SCIENCE FOR THE MASSES

THE BOLSHEVIK STATE, PUBLIC SCIENCE, AND THE POPULAR IMAGINATION IN SOVIET RUSSIA, 1917-1934

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Introduction

RUSSIAN SCIENCE, PUBLIC CULTURE, AND THE BOLSHEVIKS

On a July 1933 evening in Moscow, over two hundred workers packed into an auditorium in the city to view an instructional film and to have a discussion with teachers from the voluntary technical educational group Technology for the Masses (TekhMass). After the showing, a fiery debate broke out between Communist technical activists and Soviet workers from various Moscow factories. The workers were interested in the practical, instructional aspects of such films dealing with, for instance, electro-welding. The films, however, much to the dismay of workers, also carried propagandistic messages of the virtues of Soviet technology in comparison to the capitalist West. On this particular night, workers boldly told activists to scrap the propaganda and to get on with the business of giving them needed, basic technical education these newly minted workers had never received from the countryside, or shop floor for that matter. Various TekhMass activists were stunned by the workers’ critiques, which were blatantly apolitical; however, they also realized that they had to placate their complaints. Furthermore, the activists realized that, politics aside, their efforts toward scientific popularization depended on a core ethos that saw science as a practical tool with utilitarian goals for the everyday laborer.

The experience of various activists in the early Stalinist era demonstrates how Bolsheviks sought to bring a new science to the masses after 1928. Science during the Stalinist period took on an increasingly narrow meaning in the public realm. The Stalinist temple of science was the factory-shop floor and the machine, and productive capacity became an end in itself as scientific knowledge and epistemological inquiry were relegated to the background. Yet, this was not always the case in the early Soviet era before Stalin’s revolution in 1928. There was actually great continuity between the tsarist and Soviet periods with regard to communicating the virtues of science to the undereducated. This was part of a greater European cultural movement stretching back to the roots of the Enlightenment. Furthermore, Russian scientists and educators of science themselves shaped to a large degree their own agenda and in the process contributed to a civic, public sphere before and after 1917.
Scientists and popularizers of science adopted rhetorical strategies to combat and accommodate initiatives by a Bolshevik state seeking to support but also to control and politicize their work. A symbiotic relationship developed between the state and those scientists because the Bolsheviks realized their dependence on such specialists to enlighten the masses. Yet, even before 1928 this relationship was paradoxically marked by great tension as well as cooperation. The science-popularization movement was a microcosm of the Bolsheviks’ struggle during the twenties to develop their own cultural programs while they were still highly dependent on the old intellectual elite of Russia. Ironically, they shared many of the same values in the scientific realm, educationally speaking, even if they differed on the politicizing of knowledge.

However, efforts by militant atheists and radical activists hostile to compromise became increasingly successful after 1928 as the Stalinist state underscored the importance of nationalism, class warfare, and a myopic utilitarianism united with the immediate goals of industrialization and collectivization. Nevertheless, the science popularizers and the Stalinist regime still found reasons to cooperate, and the Stalinists recognized that they needed the popularizers to lead workers, many of them recent migrants from the Russian countryside, toward an appreciation of technology and to teach them particular technical skills useful at their job sites. To understand this evolving tension and cooperation between scientists and the Soviet state, one must consider the subtle sociopolitical patterns that arose in early Soviet society: namely, the simultaneous cooperation and struggle between regional and central agencies; considerable infighting among Soviet institutions of government; an encroaching bureaucratization and institutionalization of Soviet life after 1917; and finally, yet critically, the persistence of civil society across the revolutionary divide into the 1920s, and to a limited extent in the early Stalinist era.

The Soviet effort to popularize science in revolutionary Russia therefore provides a base from which to view and understand the expansion of public culture across the revolutionary divide, especially in the early Soviet era. Nevertheless, no major effort has been made in Western literature to analyze popular science in early Soviet (nor late tsarist) Russia. Historians of Russian science have not extensively analyzed the cultural resonance of science in revolutionary Russia, nor have they focused singularly on the civic activity of these scientists. Equally unaddressed, at least in any comprehensive way, are the intricate venues through which science was popularized in revolutionary Russia, the broad textual media involved in popular science, and how science reached beyond the educated elite.

Historians of late Imperial and early Soviet Russian popular culture have also touched on public science, but only in a peripheral sense. Furthermore, those who have looked at futuristic elements of Bolshevist culture mostly focus on the abstract, utopian concerns of Russian intellectuals (and Bolsheviks in particular) and not necessarily on the more public or even utilitarian, technical components of science that struck an imaginative chord with Russians from all walks of life: laborers, lower-middle-class functionaries, professionals, and others. It was in the interest of the state, as well as that of Russian intellectuals of the older generation, to connect with those undereducated Russians and to teach them the practical and visionary aspects of scientific inquiry. Early Bolshevik culture can be reconceptualized though an understanding of these eclectic elements, the practical and utopian. During the 1920s the Soviet state also had to accommodate the interests of both the old and new intellectual elite.

Only recently have historians of Russian science attempted to address the broad issue of scientific “public” discourse. Douglas Weiner, in his newest work on Russian nature protection, has argued that the ecologists in Stalin’s Russia maintained a sense of what he calls “scientific public opinion.” They formed defense mechanisms, which he describes as “protective coloration,” in order to survive and to continue their ecological work even under the repressive Stalinist regime. Yet, Weiner’s case study uncovered how ecologists formed a sense of public opinion that was elitist in nature; as they directed their critiques at the boorish regime, they believed that only they were the harbingers of true knowledge. Weiner also contends that his research on Russian ecologists points to their need to maintain preexisting corporate social identities, as well as independent professional positions. They were effectively shutting themselves off from the public’s more mundane interest in environmental concerns.

Science popularizers displayed a different kind of public scientific discourse. Popularizers formed “public scientific opinion,” like other scientific subgroups, but they also uniquely supported broad, popular civic culture. Their interests both diverged and converged with the mass-enlightenment agenda of the Bolshevik regime. So, instead of looking down on Soviet mass, voluntary activity, popularizers embraced it and by doing so attempted to maintain their independent civic domains. Furthermore, science popularizers, unlike other scientific subgroups, represented radically diverse professional and ideological positions. They were unique, as an amorphous cohort, since they attempted to transgress professional, discursive, social, and class boundaries. These scientists and educators offer a case in point for analysis of how groups coexisted with the Bolshevists and actively affected the Soviet state’s cultural agendas.

Science popularizers, unlike other Russian professional caste-like elites,
represented a point at which state, society, and scientists all converged in an expanding and contracting public sphere. As a group of Russian intellectuals, the popularizers were somewhat of an anomaly because they did not represent a singular corporate identity. Lastly, although the popularizers lobbied the new Bolshevik state for patronage, they manipulated their “protective coloration” in a manner that made their relationship with the state different from the relationship that shaped groups such as the Russian ecologists. Science popularizers highlighted their public enlightenment activities to show how their programs could converge with the atheistic state’s scientific vision of popularization. They adopted the rhetorical constructs of the Soviet state while accentuating those parts of their agenda that converged with the state’s pervasive platform. Since popularizers had supported public educational programs as part of their operations for decades before the revolution of 1917, fulfilling the Soviet state’s extra-curricular mission came naturally to them. Their activities represented strong continuities in scientific practice and civic activity across the divide separating tsarist and revolutionary Russia. Furthermore, an appreciation of the role of the popularizers highlights how the Soviet state’s enlightenment campaigns in the early period were not necessarily an innovation, or inherently Communist, but connected to prerevolutionary Russian trends.

After the October 1917 Revolution, the Bolshevik state supported the enlightened ideas of prerevolutionary Russian science popularizers, as well as young Communist scientists and activists who were interested in public culture. The goals and cultural vision of the Bolsheviks intersected and converged with those of prerevolutionary Russian intellectuals who also cherished the notion of bringing science out of the walls of academe and into the public realm. Both the Bolsheviks and scientific intellectuals saw science enlightenment as an inherently transformative venue for shaping Russian culture. From the very beginning of the Revolution in late 1917 and early 1918, even under adverse conditions, the Commissariat of Enlightenment’s Scientific Department (Glavnauka) donated huge sums of money to societies that had been the central source of science enlightenment in the late tsarist era.

Indeed, early Bolshevik culture can be viewed as having had a public scientific ethos at its core that would change and evolve at different stages, especially throughout the early Stalinist era. Recently, Nikolai Kremensov has emphasized, contrary to conventional wisdom, how Russian scientists fought and manipulated the Soviet system to maintain the purity of their scientific work and the coherence of their insular laboratory research after 1917. This scenario, while true for research biologists, does not properly describe the general rule for all science educators. On the contrary, perhaps Russian scientists in the post-1917 era “worked” the Soviet state to maintain their independent scientific research domains, they did not turn inward in an insular manner, away from both the state and society. Rather, Russian scientists seemed inherently driven to create a public domain for the discussion of science’s role in society, both in the pre- and post-1917 era. Understanding the historical roots of public scientific activity in Russia might even offer a better understanding of the civic movement for public discussion of social issues during the 1970s and beyond that was spearheaded by scientific elites such as Andrei Sakharov and others.

Ultimately, the Soviet state itself fostered and supported the expansion of public science in the early 1920s and 1930s. Viewing and analyzing Bolshevik culture through the medium of science popularization allows us to bring together under one rubric many aspects of the modernization paradigm of that early revolutionary government: industry and the city v. the backward countryside; science v. religious superstition; futuristic and imaginative concepts v. the insular old world.

Chapters 1 and 2 look at the critical prerevolutionary development of the science-popularization movement in publishing and the rise of scientific societies as catalysts for this activity. Russian intellectuals in late Tsarist Russia were missionary in their zeal to popularize the virtues and importance of nauka, a term they used not only for science but also for progress and enlightenment. Although the Imperial Russian state under Peter the Great and subsequent tsars was originally interested in the utilitarian applications of scientific and technological developments, the task of spreading science beyond the walls of academe and into the public realm was left primarily to Russian popularizers. This diverse group of intellectuals included scientists, editors, educators, and teachers. They did not represent simply one corporate, professional identity, nor did they all espouse the same ideological perspective.

In the eighteenth century the process was undertaken by important scientific figures like M. Lomonosov and G. F. Muller, who had an institutional base in the Russian Imperial Academy of Sciences. During the early 1700s, state patronage was the driving engine behind the development and popular diffusion of scientific information in Russian society. However, later in the century during the time of Catherine the Great, independent enlightened publishers, like N. Novikov at Moscow University, used their new presses to spread science via popular pamphlets and journals. This development paralleled the similar efforts of French encyclopedists to spread Newtonian mechanics and scientific thought throughout Western Europe. As time progressed, enlightened intellectuals in Russia began to take control of the movement and connect it more closely to a developing public culture.
Popular geographic works were among the most widely distributed forms of popular-scientific literature up to the late eighteenth century in Russia. A certain patriotic and nationalistic sentiment in these publications surveyed Russia’s vast territory and resources as the imperial empire expanded on its periphery. State sponsorship of certain geographical and geological publications emphasized the underlying importance of those works as textual media that spread ideas describing Russia’s wealth and power.

Throughout the nineteenth century the movement to popularize scientific information among a broad sector of the populace in Russia became inextricably linked to the development of programs and journals in self-education. The movement caught on as well in America and Europe after the early 1800s, where science popularization was closely allied to adult-education programs. By the mid-nineteenth century, the development of natural-history museums and scientific societies in Russia altered the nature of scientific popularization. From that point onward the transmission of scientific ideas was not strictly limited to printed textual media. Popular-scientific lectures and exhibits in new museums were a potent tool in the spread of scientific ideas to various elements of the public. Russian natural-history museums spread in the capital and provincial cities, and they sometimes emulated, without wholesale copying, their European and American counterparts.

At the turn of the twentieth century in Russia, the production of popular-scientific works became more market driven. Publishing firms in St. Petersburg and Moscow promoted books on popular scientific themes. The popular reader was interested in a variety of themes, including the origin of the Earth, human evolution, and astronomy. The result was an increase in the publication of popular-scientific journals. The journal was a cheap and accessible source of scientific information for the Russian reader. As in the West popular journals contained advertisements to supplement revenue from subscriptions for the publishing houses.

In both Europe and Russia after the era of the French Revolution, science popularizers, voluntary organizations, and educators were thus involved in a much broader social process. Science popularization entailed sponsoring adult education, moving ideas out beyond the walls of academe, and creating public museums for wider social participation. This civic activity was part of a more general process of expanding the dimensions of the public sphere in Russian society.

Science educators and scientific societies continued to foster civic activity as they broadened the public sphere across the 1917 revolutionary divide. Chapter 3 begins the analysis of the post-1917 era by discussing the relationship between the non-Communist (and Communist) scientists in the 1920s and their new Soviet patron—Glavnauka, the Scientific Department of Nar-kompros, the Commissariat of Enlightenment (or Ministry of Education). Pre-revolutionary scientists were as ingenious as young Communists in lobbying the new Soviet state for finances. They were able to use the language and rhetoric constructed by Narkompros to show how they would be an influential part of the Soviet state’s cultural and scientific enlightenment campaign. After 1928 their lobbying efforts would become less successful, but they struggled all the same until their organizations in many instances were liquidated in the early 1930s. By adhering to and manipulating elaborate rituals in their dealings with Soviet state institutions, scientific societies were able to maintain their own independent sense of public identity within certain political limits. Science popularizers not only entered into symbiotic relationships with Narkompros, but skillfully kept the state from interfering in the direction of their public educational activities during the twenties.

Chapters 4 and 5 focus on popular culture during the twenties in Soviet Russia and on how the new Bolshevik scientific vision actually converged with the dreams and imagination of many urban Russians. A market for popular science had existed prior to the revolution of 1917, and at least until 1928 the public demand continued and was fulfilled by the explosion of popular-scientific journalistic activity in Soviet Russia. Though less the case for rural inhabitants, urban Russians from a variety of social backgrounds were fascinated with popular scientific material on a range of topics including air flight, new technology, and exploration of Russia and the globe. The Bolsheviks helped foster these publishing ventures that temporarily fulfilled the state’s goal of scientizing Russian cultural norms and educational curricula. Furthermore, Russian readers in the 1920s were fascinated with the feats of foreign technology, and the regime did not attack that cosmopolitan perspective until the mid-1930s. The topical interests of the urban public converged with those promoted by the state in this interim period. This convergence is evident in the comparison of thematic content, covered in chapters 4 and 5, between non-party and Communist Party/Soviet state publications in the 1920s.

Chapter 6 will view the antireligious campaign as an outgrowth of the Bolshevik cultural vision of bringing “science to the people.” In this unconventional interpretation, the antireligion campaign can be seen more as a means to achieve a scientized culture—a venue for science popularization—and less as an end in itself. An analysis of the scientific content of antireligious propaganda is critical to a broader understanding of the Bolshevik program of cultural enlightenment in the 1920s. The Communist Party modified its antireligious propaganda due to much resistance in the local and rural areas and settled instead on long-term scientific, educational planning. That long-term strategy involved sponsoring science popularizers’ activities in aiding
antireligious activists, as well as promoting Darwinism and diverse evolutionary theory in the schools and popular press. The regime became dependent on those non-Communists in the scientific and educational community to spread evolutionary and antireligious doctrine.

The era of the New Economic Policy (NEP, 1921–27) is a complex time for cultural historians to analyze because the NEP was a transitional era wedged between two radical periods of cultural transformation: namely, the Russian Civil War (1918–20) and the Stalinist Great Break (1928–32). During the period of the NEP, the Communist Party and Soviet state (specifically Glavnauka) generously sponsored the popular-enlightenment efforts of many scientific societies, institutions, and publishers, while avoiding any severe political interference in their work. This approach accorded with the early Bolshevik concept of cultural revolution, which called for a gradual raising of educational, scientific, and cultural levels. With the end of the NEP in 1928, the Soviet state continued as the prime funding source for these societies and their enlightenment work. However, radical Communist factions and groups of intellectuals now launched an aggressive challenge to the authority of the prerevolutionary scientific intelligentsia. While their initiative might have come from below, these groups lent support to party resolutions and directives from above that demanded that all enlightenment activities buttress the socialist reconstruction of the economy. Chapter 7 offers an analysis of those confrontations within the larger discussion of science popularization in the era of the Stalinist “Great Break.” In 1928 the Stalinist state, managing from above, and radicals, fomenting from below, broke away from the mixed economies of the NEP era as well as from tolerance of the old cultural elite, which characterized NEP Russia.

Scholars have debated for some time the extent of “Bolshevization” of scientific and educational institutions in the period before Stalin’s revolution from above. Nikolai Kremenstov, in his monograph on Stalinist science, has argued that in contrast to the accommodating Bolshevik policy toward existing scientific research institutions in the 1920s, the Bolsheviks supported a more aggressive attitude toward educational institutions in the sciences. Kremenstov concurs with Michael David-Fox, who argues that in addition to reforming existing educational structures the Bolsheviks created a number of new “Communist” institutions, like the Communist Academy, in order to form a slowly a Communist intelligentsia. Other scholars, like David Joravsky, see the process of “Bolshevization” of scientific institutions as a more gradual development leading up to the late 1920s.

The “Bolshevization” of scientific and educational institutions was less well defined during the period of the NEP than previous analysts are willing to concede. In the 1920s, prerevolutionary scientific societies were able to justify their work and the funding they received from Narkompros by using the rhetoric of the Communist Party itself. They lobbied Narkompros officials to support their activities, arguing that their societies would actively take part in “enlightenment for the masses.” Both non-Communist intellectuals and Bolsheviks alike used the rhetoric of “practical enlightenment” to coexist in the period of the NEP. By 1929, however, the Bolsheviks were attempting to reorganize professional societies and organizations dominated by the prerevolutionary scientific and technical intelligentsia. Although radical Marxists had already begun to draw battle lines during the mid-1920s, they had been unable to muster enough support to purge completely the older generation of popularizers of science.

Throughout the course of the Stalinist cultural revolution (1928–31) tensions grew between young militants and the older generation of professors in the sciences. In the scientific realm, specific institutions, like VARNITSO (All Union Society of the Workers of Science and Technology for the Promotion of Socialist Construction), covered in chapter 8, helped to coalesce attacks against prerevolutionary societies and to serve as a spearhead for further criticism. VARNITSO, a powerful central organization, had ties to key Communist Party members, and its attacks against specialists modified the nature and restricted the extent of the public discussion of scientific issues during the 1930s and beyond. VARNITSO dictated to older established institutions the parameters of popular scientific and technical education and defined more clearly the new politicized rhetoric. During the Great Break, radical science pedagogues, grouped in organizations like VARNITSO, criticized those educators who did not link science education to practical economic tasks. Even within Glavnauka, the radicals openly challenged their associates, whom they accused of propagating material and a point of view divorced from immediate economic and industrial needs.

