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FROM THE HISTORY OF PHYSICS

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The journal *Priroda* — 100 years old

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<u>Abstract.</u> This paper reviews the key highlights in the 100-year history of *Priroda* (Nature), the popular science journal which has been highly instrumental in promoting the natural sciences virtually continuously in Russia and the USSR since its first issue in January 1912.

The monthly popular science journal of the Russian Academy of Sciences (RAS) *Priroda* (in English *Nature*) is one of the oldest Russian periodicals. The first issue appeared on 26 January 1912 (Old Style) with a circulation of 5000 [1]. The editors-in-chief were famous Russian scientists of the beginning of the twentieth century: the zoologist Vladimir Aleksandrovich Wagner [2], and the chemist Lev Vladimir-ovich Pisarzhevsky [3], who considered a journal to be "the best method of fighting superstitions, the influence of scholasticism, and metaphysics" (as was noted in the editors' message in the very first issue of *Priroda*).

Mikhail Isaakovich Solomonov [4], a highly popular artist of the time, prepared the cover in a style now called Russian 'modern'. This was probably Pisarzhevsky's choice: he was a poet and an artist, and his students recalled large canvases in the style of Somov. This cover adorned the journal for its first eight years through 1919, inclusive. A drawing of a hardworking bee was on the title page of the first issues, decorating Wagner's letterhead.

But the history of the journal had begun much earlier. Scientists had always needed such a periodical. There had been some attempts and some successes. The outstanding Russian biologist K F Rul'e published the popular *Vestnik Estestvennykh Nauk* (*Herald of Natural Sciences*) of the Moscow Society of Nature Testers from 1854 to 1860. And also in Moscow from 1873 to 1877, the zoologists S A Usov and L P Sabaneev published a periodical collection (in essence, a journal) *Priroda*, which can be considered the forerunner of the journal *Priroda* [5].

At the beginning of the 1890s, Wagner, who was an active promoter of the natural sciences, became enthusiastic about creating a popular science journal under the influence of Anton Chekhov [6] (they were close acquaintances, and Wagner even served as a prototype of the zoologist Von Koren in Chekhov's short novel *Duel*). Wagner's letters to Chekhov (who was presumed to become a co-editor), in

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First cover of Priroda (artist: M I Solomonov).



Title-page of the first issue of *Priroda* with the hard-working bee decorating Wagner's letterhead and a message "From the Editorial Board."

which he described the structure of the future journal and the circle of authors in detail, are now kept in the manuscript section of the Russian State Library in Moscow. Chekhov even suggested the title for the future journal: *Naturalist*. That is why Wagner called Chekhov "the godfather of the journal" in one of the letters. Unfortunately, those plans did not come to fruition through the fault of the publisher A V Suvorin, who, as he confessed to Chekhov, was frightened by Wagner's "materialistic ideas" [6].

But Wagner had not relinquish his dream and already achieved it after the writer's death. He infected Pisarzhevsky—by then a famous science popularizer—with the idea of creating a journal. Wagner's workpieces came in handy (they are preserved in his letters to Chekhov). And the title stemming from the old tradition was close in meaning to Chekhov's proposal.

The business hassles in organizing the publication of the journal *Priroda* in 1911–1912 fell to Lev Vladimirovich Pisarzhevsky [7]. Pisarzhevsky was teaching chemistry at the Kiev Polytechnic Institute. In 1911, he reacted with his characteristic energy to L A Kasso's circular depriving higher educational institutions of the remnants of autonomy [8]. As is known, about 100 professors and teachers at Moscow University resigned in protest [9]; seven, including L V Pisarzhevsky, left the Kiev Polytechnic Institute after clamorous strikes of students and teachers. Pisarzhevsky's active scientific work was interrupted for two years, while he only lectured at two second-rate institutes in St. Petersburg.

Pisarzhevsky initiated frenzied activity in Moscow in organizing the new journal. To the readers, the editors of *Priroda* declared "their deep conviction in the great social significance of spreading scientific truths." Under that

slogan, the journal collected everything most active and progressive in science.

