 and

became a Theological Academy in 1694. It had borrowed from Jesuit schools the pedagogical method and the curriculum as well as the use of the same theological manuals for teaching. Because many lay students attended it, it was, in practice, the first university in the Orthodox Slavonic world. At the beginning, it accepted students from all social classes, so that among its students were sons of priests, nobles, Cossacks and merchants. In 1734, its fame reached beyond Kiev and Ukraine and as many as 722 students were enrolled, of whom only 380 were seminarians.

A special issue of the “Harvard Ukrainian Studies” (VIII, No. 1–2 June 1984) entitled “The Kiev Academy” was dedicated to its activity: among other things, this includes a quote by A. Kniazeff, rector of the Institut de Théologie Orthodoxe Saint-Serge in Paris – one of the main theological academies of emigration:

The school of Kiev created a clear and disciplined thought. It forced definition and experimentation. It did not refuse in bulk all ideas coming from the West and did not assume an attitude of fear or despise before western science. On the contrary, it encouraged Orthodox theologians to utilise all the best features that Western thought might have had, thus eventually favouring the birth of academic spirit.

The end of 1687 saw the foundation of the future Slavonic-Greek-Latin Academy under the management of two Greeks, the Lichudi brothers, who had arrived in Moscow in 1685. Both had a degree in philosophy from the University of Padua. After teaching in Kiev, they wrote manuals of poetics, rhetoric, logic, (Aristotle’s) physics and psychology. Their teaching however still followed the model of the old philosophy school and did not reflect the ferment of ideas of the Paduan university that they came from. Nevertheless, they had a hard time in Moscow and they soon had to leave the city. The school was in difficulty, because no suitable replacement could be found. Academies aside, between 1721 and 1765, the Church managed to found as many as twenty-eight seminaries modelled after the seminary of the Academy of Kiev employing teachers coming from that very city (the Moscow Academy only started to provide lecturers towards the end of the eighteenth century).

An interesting comment was made by Vladimir Ivanovic Vernadskij (1863–1945), a geochemist and founder of a new and evolutionary approach in mineralogy; a sharp and versatile thinker, to whom we

also owe the early detailed research into the history of Russian science. In a long essay entitled “Ocerki po istorii estesvoznaniija v Rossii v XVIII stoletii” (Introduction to the history of science in Russia in the eighteenth century), published in 1914 in the journal *Russkaja mysil*, he pointed out that this prominent position of the clergy in the country’s formative system had very negative consequences, because of its total disinterest in scientific research and its problems:

In the long history of the Russian church, it is difficult to find someone who willingly took an interest in the environment or went deeply into mathematics. Among these very few, there were no important scientists. It was impossible for this attitude not to affect Russian culture.

Peter the Great realised that, in order to make up for the lack of a well-rooted and consolidated scientific and technical culture within the country’s society, it was insufficient to send off young Russians abroad to learn experimental research and new techniques which were blossoming in varied fields, just as he himself had done in the shipbuilding sector. Likewise, it was not sufficient to call in foreign mathematicians and engineers, jurists and political theorists, managers and political economists. What was needed, instead, was a reorganisation of the whole educational system, so as to take it away from the monopoly of the Orthodox church and, above all, allow it to gravitate around a centralised, state-financed institution of great prestige.

### **The birth of the idea to found an Academy of the Sciences in Russia and first contacts with Leibniz**

From this need derived the tsar’s idea to found a scientific academy or university in Russia. He himself talked about this idea already in 1698, during a conversation with patriarch Adrian.

From his first-hand experience of foreign academies and universities and information obtained from people who had similarly visited them, Peter the Great had persuaded himself that, so far in Europe none of these cultural institutions matched Russia’s conditions and intentions. It was during this intense activity of exploration of what already existed and of planning something new and different that Leibniz came into his own and his opinions started exerting a direct and remarkable influence on the tsar.

When the two met, Leibniz was already a permanent member of the “Royal Society” of London, founded in 1660, and of the “Académie des sciences” in Paris, which had started its activity in 1666. Moreover, Leibniz was working on founding the “Berliner Akademie der Wissenschaften”: the Berlin academy was eventually founded in 1700, mostly thanks to the efforts of princess Sophie and her daughter Sophie Charlotte, from 1684 the wife of prince Frederick, later to become king of Prussia. Leibniz was nominated first president of this new scientific institution. He was, therefore, at the time, one of the main experts in organisation of culture and a connoisseur of the still short experience of the main European academies.

It was therefore natural for Peter the Great to turn to Leibniz. The German also had a particular interest in and curiosity for Russia, in that it constituted the connecting link between East and West, the most direct way to reach China and Asian countries and its linguistic and cultural heritage strongly attracted him. Moreover, the tsar’s intentions to finally establish tight links between his reign and Europe constituted a unique opportunity to have at one’s disposal first-hand geographical, historical, ethnographical and linguistic information which had so far been difficult to get hold of. Flattering the German philosopher was also the attractive idea of being able to have a remarkable influence on the cultural and social development of a large nation that had decided to change direction and move towards the West, thanks to the work of an enlightened sovereign, whose fame was starting to spread with favourable echoes throughout the whole of Europe.

The commitment with which Leibniz faced this task is testified by a large quantity of letters, notes and plans he himself drew up over nearly two decades. They show his great confidence in the reformation aim and in the organisational capabilities of the Russian sovereign.

### **The constitution of the Academy of Sciences and Arts in St. Petersburg**

But Leibniz did not have the satisfaction of seeing the opening of the Russian Academy of Sciences for which he had fought and worked so hard. After his death, his position as advisor to the tsar was taken over by a person recommended by Leibniz himself, Christian Wolff (1679–1754), who had been professor in Halle since 1707. Wolff took active part not only in the working out of the final plan for the

Academia, but he was also tasked with selecting and personally choosing the German scientists who should be called in to be a part of the new institution. Blumentrost, on behalf of the tsar, offered him the position of vice president of the Academia and coordinator of teaching in physics and mathematics in a letter of which we have a dateless copy, but which must nevertheless date back to the first quarter of 1723. The offer was not successful because of the excessive financial expectations of the Halle philosopher, who declared he would only accept the post if a deposit were paid in advance and if a lump sum of twenty thousand rubles were paid as compensation for living in Russia for five years (just to enable comparison with other amounts, in the first half of the eighteenth century, a taler was worth 70 Russian kopecs, i.e. 70 cents of a ruble). Moreover, Wolff had clearly indicated several times and during talks with different people that he was aiming for the position of president of the Academy. The tsar, being unable to accommodate these demands, decided to avail himself of the collaboration of Leibniz's pupil only for the choice of more scientists and their sending to Russia.