An analysis of rhetorical and survival strategies as a methodological approach can reconceptualize the dynamic process of cultural revolution by highlighting fundamental sociological tensions and patterns. Scientists and educators came up with a variety of survival tactics before and even during the period 1928–32. Prerevolutionary organizations and intellectuals tenaciously shaped their public personas within the changing parameters constructed by the Soviet state. Scientists and educators in the early Stalin era attempted to “work the system” even when many did not support the state politically or ideologically. Unfortunately, by the early to mid-1930s, many of their attempts both to survive and to cultivate public culture became problematic, given the new political and bureaucratic constraints from above.

Scientists and educators continued to use the Communist Party’s rhetoric as a means to gain financial support. During the period of the Great Break,
however, the new militants were more effective at using the rhetorical phrases of "class war," "utilitarianism," and "Marxist dialectics" that the Party had unleashed. Independent, voluntary Communist organizations fashioned their own public images and lobbied state institutions for patronage support. The young militants isolated their opponents and placed them on the defensive throughout the early 1950s. Science educators from the old and new generation were competitors in an era of limited resources and politicized educational policy.

In the early Stalin era, Soviet state officials believed that the spread of science and technology had to coalesce with the Communist Party's utilitarian needs to revive the industrial sector of the economy. Initially, radical scientists and propagandists attacked older, prerevolutionary voluntary societies for not aiding the socialist reconstruction of the economy. Eventually, these Communists organized their own mass organizations to aid the economy and to fulfill other tasks, like educating workers. TekhMass, discussed in chapter 9, was one of the new voluntary organizations designed to promote the technical education of workers in order to integrate them into the factory environment of the First Five-Year Plan (FFYP). This extensive organization relied on operating cells throughout the former USSR, and its functioning reflected how the nature of science popularization changed during this era. Although they were fostering the Party's mass propagandistic and economic agendas, Communist voluntary societies, like TekhMass, also provided basic needs for those laborers who wanted more guidance in areas where they never received formal educational training. These organizations converged with the needs and demands of the undereducated worker-peasants entering the urban areas who were interested in more utilitarian forms of science and technology. These new workers became fascinated with journal articles that applied to their jobs and life in a practical sense. Workers' criticisms and petitions to technical educators well illustrate the degree to which laborers were emphatic in their demands. These petitions provide further evidence of public criticism in Stalin's Russia, especially in the scientific and educational realms.

This convergence of the demands of the new Stalinist state, the focus of new Communist voluntary societies, and the needs of the changing work force was reflected in both public policy and in the content of the popular scientific media. Chapter 7 analyzes the fundamental changes in the content of popular science in Stalin's Russia during the cultural revolution. Unfortunately, after 1932 even the Communist educators who were militant members of these organizations came under the control of the party. By then the Soviet state prompted the name change of TekhMass to Za Ovladanie Tekhnikoi (All-Union Society for the Mastering of Technology—ZOT) in or-
Chapter 1

THE BIRTH OF POPULAR PUBLISHING
AND PUBLIC SCIENCE IN TSARIST RUSSIA

Popular science publishing in Russia followed relatively the same developmental path it had taken in Europe. Until the first quarter of the nineteenth century, science popularizers in Russia concentrated on spreading information on geography, concrete astronomical conceptions of the universe, and utilitarian scientific inventions. Much of this effort was sponsored institutionally by the Academy of Sciences and subsequently by scientific scholars and private publishers. By the second quarter of the nineteenth century, science popularizers began to publish basic educational material in all areas of the natural sciences. Even more than their European counterparts, Russian intellectuals believed that science had to be spread through popular media to enlighten the broadest segments of the populace concerning new discoveries and to bring them up to the level of European scientific consciousness. Furthermore, Russia had its own unique tradition of public scientific lectures and traveling science exhibits that continued into the twentieth century. This notion of science for the people begun in the tsarist era connected well with the later Bolshevik notion of mass enlightenment in the early Soviet era.

Yet Russia had also borrowed Western European traditions predating its own movement to spread science to the people. Western European science popularization was more prevalent than in Russia as far back as the early 1600s. At that time, much of the science popularization in early modern Europe was conducted by individual scientists or professors. One of the first important science popularizers in Europe was the author of early theories on physics and celestial dynamics, the Italian scientific thinker Galileo Galilei. In the 1620s and 1630s Galileo launched a publishing campaign to introduce other scientists and educated laymen to Nicholas Copernicus's views on the heliocentric design of the universe and to Galileo's own approaches to the study of dynamics. The work of Sir Isaac Newton then built on Galileo's theories to produce a new system of mechanics. In 1687 Newton published his famous *Principia Mathematica Philosophiae Naturalis*. As time progressed, many scientists and scholars had to defend Newton's scientific theories publicly. At the turn of the century Roger Cotes, Cambridge University professor of astronomy and mathematics, was one of the greatest defenders of
Newton’s scientific method. Cotes was one of the few scientists at the time who could both understand Newton’s mathematical theories and explain them to a wider body of educated laymen.3

During the seventeenth and early eighteenth centuries, a movement began that lent an institutional basis to science popularization. In England, as Newton expounded on his theory of gravity, King Charles II gave the title “Royal” to a group of British natural philosophers in London. In 1662 this society took the formal name the Royal Society. Its most important member, Henry Oldenburg, the Society’s Secretary, conceived of a journal called Philosophical Transactions, which was first published in 1665. Oldenburg translated and published correspondences between great scientific figures for the scientific and educated community at large. This publication had profound ramifications, since it would be a forerunner to the modern scientific journals of later days and a means to spread knowledge among the scientific and educated lay community.4 England was certainly not the only European country where these societies developed and popularized science through lectures, exhibits, and newly founded journals.5 Galileo’s disciples formed a similar academy in Florence in 1657, the Accademia del Cimento. It publicly promoted the usefulness of the experimental sciences. Its secretary, Lorenzo Magalotti, published the findings of the academy’s experimental discoveries, which the educated public read avidly.6 These early European societies served as passageways for new scientific ideas to leave the walls of academe and enter the public realm, and Russians would learn from and build on these foundations when creating their own scientific societies.

During the middle and later parts of the eighteenth century, enlightened thinkers and publicists stressed the importance of spreading new scientific ideas through popular publications. The French philosophes believed one of their most important tasks was to popularize the ideas of Newtonian science on the continent. The chief catalyst for this movement was the French journalist Denis Diderot, and his new medium for change was the Encyclopedia he had been editing since 1747. The popularizing writers scorned superstition and most of all proclaimed Newtonian methods and physics. Articles on industry, science, and new devices also filled the pages of the encyclopedia’s several volumes.7 The Russians would have their own enlightened publicists, like Nikolai Novikov, who fashioned themselves after their European counterparts, the encyclopedists. Novikov and other Russians would use their newly minted private presses in the late eighteenth century to popularize scientific concepts throughout the empire.

During the nineteenth century printing technology advanced dramatically, and new facilities encouraged new publishers and scientists to expand publications in the natural sciences for a broader reading public. In Victorian En-

gland this technological revolution enhanced attempts to educate the working classes in both theoretical and applied science and technology.8 As the nineteenth century progressed, educators, publishers, and liberal intellectuals joined scientists to spread new ideas. In Great Britain mechanics’ institutes9 were designed to provide a largely working-class audience with scientific and technical knowledge through lectures and short courses. These institutes were supported by working-class organizations and liberal politicians and educators in Britain. Henry Brougham, the Whig parliamentarian, promoted these institutes and the movement to popularize science in general among the working classes.10 In Russia as in Europe, specialists in newly founded scientific societies, and liberal educators like Nicholas Rubakin, paid particularly close attention in the late nineteenth and early twentieth centuries to the needs of working-class citizens, determined to expand their knowledge of science.

As an increasing number of educators and publishers became involved in the European science popularization movement, more thought was given to how popular scientific texts and articles were actually created and to the kinds of language and symbols that could appropriately be used.11 This forced all popularizers, including scientists, to consider how ideas would be received by ordinary readers and how to react to the demands of the market.12 As the nineteenth century came to a close in Europe, popular-scientific literature became more market generated. Publishers of popular-scientific journals packaged publications with concise and appealing articles and themes. Journals sought out advertisers to supplement revenue from subscriptions and newsstand sales. European editors anticipated not only the most appealing trends but also the competing disciplines in modern science at the dawn of the twentieth century.13

In Russia popular literature in the natural sciences first appeared later than it had in Europe; however, it followed relatively the same institutional and editorial trajectory. The first Russian publications, printed in the late seventeenth century, outlined the study of the European parts of the country and also the early expeditions to Siberia. Public information on the Siberian expeditions of I. Rebrov, S. Dezhnev and E. Khabarov were made accessible in works such as Kratkoe sibirskie letopisi (short Siberian annals) and Chertezhnaya kniga Sibiri (book of maps of Siberia). One of the first popular-scientific texts, published in Moscow in 1710, was a collection of materials and essays on world geography. It included basic information on the world’s continents, as well as statistical information on thirty-three Russian towns. It was also the first book in Russian to give a popular explanation of the systematic view of the scholar Nicholas Copernicus.14
In 1740 the Imperial Academy of Sciences in St. Petersburg published the Russian translation of Bernard Fontenel's *Conversations on the Multitude of Worlds*. Fontenel, secretary of the French Academy of Sciences, said that *Conversations* would, he hoped, spark the curiosity of ordinary people to know how the Earth was formed and whether there were other worlds similar to ours. At this time the Russian Academy of Sciences had concentrated in its hands all publishing activities in the sciences. The spread of natural-scientific knowledge by the academy was also transmitted through textual means, such as popular calendars having a wider distribution than popular books. Calendars were printed with scientific popular articles containing information on world geography, exploration, and astronomical themes. Demand for these calendars grew in the middle of the century, and by 1750 the Academy of Science's press had printed 10,020 copies of various calendars.

The Imperial Academy of Sciences published a wide range of popular scientific media. In 1726 the journal *Sankt-Peterburgskie vedomosti* (St. Petersburg gazette) was handed over to the Academy. To explain some of the scientific articles more clearly, a supplement was published along with the gazette. By the 1730s, the basic content of the supplement, entitled *Primechanie* (commentary) and edited by F. F. Muller, consisted of popular-scientific articles on astronomy, geology, and other themes. As one of the first popular scientific publications in Russia, this monthly periodical was geared more toward the general public than the Academy's *Sankt-Peterburgskie vedomosti*.

The supplement appeared simultaneously in Russian and German. The journal's editors were careful not to focus on scholastic sciences, focusing more on farming, hygiene, anatomy, geography, and mathematics. It was also one of the first periodicals to spread popular-geographical information on recent expeditions to Siberia and the Far East, and it contained archaeological and anthropological articles on Siberian tribes. The scientific level of the journal, however, was still geared more to the specialist than to the basic reader. Therefore, Muller and M. Lomonosov met with the Academy and came out with another periodical that was set aside for the "less-prepared" reader: *Ezhemnesiachnym sochinenia* (monthly works).

During the eighteenth century, much of the history of the popularization of science in Russia was tied to the efforts of the Academy of Sciences to spread scientific views of nature through mass journalistic means. In the first half of the eighteenth century, religious publications were still the dominant category in Russia. Between 1725 and 1755 religious books made up 41 percent of all titles published, while science and technology constituted only 5 percent of all titles. But this does not reflect the enormous scientific publishing effort carried out by the academy nor how prominent a role science and technology played in that campaign. By the middle of the eighteenth century the Academy of Sciences had become the most important secular publishing house in Russia, and it was the only outlet for the publication of tracts not containing religious or official state topics. Between 1727 and 1755 the Academy of Sciences Press printed over 75 percent of all books coming from secular publishing houses.

The Academy's monopoly on science publishing changed with the founding of Moscow University in 1755. Between 1756 and 1800 the publishing house of the university produced twenty-seven hundred books of a scientific character, not only for scholars and students but also for a wider circle of readers. N. I. Novikov promoted science popularization through Moscow University's press, in the 1780s printing close to a thousand books. In 1788 Novikov published the first entry of *Magazin natural'noi istori, fiziki i khimii* (magazine of natural history, physics, and chemistry). This work was encyclopedic in form and written to serve the interests of many generations seeking to understand contemporary scientific problems like the formation of the universe. Novikov became the first enlightened publisher in Russia to popularize scientific tracts for a broad audience in the tradition of the European editors like Diderot.

Novikov was involved in translating and publishing contemporary European popular-scientific material for the small, yet growing, Russian reading public in the late eighteenth century. He helped translate into Russian the well-known "Natural History" of Georges-Louis, comte de Buffon. Buffon's multivolume "Natural History" outlined new causal theories for the formation of the world. In several volumes he argued that evolution and change of species were produced by factors such as climate and food. Novikov believed that Buffon had a unique gift for making material intelligible for the widest audience without losing the strength of his argument.

In 1783 a state decree on publishing authorized the opening of private publishing houses without the sanction of the Russian Senate. This would temporarily help to continue and foster the growth of popular-scientific material published in Russia. However, the tsarist state revoked this law on private publishing in 1796 in the aftermath of the revolutionary developments in Western Europe. Under Paul I the production of books was sharply curtailed to 120 per year, compared to the average of 350–400 per year during the 1780s. Up until 1801 it was practically impossible to import foreign books, with the exception of sheet music, into Russia.

In the first decades of the nineteenth century, journalistic activity in Russia rose sharply. From 1801 to 1811, eighty-four new periodicals were started in the Russian capital cities—sixty journals, nine newspapers, and fifteen *sborniki* (collections). Probably, the most widely distributed form of popular-
science literature during the first quarter of the nineteenth century was the *puteshesstvo* (journey). Explorers at this time published travel notes of a sentimental nature and books of adventure tales, going beyond the academic reports of scholarly expeditions. Furthermore, some of these explorers took part in round-the-world expeditions, and their reports were published for popular consumption.\(^{40}\)

In the second quarter of the nineteenth century, many accessible popular-scientific works, articles, and lectures became more directed toward adult and extra-curricular education. Journals and books were used by readers, from varied social backgrounds, interested in gaining scientific knowledge outside of formal educational establishments. In Europe at this time most learning for underprivileged adults, at least, took place outside of formal educational institutions. Popular science and other forms of nonfiction benefited from the great reading revolution in Europe in the nineteenth century. Alfred Kelley has argued that in Germany, for instance, small home libraries for the middle class were by the late 1800s rarely without a volume or two of popular science, and the workingman was already using popular science as the main tool of his self-education.\(^{51}\)

This reading revolution developed more gradually in Russia and extended broadly to the middle and lower classes only later in the nineteenth century, in comparison to Western Europe. However, even under the constrained political and educational environment under Nicholas I (1825–55), scientific publications for the popular reader expanded greatly. Nicholas Riasanovsky has revised our notion of this period by contending that this was indeed an era when publishers and journalists expanded reading material for the public and independently developed public opinion on issues outside the state’s purview. The periodical press developed in the reign of Nicholas I, reflecting the expansion of the educated public, while a journalistic explosion occurred between 1838 and 1855.\(^{50}\) Popularizers thus consistently published popular-scientific tracts through progressive and conservative reigns in the tsarist era.

In Russia, popularizers like N. Pisarevskii wrote works that were of a general character in order to target the demand for scientific self-education books. Pisarevskii’s 1852 *Otech’epsopiatataa fiziika* (physics comprehensible to all) was the first popular-scientific work on physics published in Russia. Pisarevskii believed that science could be interesting to all readers from varied social backgrounds, not just academic scientists or professors.\(^{53}\) In response to the growing demand for popular educational works, publishers beginning in the mid-1840s produced scientific encyclopedias containing basic information on the major natural scientific disciplines. In the late 1840s the first edition of a broad science encyclopedia for the beginning reader was published in Russia—*Prioda s ee taitsstvi i bogatstvami* (nature with its secrets and riches). The first entry on astronomy explained the form and development of the Earth and the stars.\(^{54}\)

During the second quarter of the nineteenth century, one of the more successful publications used for the purposes of self-education was N. Polevoi’s *Zhiropisne obozrenie* (pictorial survey). The survey was an illustrated journal for self-education with the goal of spreading useful information among readers in central and provincial arenas.\(^{35}\) The journal had seven departments, including Geography and history, Natural Sciences, and Science, Art, and Knowledge. The publication was one of the early popular-scientific journals with such a broad range of topics covered within its pages. A large majority of the articles and drawings were taken from the British *Penny Magazine* that was published in London—with a circulation of over two hundred thousand copies—by the Society for the Spread of Widely Useful Knowledge. Some of the material for the Russian journal was also taken from the French *Magazine Pitoresque*. However, articles were not simply translated from these foreign magazines, but adjusted for the Russian reader.\(^{26}\)

As early templates, European self-education journals and programs helped catalyze Russian editors and scientists to publish indigenous works for the Russian market, sparking a trend roughly between 1830 and 1855 to publish popular-scientific journals with a particular didactic or educational focus. A perfect example of these new publications was *Biblioteka dlia chentseva* (library for reading). This journal was founded in 1834 by O. I. Senkovskii, and its goal was to serve a young, semieducated clientele. The seven-branch program of the journal included sections on science as well as on industry and agriculture. Many of the articles in the natural sciences were written by science professors.\(^{50}\) Both *Biblioteka dlia chentseva* and *Zhiropisne obozrenie* reflected the early connections between the movement to produce self-educational material for the Russian reader, on the one hand, and, on the other, the spread and popularization of the natural sciences and technology in Russia.\(^{50}\)

Popular-scientific journals were also published by organizations and scientific societies that had recently been formed. One of those early societies was the St. Petersburg–based Vo’noe obschestvo liubitelei’ slovesnosti, nauk i khudozhestva (voluntary society of the lovers of philology, the sciences, and arts), which also established chapters in Khar’kov and Vlnius (1804) and in Kazan’ (1819). This society was associated with the secret organization of the first Russian revolutionaries (Decembrists), entitled Soiuiz blagodnestviia (union of prosperity). The union, reorganized as the Soiuiz spaseniiia (union of salvation) in 1818, was involved in the spreading of knowledge about science and the arts.\(^{59}\) The Decembrists also published an almanac that propagated scientific and philosophical ideas in Petersburg—*Polarnaiia zveza* (polar star).\(^{50}\)
nineteenth-century European popular-science journals that also emphasized the practical application of science and technology for the lay reader. Russian professors used these new popular journals and societies as media to popularize scientific and technical knowledge. At the turn of the twentieth century popular science information would become more oriented toward the consumer market. In the second half of the nineteenth century, however, Russian popularizers still had an enlightened mission, as they had during the earlier periods of the eighteenth century. More than any other organizations, scientific societies utilized popularization to broaden public culture and to urge voluntary association with that effort. In Russia, these societies and their publications had a dual mission: to establish professional associations for scientific scholars and to bring science to the people.