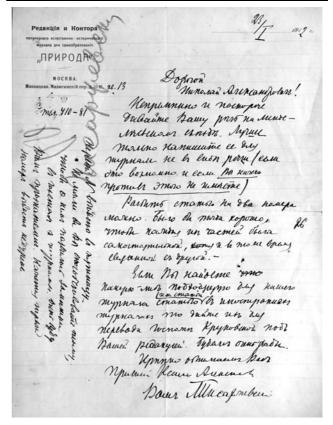
Outstanding Russian scientists began cooperating with the journal from the first issues: G V Vul'f, T P Kravets, P P Lazarev, N A Umov, and O D Khvol'son in physics; I I Mechnikov, I P Pavlov, A S Serebrovsky, V M Bekhterev, and Yu A Filipchenko in biology; L S Berg, V I Vernadsky, A E Fersman, V A Obruchev, and V P Semenov-Tyan-Shansky in the earth sciences, and many others. All the leading lights of Russian science of that time were regularly listed on the cover among the first authors and workers at the journal. Not only that, famous foreign scientists also participated in the journal's work.

But *Priroda* nearly became bankrupt already in its first year of publishing. The resources that Pisarzhevsky had received from the Odessa publishing house Zhivoe Slovo and "other good people wishing to remain anonymous" (words from Pisarzhevsky's letter to his older friend N A Morozov) were clearly insufficient in the beginning.

It was entirely possible to obtain help in improving the financial state of the young journal from the numerous philanthropists who were appearing in Russia at that time. Russia's economic growth rate from 1905 to 1914, during the period between two fateful wars and revolutions, surpassed the rates of all other countries in the world. And the Russian ruble had "passed the gold point," i.e., it was valued higher than its nominal gold value on international exchanges [10]. As was the custom, owners of gold-mines, factory-owners, and merchants raised their offspring as aristocrats of spirit and donated their capital to science, education, and art. It is reasonable to recall the 'Russian Nobel' Khristofor Semenovich Ledentsov or Alfons Leonovich Shanyavsky [11, 12]. But

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V A Wagner's worried letter to Anton Chekhov about the unclear destiny of the planned journal *Naturalist* [6].



Facsimile of L V Pisarzhevsky's letter to N A Morozov communicating the appearance of the first issue of *Priroda* [24].



Title-page of the 1913 *Priroda* and the impressive list of outstanding authors

the first editors of *Priroda* probably lacked sufficient organizational and business experience. Perhaps that is why Wagner had already ceased being an editor of *Priroda* in 1913 (and was not mentioned on the title-page), although he continued to cooperate with the journal.

Lev Aleksandrovich Tarasevich's name appeared on the cover in 1913. Tarasevich was a microbiologist and I I Mechnikov's student (he was mentioned as a co-editor on the cover from 1913–1927). His brother, Aleksey Aleksandrovich Tarasevich, was not mentioned in the publishing information. But a weighty stack of letters signed by the editorial-staff secretary A A Tarasevich, stored in the RAS archive at the A E Fersman Fund, is evidence that he carried a heavy burden of editorial duties for several years. "I do the proofing, yes, and I even do everything, because expanding the staff is impossible due to insufficient resources," he confessed in 1914 in answer to complaints about typographical errors. He coordinated the work of the editorial board (sub-editors started holding permanent positions in 1914), signed contracts with printing-houses, calculated honoraria to authors, and conducted the editorial correspondence [13, 14].

Reading the desperate letters of the editorial-staff members F K Konstantinov and A A Tarasevich, we can see the problems overshadowing *Priroda*. A way out was then found. As follows from the letters, namely Tarasevich organized a partnership for expanding the publishing activity of *Priroda*. At the same time, a partnership for publishing journal was created under the name Man and Universe, whose shareholders were predominantly scientists most closely cooperating with *Priroda*. Among them were N K Kol'tsov, his wife the zoopsychologist M P Sadovnikova, A E Fersman, S I Metal'nikov, and A S Khomyakov. The amount of a share is known: 3000 rubles. It was possible to obtain several shares. From a letter from Konstantinov (responsible secretary) to A E Fersman: "It is very desirable that such a good affair as the journal *Priroda* should finally receive its appropriate direction.... I am not used to giving up soon in life and believe that with the help of friends, our Priroda will not perish, as science cannot perish.'