At the beginning of 1724, Peter the Great was finally able to ratify the act of association of the Academy of Sciences and Arts and the annexed university in Petersburg; the act was approved by the Senate, in his presence, during a meeting on 22<sup>nd</sup> January 1724. This document explicitly referred to the necessity of choosing the members of the new society from among the most illustrious foreign researchers of the time, given the lack among Russians of "natural philosophers" who could worthily join it. What is more, it contained the open invitation to foreign members to bring with them one or two of their most promising students, so as to have enough personnel capable of carrying out teaching in the gymnasium, which was part of the academy, with the aim to prepare the future generation of Russian researchers. The twenty-two permanent members of the Academia, appointed by Catherine I between 1725 and 1727, were all foreigners: of the hundred and ten academics appointed between 1725 and the end of the eighteenth century, only twenty-eight were Russian.

With the realisation of this new, big project, Peter the Great gave a further boost to his modernisation process from the top. To underline

the deep connection between the Academy and the foundation of the city which housed it, both produced by the same, enormous strategic design, Peter decided that the *Kunstammer*, the “cradle of Russian science” (as it is called in a memorial plate on the building), first headquarters of the Academy of Sciences, was to be placed in the Vasil’evskij island. This was the biggest island of the city, with an area of over one thousand hectares, located opposite the dockyard and destined to become the administrative and cultural centre of the new capital. By order of the tsar, it was here that the most important public buildings had to be located and, starting from 1716, the nobles were authorised to build their homes only in this part of the city. The *Kunstammer*, whose construction started in 1718 and terminated in 1734, i.e. nine years after the tsar’s death, housed several laboratories, a large library, the typography of the Academia and the first Russian observatory, placed in the tower above the building.

### **The “modernity” of Russian culture**

From the outline picture drawn so far, a first, fundamental, distinctive trait of Russian science with respect to Western science emerges. Russian science is part of a cultural background which is doubly modern: chronologically, as mentioned earlier, as well as for its acts and the forced modernisation process forcefully started by Peter the Great. His reforms were inspired above all by a need for technical-military catching up with the most advanced European countries. As Vittorio Strada<sup>1</sup> observed, they also mark the conclusion of the historical phase of the “first Russia”, i.e. of the developing Russia in the first seven hundreds years of the second millennium and the beginning of the “second Russia”, extending until October 1917. The latter is already fundamentally different from the former: it is directed towards the West, which is seen as a civilisation to imitate. The two Russias are linked by a deep and contradictory connection, consisting of a set of values, situations and problems, which mark the history of the country rather deeply, leaving permanent traces.

The Russian ethnic-national conscience in the first six or seven hundred years of its development identified its own “other” in two directions: East and West. Starting from an early Christian community, Russia gradually affirmed its own national Christianity of Byzantine origin that caused it to contrast with Western confessions, first Catholic and then also Protestant. A first reason for the formation of a Russian identity was therefore a

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<sup>1</sup> Strada V (1991) *La questione russa, identità e destino*, Marsilio, Venice, p.116.

religious cause, represented by the *pravoslavie*, the Orthodox Christianity. This offered Russia membership of the (Slavonic and non-Slavonic) Christian Orthodox community but, from the fall of Constantinople, gave Russia a chance or a claim to privilege and hegemony, as heir of the second Rome. The other direction Russia's sense of "other" developed in was the East, reaching its most intense point with the Tartar-Mongolian domination. This domination was felt by some historians to be a catastrophic detachment from the West and Europe, yet reinforced the specificity of Russia, giving it new connotations, because two hundred years of dominion left a deep trace in Russia's ethnic-national identity.<sup>2</sup>

Peter the Great's grandiose renewal operation produced a radical upsetting of this picture just because of its detailed and pervasive nature which combined Europeisation with

A secularisation that deprived the Russian Church of its residual autonomy and made the Russian state a special type of absolutism, in which the sovereign holds not just the political power, but also, to use an anachronistic but clear term, ideological power. The consequence of this was that to the Russians, at least for the large majority who remained faithful to the national tradition, the anti-Christ was not only the false Christian Westerner, but even Peter I himself, a false Russian, according to a legend which denied the sovereign even Russian nationality. There resulted two national self-consciences: the first restricted to the power circles, the second typical of the masses. It is appropriate to note that both national self-consciences were rather clear, although the one belonging to the high classes had a better conceptual coherence. This coherence developed itself within the new social classes, born following the Europeisation and fuelled by the contact with European culture: the *intelligencija*, to call this social class with a term that was to be used later. At first, the *intelligencija*'s national self-conscience did not differentiate itself from that of the masses, but then gradually took on its own particular connotation, diverging more and more from the official one until, in the second decade of the nineteenth century, the two collided. The result of this process, which is clear to those who are familiar with the history of Russian culture, was that the national self-conscience was split in three dimensions: an official expression, a popular one and an intellectual one. What's more, as the reality in Russia got more complex, further differentiation occurred within each of these self-consciences. This is especially true of the *intelligencija*, which saw the formation of different and opposed groups and parties within itself. It is also true, to a certain extent, for the power circles, because their conservative or liberal tendencies were connected to different views of Russia, of its past and of its peculiarity [...]. As to the popular national self-conscience, this is the least clear and well-known, but there is no doubt that this too must have been variegated, as is shown in popular utopias, the religiosity of old believers, the very behaviour of the peasant masses who, while faithful to the myth of the tsar, at the same time had not forgotten Pugacëv's rebellion<sup>3</sup>.

If we have insisted so much on these aspects connected to the articulation and differentiation of the routes of what has been called the Russian "national self-conscience", it is because this internal

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<sup>2</sup> *ibid.*, pp. 115–116.

<sup>3</sup> *Ibid.*, pp. 116–117.

dialectic had remarkable consequences on the history of the Russian philosophical thought and therefore simply could not be ignored.