Two other science societies, established at this time under the auspices of Moscow University, were the Obrshchestvo ispytatelei prirody (society of the investigators of nature, in 1804), and the Obrshchestvo meditsinskikh i fizcheskich nauk (society of medical and physical sciences, in 1805). Professors of Moscow University who were members of these societies took part in the publication of journals such as the Zhurnal poleznykh izobretenii v iskusstvakh, khudozhestvakh i remeslakh i noveisikh otkrytiy v estestvennykh naukakh (journal of useful inventions in craftsmanship, the arts, trades, and new discoveries in the natural sciences, 1806–8). The articles in the journal were meant to introduce new inventions to manufacturers and to give the reader a survey of new technological discoveries and trends in the natural sciences.41

These Russian journals were very similar to the early eighteenth- and
Chapter 2

SCIENTIFIC SOCIETIES AND THE PUBLIC SPHERE IN LATE IMPERIAL RUSSIA

In tsarist Russia, voluntary societies encouraged citizens from a variety of social backgrounds to participate and become more engaged in civic activity. The scientific society played a significant role in the grand, ambitious movement to popularize scientific ideas. They served as nexus points for various social groups and were loci for tsarist Russia’s developing public sphere. Some of the first scientific societies in Russia developed in Moscow in the early nineteenth century. One of the oldest was the Society of the Investigators of Nature (Obshchestvo Ispytatelei Prirody), formed at Moscow University in 1804. Scientific societies began to multiply throughout St. Petersburg and the provinces as the nineteenth century progressed. Besides providing an informal atmosphere for scholars to congregate, they were involved in organizing popular scientific excursions, public lectures, and the establishment of scientific exhibits at museums. These societies served as conduits for the movement of scientific ideas between the intelligentsia and other social groups and were an integral factor in the adult education movement (vnestkol’noe obrazovanie). As voluntary associations scientific societies gave intellectuals, activists, and popularizers an arena in which to sponsor public education. T. I. Vzdorov suggests that public meetings of various voluntary societies provided a common ground for exchange among members of various prerevolutionary estates (sosloviia). These societies were conveyors of Russian obshchestvennost’, a sense of public duty and civic spirit.

Geoffrey Eley and David Blackbourn argue that in nineteenth century Germany an increasingly dense network of voluntary associations provided a conduit for the middle classes to set the tone in the cultural sphere of civil society. Samuel Kassow believes that if we look beyond political development toward more complex social phenomena, we can also see the development of a new public culture in late Imperial Russia. Like Eley and Blackbourn, he lists the rise of voluntary and professional associations as one just one of those signs. This recent comparative European historiography points to the development of a public sphere in Russia in the Habermasian, communicative sense. Jürgen Habermas articulates this public sphere as a place mediating between state and society in which European public opinion formed and developed. Scientific societies and science educators helped to develop this space in pre-1917 Russia for an articulation of public discourse.

According to Habermas, as the commercial market expanded so did the rapidly expanding reading public and cultural realm. Periodicals replaced private correspondences as the important medium of discourse, and museums institutionalized public and lay opinions on art and science. In Russia, as in Europe, periodicals, societies, and museums helped expand the distribution of scientific information in the public realm. As the eighteenth century continued and the Enlightenment developed, the public sphere, according to Habermas, became an arena for educational change where one could publicize new ideas in the realms of art and science: “[A] public reflected critically in public on what they had read, thus contributing to the process of enlightenment which they together promoted . . . [T]he first public library was founded; book clubs, reading circles, and subscription libraries shot up.”

Habermas’ sociohistorical perspective is too limited, however, to describe fully the development of the public sphere in particular geopolitical contexts. He isolates the bourgeoisie as the only class or group with the ability to transform the public sphere. His analysis, therefore, leaves little room for understanding how other classes or social groups came to take part in that public realm. Historians of science in Britain, particularly those who study European popular culture, have attempted to define the public sphere in a broader sense, incorporating the participation of a variety of social groups. Stephen and Eileen Yeo have consistently argued in their work that working-class cultural movements in nineteenth-century England competed with middle-class philanthropic societies for public meeting places. In a study on working-class culture and constraint, Eileen Yeo shows that the halls of science, for instance, competed with the mechanics’ institutes. Between 1839 and 1841 socialists built halls of science in towns from Manchester to London and Birmingham. These “halls,” much like the Chartist institutes and people’s halls, were intended as independent working-class controlled territory. They were places for workers to congregate, listen to lectures, and socialize.

Geoffrey Eley and Eileen Yeo’s analysis seems to encompass a broader definition of the developing public realm as a place where various social groups accommodate another as citizens. In nineteenth- and early twentieth-century Europe, including Russia, this movement to expand the public sphere was certainly spearheaded, as Habermas points out, by the developing bourgeoisie. Eley and Blackbourn see the development of professional and voluntary organizations as defining elements of the new public culture and the middle class as leading participants in this movement. Yet other social groups, as Vzdorov reminds us, took an active part in shaping this public sphere within the context of various organizations. In tsarist Russia the
scientific societies and their public meetings were arenas where middle-class scientific specialists and educators could interact vibrantly with laymen from a variety of classes above and below them on the social ladder. Furthermore, in Russia, this public arena continued to foster scientific exchange across the 1917 revolutionary divide, mixing scientists, bureaucrats, educated laymen, and commoners alike. We can look to these scientific organizations and their gathering places as potent sites of public, civic activity well into the early Stalinist era, when they were finally extinguished.

The Russian naturalist societies had a particularly public vision, creating an atmosphere in which amateurs could learn more about science and participate in public events, lectures, and excursions. Some, like the St. Petersburg Society of Natural Scientists, even accepted membership from all interested citizens regardless of their academic qualifications. In prerevolutionary Russia the first learned scientific associations were undifferentiated naturalist societies—that is, having no specialist divisions—like the Moscow Society of Naturalists. This scientific club provided a place where scholars could discuss their work in an informal atmosphere. The Moscow society also sponsored advanced scientific work by awarding funds to scientists engaged in research in a number of fields. More differentiated, national learned societies—such as the Russian Geographical, Mineralogical, and Astronomical Societies—began to sponsor scientific research and publication along with popular scientific enlightenment. These groups were interested in the utilitarian application of science to the needs of society.

In the late nineteenth century in Russia, a new type of naturalist society emerged that became the focal point for scientific popularization. These newer naturalist societies sponsored a broad range of scientific work—from observing natural phenomena and collecting museum specimens to modern scientific research. One of the best examples of this type of naturalist society was the St. Petersburg Society of Natural Scientists. The society was an advanced, differentiated learned society divided into specialized departments, each with its own membership and interests. It helped organize natural history excursions led by various experts in geology, physical geography, and botany; and the organization conducted a campaign among *zenstva*, or council, authorities to establish science exhibits in local museums. Petersburg naturalists participated in the various national congresses of Russian naturalists and physicians and opened the society’s doors to all interested citizens regardless of their scientific or academic qualifications. Furthermore, private citizens interested in science were included on the research committees of the society. According to Alexander Vucinich, the acceptance of nonacademics as members in the naturalist societies helped create an “organic unity of scientific inquiry and civic spirit.” Although some learned societies received government assistance, most of them, particularly the naturalist societies, depended on private donations.

By the end of the nineteenth century, nationally recognized naturalist societies combined collective research projects with the popularization of science as a new system of knowledge. The reorganized St. Petersburg Society of Natural Scientists, though founded in the 1860s, was officially sanctioned as a scientific establishment by the tsarist Ministry of Education on May 24, 1901. The new 1901 constitution of the society stated that the organization would participate in the scientific investigation of nature and serve as a gathering place for natural scientists. But the society’s new statutes underscored its popularization goals, as indicated in the second paragraph of its constitution, which states a commitment to spread and popularize natural-historical knowledge in Russia. The constitution declared that the organization would promote public lectures and organize excursions for members and the general public to investigate and observe nature.

Naturalists’ societies involved in the popularization of science also spread throughout the provincial centers of Russia. Of all provincial naturalist societies, none had as long a tradition of popularizing and spreading natural-scientific ideas in Russia as the Iaroslavl’ Natural-History Society. Founded in Iaroslavl’ in 1864, with somewhat later branches formed in Rybinsk and Rostov, the Iaroslavl’ society’s goals were the study of nature in the Iaroslavl’ region and also the spread of natural-historical knowledge among the populace. The society was founded on the initiative of A. S. Petrovskii, a botany professor who taught at the Demidovskii Lycee in Iaroslavl’. The 1864 charter statutes urged members to read public lectures, take part in public exhibitions, and popularize agricultural, economic, and biological knowledge by relying on the society’s museum. This local society served as a catalyst and example for a small, yet growing, number of provincial societies to open their doors to the public, not just in the Northern Volga region but also in parts of the Urals and southern Russia.

The Iaroslavl’ Natural-History Society provides an excellent case study for understanding the rise and fall of scientific societies as public institutions. It had strong links to the local entrepreneurial community, which provided the society with financial support. The board of the society was made up of well-trained chemists and biologists educated at Russia’s central universities. It conducted research on the local ecology and on the biology of the Northern Volga area, thus providing its provincial constituency with scientific analysis of the region. Furthermore, it would cultivate its civic, enlightened mission in the 1920s to garner state subsidies before being liquidated during the Stalinist cultural revolution.
As the oldest and most active provincial scientific society in Russia, the Iaroslavl' society provides a rubric for understanding the changes in popular science in the provinces from the era of the Great Reforms through Stalin's cultural revolution. Founded in 1010 A.D., Iaroslavl' was one of the oldest towns of Kievan Rus'. It continued to have a vibrant economy during the imperial period, fostering voluntary civic organizations and the growth of a wealthy merchant class that donated much money to the building of beautiful Orthodox churches. Located along the northern Volga River, the industries and craft houses of Iaroslavl' fostered a developing working class that also showed interest in scientific themes. Furthermore, the diverse river ecology provided an ideal environment in which ecologists and field biologists could study nature.

The Iaroslavl' Natural-History Society was first housed in the local Demidovskii Lycee and received an official approval from the Ministry of Education in late 1864. Unlike the central scientific societies, provincial organizations had to find schools with which to associate themselves where universities had not yet developed.\textsuperscript{29} A. Sokolov, director of the Lycee, helped to give the society an institutional home and was quite supportive of the founder of the society, A. S. Petrovskii (a botany professor at the school). Sokolov helped Petrovskii develop the formation of the society’s natural-history museum in 1865.\textsuperscript{31} Iaroslavl’ did not have a university until 1918, and the naturalists therefore turned to the secondary lycees for support.\textsuperscript{32}

In the prerevolutionary era, the Iaroslavl' society depended largely on its members’ dues, sales of journals, receipts from excursions, and visitors to its museum. Those funds, as well as donations from wealthy merchants and entrepreneurs, made up the bulk of its budget before late 1918. It also sought funding from the Imperial Ministry of Education, provincial and district zemstvos, and the city government (duma).\textsuperscript{33} Wealthy merchants and entrepreneurs, especially those from prominent local families, provided links between the zemstvos and the organizational committees of provincial societies like the naturalists in Iaroslavl'. For instance, I. P. Sabaneev (a zoologist) and his brothers, who were from a prominent Iaroslavl' family, were active participants in the Iaroslavl' scientific society and served as important leaders who helped to secure patrons from the local entrepreneurial community.\textsuperscript{34}

In the first fifty-three years of its existence, Russia’s first provincial naturalist society conducted public scientific lectures and short courses, guided excursions, and professionally guided tours of its museum. Educated, middle-class laymen and students made up the bulk of the society’s early participants in courses and excursions. The Iaroslavl' society founded the first natural-history museum in provincial Russia, with smaller satellite museums in towns on the northern Volga, like Kostroma.\textsuperscript{25} The museum contained specimens of local flora and fauna collected from Iaroslavl' province, fossils of preexisting animals from the area, and a general scientific collection and public library. It charged ten kopecks per visitor and registered between twelve thousand and sixteen thousand visitors per year.\textsuperscript{26}

Throughout prerevolutionary Russia, museums (and itinerant exhibitions) were potent vehicles in the popularization of ideas about science and technological progress. The Museum of Science and Industry in Moscow, organized by various groups including the Moscow Society of Natural Science and Anthropology, began its tours in 1878. The Moscow museum sponsored public lectures and exhibits, as well as courses in the natural sciences and medicine.\textsuperscript{37} In the capital cities, as in the provinces, special scientific exhibitions served a function similar to that of the permanent exhibit museum. These exhibitions included the Moscow Exposition of Science and Industry in 1872 and the Moscow Electricity Exhibit in 1892.\textsuperscript{38}

However, as the first regional group of its kind, the Iaroslavl' Natural-History Society served as a provincial model for the construction of local museums in other places, like Ekaterinburg. In the view of the members of these provincial scientific societies, their natural-history museums were the ideal educational centers for the spread of new scientific ideas and knowledge, and they also understood that broadly spreading scientific knowledge among laymen in Russia would require a huge effort on the part of regional institutions with close ties to the provincial public outside the more cosmopolitan cities, that is, their societal museums. Local natural history museums in Russia emulated Western European and American models, and their work actually displayed much knowledge of foreign institutions. The ideal of the provincial museum as the engine of lay science education was elaborated by S. G. Lepnev, a member of the Iaroslavl' Natural-History Society, at the outset of her 1914 speech entitled “On the Expansion of the Museum of the Iaroslavl’ Natural-History Society with the Goals of the Popularization of Scientific Knowledge,” given at the Social-Industrial Congress in Iaroslavl’: “It is absolutely essential that all Russians—every person who is involved in our economic-industrial complex—learn about new scientific discoveries. A majority of the Russian people must understand basic scientific concepts. One of the most important goals of the Iaroslavl’ Society of Natural History is to popularize natural science in Russia.”\textsuperscript{39}

In her speech Lepnev stated that the museum needed an overhaul in order to serve as a popular-exhibition site. She argued that in America and Western Europe most natural-history museums were both attractive and instructive. In her view the guiding principle of the National Museum in Washington, D.C., for example, was that “one should not exhibit a single specimen
object that does not represent a special educational goal, does not interest a majority of the public, and does not serve an important general, educational objective." The director of the Iaroslavl' museum agreed that the complex should be a place of cultural enlightenment, accessible and useful to all its visitors. With this goal in mind the director had organized a section of comparative anatomy, which gave visitors to the museum a chance to view skeletons of various local animal species. The director also developed a "living nature" section, which contained an aquarium featuring a variety of fish species and a terrarium including snakes and birds from various parts of Russia.30

Lepneva believed that the museum had to create an atmosphere where visitors could both observe the permanent collection and become practically familiar with the achievements of science. She helped create a visitors' laboratory in the museum, where patrons could use simple apparatuses under the guidance of a professional scientist.31 By the eve of the first World War, and as a result of the efforts of local naturalists, the Iaroslavl' Natural-History Museum had become one of the most important provincial museums of any type in Russia. By 1914 it boasted not only a specific department involved in public education but also sections specializing in comparative anatomy, geology, botany, entomology, and ornithology.32

In addition to the work of the naturalists, other amateur scientific societies developed in Russia in the nineteenth century and were also potent forces for the spread of science. S. M. Selivanov, a popularizer working with organizations of amateur scientists, believed that amateur scientific investigation had been one of the essential components of the empirical research process. By the turn of the century, according to Selivanov, the participation of amateurs in Russian science through the formation of voluntary amateur scientific societies had taken on the character of a mass-movement.33

One of the most important amateur scientific groups in Moscow involved in science popularization was the Society of the Amateurs of the Natural Sciences, Anthropology, and Ethnography. It was founded in Moscow on October 15, 1863, with the goal of spreading popular enlightenment and criticizing the more scholastic, insular, and dogmatic aspects of scientific development. The society was one of many amateur groups having a thoroughly inclusive orientation and supporting public participation in scientific observation and education. The society helped found the famous Moscow Polytechnic Museum, which lasted well into the late twentieth century. That museum became a central place for large public scientific lectures on a range of topics both before and after the First World War. Some of Russia's most famous scientists, such as K. Timiriazev and V. Vernadsky, gave frequent popular lectures at the Polytechnic to huge audiences. Timiriazev, for instance, popularized Darwinism and evolutionary ideas in several of his public lectures at the Polytechnic Museum at the turn of the century.

The society helped promote the formation of two university museums in Moscow—anthropological and geographical—and helped in procuring exhibition materials for such university museums as the Moscow Zoological Museum.34 The society organized several important public scientific exhibitions in Moscow in the late nineteenth century. These exhibitions included the Ethnography Exhibition of 1867, the Moscow Polytechnic Exhibition of 1872, the Moscow Anthropological Exhibition of 1879, and the Moscow Geographical Exhibit of 1892. Through its public lectures, the society attempted to bring science closer to the common man. It also helped connect professional organizations with scientific intellectuals to create a symbiotic relationship between science and industry.35

Amateur scientific societies throughout the provincial centers of Russia were also involved in popular-scientific education in the late imperial period. The Ural Society of the Amateurs of Natural Science was founded in Ekaterinburg in 1871. This society organized a public natural-history museum with exhibits in archeology, botany, geology, zoology, and fossils of the Urals. It created a meteorological station that helped monitor climatic changes in the Urals and helped organize a number of scholarly expeditions in that region, in addition to expeditions for manufacturers, industrialists, and trappers to understand better the geography and geological conditions of the Urals.36 The organization united scientists with those people active in the local economy and served as a facilitator between the two groups. The Ural Society became a trendsetter in the eastern provincial areas of Russia, and other amateur groups began to emulate its organizational structure and popularizing methods. In 1887 the Ural Society organized the Urals West-Siberian Scientific-Industrial Exhibit. It conducted public courses, lectures, and conferences on themes such as fishing, forestry, and wildlife of the Urals.37 In many respects the Ural Society was a perfect example of how scientific societies functioned as an essential component of the kraevedenie (regional study of lore, history, and economy) movement.

Amateur scientific societies were involved in a myriad of scientific arenas, and some in the capital cities were particularly involved in popularizing astronomy. Astronomy became very popular in Russia, particularly because amateurs could easily engage in this discipline by spotting shooting stars and identifying planets using telescopes at observatories. The Russian Society of Amateur Investigators of the Natural World was one of the most active in this regard. This Russian amateur astronomy society, founded in St. Petersburg, published a popular journal entitled Mirovedenie (study of the natural world),
which concentrated on astronomy and physical-mathematical knowledge. Professional scientists also worked for the society and wrote articles for its journal. This enabled amateurs and trained scientists to integrate their work, and laymen could be exposed to more sophisticated methods and theories in astronomy.