Things began improving rapidly. Along with the journal, books were published with the trademark of the publishing house Priroda. More than 50 books were published in five or six years, and as many were on the way. The series Nature

Library, Principles of Natural Science, Classics of Natural Science, and others were going well. Books by I P Pavlov, I I Mechnikov, F Soddy, S Arrhenius, and Yu A Filipchenko were published in these series [15].

Wagner and Pisarzhevsky were replaced as editors in 1913–1914 by a bright group—the biologist N K Kol'tsov, the geologist A E Fersman, and the microbiologist L A Tarasevich. Kol'tsov became the main figure among them [11, p. 143]. Kol'tsov's letters to Fersman, who headed the Petrograd editorial section, were preserved. All the letters are only about *Priroda*. Everything is discussed, even the production process and commercial questions. "The subscriptions to *Priroda* are going very successfully," Kol'tsov reported with satisfaction on the eve of 1916, "twice as many subscribers as on the same date a year ago" [16]. At that time, Priroda took on the functions of a middleman, connecting scientific societies, collecting and issuing information about productive forces in the country, and organizing lecture cycles, which were later published as articles and books (which began to be published as supplements to the journal Priroda [15]).

Priroda and its publishing house continued to do well under Kol'tsov. The peak naturally occurred in 1917 [17]. Thumbing through the annual journal files, one cannot help admiring how respectfully and skillfully E S Fedorov, P I Val'den, Yu A Filipchenko, and N A Morozov spoke with readers about complex and sophisticated matters; how vividly the chronicles were written; how practical the news was, and how rich the miscellany of most engaging materials was (including Kol'tsov's column about the 'genetics' of the Romanov dynasty).

Priroda also reacted to the social upheavals of 1917. A welcome to the February Revolution appeared already in the March issue: "We are entering a new epoch with deep faith in the upcoming rise of Russian culture..." In the last issue of 1917, there was a response to the October–November events: "Heavy blows were also delivered to Russian science during the black days from 28 October to 3 November in Moscow..." It is certainly unnecessary to continue.

The first and probably the best period of the journal ended there. Only a few thin issues, put together with difficulty, were published on bad paper in 1918–1919. The journal was not published in 1920. Not only the general trouble but also A A Tarasevich's untimely death played their roles. Without Tarasevich, the publishing process stopped temporarily [13].





Covers of Priroda in 1918 and 1921.

N K Kol'tsov deserves a great deal of credit for sustaining *Priroda* in the revolutionary period.

In 1921, the journal began to be published in a different place—Petrograd—and in another capacity—as a periodical of the Commission for Studying Natural Productive Forces in Russia (in Russ. abbr. KEPS) under the Academy of Sciences [17]. This commission had been created by outstanding Russian scientists during the First World War in 1915. Academician V I Vernadsky came up with the idea and created the commission. He headed it from 1915 to 1930. The Moscow KEPS department began working in 1918 and was headed by Academician P P Lazarev, the editor of Priroda's physics section from 1913. A E Fersman, Vernadsky's student, was elected scientific secretary of the KEPS. On Vernadsky's initiative and apparently mainly through Fersman's efforts, the journal Priroda became an official periodical of the KEPS in 1921 [and later of the Academy of Sciences (AS)]. Considerable funds were allocated by the Soviet government for the work of this commission already in the first years after the October Revolution (KEPS data, for example, were used in drawing up the GOELRO Plan). The KEPS also found money for publishing *Priroda*. It was noted on the title-page of the 1921 issue that it consisted of double issues for the current and the preceding year. The editors-inchief were the same, and the themes were also the same. As in the first years, the journal was patronized by world-famous scientists. Calling themselves editorial staff, they not only wrote and translated for the journal but also edited papers and involved their colleagues in writing for Priroda. The authors were both Russian and foreign (for example, papers by Albert Einstein and by Max Planck were published in 1927, and W de Sitter's paper "The expanding Universe" was published in 1931).

The journal's style was preserved until 1931 (the year of Stalin's Great Change). "*Priroda* is a popular science and history journal established in 1912 and published by N K Kol'tsov, L V Pisarzhevsky, L A Tarasevich, and A E Fersman" was invariably written on the front page as a tribute to the founding predecessors.