### **Criticism of the idea of progress and of the conception of history as linear development**

The first and most relevant of these consequences consists in Russian culture and society's peculiar attitude to time: this attitude was very dissimilar to the view that had been asserting itself in Western Europe. The main element on which to focus one's attention in this world is the very small importance of the concept of *progress*, or the possibility of a controlled change, based on the firm belief that it is possible to arrive at a new and better future through a process of growth, that is a continuation, evolution and capacity to reap opportunities offered by the present situation and by the tradition of the past, whose limitations are however felt. This model of history as evolutionary schema, as underlined by – among others – C. Hill<sup>4</sup>, has had a very important role in Western history from the beginning of the seventeenth century onwards; on the contrary, in Russia it was eclipsed by the concept of change as eschatological reversal. Because of the absolute predominance of such view, the dynamic process presented peculiar aspects, which could cause one to see change exclusively as a radical rejection of the preceding phase and the new as the result of a pure and simple transformation of the old or, better said, of an operation of reversal. It was Lotman and Uspenskij<sup>5</sup> who clarified this characteristic trend in Russian culture and the reason for its substantial immutability across its

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<sup>4</sup> Hill C (1965) *Intellectual Origins of the English Revolution*, Clarendon Press, Oxford – Italian edition: *Le origini intellettuali della rivoluzione inglese*, Il Mulino, Bologna, 1976.

<sup>5</sup> Lotman Ju M, Uspenskij B A (1977) Rol' dual'nyh modelei v dinamike russkoj kul'tury do konca XVIII veka (*The role of bipolar models in the dynamics of Russian culture until the end of the eighteenth century*), *Trudy po russkoj i slavianskoj filologii*, XXVII. See also: Lotman JM, Uspenskij BA (1984) *Semiotics of Russian culture*, (A. Shukman Ed.) Ann Arbor, Michigan: Department of Slavic Languages & Literatures, The University of Michigan.

various phases. The fundamental peculiarity of this culture, in their opinion, consists in fact in

its fundamental polarity, which is expressed in the dual nature of its structure. The basic cultural (ideological, political, religious) values in mediaeval Russia were arranged in a bipolar value field divided by a sharp line and without any neutral axiological zone".<sup>6</sup>

A typical example of this situation is the fact that, in Russia during the Middle Ages, there was not perceived to be a middle ground (purgatory) between the two extreme concepts of Hell and Heaven. As an immediate result, it was impossible to identify, in our lives on Earth, a type of behaviour which could be characterised as neutral, not saintly but not even sinful, such as to act as a neutral axiological zone in this bipolar value field and as a reserve from which to draw those elements which, exactly because not involved in an extreme judgement (whether of exaltation or condemnation), could form a mediation buffer between the two different development phases and thus grant a passage from the one to the other without too many jolts and fractures.

In the Western world, as Lotman and Uspenskij point out, the presence and availability of a wide variety of behaviours considered neutral and social institutions considered neutral allowed society's contemporary critics to derive their ideals from well-defined circles part of the (social non-ecclesiastical system, lower middle class family) reality around them. Thus, their fight became an attempt to eat into and turn upside-down the current value hierarchy, ensuring that elements taken from the neutral zone became standard values, i.e. the norm. There resulted the possibility to establish a real continuity between the today that was negated and the long-awaited and hoped for future. It is just by virtue of the recognition of this possibility that a new view of life gradually emerged and consolidated itself. This view accepted the challenge of fear, anxiety and anguish that affect human existence without however giving in to the temptation of shunning reality.

In Russian culture, on the contrary, the absence of an idea of progress, seen as an opportunity to derive from elements of the present the conditions for its transformation into new forms, resulted in the prevailing of mechanisms that fatally reproduce aspects of the past within this culture. This peculiarity is not limited to the Middle Ages or to the period preceding the end of the eighteenth century. In fact, it can be found in various phases of its development and in

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<sup>6</sup> *Ibid*, p.4.

seemingly heterogeneous aspects: for instance, in the wave of the religious popular turmoil, usually known as *raskol* (schism, split), which rose in the second half of the seventeenth century. As A.I. Klibanov, an attentive historian of the *raskol*, notes:

the insufficient development of social relationships, the fact that the new economic phenomena, in the seventeenth century, were still at the beginning of their history and had affected only the insignificant strata of the peasant classes, had as a consequence the fact that, in the *raskol*'s view, the predominant motive was the idealisation of old patriarchal habits. This finds its expression in both the contraposition of the old faith to Nikon's "new" one and the demand to return to the old habits.<sup>7</sup>

However, the influence and predominance of such type of attitudes were not limited to the seventeenth century and, in fact, can be found even as late as the end of the nineteenth century, just three decades before the October Revolution, within a trend of the *postnicestvo* (fasting) which had formed within the sect of *christovoverie* (Faith of Christ). At that time, V.F. Moxsin attempted to introduce a new form of *christovoverie* devoid of any form of prejudice, superstition and ignorance and founded on an idea of "progress" of middle class origin. But this effort to respond to a changed reality through a reform of the movement according to the middle class interests and values which gave it meaning, found a huge obstacle in the competition of other, better-known exponents of this trend, as well as in the resistance of the lower social classes. The latter were still attached to the old and believed that a real renewal could only take place within the boundaries given by the traditions of the original *christovoverie*.

On the other hand, this very tendency to counter the existing with preceding forms of organisation and to think that a renewal can be the result of a return to the old has permeated the whole history of the Russian revolutionary movement. Already Aleksandr Ivanovic Herzen (1812–1870) had noticed that Slavophiles had tended to fill with real meaning that *narodnost'* (term derived from *narod*, "people" and "nation") which was one of the official passwords at the time of Nicholas I and to uncritically extol popular traditions and patriarchal ways of life, while negating the more modern and less native ones. Their adherence to the Russian mediaeval tradition, of which they declared themselves heirs and which they wanted to continue, caused them to fully condemn Peter the Great, because he created a state that openly followed the idea of renewal and modernisation. Hating their contemporary world, they extolled the most ancient forms of possession and distribution of land in rural communities: hating the state, they wanted to feel close to the Russian people and peasants and rekindle with feeling the Church. Theirs was therefore an idolization of their origins, a myth of a Russia outside time which supports Lotman and Uspenskij's claim that, in Russian

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<sup>7</sup> Klibanov A I (1980) *Storia delle sette religiose in Russia*, La Nuova Italia, Firenze, p.67. *History of Religious Sectarianism in Russia (1860s-1917)*, Molokan Heritage Collection, translated by Ethel Dunn, 1982.

history, change does not normally happen through the working out of alternative and, as far as possible, new models, but rather through an axiological exchange, so that what was positive becomes negative and vice-versa. The most immediate consequence of this is that the very concept of “new”, in general, turns out to be the realisation and the putting forward again of concepts whose roots go back to the ancient past.