Between 1909, the year of its foundation, and 1916 the society financed its activities primarily through membership dues, revenues from the sales of its publication Mirovovedienie, and other sources. In 1909 the society sponsored several popular-scientific lectures for the public in St. Petersburg, with a special emphasis on popular astronomical themes. The first meetings of the society were conducted on the premises of the St. Petersburg Conservatory. The society formed a public library, which had to be kept in the private apartments of members. In 1909 the director of the Tenishev School in St. Petersburg offered the society the use of its relatively large telescope and other refractory instruments. With the help of members, the society was able to procure a 175-mm refractor, the second largest in St. Petersburg at the time, and some other instruments. The observatory served both the scientific work of the society and the educational needs of the school. Once or twice a week the observatory was open to the public free of charge. Members of the society helped visitors view stars, planets, and other objects, while offering explanations for various stellar configurations. The refractor was transferred to a building in the Petrograd Biological Laboratory after 1914, and the society formed the same symbiotic relationship with the laboratory as it had with the school. As in the case of the Iaroslavl' Natural-History Society, these amateur associations formed symbiotic bonds with local schools and institutions to get off the ground initially. Furthermore, they served as conduits between the scholarly community and the local public.

The Russian Society of Amateur Investigators of the Natural World received public support, and its membership grew at a remarkably fast pace. It sponsored the publication of popular-scientific works for the lay reader. Some of the new publications the society printed included pamphlets for amateur astronomers, such as Professor K. D. Pokrovskii's Instructions on the Observation of Shooting Stars (1913) and A. V. Bochek's Changes on the Lunar Surface (1915). Pokrovskii's popular work included a guide to the main meteor movements and showers and an explanation of how to follow the path of falling meteors. Astronomy, cosmology, and even the possibilities of spaceflight were among several themes capturing the popular imagination in Russia both before and after the First World War and the Bolshevik Revolution. Readers anticipated the publications of articles, books, and pamphlets written by experts on stellar configurations and on the general analysis of the solar system and its planets.

Whether spreading ideas on flora, fauna, or the universe's expanse, scientific societies substantiated themselves in late Imperial Russia as public institutions, relying heavily on public and private donations. Although registered with the Ministry of Education, they generally received limited funding from the ministry. As in the developing private sector within the economies of the West, these societies in Russia lobbied for their participants' help in keeping their organizations financially afloat and also depended on revenues from journal subscriptions, public events, and membership dues. Their activities helped to expand the Russian public sphere outside the purview of the tsarist state and to create a space for the interaction of varied social groups, laymen and scientific elites alike.

In the aftermath of war, revolution, and the rise of the new Bolshevik bureaucracy, these societies would lobby the new Soviet secular state for funding. In turn the Bolsheviks would use these societies as a means to spread their cultural vision of a rational, irreligious social order. These organizations would struggle to maintain their control, separate identity, and autonomy in this dynamic process in the 1920s. These societies would expand their civic and public educational activities, fostering a continued sense of that Russian ideal of public duty and civic spirit, obshchestvennost', across the revolutionary divide into early Soviet Russia. Along with publishers, scientific societies were crucial components in the spread of science to the Russian public and in the maintenance of a limited, yet viable, "public sphere" in the new Soviet scientific realm.
Chapter 3

PATRONIZING SCIENCE

Glav nauka and Scientific Societies, 1917–27

The Bolshevik Revolution in 1917 radically transformed the administrative, institutional, and fiscal landscape in which scientific societies had to operate. After the Bolshevik Revolution, all scientific societies in Russia were funded primarily by the Soviet state and made subject to registration and auditing by Glav nauka, the Scientific Department of Narkompros (the Commissariat of Enlightenment) and the People’s Commissariat of Internal Affairs (Narkomvnutdel or NKVD). The state required that a scientific society send Glav nauka its statutes, a list of its members, and various departments, along with an estimated budget of its yearly expenses. The estimate included what funds it was requesting from Narkompros. Narkompros would then send this material to the NKVD with its registered approval of the association. The NKVD would keep detailed records on which societies were registered by the state and their yearly financial status.1

A paradoxical, yet symbiotic, relationship then developed as former independent voluntary societies became housed under Glav nauka, thus receiving their financial sustenance from the Soviet state. The new state funding allowed these societies to continue their scientific and public work, and the leaders of these organizations continued to support independent activities outside the state’s purview. Glav nauka, in fact, was a key patron of prerevolutionary scientific groups, helping them to survive the upheaval of the Bolshevik Revolution into the 1920s. On more than one occasion, Glav nauka and its head, F. N. Petrov, directly intervened to help prerevolutionary scientific groups, sometimes in the face of caustic political accusations against the older groups by rival Soviet organizations, like Vesenka (Supreme Council of the National Economy, or VSNKh). Petrov, an old Bolshevik Party member, strongly believed in supporting public scientific discussion in Soviet Russia. He had joined the Social Democratic Party in 1896, organized alongside Lenin during the revolution, and subsequently became an important member of the Soviet Council of Ministers. He was a key supporter of the role of science in shaping Soviet culture.
STATE PATRONAGE, PUBLIC SCIENCE EDUCATION, AND THE NEW BOLSHEVIK CULTURAL VISION

Narkompros in general, as well as Petrov’s Glav nauka, had certain agendas in mind. They were interested in funding and registering societies that especially promoted popular enlightenment programs. Therefore, some societies tried to promote their popularizing activities and mass-enlightenment work in order to gain large monetary subsidies from Narkompros. Many of these societies had been involved in science popularization for some time before the revolution. In the post-October period, some tried to show that the new state needed the work of these organizations in raising the scientific level of the common Soviet citizen.

An example of this interaction is the application to Narkompros from the Moscow based Society of the Amateurs of Natural Sciences, Anthropology, and Ethnography. In a 1918/1919 budget estimate, the society requested 50,000 rubles from Narkompros for its science popularizing activities, which included public courses, lectures, educational excursions, and popular-scientific publications. The rhetoric employed in that budget request shows how these societies cleverly used the catch-phrases that Narkompros officials themselves had coined to promote Soviet cultural enlightenment:

The popularization of scientific knowledge has been conducted by the society since its foundation. The society, along with the Polytechnic Museum in Moscow, since 1872, has attempted to interest people of all ages in the natural sciences. The society is reworking various projects and programs of popularization in the area of excursions, lectures, and popular-scientific publications. With 50,000 rubles a year, we can organize many useful popularization activities, which today is an important enlightenment task for Soviet power.

The societies rhetorically worked the system of state patronage and succeeded financially at the new game. Their budget requests made prominent use of such phrasings as, “We can accomplish important enlightenment tasks,” which echoed the language of Glav nauka’s official pronouncements.

Narkompros’s Glav nauka department was quite generous in funding these scientific societies, and the sums transferred were remarkable, given the financial and administrative turmoil during the Russian Civil War. The estimated budget of the Petersburg-based Russian Society of Amateur Investigators of the Natural World for 1919 was 115,500 rubles. The society received 58,000 from Narkompros, after the total budget was recalculated by Glav nauka officials at 90,891 rubles. In 1919, therefore, the society received 63.8 percent of its total budget from the Commissariat of Enlightenment’s Scientific Department. The rest of the budget was covered by membership dues, journal subscriptions, and charges for public activities.

On occasion societies asked for supplementary funding, outside of the yearly budget, for new projects or specific public lectures and exhibits. Exploiting the popularity of astronomy among the Russian people, the Natural World Society lobbied for funds in 1923 to build an enlarged telescope for an observatory in Odessa. The society requested 3,500 rubles from Narkompros, hoping to conduct public viewings of the astronomical opposition of the planet Mars in August of 1924. Scientific groups like the Natural World Society would add to their budgets and justify their requests by highlighting for Narkompros officials the public-enlightenment value of these supplementary projects.

After the Bolshevik Revolution, other established Petrograd scientific societies continued their work of popularizing science among broad segments of the populace. In May of 1918 the secretary of the Russian Technical Society (RTS) requested government subsidies from Narkompros to keep the society running. He too, realizing the importance of rhetorical strategies, argued that the RTS had been involved in cultural enlightenment for the preceding fifty years and had achieved much success.

Much of the activity of the organization involved disseminating information and organizing informal discussion sessions. Technical education for the public was an important aspect of the society’s original agenda. The society fostered a number of schools for workers at various industrial enterprises. Under the leadership of E. Andreev, a number of specialized schools offered the public technical training in a variety of areas. These included courses on printing technology, basic concepts in electricity, and various technical skills.

Glav nauka was particularly interested in societies that could offer technical education to workers outside of traditional schools, and the RTS was adept at showing the new state how they could provide those services.

The secretary of the RTS complained that during the war the society was ruined by governmental war taxes and other fees. He further argued that the society needed credit in the amount of approximately 100,000 rubles. In July of 1918, Narkompros responded to this request by ordering its finance commission to send 20,000 rubles to the technical society for the second half of 1918. The presidium of the society contained several key Petrograd scientific figures, including mineralogist and academician A. E. Fersman and chemistry professor M. A. Blokh. In 1919 the society was involved in organizing adult-education courses on technological topics and publishing popular technical works. The RTS was concerned with the application of new technology to agriculture, noting in its 1919 report that it needed to popularize methods of
melioration or land improvement (either by drainage or by proper methods of irrigation). Lastly, the society believed it was necessary to spread useful knowledge concerning municipal planning and proper building construction by publishing public norms that were accessible to all. The RTS fulfilled several utilitarian tasks for Glav nauka outside the purview of typical educational institutions and in other ways was a useful organization to Narkompros officials, thus solidifying the society’s position with the state’s principal agency of support.

With the advent of the New Economic Policy (NEP) in 1921, and the beginning of cost accounting in general, the Bolshevik state introduced across-the-board cutbacks in government spending and subsidies for voluntary organizations. Factories and organizations were instructed to keep close balance-account sheets. A mixed economy was introduced in which the state owned and operated the commanding heights, while significant portions of light industry and retail trade were privatized. Though many scientific societies were affected by the cuts in government subsidies, the state was still the principal financial supporter of those organizations. For example, the Petrograd Society of Natural Scientists continued its work after the Bolshevik Revolution. Its postrevolutionary executive committee was headed by Academician I. P. Borodin. After the transfer to the NEP, the society was deprived of subsidized train transportation for its excursions and printing subsidies, which it had enjoyed during the period of War Communism (1918–20), when most of the centralized economy was state operated. Nevertheless, with other government subsidies and funds from public lectures, excursions, and popular publications, the society was able to survive the difficult change to the NEP.

After the introduction of the NEP, the Russian Society of Amateur Investigators of the Natural World needed increased funding. In a November 1921 memorandum to all members in the society’s journal, the director of the society stated that it was necessary to increase the membership fees and asked for donations from individual members. The government subsidy, for the most part, paid for the publication of the journal and support of staff workers. Besides new scientific work, the society had increased its cultural-enlightenment effort and therefore had a larger yearly budget.

However, even under the NEP, government subsidies were responsible for the vast majority of the operating funds of the Russian Society of Amateur Investigators of the Natural World. In 1923 73 percent of the general budget of the organization was provided by Narkompros subsidies; 12 percent came from membership dues, 10 percent from sales of the journal and other popular publications, and 5 percent came from popular lectures. The figure of 73 percent government sponsorship did represent a small drop in state subsidies; and inflationary pressure also played a role in the need for new funds. The society’s director therefore argued that the membership fees had to rise for the coming fiscal year. The increase in dues caused a temporary exodus of members during 1924. Over the course of the year, memberships dropped from 849 to 639. Furthermore, the society calculated that approximately 350 members did not pay their dues in full for 1924. The society believed this would not affect the work of the organization. They stressed that only a small number of the more active members would actually leave the society. They were also confident that they would receive a majority of their operating costs from Glav nauka. The effect of the NEP, therefore, did not necessarily mean that the state would abandon voluntary scientific organizations in Russia. Furthermore, some continuity remained with the earlier period of 1917 to 1920. Conventional descriptions of the NEP era usually paint a picture of the state’s abandonment of civic organizations, as it reintroduced a modicum of private economics into Russia. But that picture might not be a good analytical framework for understanding the period, especially since established scientific organizations were able to develop close patronage ties to certain Soviet institutions. Glav nauka was the main funder for the scientific intelligentsia, and the voluntary scientific organizations benefited considerably between 1917 and 1928 because of the close working relationship they actively cultivated.

Along with the positive benefit of Soviet state subsidies came some state interference in the work of the scientific societies. Civic scientific organizations interacted with various Soviet institutions, some of which were sympathetic, some not so sympathetic. From the beginning of 1918, the Russian Society of Amateurs Studying the Natural World insisted on trying to maintain its private status even though it was registered with Glav nauka and received government subsidies. In a 1922 report the society complained to Glav nauka that its broad, science-popularizing activities were being curtailed because the society was required to take part in political-enlightenment work in Petrograd at the request of the Petrograd Guopolprosvet (Regional Political Enlightenment Organ). The society demanded that Glav nauka intervene and protect it from the local Guopolprosvet.

The Scientific-Technical Department (NTO) of Vesenkh had also been critical of Glav nauka’s support of prerevolutionary scientific societies and their popular-enlightenment work. In general this criticism reflected a growing and important power struggle between these two institutions throughout the 1920s that would lead to NTO’s displacing Glav nauka by 1928 and taking over the jurisdiction of some of the latter’s scientific research institutes. Vesenkh’s NTO believed that Glav nauka took an almost “ivory scholarly tower” approach to scientific research and popular enlightenment.
Paul Josephson has noted the growing Soviet distrust of research science during this period, that Vesenka’s officials complained that Glavnauka actually preserved prerevolutionary attitudes about the importance of theoretical science while ignoring more applied science and production. In terms of popularization, Vesenka was highly critical of Glavnauka’s support of the popular cultural activities of scientific societies and educators in the 1920s. Vesenka was more concerned with popularization that would have some immediate utilitarian gains for the Soviet state, economy, and workers and favored spreading useful technical ideas related to production and industry.

Branches of Vesenka meddled in the affairs of societies in certain key industrial areas containing valuable natural resources. Some of the scientific societies had been involved in intensively studying the region around a major provincial center. After the October 1917 revolution, Vesenka realized that such societies could provide much-needed information about the industrial, agricultural, and mineral wealth of these areas. Yet scientific societies complained persistently to Narkompros officials asking for protection.

One case where Narkompros successfully intervened on behalf of a society in the Urals against Vesenka is instructive. In March of 1920 A. V. Lunacharskii, commissar of Narkompros, received a letter from the president of the Urals Society of the Amateurs of Natural Sciences. This was one of the older, more well-established public scientific societies in eastern European Russia and was based in Ekaterinburg. The president of the society complained directly to Lunacharskii that the Urals Scientific-Technical Branch of Vesenka had practically decided to nationalize his society and incorporate its various establishments into already existing Soviet organizations. The President stressed the fifty-year commitment his society had made to a wide variety of scientific and public-enlightenment activities. A year later Lunacharskii and Narkompros successfully intervened on behalf of the Urals Society. On July 21, 1921, Narkompros officially certified the Urals Society as a scientific establishment under Glavnauka, the Scientific Department of Narkompros. Narkompros enabled the society to conduct its affairs with relative independence, certainly not under the jurisdiction of Vesenka. This infuriated Vesenka officials who believed Glavnauka was shielding bourgeois activists from working for the economic growth of the new Soviet state. This example demonstrates that scientific societies had strong patronage support at the very pinnacle of the Soviet cultural hierarchy. They were able to appeal directly to Lunacharskii, commissar of Narkompros, who became personally involved in specific disputes on a case-by-case basis. Like Petrov, Lunacharskii believed that the old scientific elite in both the capitals and provinces could help raise the cultural and technical level of the Soviet people.

The People’s Commissariat of Internal Affairs (NKVD) also persistently monitored the functioning of preexisting science societies and, on occasion, intervened to subsume them under new Soviet institutions. Since the NKVD was responsible for officially registering science societies with the Soviet state, it tried to closely oversee their budgets and affairs. Occasionally, Glavnauka had to come to the societies’ defense. For example, in a circular sent to Glavnauka in July of 1923 by the Petrograd Provincial Executive Committee, Narkompros was informed that the NKVD was reviewing the statutes of the Russian Society of the Amateur Investigators of the Natural World. The NKVD claimed that there was no need for such a society in view of the existence of many analogous societies such as the Association of Physicists and the Mathematical Society. Therefore, the NKVD proposed merging this amateur society with one of the other existing societies. Such plans for “reorganization” caused great fear among many societies, whose members worried that they might be engulfed by a new umbrella organization more suitable to Soviet political officials.

In a rebuttal to the NKVD, Petrov, the director of Glavnauka, argued that this Russian amateur naturalist society had existed since 1909, with some eleven-hundred present members and a number of provincial branches. Furthermore, he pointed out, it was subsidized by Glavnauka and performed a number of significant works and activities. According to the director, there were no other existing analogous organizations, contrary to the view expressed by the NKVD in its report. Glavnauka cleverly used the rhetorical constructs of “educational utility to the state” to defend these organizations from outside interference. Here too, Petrov, an old Bolshevik in a powerful position as director of Glavnauka, intervened directly in the affairs of critical scientific societies to save them from the clutches of other Soviet institutions. In this manner both Lunacharskii and Petrov skillfully competed with other Soviet institutions in the bureaucratic turf wars of the 1920s.

Another battle erupted in January 1923 after the NKVD sent a letter to Deputy Commissar of Enlightenment M. N. Pokrovskii requesting a decision regarding whether or not to confirm and reestablish the Society for the Spread of Natural-Historical Education. That natural-history society was founded in St. Petersburg in 1907 and headed by Professor B. E. Raikov, a prominent science pedagogue and member of the Petersburg intelligentsia. Raikov and V. A. Vagner edited the society’s journal, The Natural Sciences in School. In a September 1923 reply to the NKVD’s Administrative Branch, Ivanov (of Narkompros’s Branch of Scientific Establishment) successfully argued that the society trained natural science teachers and popularized natural-historical knowledge. He noted that along with its central organization the society had five hundred long-standing members and twenty affiliate members in other cities. He believed that the Society for the Spread of
Natural-Historical Education was unique in the Russian Republic for its ability to unite pedagogues, natural scientists, and teachers in higher institutions. In essence, Ivanov’s responses to the NKVD's complaints might make or break the continued existence of many preeminent scientific and educational institutions with a long and distinguished record of public service in Russia which predated the October Revolution of 1917.