The little birch tree, which had replaced Solomonov's drawing on the cover of *Priroda* in 1921, was most likely considered 'lacking ideology' in the years of the 'Great Change' and was soon replaced with fuming factories and manufacturing plants. And then, to prevent criticism, everything appeared on the cover at the same time—a mammoth,

an excavator, a microscope, a volcano, a rocket, and something else, and stars all around. But all of these novelties were occurring without Kol'tsov, Fersman, and Tarasevich.

Academician A A Borisyak, a geologist and paleontologist, headed the journal from 1931 to 1935. In 1936, the young Academician S I Vavilov was appointed to the new position of the editorial board chair, and V P Savich, head of the Spore Plant Department at Komarov Botanical Institute, who was famous for participation in the polar expedition on the ship *Georgy Sedov*, was appointed the responsible editor.

Trofim Lysenko was put on the editorial board in 1939. But he did not find 'common ground' with the other members and replaced himself with his associate N I Nuzhdin. But *Priroda*, to its credit, was never Lysenkoist. S I Vavilov shielded it from Lysenko and, just in case, kept it somewhat farther on in Leningrad, although it should have long been published in Moscow as a house journal of the Presidium of the AS USSR.

The fact that S I Vavilov headed *Priroda* during the Lysenko times (from 1936 to 1951) was very lucky for the journal. Vavilov made sure that *Priroda* was always faithful to scientific truth and guarded it (as much as it was possible) from both financial hardships and ideological pressure.

But, alas, even S I Vavilov, President of the AS USSR from 1946, was not almighty. Thus, the journal inevitably carried the imprint of ideological abuse, which compelled it to employ retaliative mimicry. *Priroda* was obligated to reprint 'directives from above', but the official ideology still little penetrated the main tissue of the journal. The readers understood and appreciated it, while the guardians of the System were constantly irritated by it. The journal was subjected to periodic flogging in connection with failing to line up behind some new tasks in constructing communism. The flogging was administered by the Presidium of the Academy, the newspaper *Pravda*, and even some own editors.

The Great Patriotic War reached *Priroda* still in Leningrad. The work of publishing the journal continued even during the blockade. We quote an extract from responsible secretary V S Lekhnovich's letter to V P Savich (at the beginning of the Leningrad blockade in 1941): "Publishing is moving slowly..., weakening of the people has become a significant factor at all stages. Burying became a difficult problem, especially a grave in the frozen ground. I am organizing a series of papers: botany and the Patriotic War, astronomy, and zoology, but they are moving slowly for the

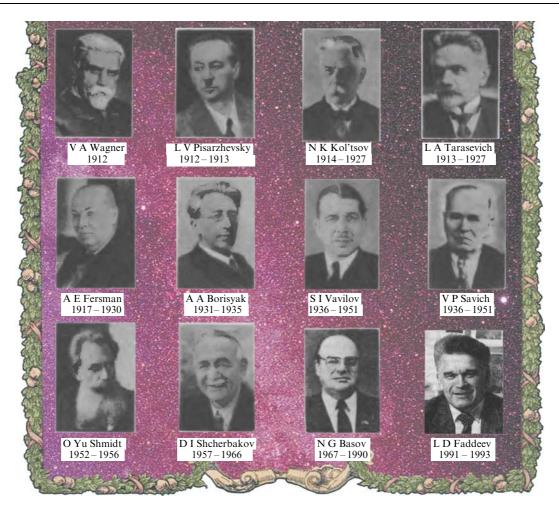


Stalin's 'Great Change' on the cover of Priroda.





Cover 'with mammoths' (continuing from 1938 through 1951) and the 'academic' cover that replaced it in Moscow in the 1950s.



Scientists who headed *Priroda* (their years as head of the journal are shown).

above-mentioned reason" [18]. In the evacuation in Kazan, *Priroda* continued to appear. V P Savich wrote about this period (in a draft for a speech at a session of the Presidium of the AS USSR in 1946): "I was not only the responsible editor but also head of the editorial office, secretary, typist, technical editor, proofreader, copy editor, courier, and I sat in the printing-office in the evenings as a printshop proofer.... The editorial staff consisted of me alone.... Looking back, I wonder where the energy for all of this came from [19–21]." The journal was one of the few issued all five war years, for which Professor V P Savich received the gratitude of the Presidium of the AS.