The constant and massive presence of this peculiar trait is also confirmed by many scholars of rather different background. So, for instance, in a paper published in the *American Historical Review* in October 1953, A. Gerschenkron observes that populists had correctly started from a solid awareness of the economic backwardness of their country, but had then rapidly distorted their intuition, ending up by paradoxically affirming that

the preservation of the *old* rather than the easy adoption of the *new* constituted the advantage of backwardness. The result was a tragic surrender of realism to utopia. Here is perhaps the main reason for the decline of populism. When the rate of industrial growth leapt upward in the middle of the eighties, after the government had committed itself to a policy of rapid industrialization, the divorce between the populist utopia and the economic reality became too great, and the movement proved unable to survive the repressions that followed Alexander III's advent to the throne.<sup>8</sup>

Even Venturi, in the *Introduction* to his classical work *Russian Populism*, after remembering Slavophiles' decisive opposition to revolutions and despotisms and, in general, all barbarian methods to combat barbarianisms, observes:

It is exactly this attitude that seems to be the deepest root of the interest, which is currently resurfacing in today's Russia, for these figures so far away from today's Russia, for these nineteenth century romantics who seem to have been covered in scorn and hate for decades.

Referring to this interest, he makes a further comment that is of particular relevance to our analysis:

A deep movement supporting a return to old Russia and the religion of the forefathers invite us to look at the past differently, to again consider and appreciate values that seemed destroyed and buried (one can easily be persuaded of this simply by seeing how Russian mediaeval art is considered or by reading Pasternak's and Solzenicyn's work or even simply by watching Tarkovskij's film on Andrej Rublëv). What is most important is to see how this deep and varied movement now present in the Soviet Union ends up **attacking**

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<sup>8</sup> Gerschenkron A (1968) *Continuity in History and Other Essays*, Harvard University Press, Cambridge, pp.455-456.

an adversary and an enemy that is both feared and hated: the despotic and bureaucratic state. This is just what happened in the 1830s and at the time of the rise of Slavophilia.<sup>9</sup>

Looking at most recent Russian news, one could add to Venturi's many other interesting and significant examples of this deep movement of return to old Russia.

Additional proof of the little effect of the idea of progress based on a gradual transformation and renewal and seen as controlled change, is the predominance of programs of *integral* transformation of Russian society. The theme of regeneration, rebirth and palingenesis is constant in Russian culture, both before and after the revolution. As mentioned earlier, this idea of change as total reversal triggers a mechanism that inevitably brings us to look to the past and to reconsider with interest forms of life and culture that were already tested out and consumed at the appropriate time. Herzen had already understood this when he noticed how the juxtaposition between Slavophile and Westernising factions was the fight of two alternative models which were totally distinct, apart from their common tendency to look intensely to the past, be it mediaeval Russia (the former) or Peter the Great (the latter). The exhortation he addresses to both factions is significant:

It is time for humanity to forget what is not necessary in its past, or rather, to remember all, but at the same time to remember that it is past and no longer existing.<sup>10</sup>

A further boost to this small or non-existent inclination to ideas of progress, growth and modernisation came from the widespread distrust in industrialisation and the development of certain economic sectors. As Gerschenkron notices:

the creation of large industrial centres threatened to infect Russia with the "cancer of proletariat", as they would have put it at the time. The government was anxious to ward off the menace of peasant revolts and had no wish to evoke the menace of urban revolutions. The traditionalism implicit in an economic structure based on agriculture appeared to be a much better guarantee of political stability than the restless changeability of modern industrialism. Among the forces that, in the Russia of the second half of the 1850s, were capable to make themselves heard, there was none that could push the government towards a decisive policy more favourable to industrialisation. The upper and lower nobility, considered as a group, did not wish at all to see widespread urban growth, because this

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<sup>9</sup> Venturi F (1972) *Il Populismo Russo*, vol. I, pp. LIV-LV.

<sup>10</sup> *Ibid.*, vol. I, p.4.

would have threatened their pre-eminence within the social structure of the Russian state. The *intelligencija* was mostly radical and political stability simply did not figure in its ideals: it hindered the aristocracy and supported a type of peasant emancipation that was well beyond the limits of acceptability for the government. However, in its hostility towards industrialisation and in its making rural society's (actual or alleged) values its own, it was remarkably close to the government's position, although for very different reasons.<sup>11</sup>

On a structural level, this distrust towards industrialisation, combined with a view of change based on the principle of juxtaposition and alternation of opposites, i.e. of radically different social models in constant competition among themselves, caused the process of development of all sectors of Russian society to have a characteristic, slow and stuttering course. This process can be easily documented and illustrated. While the Russia of Catherine II placed itself among the greatest economic powers of the eighteenth century, for number of industrial establishments, production volume and its part in European commerce, already in the mid-nineteenth century, industrial Russia was going through a slump and was not participating in the general movement which had been transforming western economies. Moreover, while the last decade of the nineteenth century was characterised by impetuous progress which fixed the traits of a new industrial geography for the next thirty years, it was soon followed by a prolonged period of stagnation, during which (especially between 1901 and 1903) the country's economy, and in particular its metallurgic industry, was hit by a serious crisis. There was a continuous wavering between the two poles around which were arranged the ideas relating to the model of society to be aimed for: on the one hand, opening to the West and choice of a process of modernisation following in the steps of what had been done mainly in England, Germany and France; on the other, all-out defence of the specificity of genuine Russian tradition. The initiatives of the state were often characterised by a bitter struggle against what had been laboriously built over several decades. This situation could not but determine a periodic destruction of what had been achieved by preceding generations, with the consequent lack of that process of accumulation of results

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<sup>11</sup> Gerschenkron A (1974) *Politica agraria e industrializzazione in Russia, 1861-1917*, in: *Storia economica Cambridge*, vol. VI, II, Einaudi, Torino, p. 771.

and experiences that is an indispensable condition for a stable and lasting development.