Glavnauka received a series of complaints from various scientific societies concerning the NKVD's interference. However, it was the NKVD's responsibility to check on the registration and financial support of various organizations. Given its role as a Soviet institution, the NKVD would understandably want to reject support for certain organizations that seemed redundant or superfluous. However, the NKVD, on the one hand, was also weary of the continued, forthright independent stance of prerevolutionary, voluntary societies. Glavnauka, on the other hand, was a generous patron of scientific societies during the twenties. In many respects, especially regarding national funding, Glavnauka's patronage represented a marked improvement over the prerevolutionary period during which the tsarist Ministry of Education offered little financial support for these societies. These groups not only had a state financial patron in Glavnauka; they also had a protector against Vesenkha's NTO and the NKVD's random checks. During this “golden age” of Soviet science under the NEP, Glavnauka not only protected fundamental scientific research in Soviet Russia from encroachment by government officials, but more importantly was able to protect the broad cultural-enlightenment efforts of scholars, societies, and publishers.

PROVINCIAL SCIENTIFIC SOCIETIES, PUBLIC CULTURE, AND THE BOLSHEVIK STATE

Scientific societies in the provinces were requesting government subsidies from Glavnauka, and they, too, received generous funding because of their ability to lobby Narkompros. Even under the difficult conditions of the early years of Soviet rule, these societies were able to maintain their enlightenment activities. The Bolsheviks saw them as important cultural organizations to support and nurture financially. In turn, the scientific societies in provincial Russia continued to be important purveyors of civic culture in the post-1917 Soviet era. They brought together various social classes that might not have mixed in other arenas. They continued to sponsor a sense of shared community and vision in those regions. These scientific organizations provided Narkompros with a foothold in existing cultural circles that encompassed intellectuals in provincial settings in Russia. The young Soviet state saw the societies as key players to win over and sponsor during a time when the Bolsheviks' political position was tenuous in those areas. The Bolsheviks lacked qualified cadres in provincial settings and relied on the older, scientific intelligentsia and its networks.

By 1918 Glavnauka successfully began registering the provincial societies with Narkompros and winning the favor of Gosbiudzhet (Government Budget Organization) by releasing funds to the societies in business-like fashion on a yearly basis. In the spring of 1918 Glavnauka actively drew more and more provincial organizations into its administrative network. In May of 1918 V. T. Ter-Oganesov—at the time in charge of Glavnauka's financial and accounting department—sent out an important administrative circular affecting regional scientific societies throughout the Russian Republic. The circular stated that Glavnauka requested all regional scientific organizations and societies to send yearly budgetary accounts and organizational records for the period 1915 to mid-1918 to Narkompros officials. The circular added that these societies would then have to be officially registered with the NKVD. Ter-Oganesov mentioned that only then could Glavnauka begin to instruct Gosbiudzhet to transfer government subsidies to provincial societies (usually distributed through the local Guberniarodobraz, or Provincial People's Ministry of Enlightenment Branch).

Even throughout the difficult period of the Russian Civil War, Glavnauka persisted in its efforts to register and patronize local scientific societies. The societies, in turn, lobbyed their patron with meticulous budgetary proposals detailing their monthly activities and financial needs. As with societies in Moscow and Petrograd, symbiotic relationships developed through which Glavnauka provided stability, protection, and funding to these organizations and, in return, the societies agreed to report their accounts and activities regularly to these new state institutions. Provincial societies also lobbyed the local soviets, which had replaced all municipal dumas. After 1917 local soviets had educational departments that funded scientific societies as long as they claimed to popularize science for workers and other classes beyond the intelligentsia. Given the political turmoil and collapse of prerevolutionary local patrons, older science organizations (such as those in the Northern Volga region) saw this as a chance to gain state subsidies. They quickly registered their societies and requested large government subsidies.

Provincial scientific societies had proliferated in many geographic areas in Russia: for example, in the south (Voronezh), east (Ekaterinburg and other Ural towns), and northeast (especially those on the northern Volga like Jaroslavl', Kostroma, Rybinsk, and Rostov-Velikii). In the south of Russia in 1919, the Society of Natural Scientists at Voronezh State University requested 40,000 rubles from Narkompros for the first half of the fiscal year. The
society requested funding for the printing of its protocols, various popular-enlightenment lectures, excursions, and research projects, like the study of malaria in the region. The organization stressed to Narkompros officials the work's practical applications, particularly how the work could be a model for other scientific societies in the area. Other scientific societies in Voronezh also sent budgetary accounts to Glavnauka for funding on a yearly basis, particularly in support of the biological and medical information they could provide to both the local public and the Soviet state.

In eastern Russia, especially in the Urals, various societies served as centers for science popularization. The Urals Society of the Amateurs of Natural Sciences was inextricably involved in building public scientific exhibits and museums. Ekaterinburg was known for its high concentration of scientific societies involved in uniting scientists with professionals to promote understanding of the regional distinctions of the area and its economy. The industrial nature of Ekaterinburg, as well as its network connecting to the surrounding natural wealth of the East, made it an ideal place for scientists to publicize the utilitarian virtues of technology. Although the society had run into trouble with the local branch of Vesenkhakha before the NEP, by 1922 it was already vigorously at work on extracurricular science-educational tasks. The society was once again busy collecting artifacts and specimens for the archaeological and mineralogical exhibits in its museum. The museum was a provincial center for the study of mineralogical deposits and natural resources. The entomological section of the society conducted a number of research projects in the region and published a number of popular brochures on the struggle with vermin. Lastly, the excursion bureau conducted over thirty excursions for the regional public in 1922 alone.

The societies of naturalists in Ekaterinburg were eclectic in their pursuits and scientific interests and, probably more than anywhere else in Russia, focused on the study of regional culture and resource potential. Regional scientific organizations were important both to Vesenkhakha and to Narkompros officials for the knowledge they commanded on local natural resources and industrial potential. Soviet political agencies naturally saw in the regional scientific societies excellent potential for support of the state's secularizing and modernizing goals.

The most developed and oldest provincial scientific organizational structures were in northeastern Russia, particularly in the area around Iaroslavl' province and other towns in the Northern Volga basin. For this reason I will focus on Iaroslavl' as a case in point to demonstrate how these institutions more specifically related to the developing state. The naturalists in the region had formed the earliest science museums and societies in provincial Russia. They organized branches in many towns including Iaroslavl', Kostroma, Rybinsk, and Rostov-Velikii, and their members traveled to Moscow and St. Petersburg and had numerous foreign connections. After 1917 they vigorously and methodically lobbied Glavnauka for financial and material support. Records show that even during the anarchy of the Civil War, the Iaroslavl' Natural-History Society sent elaborate budget requests to central state agencies. They particularly detailed how this funding would in turn benefit the state's extracurricular scientific-enlightenment campaign. Furthermore, they showed how they could provide the state with a valuable cultural resource in provincial areas where Communist rule was not yet firmly entrenched.

The Iaroslavl' Natural-History Society requested 100,000 rubles from the Glavnauka for the 1918 and 1919 fiscal years. This sum equaled the budgets of some of the large, urban societies. The society skillfully requested funds during the Civil War by arguing that it could provide a social service to the young Bolshevik regime:

Since 1864, the Iaroslavl' Society had been the first to promote popular-educational lectures in the natural sciences, and sponsored the formation of the first provincial public science museums. However, the society needs to pay for certain expenditures at the present time. The Zoological and Botanical Gardens will not be able to conduct popular-scientific activities without proper funding. Therefore, the society believes that 100,000 rubles should be sufficient for the work of the organization, which would benefit the new Soviet state in its ability to spread science to the masses.

The Soviet state's fulfillment of that budgetary request further validates the importance the Bolsheviks placed on these provincial science organizations.

In January 1917 the Iaroslavl' society, along with the Iaroslavl' Physical-Mathematics Circle, was successful in starting a people's university in Iaroslavl'. The society arranged to have scholars at the natural-history museum give lectures at the people's university. Several members of the society delivered popular-scientific lectures at the newly founded university during the autumn of 1917 and winter of 1918. These activities would place the society in the good graces of Glavnauka officials.

The Iaroslavl' society also lobbied the local soviet for funding. On June 18, 1918, the local soviet in Iaroslavl' sent a representative to observe the proceedings of the Iaroslavl' Natural-History Society to verify the necessity of the 5,000-ruble request for funds. The representative reported back to the soviet by approving the need for those funds. Subsequently, on September 16, 1918, the society sent Glavnauka a lengthy report documenting its history and goals, its former financial budget and donors, as well as its projected needs for the second half of 1918 and first half of the 1919 fiscal year. Two months later on November 13, 1918, Glavnauka responded by saying it had
approved 47,990 rubles to be sent to the society for its operating costs until mid-1919, and it officially sent out the funds on December 2, 1918.38

In 1918 the society was moving ahead with the reorganization of the Laroslavl’ Natural-History Museum. During that year, the Laroslavl’ provincial executive committee donated another building in town to the museum. The society decided that the museum should be more contemporary and also serve as an educational center for the entire region. A special scientific-popular department was organized within the museum. The society had opened an auditorium for public science lectures in the museum, and its staff conducted four to five guided tours a day for school children from areas throughout the Northern Volga. There was little interference from the local-soviet executive committee, and the society was able to continue its business as it had prior to 1917.

The society believed that the popularization of science and its methods could influence the teaching of the natural sciences in the schools. The society’s summer biological station set up a program of visitation for teachers so that they could gather better practical knowledge of the research and investigation of natural processes. The society requested 20,000 rubles in government subsidies in 1918 from Narkompros to strengthen its programs for science teachers. It also requested 25,000 additional rubles for organizing the Laroslavl’ Botanical and Zoological Gardens to enhance their public displays. The gardens featured diverse flora and fauna from the northern Volga River Basin and had an extensive collection of insects and butterflies.39

During 1920 and 1921, in order to spread and popularize natural-historical knowledge, the society began short courses for the public. The courses averaged approximately sixty hours in length over a defined period, and each course usually contained sixty adult students. They became even more popular as the 1920s progressed and the political environment in the country became more stable. The activities in the courses included listening to popular-scientific lectures, participating in practical scientific labs, and also going on various nature excursions. The excursions were broken into sections concentrating on various flora and fauna of the forest and other environmental settings surrounding Laroslavl’. During 1920 over eight thousand people visited the society’s natural-history museum, and this number continued to rise after 1921.

After 1921 the Laroslavl’ museum continued to receive government subsidies and was even helped by generous grants from private citizens in the sum of 75,000 rubles.40 Throughout the NEP the society had to rely on membership dues, some private funding, and funds from lectures and short courses for which it charged the public. However, it was still able to receive large subsidies from Narkompros’s Glavnauka, which served as its major patron throughout the 1920s. The NEP did not mean that provincial scientific societies would be left to fend for themselves and rely primarily on private donations. However, as the decade progressed, Narkompros officials became more concerned with intensively documenting all societies’ inventories, members’ backgrounds, and financial expenditures. During the NEP, a positive, yet strained, relationship developed between the new patron (Glavnauka) and client (provincial science societies). Scientific societies benefited from Glavnauka’s subsidies and its protection against the encroachment of other Soviet institutions. These organizations remained independent to continue their scientific research and popular educational activities. Slowly, however, the arm of the ever-encroaching central state began keeping closer and closer tabs on their minute local activities and provincial records. The continued success of established local scientific organizations was paradoxical: their ability to remain independent and garner state subsidies suggests only incremental sovietization of cultural organizations in provincial Russia during the NEP; however, fiscal reliance on the state was simultaneously leading to gradual sovietization by the late 1920s.

Starting in 1922 and 1923 Glavnauka sent out circulars to provincial scientific organizations asking them to have their charters and revised statutes filed with their gubispolkom (regional executive committee). Glavnauka requested that an overview of their key tasks and activities, especially public enlightenment work, be sent along to the regional executive committees.41 By 1924 Glavnauka requested that detailed questionnaires (ankety) be filled out by all members of local scientific societies, museums, and libraries. The completed questionnaires documented that very few of these naturalists were actually Communist Party members. Glavnauka sent circulars to local Narkompros branch departments, housed within the local gubispolkom, making sure that local Soviet authorities verified membership, activity, and party affiliation of those in the societies.42

Glavnauka made it clear in its circulars to local organizations that no funding or institutional support would be forthcoming in the absence of these completed questionnaires, along with the mandatory budgetary reports. In December of 1924 Glavnauka stepped up its administrative demands by requiring much more detailed documentation from these societies. Petrov, the head of Glavnauka, sent out a circular to all societies in the Russian Republic stating that funding and continued state registration would be dependent on the successful and prompt completion of new yearly reports. Responses to Petrov’s circular were remarkable in just how detailed their inventories were, listing practically all possessions and equipment down to office chairs. Furthermore, Petrov’s office sent out form templates to guide societies on how to organize these inventories and yearly ankety (activity records and
accounts). This remarkably incisive attention to detail and inventory control would soon come to characterize the Bolshevik state as its bureaucracy developed more firmly in the locales.

As long as they did not experience enormous interference in their daily activities, provincial scientific societies continued to play the administrative game required by Glavnauka, to assure substantial funding. By the mid-1920s, provincial scientific societies, like the Iaroslavl' naturalists, started sending letters to the local gubispolkom notifying them of their public-enlightenment activities and how their work was oriented toward popular lectures, courses, and exhibitions. A January 1926 letter to the Iaroslavl' Gubispolkom from the local society sent along a list of public lectures by their members. Some were of general interest, such as overviews of the flora and fauna of the area, while others pertained to more detailed scientific subjects, like plant ecology. The society sent advertisements of public events to local newspapers, offering editors an occasional synopsis of practical public lectures. On June 7, 1926, a letter was sent to A. N. Zverov, editor of the local newspaper Severnyi rabochii (the northern worker), asking him to advertise public lectures and exhibitions of the society and its museum. A list of lectures would then generally appear in the paper, sometimes in the popular section entitled “News of Science and Technology.” Such utilitarian public lectures, which certainly had intrinsic scientific value, put the society in the good graces of local Soviet authorities.

Many regional newspapers carried science sections popular with readers. Though they were intrigued by foreign feats of aviation and news on astronomy, readers also focused on scientific issues relevant to the local province. The Iaroslavl' Soviet Executive Committee published its newspaper under the title Vlast' Truda (the power of work). This popular and cheap four-page newspaper had a section entitled “Local Life,” which featured announcements for local science clubs including amateur astronomers, aviators, and naturalists. The newspaper also carried articles on science and technology and those pertaining to local industries, ecological problems in the area, and the geography of the Iaroslavl' region.

The civic activity of local scientific organizations became transformed for Glavnauka into work that served the new Bolshevik state. The 1926 public lecture on water utilization, by V. Iaroslavskii of the Iaroslavl' Natural-History Society, which had been advertised in the local paper, included a detailed account on how to make sure drinking water was boiled properly. This public lecture had detailed charts and graphs to simplify concepts for the average viewer. At the end of the lecture, other society members in the auditorium, which was filled to capacity, had suggestions for the public on how to carry out what had been learned from the lecture. They passed out captioned notes for local residents, who were evidently obsessed with hygiene and worried about water contamination from local factories. Since paper was expensive, local residents had to share handouts; though specialists complained that residents unfortunately had to fight over copies, the incident reflected the public’s interest in the scientific analysis of their daily surroundings.

Lectures that discussed local ecology and biology were particularly popular with residents. On occasion, lecturers complained that there were not enough seats in the small auditorium for eager citizens who were curious about ecological issues. Provincial naturalists also lectured on similar topics, such as air flight and astronomy, which were popular with Russians all across the country. However, naturalists also catered to local laymen’s interest in understanding their natural surroundings and thereby helped to foster civic and regional pride. Between August of 1924 and September of 1925, the society’s yearly report mentioned an abundance of lectures given by naturalists focusing on scientific topics of local interest. In this way, the society could indeed emulate the large, central societies while specifically defining their own image and scientific mission in the provinces.

In the Iaroslavl’ society’s auditorium, which seated about one hundred persons, local citizens eagerly listened to lectures with titles such as “History of the Iaroslavl’ River Bank,” “Study of the Northern Volga’s Plant and Animal Life for Amateur Naturalists,” and “Local Ecology and Natural Resources of the Volga River Basin.” Though seemingly mundane topics, they offered ordinary citizens and nature lovers a scientific understanding of their natural surroundings. B. A. Fedchenko, a biologist who lectured for the society, noted that in 1925 the lectures on local science captivated audiences, who believed they could now understand the technical relevance of those topics when applied to their province’s ecology. He linked the lectures to the strong interest in nature excursions run by the society’s museum and educational department.

In the Fall of 1925 many excursions planned by the Iaroslavl’ society had an educational purpose while also offering local residents an opportunity to see certain plants and animals in their natural settings. Naturalists and field guides in September 1925 took several groups on botanical excursions up and down the Volga River from Iaroslavl’ to Kostroma. Participants rode in boats and took nature walks at various points along the river, and they even helped identify and collect plants for the museum in Iaroslavl’. Fedchenko noted that participants mounted horses to take rides further away from the Volga’s banks when searching out particular areas naturalists had identified containing rare plant species. Participants expressed enthusiasm for these adventurous and informative trips on which they learned a good deal about the ecology of the area. The Iaroslavl’ society also expanded these excursions to
target schoolchildren, who were frequent visitors of the museum. However, local schoolteachers and professionals also frequented the excursions to expand their scientific knowledge.

Ultimately, besides catering to local interests, the provincial societies knew that they had to lobby the central Glavnauka officials using evidence of the progress of their popular-enlightenment programs. Beginning in 1925 and 1926, the Iaroslavl' Natural-History Society sent, along with its yearly reports, detailed accounts of its popular-enlightenment efforts in a section entitled “popularization activities.” In a February 26, 1926, circular to scientific organizations in the Iaroslavl' area, Glavnauka officials made it clear to these societies that they must discuss at length their “popular-enlightenment work.” New questionnaires regarding public activities were sent to local scientific societies with sections asking: (1) what popular publications did you produce this year; (2) for what kind of readers are your publications geared, ‘the wide masses’; (3) which public lectures did you conduct; (4) describe your activities with regard to public exhibitions, short courses, and excursions; (5) analyze the social categories and interests of your listeners, viewers, and readers (do you get enough worker and Red Army personnel?).

Glavnauka officials' attention to “social categories” and “public utility” was both characteristic of the Soviet 1920s and indicative of more stringent times to come under Stalin. Glavnauka's questionnaires were part of a general trend toward sociological analysis for political purposes and organizational control on the part of the regime. This trend was especially evident in provincial areas where Bolshevik control was more precarious after the 1917 Revolution. As controlling as these bureaucratic requests were, provincial societies responded favorably because they wanted to maintain their activities and gain access to state patronage. This was true even though many members were neither affiliated with the Communist Party nor political supporters of the Bolshevik Revolution. The society found funding to be generous during the post-1917 era and, given the general Soviet political constraints, wanted to continue the favorable working relationship with Glavnauka.