In 1951, after Vavilov's untimely death, the journal received a blow (the instigator is known—Lysenko). A real excoriation then followed with all the usual organizational consequences. *Priroda* was moved to Moscow in 1952. Academician O Yu Shmidt, a famous polar explorer, was appointed editor-in-chief. He was notorious for his deeds, excellent and not so excellent, but was definitely an erudite and talented organizer. He started creating *Priroda* anew, as it seemed to him. The journal's format and cover were changed. It was published on better paper and acquired a respectable look for its time. But the authors, the majority of the editorial board, and the readers remained intrinsically the same, and the previous classic style gradually started coming back. *Priroda*, as should happen in Nature, reproduced itself anew.

The geologist D I Shcherbakov, Fersman's student, became the editor-in-chief after O Yu Shmidt in 1957. The

Nobel laureate in Physics 1964 N G Basov, one of the creators of the laser, replaced Shcherbakov ten years later in 1967. From the large editorial board, Basov selected three deputies to help him: D A Frank-Kamenetsky headed the physics section (then V M Galitsky replaced him), Yu M Pushcharovsky was responsible for earth sciences for many years, and Academician B L Astaurov supervised the biology section (A K Skvortsov then continued his work).

At that time, the editor-in-chief and his deputies—scientists seriously involved in science and heads of institutes and laboratories—were always close to the journal *Priroda*: they chose topics and interesting authors, refereed papers, and even proofread the issue before sending it to print. Nowadays, few editorial board members are so concerned with journal matters, a circumstance explainable by the current state of Russian science. But many of them (N N Vorontsov, A K Skvortsov, A A Komar, S S Gershtein, S P Kapitza, A V Yablokov, A L Byzov, S E Shnol', G A Zavarzin, and others) regularly dropped by the editorial office to discuss scientific topics and questions connected with science during evening tea only 15 or 20 years ago. New issues of the journal were born in such a home, in an almost family, atmosphere.

The rebirth of genetics began at the end of the 1960s. Genetics had suffered from Lysenkoism, and B L Astaurov, a follower of N K Kol'tsov's traditions, did very much to win back the former glory for his favorite science. Astaurov chose *Priroda* as his tribune, and V M Polynin as an assistant.

Astaurov knew Polynin as a talented journalist who had received good training at V V Sakharov's seminars. Polynin became the responsible editor of *Priroda* in 1967. From then until his death, Vladimir Matveevich gave all his creative energy and talent to the journal. It suffices to say that he, the author of two remarkable books (*Daddy*, *Mommy*, and *I*, the first popular account of desecrated genetics, and *A Prophet in His Own Country*, about Kol'tsov), did not write a single line working as editor.

It is commonly known that there is always a leader (or 'passionary' in the words of L N Gumilev 1) on a good team. Polynin became such a person for *Priroda*. The 'golden age' of *Priroda* started with his appointment (a circulation of 85,000 speaks for itself: this did not happen before or after). Many of his innovations made the journal more lively. The papers obtained a 'face': a photograph and an author description now seem to have been forever in Priroda. The regular Nobel Prize column was created, in which specialists explained in detail who received the Nobel Prize and for what. This tradition has been kept to date, although it is not so valuable any more. Polynin taught his colleagues many things, including working with archives. The selections of interesting biographical articles appeared with his recommendation and support (for example, the October 1987 issue was entirely devoted to N I Vavilov).

We can therefore say that Priroda has been almost continuously issued all 100 years. It survived the revolution, the wars, Stalinism, the Period of Stagnation, and Perestroika. And all those years, the members of the editorial board were famous Russian scientists who protected the journal from pseudoscience, financial hardships, and ideological pressures. All the elite and pride of Russian science published papers in Priroda: N I Vavilov, S I Vavilov, A F Ioffe, N D Zelinsky, N N Semenov, L A Orbeli, Ya I Frenkel', I E Tamm, L D Landau, Ya B Zel'dovich, M A Leontovich, E K Zavoisky, A E Arbuzov, A P Vinogradov, B L Astaurov, L A Artsimovich, and many others. Andrey Sakharov was a member of the editorial board from 1959 to 1969. The Nobel laureate N G Basov headed the journal from 1967, and was replaced by Academician L D Faddeev in 1990. Faddeev handed the journal over to me in 1993.