This concept was grasped with great shrewdness by Pëtr Caadaev (1794–1856) in the first of his eight *Filosofskie pis'ma*, dated 1<sup>st</sup> December 1829, in which he critically listed the evils of the Russian past, which appeared to him to be substantially lacking a history:

One of the most reproachable aspects of this odd civilisation of ours is that we still have to discover the most trivial and obvious truths even among peoples that are certainly less advanced than us. The fact that we have never walked together with other peoples, that we do not belong to any of the big families of the human race, neither to the West, nor to the East, and we do not have the tradition of either. It is as if we were placed outside time, so that the universal lessons of humankind never spread among us. The remarkable concatenation of human ideas in the sequence of generations and the history of the human spirit, which has enabled it to reach the levels at which it is today in the rest of the world, have had no effect on us. What is elsewhere the very foundation of society and life is for us simply theory and speculation”.<sup>12</sup>

## The “Reaction” against philosophy

An aspect of remarkable importance in our discourse – and one that characterises the cultural situation in Russia in the second half of the nineteenth century and first years of the twentieth century – is the widespread hostility and distrust towards philosophy that steadily came to affect progressive thinkers and revolutionaries. The latter, in general, had grown up with a deep suspicion towards the “official” culture that never failed to provide ideological support to the ruling classes and the monarchy. “Academic” philosophy could not but be affected in this globally negative opinion, particularly since idealistic and spiritualistic trends and approaches clearly prevailed within it. Next to these approaches, a positivist trend emerged and progressively became stronger, as capitalism developed. Positivism was represented above all by thinkers such as K.D. Kavelin (1818–1885), Vladimir Viktorovic Lesevic (1837–1905), Evgenij Valentinovic De Roberti (1843–1915), Grigorij Nikolaevic Vyrudov (1843–1913), Nikolaj Ivanovic Kareev (1850–1931), just to quote the most important ones. Most of them had been educated at the school of revolutionary intellectuals such as Herzen (1812–1870) and Petr Lavrovic Lavrov (1823–1900) and, with the worsening of social and class tension, they sided with the bourgeoisie. The necessity to fight the materialistic tendencies prevailing within revolutionary organisations caused this positivist movement to come to agree with neo-Kantian trends that had

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<sup>12</sup> Caadev P Ja (1991) *Polnoe sobranie socinenij i izbrannye pis'ma* (Complete works and chosen letters), vol.1, Nauka. Moskva, pp.323.

emerged within German positivism. Another consequence was that the positivist movement adopted the conclusion of Otto Liebmann, who, in his work *“Kant und die Epigonen”* (Kant and his followers) published in 1865, had terminated his examination of the four main trends in German post-Kantian philosophy – the idealism of Fichte, Schelling and Hegel; Hebart’s realism; Fries’s empiricism and Schopenhauer’s transcendentalism – with the invitation “We therefore must go back to Kant”.

In these conditions, a sense of impatience towards philosophy grew in progressive and revolutionary circles. The most radical expressions of this trend were to be found in the work of two of the most active exponents of “Zemlja i Volja”: Aleksandr Aleksandrovic Serno-Solov'evic (1838–1869) and Nikolaj Isaakovic Utin (1840–1883). They considered philosophical thought to be the heritage of preceding generations, imprisoned in its utopian dream of a free and unconditioned human personality, and therefore able to develop and make progress without boundaries. By this time, however, philosophers and romantics had been replaced by a bigger and bigger crowd of revolutionary socialists who, as Utin wrote, were moved

not by abstract ideas, but by a rigorous adherence to harsh reality, which has always the power to draw to itself and constantly remind of its own presence”. Therefore, philosophy needed to be replaced by a new, authentic science, capable of “filling with loathing for the current social regime” and to indicate the “non-deferrable and irrefutable necessity of a new order based on maximum freedom” (*Narodnoe delo*, 2–3, 1868, p.40).

Petr Nikitic Tkacev (1844–1885), one of the main ideologists of revolutionary populism, also came to be hostile to the most recent western philosophical trends (in particular Mach and Avenarius and their empirio-criticism, which found supporters even in Russia<sup>13</sup>). So much so that he theorised the necessity of overcoming philosophy, which he considered a corruptor of youth, because it made them lose sight of the practical tasks which life put in front of them. While scientific investigations and generalisations taking place within these refer to real and actual phenomena, according to Tkacev, philosophical investigations “refer to a set of phenomena of purely speculative nature and are totally detached from reality” (Tkacev PN (1877) *O pol’ze filosofii* (On the utility of philosophy), *Delo*, 5, p.83).

The characteristic aspect of these statements about philosophical thought is its clear tendency to consider the latter as an ideological weapon, a fighting

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<sup>13</sup> Particularly important, in this context, V.V. Lesevic, author of *Ot Konte k Avenariusu* (From Comte to Avenarius), which gives evidence on and explains the evolution of traditional positivism into the “second positivism” of Mach and Avenarius.

instrument in the ideal and cultural, but also political and social, battle that was taking place in the country. In other words, it was the object of a dispute which went beyond the specific topic of its assumptions and conclusions and which involved problems concerning the historical situation at the time. The positions of the various authors were thus considered with reference to a “general climate” in force in Russia at that time: they were judged on the basis of the supporting role to certain political tendencies, which – more or less occasionally and instrumentally – they might end up carrying out. The strict connection that was made between the spreading of philosophies of a speculative type, characterised by a large use of abstractive methods on the one hand and the strengthening of reactionary and conservative tendencies in politics on the other, led the exponents of revolutionary organisations and movements to put into discussion most of the available philosophical heritage.