The Iaroslavl' Natural-History Society was always prompt in replying and thereby won the good graces of Narkompros officials. Furthermore, Narkompros officials realized it was the oldest provincial science society in Russia, and its actions would be observed by other local science organizations. In March of 1926 the society sent a detailed list of its 1925/26 popularization activities back to Glavnauka. This list included examples of public lectures on popular topics like astronomy, as well as lists of more practical scientific lectures on agronomy and disease control in the area. During the twenties, instead of choosing the road of confrontation, they chose administrative cooperation, while maintaining independent control of their public activities and scientific research.

Glavnauka's Petrov seemed very pleased with the responses he received from local scientific organizations by 1926. In turn, Petrov offered local societies not only funding but even opportunities to engage in dialogue over public science education with Narkompros officials. In a March 1926 circular sent specifically to local scientific societies, Petrov requested feedback as to whether they believed it would be advantageous if foreign scholars were invited to Russia to give public lectures in local areas popularizing new themes in science. Petrov asked officials of local science organizations to send Glavnauka their opinions on the benefits of this proposal and the names of qualified foreign academics. The response from local societies was healthy and quite interactive. The Iaroslavl' society thought this a great idea and offered lists of foreign scholars, like the famous American geneticist Thomas Hunt Morgan, who could come to the USSR to give detailed scientific and broad popular lectures.

During the NEP, scientific societies filled out and sent detailed questionnaires, which included profiles of their members, to central-Narkompros officials. Profiles of major and minor figures in these organizations included their social, educational, and political backgrounds. Since the Bolsheviks were interested in collecting detailed sociological information of members of prerevolutionary organizations, the ankety usually included one's name, party affiliation (if any), educational background, job before and after 1917, and present institutional affiliation. Most of those in the Iaroslavl' Natural-History Society, for instance, were not Communist Party members. Yet the society's collegium certainly contained some party members who had regular positions in Soviet organizations such as the rabfaki (workers' faculties/preparatory schools) or various teknikumy (technical schools). Many came from middle-class university educated backgrounds, but not all of them. Most of those in the Iaroslavl' society's leadership positions were educated either in Moscow or St. Petersburg (generally before the revolution) before coming back to provincial Iaroslavl'. Some assistants, graduate students, and researchers came from more humble socioeconomic backgrounds.

The backgrounds of a typical segment of the membership indicate a wide variety of interested citizens. Major figures in the Iaroslavl' society who held positions in the collegium were well educated with diverse scientific training. N. I. Shakhanin, a director of the museum, was a biology teacher in secondary school between 1918 and 1920 and then taught at Iaroslavl' University. P. A. Bogdanovich, who volunteered for the museum, taught mathematics at local secondary schools. V. P. Kazanskii, who taught at Iaroslavl' University,
was also an agronomy specialist who consulted for the society and helped in creating excursions to rural areas.\textsuperscript{50} Some volunteers to the Iaroslavl' society had more mixed educational and economic backgrounds. In a response to a 1924 anketa, or questionnaire, Elena F. Viche (twenty-two years old) indicated she had been volunteering in the society's museum as a curator and was interested in local natural history. Her father (deceased) had been an agronomist, but she listed her mother as uneducated and living in the countryside. Elena had been a student during the early 1920s at Iaroslavl' University before it closed in 1924\textsuperscript{51} and indicated she wanted to further her knowledge of natural sciences while working at the museum.\textsuperscript{52}

The records document how educated people (such as teachers in the sciences) searched for provincial institutions to carry out their scientific interests after the revolution. V. V. Shestakova, a thirty-two-year-old from a noble family who had been a science teacher in Petersburg before the revolution and Civil War, now sought out work in the Iaroslavl' museum as a science librarian. She indicated on her questionnaire that she had been educated in St. Petersburg and had had trouble finding teaching jobs (maybe because of her class background). She therefore sought out the society in Iaroslavl'.\textsuperscript{53} Shestakova's plight is an example of those intellectuals with checkered class backgrounds who sought out provincial organizations to hide or 'mask' their prerevolutionary affiliations. Such individuals were needed in provincial scientific organizations and were made welcome by local communities of intellectuals. This conclusion is supported by the records that show a high percentage of scientists returning to the provinces during the post-1917 era. Kendall Bales has argued that this out-migration of scientists from the center to the provincial periphery was typical during the Civil War and immediately after. Bales attributes this to the difficult conditions for scholars in the central cities between 1918 and 1920. This out-migration of highly qualified scholars helped solidify scientific research and organizational foundations in provincial settings.\textsuperscript{54}

With the help of a well-educated and qualified staff during the NEP, the scientific society in Iaroslavl' set up a series of popular scientific lectures oriented toward educating the public on basic scientific topics.\textsuperscript{55} The lecture series was entitled Azbuka nauki (the ABC's of science). They also set up an excursion bureau for various social and institutional groups. Although in the prerevolutionary era these excursions were oriented mainly toward educated middle class intellectuals such as schoolteachers, in the 1920s they were offered to students, schoolchildren, local intellectuals, and workers, as well as to visiting naturalists, teachers, and agronomists. On that level the revolution did have a democratizing effect on the clientele of the society, concentrating its efforts on the popularization of science. Of the 5,560 visitors it registered for the first half of 1922, 4,337 of those were students, including those in specialist schools. In addition the museum had a branch that dealt with extracurricular education in the natural sciences for schoolchildren. The museum received a working budget (mostly from Glavnauka) of 99,000 rubles for 1922 out of the society's total yearly budget of 512,820 rubles (by 1922, inflationary prices had raised budgets dramatically in comparison to the pre-NEP era). About 15–20 percent of the museum's budget itself was then spent on "popularization activities," which included public lectures, special exhibitions, and popular excursions.\textsuperscript{56}

In 1921 the new director of the Iaroslavl' museum was B. E. Rozov, who believed Russia needed both central and provincial museums that educated the public. Rozov, who lobbied local and central officials for more funds for the museum, documented that close to fourteen thousand visitors came to the local museum between 1920 and 1921. The museum, according to Rozov, led all social classes on scientific excursions, including Red Army soldiers, local workers, and students, in addition to members of Soviet associations such as the "workers' clubs." Rozov knew that serving the Soviet Republic as a public institution was essential to the museum's existence. Members of the museum were also involved in such useful practices as studying local agricultural conditions, maintaining natural bogs and streams, and researching the uses of local plants for medicinal purposes. All of this was carefully logged by museum authorities and sent along to Glavnauka officials in yearly reports. These reports were constructed (by museum staff) to emphasize public utility of the museum and civic culture as key "Soviet attributes" of the society. The society and museum staff even set up a meteorological station in the area. The museum had ecological displays for the public but also put together reports for local officials on river pollution from local factories on the Volga.\textsuperscript{57}

The Iaroslavl' Natural-History Museum expanded its exhibits and staff in 1923 and by early 1924 had a new director, N. I. Shakhmanin, a botanist with a degree from Petrograd University. Shakhmanin received a degree from the Physics-Mathematics faculty of Petrograd University, had taught in Iaroslavl' as a science instructor since 1918, and had worked in the museum since 1922. The chief curator of the museum was N. V. Kuznetsov, and the botanist of the collection was E. A. Garkavy, who had a degree from Donskoi University. Many of those affiliated with the society's museum staff were well-educated and highly experienced naturalists and biologists.\textsuperscript{58}

Shakhmanin noted that the museum offered exhibits in a wide range of areas, including sections on birds, mollusks, mineralogy, paleontology, and entomology. The museum had over three hundred varieties of stuffed birds...
on exhibit, as well as a new herbarium that featured brochures for viewers examining the diversity of plant life in the Iaroslavl' region. Between October 1924 and September 1925, over fifty-five hundred local people participated in nature excursions sponsored by the museum and led by its staff. Public lectures were held in its buildings, and it had supervision over the large auditorium that could seat approximately one hundred people. On average, the museum documented that approximately eighty to ninety people came to the more popular lectures, while numbers were much smaller (approximately twenty to thirty) for more sophisticated scientific presentations. Information about local flora and fauna and about agronomic and ecological topics dominated public lectures, but lectures on astronomy and air flight, as in the central cities of Russia, also seemed to bring in large numbers of visitors. The director also noted that local citizens were keenly interested in the ecological conditions of the Northern Volga, and they flocked to lectures offering them practical information on pollution and disease in the area. Unlike the large central naturalist societies, local biologists and chemists could provide scientific information immediately relevant to provincial Russians. The provincial science society became a locus for natural historians, ecologists, biologists, and an array of individuals interested in regional studies.

Though these societies provided the Bolsheviks with an understanding of local cultural traditions, the Soviet state continued to bureaucratize these entities from the center, leading to center-periphery tensions. Beginning in 1924, the Iaroslavl' Natural-History Museum became an affiliate of the Museum Department of Glavnauka. This was a mandatory reorganization based on central administrative dictates, and it meant that the museum itself, independently of the society, had to send questionnaires and financial budget reports back to Glavnauka. By July 1925 the Natural-History Museum had officially become part of the Iaroslavl' State Oblast Museum. Glavnauka's main Museum Department in Moscow, headed by N. Brotskaia, ordered these reorganizational changes throughout provincial Russia. This meant that although the Iaroslavl' museum was still attached institutionally to the Natural-History Society, it would be housed with all local museums in the Iaroslavl' region within a single building. For instance, this enlarged state museum, besides having a natural-history division, housed an ancient-historical and zapovednik (preservation) department. Although N. I. Shakhnin remained head of the natural-history section, the well-known regional studies specialist (kreasvednik) N. G. Pervukhin became the head of the newly enlarged oblast' museum in Iaroslavl'.

The reorganization in the Museum Department of Glavnauka came as a result of a Council of People’s Commissars (Sovnarkom) decree in early 1924 to centralize museum affairs in provincial areas. This decree ordered local

Narkompros branches to subsume natural-history museums, like the one in Iaroslavl', under more enlarged state museums for particular regions. This reshuffling by Narkompros created a way for the Soviet authorities to centralize all museum affairs, bringing them literally under one roof. Soviet authorities could glorify the expanded museum as an epicenter of regional culture supported by central initiative and funding.

The Soviet centralization and reorganization of prerevolutionary cultural institutions typified the gradual process of Soviet bureaucratization in provincial areas. The process occurred slowly throughout the NEP, not suddenly after 1917. However, it was also an early indication of even further centralization of local cultural institutions that would lead to grave problems for provincial scientific societies while the NEP was drawing to a close around 1927 and the Stalinist cultural revolution was looming on the horizon. Although this bureaucratization of culture could be interpreted simply as Soviet methods of basic kontrol (accounting), in reality it led to a gradual hegemonic struggle between the state and the local prerevolutionary cultural elite. For local intellectuals, more detailed inventory procedures became linked to long-term struggles with the new state. Although scientific societies were able to navigate safely through the new Soviet bureaucratic constraints under the NEP, perhaps even tolerating those methods as long as they received generous state funding, the tenuous relationship would be consistently more difficult to hold together after 1928.
Chapter 4

FORGING THE NEW WORLD

Scientific Print Culture and the Russian Reader in the 1920s

Professional educators and science popularizers, like Rubakin, survived the October Revolution of 1917 and continued to publish popular texts into the 1920s. These popularizers received funding from independent and state-run publishers. Bolshevik administrators in Gosizdat (the Soviet state publishing house) and Narkompros supported the printing of scientific texts by both Marxists and traditional popularizers alike. The Bolsheviks were keenly aware of the transformational role scientific texts could play in their envisaged cultural revolution of the following two decades. However, radical popularizers and leftist science educators opposed the Bolsheviks’ initial support of the older generation of popularizers and educators. Marxists believed that studying the “interests” of the reader was worthless, since one needed to devise textual strategies that molded the reader instead. They envisaged a reader that accepted the preplanned, a priori, communicative discourse of revolutionary culture in post-1917 Soviet Russia.

SCIENCE, PUBLISHING, AND PRINT CULTURE IN SOVIET SOCIETY

The spread of popular science publications was the most significant factor in marketing scientific information in Russia at the turn of the twentieth century. The journal was an especially cheap and accessible source of scientific information for the Russian layman. In the era before the First World War, new popular scientific journals of all types offered the Russian reader excellent coverage of worldwide scientific developments. Publishers and editors geared these new journals to specific reading audiences, depending on the sophistication of the journal. On the one hand, the natural-history journal Priroda (nature), started in 1912, attracted the educated layman and the more scientifically inclined. On the other hand, articles in the journal Priroda i ludi (nature and people, 1890–1918) outlined complex scientific developments in a more accessible fashion for the popular reader. Journals like Priroda i ludi included articles on popular themes such as air flight and the exciting ideas of K. E. Tsioikovskii on overcoming the Earth’s gravitational forces by the use of futuristic jet-propelled rockets. The journal was published by the Soikin publishing house in St. Petersburg, and it was dependent, like other popular journals, on advertisers as well as on a diverse group of subscribers.

In the late imperial tsarist era prior to 1917, Russian educators worked carefully to craft popular articles and texts that simplified difficult scientific theories. They labored to analyze the reader and how he would respond to new, scientific articles, books, and pamphlets. The pioneering work in this area in late tsarist Russia can be attributed to the bibliographer and science educator Nicholas Rubakin, whose work anticipated modern reader-response theory. Rubakin’s work also points to the early ties between Russian reader-response theorists and science popularizers. In the late nineteenth century Rubakin had been part of various committees to combat illiteracy, especially in St. Petersburg. He was the author of hundreds of popular scientific and educational articles, pamphlets, and calendars at the end of the nineteenth and early twentieth century. He and his colleagues exemplified an older generation of prerevolutionary popularizers who were concerned with the reader’s educational needs. Rubakin’s cohort would come into conflict with Marxist scholars in the 1920s, who imbibed their work with ideological overtones.

Rubakin’s methodology for creating popular works revolved around his theory of biblio-psychology, which required consideration of the reader from a psycho-physiological and sociological point of view—that is, examining the effect of books on a reader of given social condition. Rubakin’s philosophy emphasized the reader’s receptivity and psyche as fundamental points of analysis and the author who produced texts as secondary. Rubakin’s methodological approach conflicted with the perspective of Soviet Marxist scholars, who believed scientific popular texts had to have an ideological component. Marxists downplayed the importance of the reader as receptor, disregarding the significance of an individual’s reading of a popular scientific text.

The early Bolshevik leadership—especially F. N. Petrov of Glavnauka, Commissar A. V. Lunacharski of Narkompros, and others in Narkompros—saw the propagation of popular printed scientific texts as an integral part of their secular, cultural revolution. Just as it relied on prerevolutionary scientific societies, Narkompros believed it had to support Gosizdat’s publication of prerevolutionary popularizers and educators. Bolshevik state officials wanted texts that would challenge the public’s religious preconceptions on a range of scientific issues, especially evolution and the creation of the universe. The
state in the 1920s could not yet afford to unleash the young, radical Marxists against the older prerevolutionary generation of popularizers. Those science educators and editors were professionally embedded in their disciplines, and the state required their expertise for its enlightenment campaigns. Furthermore, old Bolsheviks such as Lunacharskii and Petrov patronized these prerevolutionary intellectuals and resisted any attempt to purge their societies.

The Soviet regime concurred with liberal and radical prerevolutionary intellectuals alike on the need to popularize scientific material, texts, and posters, regardless of the textual strategies pursued. The state fostered a climate wherein state, cooperative, and even some private publishing houses would create eclectic scientific material that did not necessarily mold a new Soviet scientized citizen in an a priori, Marxist fashion. This diverse climate was emblematic of the NEP era. The works of prerevolutionary popularizers like Rubakin continued to be popular among readers during the twenties, and Soviet state officials recognized this demand from below. Furthermore, editors, journalists, and scientists did not feel constrained, during the NEP, in writing on scientific topics. At least in the 1920s, scientific texts did not necessarily have to be filled with either class analysis or myopic utilitarian vision. Prerevolutionary science editors and publishers even tended to defy the radical Marxists and to show an editorial tendency to capture both the needs and the imaginative interests of the reader.

Although scientific publications appealed mostly to urban Russians, those readers came from a variety of professional and class backgrounds. The Russian urban readers of the 1920s not only had cosmopolitan tastes but were fascinated with the technological feats of other countries, seeing themselves as part of a European citizenry. The Soviet state itself fostered that sense of cosmopolitanism, especially the global significance of scientific and technological development. Increasingly, however, the isolationist tendencies slowly developing in Soviet Russia contradicted that view, making it difficult to reconcile the early Bolshevik technological cosmopolitanism with the new theory of “socialism in one country” that the Stalinist state would eventually support more substantially.

Popular literature in the natural sciences and technology had a special significance for Soviet power from the first days of the October Revolution in 1917. The popularization of natural scientific and technical knowledge was an important means by which the young Soviet regime believed it could struggle against religion, form a new ideology based on scientific principles, and attract the common man to scientific and technical knowledge. On August 16, 1918, a Sovnarkom decree created a Scientific-Technical Department (NTO) under Vesenkh. On October 9, 1918, NTO created a state scientific-technical publishing house (Gostekhizdat) based in Moscow with an affiliate in Petrograd. The head of the publishing house was A. G. Braun. Gostekhizdat was involved in publishing literature in all areas of technology and industrial production, except chemical technology and metallurgy. It published popular-technical guides for workers, foremen, and engineers, as well as textbooks for students in middle-level and higher technical schools. By 1925 the average print-run of its publications was seven to eight thousand per title. Between 1921 and 1928 Gostekhizdat published 996 books with a print-run of over seven million copies.

In March 1919, at the Eighth Congress of the Russian Communist Party, the Central Committee ratified a special decree on “The Party and the Soviet Press.” The press was to be a powerful means of propaganda, agitation, and organization of information for the widest possible audience. On May 20, 1919, the All-Russian Central Executive Committee (VTsIK) issued a decree on “Government Publishing.” All publishing activities of People’s Commissariats, branches of VTsIK, and other Soviet establishments (as far as they related to sociopolitical and cultural questions) were subordinated to the new state publishing house (Gosizdat). The publishing activities of all scholarly and literary societies, and all other publishing houses, were also subject to the control and regulation of Gosizdat.

Originally created under the auspices of Narkompros, Gosizdat’s two principal tasks were to publish its own books and to regulate all publishing activities in the Russian Republic. It was headed by an editorial collegium: Sovnarkom named V. V. Varovskii as its first chairman. The size of Gosizdat’s publishing activities grew quickly. In 1919 it published 9.6 percent of all books in the country, and by 1920 it was already publishing 64 percent of all books. In June of 1919 Gosizdat created a popular-scientific department. In the fall of 1920 the department planned a series of popular-scientific readers for workers. With these goals in mind, the department invited scholars and scientific specialists to write popular-scientific books and pamphlets, to be written in a style accessible to Soviet workers.