Priroda looks very different on the outside today than it did a century ago, but its ideology has not changed. It remains a journal for self-education in all areas of the natural sciences and the history of natural science, and keeps its creators' traditions. The publishers of the first issue of *Priroda* wrote in their address to the readers: "...the rise of the common good is only possible under the condition that not the select but everybody will use the light of knowledge and, moreover, from original sources or through well-informed persons."

Priroda is now the only popular science publication included in the Higher Attestation Commission list. And this trust has been deserved. First, it is a primary source journal, and the authors are scientists. Second, it is refereed, and it is difficult for unverified and doubtful information to slip into its pages. It says much that an appreciable portion of the illustrations for classic university textbooks and encyclo-

pedias in the natural sciences published in Soviet and post-Soviet times has been taken from the articles that were first published in our journal.

There is one fact in the latest history of *Priroda* that is little known: the cooperation with the British journal *Nature*. Information about the most important publications in that journal have promptly appeared in our journal *Priroda* since 1912. The journals of the same name became twinned in 1987: they exchanged issues and publication materials [23]. This continued until 2004.

Priroda's one-century achievement is its own kind of retrospective on the development of science. Some journal papers will always remain landmarks in their fields of research; others originated new ideas that have been successfully developed for a century and still continue to interest scientists. For example, in the very first January 1912 issue, Professor I I Borgman, although he did not mention the quantum theory of radiation or the theory of relativity, which were the most essential theoretical achievements of the preceding decade and laid the foundations of contemporary physics, described several phenomena connected with the new physics in detail in his report "The recent successes of physics", phenomena that nobody then suspected.

It is necessary to say that by the beginning of the twentieth century, chemistry in Russia looked more than worthy and was at the level of the leading European countries (England, Germany, and France). It will suffice to mention the name of Mendeleev, who stood ahead of many outstanding chemists. Biology and geology were successful, too. But this cannot be said about physics. Although A G Stoletov and P N Lebedev created the Russian scientific physics school, it did not last long. Lebedev experimentally proved James Maxwell's insight about light exerting pressure on the target when reflected. This discovery is at the Nobel prize level. But it is difficult to say whether Lebedev would have received it if he had lived another thirty years. The reason is that world physics at that time developed at such a rapid pace that Nobel laureates of those years could not possibly be replaced.

But several Soviet physicists instantly and seamlessly fit into the rise of physics of the last century—P L Kapitza, LD Landau, I E Tamm, and NN Semenov—who later became Nobel laureates. The atomic and the hydrogen bombs were created then, placing Soviet physics and its leaders, I V Kurchatov, Ya B Zel'dovich, and Andrey Sakharov, on a par with Enrico Fermi. How could the breakthrough of Soviet physics to the international level happen so quickly? Mathematics, which had flourished in Russia since Leonhard Euler, played an important role in this. Mathematics does not belong to the natural science disciplines and is not covered to any significant extent in our journal. But without it, twentieth-century physics (like other sciences) could not have developed.

All the above-mentioned physicists were authors in *Priroda* in different years. Their papers (and the papers of many other outstanding scientists) are preserved on the journal pages, faded by time. But a complete electronic archive of *Priroda* was issued for the journal's centennial. This archive was created by the employees and friends of the journal under the auspices of the Russian Foundation for Basic Research (grant No. 11-05-07078). The scanning is now complete, and all issues over those 100 years (about 40,000 articles published in 1084 issues) will be available to all who love science and are concerned with its past, present, and future.

¹ Incidentally, Yu M Borodai's review of L N Gumilev's book *Ethnogenesis and the Biosphere of Earth* [22] provoked a stormy reaction in the Academy. As a result, Deputy Editor-in-Chief V A Goncharov was fired for an 'ideological error', and the editorial board members A K Skvortsov, A L Byzov, and A V Yablokov were reprimanded.

In conclusion, I thank all the editorial board members for their creative work, especially my deputies A V Byalko, A A Komar, V V Malakhov, and A A Yaroshevsky, and also the journal's editors O O Astakhova, L P Belyanova, E A Kudryashova, K L Sorokina, N V Ul'yanova, N V Uspenskaya, and O I Shutova. I am especially grateful to Nina Vladimirovna Uspenskaya, whose publications on the history of *Priroda* formed the basis for this article.

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