The effect of this anti-philosophical attitude at the hands of anarchists and populists is testified by the persistence of similar positions also in the debate following the October Revolution. One of the first issues of *Pod znamenem marksizma* (Under the flag of Marxism) – the new review described as an “organ of militant materialism”, which had started being printed in January 1922 – contained an article significantly entitled *Filosofiju za bort!* (Throw Philosophy overboard!) by S.K. Minin. The author, an expert on religious criticism, presented the whole of philosophical thought as a variant of religious ideology, since both lack any cognitive [conoscitivo] value. Its most authentic meaning, according to Minin, was instead that of constructing the indirect and mediated, but not less genuine, expression of the interests of the middle classes and other ruling classes. The essay started in a characteristic way, by immediately communicating its author’s intentions and aspirations as follows:

In the last few months, the fight on the front of abstract thought has been rekindled: the guns of reviews have again started to crackle and the heavy artillery, composed of treatises and volumes, has restarted to shell. What a comforting symptom! But in this impetuous attack, we show quite a bit of disorder and at times, unfortunately, this happens exactly with reference to the fundamental problems. Examples? Here is a wonderful and surprising example: our being busy around a “Marxist philosophy”. (Minin S K (1922), *Filosofiju za bort!* (Throw Philosophy overboard!) *Pod znamenem marksizma*, n.5–6) [25]

In a successive work entitled *Osnovnye voprosy marksizma* (the Fundamental Questions of Marxism), Minin further explains his point of view, identifying with clarity the aims of his argument:

But, in spite of everything, we continue to speak of this very ‘philosophy’ and to proclaim its importance. So Plehanov often uses this non-Marxist expression, ‘Marxist philosophy’ or ‘philosophical aspect of Marxism’. In his preface to the second edition of *Materialism and Empirio-Criticism*, Lenin himself went as far as to write: ‘I hope that, independently of the polemic with Russian Machists, it [this work] will not be useless as support to the knowledge of *Marxist philosophy*, dialectic materialism, as well as the *philosophical* conclusions drawn from the most recent discoveries of natural sciences’. And the editorial staff of the new review *Pod znamenem marksizma* commits sins which are more serious than venial sins in this respect, starting with the preface ‘From the editor’, published in the first issue”. Minin S K, *Osnovnye voprosy marksizma* (The fundamental questions of Marxism, Moscow, p.10).

Minin’s conclusion was preemptory:

In completing the building of our scientific vessel and in equipping it, we must make sure we throw overboard, together with religion, the whole of philosophy.

### **Stalin’s “diamat”**

In the few months following the revolution, when he was still active effectively in command, Lenin undertook to gradually building what could be called a *critical culture* of modernisation and change. He went back to Marx’s lesson, as explained rather clearly in the preface to *A Contribution to the Critique of Political Economy*, where it is indicated that the distinctive trait of the superstructures is the fact that they are subject to a far slower revolution than its structural basis. Lenin was persuaded that one could develop ? [prodotti conoscitivi oggettivabili] that could be stored and re-used so as to take on a character of permanent acquisition, and be cumulative, even in the case in which historical circumstances forced their temporary shelving. In fact, in his *Proekt rezoljucii o proletarskoj kul’ture* (Outline of a resolution on proletarian culture) of the 8th October 1920, he wrote explicitly that “a really proletarian culture” is the result not of any kind of *ex novo* “invention”, but of a “development” process, from a Marxist viewpoint, of the “most precious conquests of the bourgeois period”. Far from rejecting the latter, the “proletarian culture” had instead, according to Lenin, “assimilated and adopted the most valid areas in the over bi-millenary development of human culture and thought” and must continue to work “on this basis and in this direction”<sup>14</sup>.

Lenin’s attempt was brutally censored by the new generations of thinkers and researchers to whom Stalin gave the task of bringing

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<sup>14</sup> Lenin, *Opere Scelte in Sei Volumi*, Editori Riuniti – Edizioni Progress, Roma, 1973-1975, vol. VI, pp.187-88.

about the “big turn” on the philosophy and science fronts when his power had definitively consolidated, i.e. starting from the beginning of the Thirties. M.B. Mitin and P.F. Judin, who ran the communist unit of the Institute of Red Professors, acted as standard bearers of this radical line of cultural renewal. Others were philosophers P.M. Fedoseev, F.V. Konstantinov, M.D. Kammari, physicists V. Egorsin and A.A. Maksimov, mathematicians E. Kol’man and S. Janovskaja and biologist B. Tokin. The obvious and glaring fracture characterising the passage from the generation which had Lenin as a background and origin to the one imposed by Stalin revealed itself in 1931 with a radical change of direction of the two main reviews in the country. Both reviews, *Pod znamenem marksizma* (Under the flag of Marxism) and *Estestvoznanie i marksizm* (Natural Sciences and Marxism), had been given the task of going in more depth into the problem of the relationship between philosophy and science and the cultural significance of the new theories and views which had been emerging in the scientific field. Their editorial offices were completely revolutionised: to explicitly cancel any traces of continuity with the past, the latter, “organ of the exact sciences and natural sciences section of the Communist Academy”, took on the new name of *Za marksistsko-leninskoe estestvoznanie* (For Marxist-Leninist natural sciences). In fact, already the 1930 issue number 2–3 included an editorial by the new editorial staff entitled *For the party line in philosophy and in natural sciences*, preceded by a note reading “The editorial staff points out that this issue, organised and realised by the old editorial team, was published late due to technical reasons and its content does not yet reflect the turn discussed in the opening article. The problems relating to such a turn will therefore be dealt with in the next issue of this review”. The first thing that emerges from reading this editorial, apart from the keen claim of the non-neutral and biased character of any result achieved within the theoretical sphere, is the tight bond which is postulated between theory and practice. This bond gave away the increasing importance of the tendency to judge the value of scientific hypotheses on the basis of the success (or lack of success) of their concrete applications.

What these practical aims were which the development of science was considered destined to submit to, can be clearly deduced from

the resolution entitled *Balance and new tasks on the philosophical front* approved at the end of a joint meeting of the sections of the Institute of Philosophy of the Communist Academy and the Moscow organisation of the society of militant dialectical materialists of 24<sup>th</sup> April 1930. It was, so to speak, a compromise document, still straddling two phases, the one that was already setting and the one, which was just starting, of Soviet cultural debate. The latter phase therefore reflected contrasting requirements and trends: in any case, it already clearly showed the aim towards which all the “healthy forces” in the country had to converge:

The future activity on the philosophical front of the fight for Marxism-Leninism must be affected first of all by those general tasks that nowadays face the country of proletarian dictatorship. The proletarian revolution, in its current stage of evolution, that is to say in the conditions of fierce class struggle and victorious construction of socialism, has reached the fundamental task of the socialist revolution in our country: the eradication of the roots of capitalism. On the basis of the successes met in the industrialisation of the country, the full collectivisation and the removal of the *kulaki* as a class mean laying the foundation for the collective running of the national economy. As long as socialistically collectivised industry continues to be contrasted with the wide margin of discretionality of small rural properties, spontaneity will continue to have an important role in social relations.