After 1919, however, publishing activities and the quantity of books printed in the country dropped. A primary reason for the decline was the economic dislocation suffered during the Russian Civil War. Many printing houses stopped working or could not get electricity to run their presses. There was not enough ink or paper, due to the severe crises in the land. By the middle of 1921 the country was producing twenty-five times less paper than it was in 1914 before the First World War. At the Ninth Congress of the Russian Communist Party, various speakers noted that it was necessary to put all “productive strengths” into raising the quantity of paper production, improving its quality, and introducing some order into typesetting and press activities in the country. Paper production did not reach prewar levels until
1928, although the regime spent substantially to import paper from abroad, especially after 1924. The comparable problem in book production was officially raised at the party’s Thirteenth Party Congress in 1924. Delegates noted that during the NEP the number of presses and typesetting machines fell dramatically. The overall production of books did not reach prewar levels until 1925.

The destruction of various prerevolutionary distribution networks after the revolution also made it difficult to deliver books to readers during the early Soviet era. During the Civil War, the distribution of books and newspapers was organized by Tsentropoekhod (Central Press Agency). During the NEP, the Central Press Agency was replaced by Komsosnovo Pechati (the Press Contracting Agency). This organization opened many book and newspaper kiosks in the major urban areas, especially at railway stations in the urban and outlying areas. After the dislocation of the Russian Civil War, the distribution of printed publications developed and expanded, but at a slow pace. The number of Soviet bookstores rose dramatically between 1922 and 1924, but still only to half the prewar level.

The relationship between government and private publishing houses after the revolution was also precarious. In 1917 government publishing houses produced only 11 percent of all titles published in Russia, but this figure doubled to 21.5 percent by 1918. Meanwhile, the share of private publishers fell from 80 percent of all titles in 1917 to 58 percent in 1918. During the period of War Communism (1918–1920) economic hardships led to a gradual centralization of the publishing industry, as the printing sections of various commissariats were amalgamated into Gosizdat. However, by October of 1920 close to two hundred private firms still existed in Russia. That changed at the end of 1920 when the Soviet government moved against even the small private printing shops, but the number of private publishers would rise again during the NEP era.

By late 1921 the situation shifted in favor of private firms. In November of 1921 Sovnarkom published a decree that allowed books to be printed and sold by private and cooperative publishers. The Sovnarkom decree enabled licensed private publishers to own printing equipment, sell their output at free-market prices, and (after obtaining special permission) import foreign books. All manuscripts had to be approved by the state, and Gosizdat reserved the right to buy, at wholesale prices, all or any number of copies of a book privately printed in Russia. Although private companies printed close to 25 percent of all books in 1922, the number they produced began to drop gradually as the decade progressed towards 1928. However, private publishers greatly expanded the variety of books and journals available for the Russian reader in the 1920s, and many authors sought out private publishers during the NEP to print their manuscripts. This publishing expansion especially included science popularizers, engineers, and technical specialists. As the decade unfolded, a vast array of privately printed popular-scientific books and journals became available to a public eager to consume information on themes from astronomy to water pollution.

During the twenties cooperative publishers were especially involved in creating popular-scientific and technical literature for a broader audience. Cooperative associations like Nachatki znani (basics of knowledge) published the works of prerevolutionary science popularizers, such as the biologist V. V. Lunkevich and the educator N. Rubakin. Like other authors, popularizers received royalties for their publications, and this was certainly an incentive for scholars and scientists to write popular pieces during the NEP. For example, the cooperative publisher Seiatel’ (disseminator) produced a series of popular-scientific works on such themes as mathematics, physics, and astronomy. This series included works for popular consumption by both foreign and Russian authors, including Albert Einstein’s Osnovy teorii ot-nositel’nosti (basics of the theory of relativity) or Ia. I. Perel’man’s Polet na lunu (flight to the moon).

During the NEP, the Soviet state’s publishing decrees gave private publishers temporary access to the market. This allowed older, prerevolutionary publishers to compete with the new Soviet publishing houses. For example, the expansive private, prerevolutionary St. Petersburg publishing house of P. P. Soikin once again became one of the more active firms involved in publishing popular-scientific works. Furthermore, it became financially solvent and incredibly successful in the early Soviet era. During the twenties Soikin produced several popular-scientific series as monthly supplements to the widely read journal Vestnik znani (gazette of knowledge). One of these series was entitled Priroda i ludi (nature and people) and contained entries that described various geographical areas of the world and their flora, fauna, and indigenous peoples. An example is Elgin Lendt’s In the Virgin Forest of the Amazon (1927). Readers were particularly interested in popular-scientific pieces on world geography and exotic places because they themselves would never be able to see them. And Soikin targeted those particular scientific interests of readers based on marketing studies and reader surveys.

During the NEP period, private and cooperative publishers printed popular material ranging from biographies of great scientists to translations of Western science-fiction novels. Specific editors and publishers paid especially close attention to this development. They included important prerevolutionary figures such as Maksim Gorky, P. P. Soikin, and various Moscow and Petersburg science professors. They continued their work after 1917, building important reputations as supporters of mass-scientific literature.
The content of the material produced by this array of state- and private-publishing sources included eclectic themes. Western scientists continued to publish articles in Russian journals, and their monographs were translated for new series for the lay reader’s consumption. At least in the 1920s, the regime and various publishing houses were willing to offer the public a wider range of scientific information, including the work of foreign scientists from Western capitalist countries. Journals and science newspapers became the most widely read and accessible sources of popular-scientific information in Russia during the twenties. Journals were best at providing diverse social groups basic information on various aspects of the natural sciences and technology. Furthermore, they were the cheapest and most condensed form of information; and they were part of a larger genre of short publications the Soviet regime itself promoted in the 1920s to propagate information rapidly.

Popular-scientific journals began to spread throughout Russia and other republics of the Soviet Union during the twenties. For example, a popular-scientific journal entitled Znanie (knowledge) was published in the Ukraine in the Donets basin and was very popular especially among workers in coal and other resource-producing industries. Many popular-scientific journals geared toward workers were published as supplements to provincial newspapers. A popular-scientific supplement to the Sverdlovsk newspaper Vysokii trud (knowledge and labor). Another supplement to Northern Worker, published in Iaroslavl, was entitled About Everything, Little by Little—Science, Technology, and Literature.

Prior to the NEP most of the Soviet journals were associated with specific organizations and had small circulations. During the NEP the Communist Party and the Komsomol (Communist youth league) sponsored the publication of new literary and popular journals. This certainly allowed the party to emerge as a significant factor on the cultural scene during the twenties.21 However, even those journals, which had large circulations, featured substantial sections devoted to popular-scientific themes. The editors of the journals felt compelled to compete with other privately published journals to meet the popular demand for clearly written articles on scientific discoveries, especially about new technology from Western Europe and America.

The Komsomol published a monthly journal in the 1920s entitled Molodaia gvardiia (young guard). The journal had a popular-scientific section that featured articles by Marxist science popularizers, like B. M. Zavadovskii, on a range of issues. However, by 1923 the journal contained a new subsection entitled “News of Technology,” where new machines and technical devices from all over the world were analyzed and displayed in an apolitical manner. This section analyzed the benefits of new technological devices created in the West. Within the pages of this Komsomol journal, Western technological development was revered and portrayed as something that should be emulated by the new Soviet state. Instead of focusing on the dynamics of class struggle, the articles stressed important themes such as modernization and technological development, even if it meant borrowing Western models.

Varied popular-scientific journals and newspapers expanded rapidly in the 1920s and were geared to different social groups, not simply to Communists or educated laymen. The journals offered a variety of levels of sophistication based on their projected readership. For instance, the Leningrad Soviet published a popular-scientific journal during the twenties entitled Nauka i tekhnika (science and technology). Nauka i tekhnika was one of the most popular and widely read popular-scientific journals for workers during the twenties. It was a weekly and cost ten kopecks per issue. Besides being the most affordable popular journal, its format of short, one-page articles, written in a style that was accessible to most readers, made it attractive to a wide readership.

Beginning in 1925 with a weekly circulation of 128,000, Nauka i tekhnika had the goal of introducing the worker-reader to the latest movements in science and technology in Europe and America. Like other popular-scientific journals of this era, Nauka i tekhnika carried a section entitled “News of Science and Technology.” This section described new scientific experiments, discoveries, and technological inventions in a more accessible language for readers. The concentrated emphasis on the feats of foreign technological developments in a journal published by a state organ was typical of the 1920s and would not be repeated in the following decade.

Many organizations (besides soviets) published popular-scientific journals during the twenties. The publishing house of the newspaper Gudok (siren), an organ of the All-Russian Central Council of Trade Unions (VtisSPS), published a monthly popular-scientific journal entitled Iskra nauki (the spark of science). The journal cost forty kopecks per month for subscribers to Gudok, and one ruble, fifty kopecks for nonsubscribers. The journal featured a “Question and Answer” section, where questions submitted to the editor by workers were answered by scientific specialists. Another section entitled “Soviet Industry and Technology” focused on applied technological developments. Another feature simplified the analysis of scientific topics written by prominent academic figures like S. F. Ol’denburg, secretary of the Soviet Academy of Sciences. The journal, supported by industrial trade unions, emphasized the dissemination of scientific information for the common worker as a form of extracurricular education. Well-known Russian academicians contributed to such newspapers and journals in an effort to connect the new Soviet Academy with a wider reading public.

More advanced discussion of scientific and technological development
was promoted in Soviet Russia during the twenties in a similar fashion by a diverse body of journals representing various institutions and commercial publishing ventures, both Soviet state and private/cooperative. They all admired Western European and American technological development. Furthermore, they attempted to capture the popular interest and imaginative impulse of cosmopolitan, urban readers. Astronomy, air flight, space travel, and world geography/travel captured the public's eye, as it concurrently did in most of the West. These published materials indicate the relative absence of isolation of the Soviet reading public in the 1920s in contrast to later times under Stalin. Even in the pages of Communist journals, it was difficult to discern the difference in scientific, thematic content when compared to non-party journals of the time. In the 1920s Russia's readers from diverse social groups were part of a broad European cultural milieu, and they were interested in the same scientific feats and developments that captured the imagination of Westerners.

Soviet scientific publications of the 1920s were offering the public an international, if not cosmopolitan, perspective on the changing nature of new technology. Diverse publishing ventures flourished during the Soviet 1920s. Lines of political activity were submerged, if not overlooked, in various publications in order to capture the reading public's interest in science and technology. Ultimately, the Soviet state's goal, which converged with that of popular educators (many of whom were not Communists), was to foster the desires of Russian urban readers in order to solidify their fascination with global scientific and technological activities. In the process the Soviet state during the NEP engaged non-Communist publishers and popularizers, such as Rubakin and Lunkevich, who were an integral part of that cultural movement.

ASSESSING POPULAR INTEREST IN SCIENCE

Assessing popular interest in science among the Russian mass readership in the 1920s is a difficult task. At best, one can provide a sketch of the themes that readers found most fascinating. Three types of sources are relevant to the gauging of popular themes: general readers' surveys and surveys geared toward a specific readership are essential; published and unpublished letters to editors and popularizers are valuable; and reports by officials of Gosizdat and Agit-Prop (Agitation and Propaganda Department of the Central Committee of the Communist Party) who analyzed popular reading interests during the twenties are also helpful.

Some of the most interesting sources for gauging reader response were reports sent back to Moscow by Communist Party activists in the Agit-Prop department of the Central Committee. These records provide frank assessment of conditions of libraries outside the capital cities and also how both urban and rural readers responded to printed material. Agit-Prop officials were most keenly interested in seeing whether the party's rhetorical constructs and propaganda were actually reaching and being absorbed by the masses. Many of these reports reveal the frustration on the part of these officials, especially in rural areas where many peasants paid little attention to scientific books.

The Soviets of the 1920s were intensely interested in the sociological analysis of society. The period was especially marked as a time of detailed Marxist analysis of various organizations and groups. Sociologists and statisticians collected data on the class composition of all types of organizations in Soviet society, including the ruling Communist Party. Investigators were interested in the social origins of various officials, students, blue-collar workers, and also white-collar workers (sluzhashchie). Soviet studies of the reader, which were carried out by a number of organizations, took on a similar orientation. Soviet investigators were particularly interested in the effect of certain types of media on specific groups or social categories of the population, for instance, worker or peasant readers.

During the period 1917–1920, when the Soviet state had an almost complete monopoly on publishing, publishers did not have to worry much about competition or readers' demands, as had their counterparts in the prerevolutionary era. During the Civil War, many books and newspapers were distributed to the public without charge. With the introduction of the NEP, however, publishers were required to sell a portion of their product at a profit. Within the context of that mixed economy, profit-and-loss accounting was not a complete and effective indicator of a publisher's ability to satisfy reader demand. However, the need during the NEP to sell a portion of what was produced to individual readers certainly heightened official awareness of earlier economic failures. The first Soviet reader investigations, conducted between 1923 and 1926, gathered some interesting material, mostly from people who willingly volunteered their thoughts on various questions posed to them. During the latter part of the 1920s this haphazard sampling of opinion from below was overshadowed by politicized studies of particular groups of readers, for example, party cadres or press correspondents. However, the earlier studies are particularly valuable in gauging the public's interest in scientific and technological themes.

In 1924 a special commission was directed to study the Russian reader and was created under the library department of Glavpoliprovst. The commission was headed by the Soviet bibliographer L. N. Tropovskii. Also prominent participants in the activities of the commission were N. K. Krupskaya
and M. A. Smushkova, who headed the library branch. The commission proposed to conduct a centralized sociological investigation of the reading interests of the public in the Soviet Union.  

On the initiative of the commission, research was conducted primarily in the following provinces: Moscow, Leningrad, Nizhnegorod, and Cheliabinsk. Sociologists primarily studied readers' interests, but they also analyzed reasons for choosing certain books and goals that readers set for themselves. These studies were conducted in large state libraries on the bases of observations, conversations with readers, and analyses of surveys of readers' opinions. The results of investigations in the Leningrad region were published by B. V. Bank and A. la. Vilenkin, two of the best-known sociologists studying the popular reader in the 1920s and 1930s in Russia.  

By 1924 Gosizdat also sponsored sociological research of this type, and scholars began to study the worker-reader by conducting reader surveys at various Moscow and Leningrad factories and institutions. One of the first serious studies was by E. Vinogradova in 1924. Vinogradova wanted to assess the popularity of itinerant libraries at twenty-five factories and institutions (workplaces) in Moscow over a ten-month period. Itinerant libraries were a source for lower-class readers to obtain access to reading material by an easy method—the library came to their place of work. The workplaces where she conducted her survey included mills, shoe-factories, and fire brigades. The researchers counted how many times a book was read and how long readers spent on certain books. They classified belles lettres by author and scientific works by branch of knowledge and author. “Science” was a general category including social, political, economic, and popular-scientific works.  

Vinogradova found that 40 percent of all books borrowed by readers were on scientific themes, while close to 60 percent were belles lettres. She found the popularity of works on religious themes to be much lower than those on natural-scientific topics. Of the natural-science books, the most popular were on the origin of the world, land, and mankind. Rubakin, Lunkevich, and Perelman were found to be the most popular authors of books on natural-scientific and geographic themes. The study showed that prerevolutionary science educators were quite popular among readers in comparison to their Soviet and Marxist counterparts. Natural-scientific works were even more popular than fictional works by well-known authors like Maksim Gorky. Natural-scientific books were read by all age groups and by both men and women.  

The findings of this survey parallel some of the discoveries that the book scholar and popularizer Rubakin himself uncovered both before and after the revolution. In an intensive study of several thousand popular-scientific works published in the 1920s, Rubakin found that those written in a simpler fashion, taking into account the reader's abilities, were much more in demand than more technical works. He argued that more sophisticated works were less popular because they used scientific terms that were incomprehensible to the more underdeveloped Soviet reader.  

Popular-scientific journals conducted their own surveys of readers throughout the 1920s. Those surveys were concerned with which social groups were interested in popular science. Journals conducted such market surveys to increase their understanding of readers' interests and demands. They were also interested in generally categorizing their subscribers and clientele. Of course, some journals had political goals in mind, perhaps to show how their journals were read by workers to satisfy the populist tendencies of the Soviet regime. All the same, the surveys provide an interesting sociological profile of readers' tastes.  

For example, in the autumn of 1925 the popular-scientific journal Nauka i tekhnika conducted an extensive survey of its readers, receiving twenty-one thousand completed questionnaires, which at the time represented approximately 17 percent of its circulation. Ninety-five percent of those who filled out the questionnaire were subscribers to the journal. The editors assumed that the majority of their readers were urban dwellers, since subscription rates were rising in industrial and urban areas. Furthermore, popular-scientific journals and books had always been more heavily subscribed to by urban readers. Respondents to the survey were broken down into the following categories: blue-collar workers 36 percent, white-collar workers 31 percent, students 25 percent, peasants 5.5 percent, and others 2.5 percent. The editors argued that this was not exactly representative of the social breakdown of their readership because the journal received a number of questionnaires filled out by one worker on behalf of a number of less-literate workers. For instance, one metalworker from the Votkinski factory in the Urals sent in his questionnaire for himself and ten of his fellow workers with the following comment: “We are all workers, and we read the journal collectively. Afterward, we discuss together what is most important for us to analyze more thoroughly, and what is of general interest.” Of the workers who responded to the questionnaire, the largest group (48.5 percent) were metal workers, 22.8 percent electro-technicians, 17.4 percent transport workers, 8.2 percent woodworkers, and 3.1 percent chemical industry workers. Forty-four percent of all respondents came from the Leningrad region, and 56 percent came from other regions in the Soviet Union. The number of female readers of the journal was low. Thirty-seven percent of the readers were between the ages of 26 and 35. Fifty percent of all readers had what was categorized as a middle education (professional school, technical courses, night courses, secondary school, etc.).
Thus, according to the editors, the majority of readers of the journal were workers, with an above-average education, primarily young and male.83 Because editors of that period generally tried to inflate the percentage of worker-readers, one cannot state definitively that workers made up the clear majority of readers. Furthermore, the number of readers who were white-collar workers and students was significantly high. Together, those two sub-groups also represented a large percentage of those that read popular-scientific literature, based on this journal’s statistical findings.