The current stage of revolution has placed in front of us tasks from the solution of which depends the transformation from “blind” necessity into the chance of a conscious choice on the part of the producers themselves. This is a trend which is emerging in the class struggle and which leads to the creation of the premises for the destruction of classes.<sup>15</sup>

The “political-social” objective of reaching a swift and full collectivisation of the countryside and the economic aim to reach a noticeable and prompt increase in agricultural production are therefore two of the most important motives behind the fight against science and bourgeois scientists. In fact, it was thought that a new, collectivist structure of the agricultural production should be matched by a totally new agronomic technique derived from scientific principles and totally different from the traditional ones. It is hardly surprising that these movements ended up leading to a very distorted view of the complex problems concerning the relationship between political reasons, scientific requirements and economic-social needs. This is particularly true if we remember that the institution and the consolidation of the socialist production chain in the countryside was one of the “theoretical” nodes that proved the most difficult for Marxism to solve. Alternatively, one could analyse the tribulations of the agricultural policy of the Soviet Communist Party in the years immediately following Lenin’s death.

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<sup>15</sup> Tagliagambe S (1978) *Scienza, Filosofia, Politica in Unione Sovietica* (Science, Philosophy and Politics in the Soviet Union), 1924-1939, Feltrinelli, Milano, p.285.

Having set out the question in the terms described so far, the participation of science to the construction of socialism might be considered really useful only in the case of a reformulation implying above all a review of the work methods and times followed until then. This review, aiming first of all to carry out planning, that is the systematic management and organisation of experimental and scientific activities, had to be carried out on the basis of principles determined by the party line. The reference to dialectics, considered as universal scientific method, was above all meant to underline this latter need. In fact, since the indissoluble link between theory and practice, in the reductionist sense explained earlier, had been singled out as the fundamental principle of dialectical materialism, the reference to that philosophical doctrine was meant to be conceived essentially as a reference to a constant link to concrete problems which the party was having to face and with the directives which it issued in the attempt to solve them.

In fact, it was this link that constituted the *leit-motiv* of all the following cultural debates. The most important among those which took place after the events described so far, was the debate held in March 1931 on the occasion of the joint meeting of the direction of the association of natural sciences of the Communist Academy, the managing committee of the natural sciences section of the Institute of Red Professors and the general editorial team of the *Great Soviet Encyclopaedia*. The meeting was open by an introductory report by O.J. Smidt, as chief editor of the Encyclopaedia. While admitting that inadequacies and mistakes were present in the work carried out in the field of natural sciences, he also claimed its substantial validity and effectiveness. There followed a speech by A.A. Maksimov, who was very critical towards the criteria and choices that had been followed during the working out and realisation of the work plan for the publication of the Encyclopaedia itself. After analysing the content of some scientific entries, he declared:

We must conclude that, as far as natural sciences are concerned, we do not have a Marxist view: we have attentively sought Marxist entries and we must frankly say that there are none. At most, some of them need not be criticised that much and can therefore be left alone and not commented upon: if, however, one must refer to the large majority of the entries, it has to be said that, not only do they not adhere to a Marxist view, but they even express views which are antithetical to those of Marxism. Our conclusion, which was already formulated in the *Theses* that we developed and expressed in the headquarters of

the Presidium of the Communist Academy, is that the natural sciences section of the Great Soviet Encyclopaedia, headed by comrade Smidt, must be labelled as anti-Marxist. This conclusion, as we have said, is undoubtedly correct. The ideological errors signalled so far are matched by errors in the choice of authors<sup>16</sup>.

During the discussion, many specialists advanced a punctilious examination of the “ideological” inadequacies of each scientific section of the encyclopaedia. As to mathematics in particular, it was S. Janovskaja who spoke and pointed to the inadequacies and errors that, in her opinion, affected the section dedicated to this discipline.

She observed:

Mathematics occupies a peculiar position among scientific disciplines, if nothing else because the hopes of idealism are strictly connected to it. It was not for nothing that, in *Materialism and Empirio-Criticism*, when quoting the *History of Materialism* by F.A. Lange, Lenin notes that ‘Hermann Cohen is, as we have seen, enthusiastic of the idealistic spirit of modern physics and goes as far as to preach the teaching of superior mathematics in schools, so as to infuse in secondary-school pupils the idealistic spirit driven back in our materialistic time’<sup>17</sup>. In fact, mathematics, being the most abstract science, constitutes a fertile ground for idealism and, just because of this, even if it is not yet possible to supply a positive elaboration of it at the level of dialectic materialism methodology, criticism of idealism must be clear and precise. Now, if we examine the content of the mathematics section of the *Encyclopaedia*, we must note that, not only is there no trace of any criticism of idealism, but on the contrary, as comrade Maksimov has pointed out, idealism is extolled.

For instance, the entry “Arithmetic” exudes a pretty utilitarian spirit: it would be useless to look for any reference to Marxism, to class or ideology struggle in it (...). And this is nothing: the point is that this is a direct recommendation of the most ingrained idealism in mathematics: ‘The problem of the principles of arithmetic’, the author wrote, ‘has found a satisfactory solution in the works of Robert Grassmann, Karl Weierstrass, Julius W.R. Dedekind, Georg Cantor and others’. Later on, it is true, he himself recognised that the problem of the principles of arithmetic could not be considered solved once and for all. However, his hopes of a solution were obviously placed in the formalism of David Hilbert, that is to say in the work of an author who, without any embarrassment, had turned mathematics into a game, with the result of preventing the assignment of any concrete, real content to its basic concepts. Idealism under the mask of utilitarianism: this is the – scientifically very mediocre – general methodological formulation of this entry.<sup>18</sup>

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<sup>16</sup> *Za marksistko-leninskoe estestvoznanie*, 1931, n.1, p.73.

<sup>17</sup> Lenin, *Materialismo ed empiriocriticismo* (Materialism and Empirio-Criticism), Editori Riuniti, Roma, 1970, p.302.

<sup>18</sup> *Za marksistko-leninskoe estestvoznanie*, 1931, n.1, pp.74-75.

Janovskaja similarly criticises the entries for “Algebra” and “Axiom”. Talking about the latter, she observes that its fundamental flaw is its

separation of logic from history, which, in turn, is the result of the attempt to treat logic not as an awareness and understanding of historical necessity, but rather as something which can be explained or put forward in a totally formalistic way, without any reference whatsoever to history, reality or practice. Thus, this is not simply a separation of logic from history, but also of the inevitably connected separation of form from content and of theory from practice. Even the author of this entry, just as O.J. Smidt himself, limits himself to talking of “specially prepared structures and methods” which we “gather, choose, build and adapt at first in a not totally conscious fashion, but then reach a phase of full awareness and consciousness” and “are improved thanks to a slow adaptation”. ‘gather’, ‘choose’, ‘build’ and ‘adapt’: we do everything but *reflect*. In the latter case, in fact, there would be no conventionality whatsoever and mathematics could not be considered, as it is by all Machists, not a science referring to material reality, but rather a simple store of ready-made confections, from which physicists can choose as they please, guided only by considerations of ‘opportunity and convenience’ and ‘economy of thought’. This is a point of view that constitutes a complete deformation of historical reality, a real distortion of what really happens in the relationship between mathematics and physics.

Here materialism is clearly confused with idealism, with feeling and experience; here there is no talk of experiment, but rather of experience, a term which is known to lend itself to the most varied interpretations. The author keeps to the empiricist view and, in all conviction and sincerity, confuses this empiricism of his with materialism. He would like to stick to our point of view, but does not know and cannot grasp that empiricism and materialism are not the same thing.

I would also like to dwell on another point. The author is right when he claims, or nearly claims, that an axiom is simultaneously a definition and a judgement. This statement highlights its synthetic character, since it can be dealt neither as a simple definition, nor as a simple judgement. The author, instead, starts from the fact that an axiom is also a definition and that in each definition there is an aspect of conventionality to draw the conclusion that axioms are a kind of convention. This is not true: this is not the case at all. The difference between our logic and formal logic lies exactly in the fact that, while for the latter talking about something being true or false is always and only expressing a judgement, we could also be talking about a correct definition. This is because a correct definition reflects exactly the essential and peculiar traits of the object (thing, process or relationship) under discussion, while an incorrect definition cannot do that. Games, empty definitions and purely nominal determinations were never admitted by Marxism: in fact, Lenin fought against them with all his might. I would be wandering too far if I continued talking of this problem, but I still feel I have to stress that for us, just like judgements, even definitions can be true or false, correct or incorrect, because they too reflect reality.

Finally, the entry should have mentioned that one cannot talk of a single axiom or judgement, but only of a *whole system* of judgements and that the system itself can only make sense if it is considered as part of a totality, of a system.

As to the fact that, with change and development in science, axioms change and develop too, it would have been necessary to examine how they change and show that this development *determined by practice* brings us ever closer to absolute truth. The problem is that many idealists confuse these two facts, that is the compactness of the axiom system, which should be considered as a totality, and its variability, to the only end of distorting the

reality of things. Thus, to idealists, a certain axiom system allows us to define real numbers: these, however, could be defined differently, that is following the so-called genetic method which fully corresponds to historical development and is linked to progressive change, to the 'extension' of the concept of number and operations that can take place on it. From this point of view, though, it is not the genetic approach which is fundamental and decisive: everything is turned upside down and the axiom system ends up being considered as something which, just like Minerva, is fully complete on exiting Jove's head, that is it exits the head of the modern mathematicians in an already complete form. It is exactly this system that becomes the demiurge of mathematics, the person whose task it is to establish the course and limits of the next genetic extension of the concept of number. The discussions on the genetic and the axiomatic methods continue to shake the philosophy of bourgeois mathematics, but their traces cannot be found anywhere in the entry. Yet, it is very important for us to explain the subordinate role of axiomatics in science and to clarify that it does not constitute the real starting point, but it is instead the result of an analysis that can be carried out starting from an already high level of scientific development. This attribution of the fundamental function to axiomatics is useful to idealism, in that what the latter does in mathematics is take relations which are found in reality and turn them upside down, so as to be able to assert that the trunk has originated from the head and not vice-versa: this is the formulation that we must fight. This is why I believe, in conclusion, that the 'Axiom' entry is to be considered as idealistic and not Marxist<sup>19</sup>.

For its linearity and the clarity of its position, Janovskaja's critical analysis might well summarise and be exemplary of the overall debate on natural sciences, and on mathematics in particular, which developed starting from 1931 and continued for the whole of the Stalin era.

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<sup>19</sup> *Ibid.*, pp.79-81.

## Conclusion

We have proposed two moments that we consider to be particularly significant in the debate on mathematics in Russian scientific thought and tried to place them in the social and cultural climate of their respective historical phases. These “probing” certainly do not aspire to summarise and express the complexity of a long and tormented historical event, particularly its stages in the first half of the twentieth century. They can however give an idea of the consequences that inevitably derive from a certain type of attitude towards scientific research; consequences which Julian Huxley admirably summarises in his 1949 work dedicated to the analysis of the “Lysenko case”:

Science cannot flourish and cannot be fully fruitful save in certain material conditions and in a certain moral and intellectual atmosphere. As Muller (1949) well puts it, “It has taken thousands of years to build the basis of that freedom of inquiry and of criticism which science requires. It has been possible only through the growth of democratic practices, and through the associated progress in physical techniques, in living standards, and in education, applied on a grand scale. Only in modern times have all these conditions advanced sufficiently to permit the wide-spread, organized, objective search for truth which we to-day think of when we use the word Science.”

But the atmosphere necessary for science to flourish can be all too readily destroyed or poisoned, whether by ignorance and mental laziness, by prejudice and vested interests, or by authoritarian power<sup>20</sup>.

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<sup>20</sup> Huxley J (1949) *Soviet Genetics and World Science: Lysenko and the Meaning of Heredity*, Chatto and Windus, London, p.222.