The specific scientific interests of readers were much harder to gauge. Almost 20 percent of the readers indicated that “News of Science and Technology,” which consisted of short entries on new developments in science, was their favorite section. The same readers stated that they were interested in news of scientific feats in Western Europe and America. Another favorite section was that which discussed new developments in the medical sciences. Almost all respondents, regardless of occupation, asked that sections relating to their own work be expanded. A twenty-six-year-old machine-tool engineer from Leningrad wrote, “It would be good if you start a small section in your journal which would cover a broad range of special trades, such as glass-cutting or the tempering of metals.” A forty-one-year-old teacher from Riazan had the following to add: “I wish that at the end of the year, the journal could give a short systematic overview of various important scientific movements in the USSR; this would be helpful to my students.” A thirty-year-old female doctor from Kuban added, “I wish that you would publish articles on maternity and proper hygiene in child rearing.” Lastly, a twenty-one-year-old peasant from Pskov province wrote: “You do not have a section on scientific developments in the agricultural area. There is nothing in the journal on new machines that can help those of us working in the countryside. For farmers, knowledge of new technology is important.”

Comments by those survey respondents point toward the consistent need of various readers of popular-scientific material for relevant information. Scientific articles of a utilitarian and practical nature, those capable of enhancing people’s everyday work life, were in high demand. This need, however, did not preclude urban readers from interest in scientific themes not applicable to their jobs. Actually, public astronomy lectures and literature on astronomy, for example, were extremely popular among urban dwellers. The public had a genuine fascination for how the world around them was constructed. The survey shows that articles on air flight and space exploration were particularly noted as very popular among regular readers of journals. Nevertheless, the preponderance of responses concerning practical material suggests that readers primarily wanted to know how science and technology could benefit their lives and enhance their job performance.

As the survey indicates, white-collar employees and students were also avid readers of popular-scientific journals. In a 1927 survey conducted by the popular-scientific journal *Iskra*, students made up approximately 20 percent of all respondents, while employees made up approximately 30 percent. Furthermore, respondents once again indicated their interest in articles that related to their work. White-collar workers were especially interested in articles on topics such as the metric system and standardization or topics related to the economy. Students were specifically interested in articles on Darwinism, evolutionary theory, and Marxism. Doctors were interested in articles on biological and medical topics.85

Published and unpublished letters to the editor represent another tool for measuring reader response to popular-scientific themes. Many popular-scientific journals had sections entitled “Perеписка с читателями” (correspondence with readers). The editors of *Iskra* believed this provision was a means for readers to express their opinions about changes they wanted to see incorporated into the journal’s format. Many of the letters to the editor of *Iskra* were on such subjects as the evolution of humans, the Earth, and planets in the solar system. These requests echoed the results of reader surveys conducted in urban areas by sociologists like Vinogradova. Many readers wrote in asking the editors to review more popular works on astronomy. They were especially interested in books on the stars and moon. Many readers expressed interest in how humans evolved and how the Earth developed. One reader wrote in a June 1923 letter to the journal: “Could you please review books in your journal that give readers a basic analysis of contemporary evolutionary theories on the development of man and the Earth? I am especially interested in learning more about hereditary influences and genetic variation.”86

*Iskra nauki*, like other similar journals, had a section entitled “Questions and Answers,” where readers’ mailed-in questions were sometimes answered by science journalists but also by scientists, academics, and professors. Occasionally, well-known academics, such as Oldenburg or Perel’man, were hired by the journal to answer those letters with cogent replies. Letters to the editor covered a number of scientific topics from atomic structure to electric power. Many letters came from readers who had questions concerning their particular specialty and line of work. Sometimes readers had questions on medical advances relating to certain diseases. A forty-six-year-old female worker wrote explaining she suffered from goiter and was wondering whether a physician could explain to her what she should expect if the disease worsened.87 Readers engaged experts working for these journals in a serious and personal manner regarding scientific or even medical problems with which they struggled.
Many workers wrote letters to the journal asking questions about their amateur scientific interests, like astronomical observations. Some wanted to know how one can observe certain stars and planets. One worker asked when and where one could observe the planets Jupiter and Mercury. With regard to Mercury, a scientific specialist explained that Mercury’s position as the first of the interior planets makes it difficult to observe because it often gets lost in the sun’s rays, making it a challenge even for astronomy specialists to observe. A worker named Meñikov asked about the nature of cosmic rays falling down to Earth from interplanetary space. He wanted to know what effect these rays had on the earth’s surface.33

One of the best-known popularizers of astronomical knowledge, Ia. Perel’man, received many letters from his readers. Unpublished letters in Perel’man’s personal file in the Academy of Sciences archive evoke the expressive nature of popular science-reading interests among young Soviets in the 1920s. According to Perel’man, many of the letters he received from younger readers attested to an interest in rockets and the ability to travel into space. Almost all of these letters contained references to the ideas of Konstantin Tsolokovskii.34 Even though a provincial schoolteacher of physics from Kaluga, Tsolokovskii was a visionary rocket specialist and is considered the grandfather of Soviet cosmonautics. According to Perel’man such letters displayed an utter fascination, if not obsession, that Russian readers had with the cosmos.

Perel’man wrote a number of popular-scientific books in the ’20s and ’30s in a series carrying the title “Zanimatel’naia nauka” (science for entertainment). These books were used as self-education texts by many people. They covered physics, mathematics, astronomy, and chemistry. A professor of physics at Moscow State University wrote Perel’man telling him that “your books interest not only my students, but also school children and common workers. In your books, you are able to provide the mass reader with new, interesting facts.” A Leningrad worker wrote Perel’man saying that his popular books on physics were very interesting and were read by a number of his fellow workers. That worker was especially interested in physics and said he had learned a lot from Perel’man’s book *Physics for Entertainment*. Workers found that Perel’man’s books rendered complex scientific principles in a more accessible form for the layman.33 Those works anticipated contemporary science texts and courses with titles like “Physics for Poets” that simplify disciplines for the layman.

On the fortieth anniversary of Perel’man’s career as a science popularizer (1899–1939), three major academics—A. Ioffe, S. Bernshtein, and V. Smirnov—sent a letter to Perel’man’s publisher commending him for his cultural work. Those scientists believed Perel’man’s books helped spread science to a wide range of Russian readers. In their letter they wrote: “Ia. I. Perel’man wrote books not for a small circle of enthusiasts of the natural sciences, but for the widest circle of readers. The basic idea of his work—‘absorbing science’—captured the interest of an entire generation of Russian readers. Our young people especially liked the works of Perel’man. The general circulation of his books numbered in the millions of copies.”33

The availability of popular-scientific material was more problematic in the Soviet countryside in the 1920s when compared to the situation in urban areas. In 1925 merely seven publishing houses published books for distribution in the countryside, and by 1924 that number had increased only to twelve. In 1924 the publication of books for rural readers was broken down into the following subject categories (including percentage of total books published): agricultural 37.5 percent, social-political 30 percent, literary/artistic 17 percent, scientific-popular 15.2 percent, and others .3 percent.32

Although popular-scientific books represented 15.2 percent of all books published for the peasant-reader, that does not accurately reflect the peasants’ interest in scientific works. On the one hand, according to M. M. Slukhovskii, only 2.7 percent of peasant readers surveyed in the state sociological studies were interested in books on natural-scientific and medical topics. On the other hand, 20 percent were interested in books on agricultural themes, and 18 percent on crafts and industry.33 The surveys reflected a tendency among peasant readers to demand books on practical themes and topics relating to their agricultural work.

In the 1920s I. Taradin conducted a study of rural book holdings in Voronezh province. He found on average that 35.3 percent of all books in peasants’ personal collections were self-educational textbooks, 12.5 percent were non-fiction works on agricultural topics, and 36 percent were on religious topics. According to Taradin, though the figure of 36 percent for religious works had dropped from 50 percent since the revolution, that still indicated that religious books, published prior to 1917, were a high proportion of all books owned by peasants. Only 2.2 percent of books in peasant-home collections before 1917 were textbooks. That rise after the revolution in the percentage of textbooks owned by peasants to 35.3 percent was a direct result of the interest peasant farmers had in purchasing instructional texts and pamphlets dealing with agricultural and horticultural themes.34

Agit-Prop officials also monitored rural readers’ interests during the twenties. The Central Committee’s Agit-Prop Department trained various individuals to survey reading interests in Russia. Much of this concentrated on the countryside, where Soviet rule was rather tenuous before 1928. Government officials were especially concerned with what peasants were reading and with their ability to buy books during the NEP. In 1923 Gosizdat officials attempted to lower the taxes on small book stalls to give merchants...
incentives to lower book prices for peasants. They also provided peasants with free book catalogues at agricultural exhibitions in the countryside.65

One Agit-Prop worker surveyed book markets in the Orel region. He presented himself as an independent book trader and asked those purchasing books what they came to buy. He noticed that peasants were mostly interested in nonfiction books on the following subjects: pig-breeding, horticulture, and sheep-breeding. Most of their purchases were of scientific books on subjects that had practical use for their agricultural work. Many peasants told him that “we have very little money, except subsistence funds for food and provisions. We lose much of our surplus funds to taxes.” He concluded that they could afford little for books. Furthermore, those who came to look at or buy books referred to them as kuniel’mye (smoking books). The peasants explained, “We buy them, read through them a bit, and then use the paper to smoke tobacco.”66

The Agit-Prop researcher Levin noted that peasants in this region were very interested in scientific books containing basic medical information on infectious diseases. Levin believed this might have been due to the high rate of syphilis in the area and to the fact that farmers were interested in learning more about diseases affecting animals. He summed up his observations by noting:

Concretely, scientific works are popular with peasant readers if these books can describe to them better and more efficient methods of breeding and planting. They are also important if they can help give scientific reasons for certain epidemics. However, in general, scientific books seem to have no present worth to the peasant. They stop and look at pictures in the books, but only give the rest a cursory glance. It is also absolutely imperative to immediately stop the appalling epidemic of peasants smoking the pages of books. Unfortunately, the peasants in this area cannot purchase and read books when they are more concerned with their dreary living conditions. They are poor and dirty. They have no meat to eat, and they only eat milk and potatoes.67

Another Agit-Prop researcher named Roga investigated readers’ interests in the Petrograd region of Russia during July 1923. Roga’s observations of peasants around Petrograd were quite similar to Levin’s in Orel. Peasants were especially interested in scientific pamphlets on horticulture and animal husbandry. But Roga claimed that most peasants saw little worth in scientific books in general. Roga also noted that in this region a majority of books were bought at shops. According to Roga, book peddlers had become a much more expensive source.68

Yet another Agit-Prop researcher, traveling in the Orel region of Russia, found several libraries in the area, but they were in dreadful condition. Many of the books just stayed on the shelves of the libraries. Most of the libraries contained either old Russian classics (like Turgenev) or Soviet polemical literature from the period of War Communism, with very little material that dealt with popular-scientific or practical-agricultural themes. The researcher believed that few peasants in that area could actually afford to purchase books. Peasants complained to him about their poverty and expressed a disinterest in official Soviet publications like newspapers. They reiterated their inability to afford books, which were seen as a luxury. One peasant said to him that “if we were living in the city or center, then things would be different.”69

The researcher in Orel said that most villagers still lived by rumor, especially with regard to scientific inventions and new technology. One villager, in all seriousness, asked the researcher whether it was true that “in Moscow people saw a boat that could move along the streets by itself.” The researcher noted that the peasant was only interested in nonfictional works that related to his vocation. He reported that most peasants only wanted to read books that could tell them more about breeding and planting, “how to breed a better pig, and plant better vegetables,” as one peasant put the matter. He observed that it was rare to find villagers interested in popular-scientific or technological works that had no practical use.70

In contrast to the readership of rural Russia, readers in urban areas expressed an enormous interest in popular-scientific and technical books, journals, and pamphlets. In addition to a demand for articles relating to their work and for themes having practical application to their everyday life, the urban reading public had an appetite for a variety of fascinating themes such as astronomy, global exploration, and the cosmos beyond. These readers showed a genuine interest in understanding the world around them and had an imaginative impulse to understand the universe. They were forthright in the queries they posed to scientists through the venues of the journals’ surveys and question-and-answer sections. The content of science in the public realm was not usually politicized or didactic, nor was it limited to glorifying Soviet Russia’s accomplishments. In this way, most Soviet readers were exposed to technological information and the feats of Western technology, which were reported in laudatory articles and editorials by Communist and non-Communist journals alike. This popular demand from below for information on global technology had temporarily survived the October Revolution and had been cultivated by many Bolshevik leaders who were obsessed with Western scientific achievements.
Chapter 5

IMAGINING SCIENCE

Land, Air, and Space for the New Soviet Citizen of the 1920s

An important, overarching theme in the popular science media in the
1920s was the creation of the new scientific and modern world. In their
work on the semiotics of Russian cultural history, Yuri Lotman and Boris Uspensky
describe the dynamics of Russian growth in the 1920s as transformational and not as
developmental, that is, a process essentially binary in nature that depicts a duality in Russian cultural history. The past can be painted in
a dark frame to dramatize the brightness of the new world of the twentieth
century, especially after the October Revolution. The emblems of the new
world would be the machine and modern technological advances.

TECHNOLOGY AND THE UTILITARIAN APPLICATIONS OF SCIENCE

For the Bolsheviks, science popularization involved actively spreading tech-
nology to dispel the darkness of the masses by transforming their minds and
instilling in laborers a rational mode of thought. It involved bringing the city
(modern technology, education, and rational planning) to the countryside.
There was an equation between light and knowledge. The Leninist electrifi-
cation campaign was a symbol of technological progress and an integral part of
a rational, scientific society. The pervasive theme of “science as enlightenment” in the popular-science media also encompassed the rationalization of production in industry and the countryside. One can find many articles in the popular journals concerning
Soviet Taylorism. The notion of a rationalized scientific agriculture was
especially prevalent in the popular literature. Popular-scientific journals like
Pireoda (nature) carried articles entitled “Applied Botany.” Many of the popular-
science series published in the 1920s by Gosizdat and private publishers included pamphlets on the transformation of agriculture through science. The metaphor of the “invisible beings” was constantly evoked in pamphlets
and journals explaining the basics of microbiology. Previously unknown dis-
esases (among livestock and humans) were now found to be caused by vari-
uous microscopic viruses and bacteria, which could be cured through applied
scientific research. Many popular journals and pamphlets also stressed the
importance of hygiene and health. Cleanliness and the use of disinfectants
could fight disease, and emphasizing those themes had practical importance.
Sanitation and hygiene were portrayed in the popular media as the accom-
plishments of modern industrial society. Science could transform Soviet society
with a new ethos but also create the basis for a more productive industrial
and agricultural economy.

In the popular-science media, technology was portrayed as a progressive
force for society and industry. Popular-scientific journals carried sections on
new technology and inventions and how they could be used in industry.
Furthermore, Western technological developments were practically revered
in the popular journals. This reinforced the portrayal of Western (especially
American) technology in Soviet newspapers during the twenties. Fordism
and Taylorism blended in Soviet Russia during the twenties, emphasizing
America as the giant emblem of modernity. Sometimes “America” was a sym-
bol of how technology was transforming modern culture.

In the Leningrad journal Nauka i tekhnika, many of the short entries on
technology featured mostly new inventions or devices from America or
Western Europe. One 1926 article described a new, grandiose hydroelectric
station being built in Tennessee. The article described how magnificent this
new station would be and how easily it could produce enough energy to run
two factories. The dam, blocking the river flow, will be 1,500 meters long,
and the lake thus formed will have a surface area of 34 square kilometers. The
power station, 375 meters long, will be part of the dam, and when it is com-
pleted will have eighteen turbines generating over 600,000 horsepower.
Another article described how a company in Spain (Oviedo) devised a tech-
nique to extract iron from ore without using a blast-furnace. The technique
involved using compressed gas as a fuel and extracting the metal magneti-
cally from the silicate mixture remaining after the burning process. Both
the advances and application of Western technology were emphasized for read-
ers to digest. In these journals, borrowing from the feats of Western technol-
ogy was portrayed as acceptable for an international citizenry. Furthermore,
it situated Soviet Russia within a developing global technological revolution,
not outside of it because of political, governmental divergences.

A 1923 article in Iskra was one of many in the journal that explicitly lauds
the speed and technical performance of Ford's great American automobile as-
sembly lines. During the twenties the Soviets became fixated on Western
conveyor-belt assembly production. The article emphasized how the Soviets
could learn from Ford’s techniques in Detroit. Even the Komsomol’s thick journal *Modolatia zvrdilag* continually invoked America as a symbol of modern technology. Short entries on American technology filled the section “News of Technology.” These ranged from inventions that could be used for industry to those that could help agricultural productivity. One article entitled “Iron Horse” described a new tractor built in America that could replace any horse in its ability to plow the fields without stopping. Young Communist readers were asked to consider how this new plowing device, once imported throughout Russia, could transform agricultural productivity. Remarkably, this Communist youth journal includes relatively few references to Soviet technological advances in the production of agricultural equipment. The articles focus instead on how underdeveloped countries like Russia could borrow from the advanced inventions of the West.

Although notes on Western technology occupied a large portion of these journals, as the 1920s progressed some began to carry sections on Soviet technology and inventions. For instance, *Iskra nauki* carried a section entitled “Soviet Industry and Technology.” Until 1928 entries in these sections still discussed the application of Western technology to Soviet industry. One article in *Iskra nauki* described a huge freezer devised by a Danish professor that could keep large quantities of fish frozen. In 1927 a large freezer of this type was being imported and constructed in Baku near the Caspian Sea. The entry described how important this would be for the fishing industry in the Caucasus region.

As the 1920s unfolded, more articles appeared that illuminated the new advances of Soviet science and technology. In 1927 *Iskra nauki* stressed the ties of science and Soviet industry in new sections such as “On the Path of Industrialization” and “Soviet Machine.” The latter included articles emphasizing the advances in Soviet science and its application to machine production and technology. Articles also described the construction of large turbogenerators. Much of the section was devoted to describing technological advances like high powered steam turbines in Soviet industry during the first decade after the revolution.

On the eve of Stalin’s revolution from above, popular-scientific journals began to feature the work of Soviet inventors, anticipating the focus on national technological feats of the 1930s in Soviet Russia. Editors of popular journals encouraged amateur inventors and workers to send in descriptions of their new projects. Many journals formed sections devoted to Soviet inventions, including critiques of their potential by scientific specialists. Many of these project descriptions came from workers eager to display their own ideas. Projects varied from new barometers to various types of turbine engines. Scientists, although encouraging, were usually critical of these new inventions. All the same, editors and scientists clearly sought to encourage technological innovation from amateurs.

In a later period, during the First-Five Year Plan (1928–32), the Soviet regime would commit an enormous amount of energy to sponsoring a mass movement of worker-inventors (the *rabochi izobretatel’* movement). Kendall Bailes has argued that this movement actually did little to sponsor good inventive projects by workers. One problem was that graduate technical specialists and engineers did not want to take time off from their work to evaluate the enormous number of amateur projects sent to them. This is understandable considering the poor quality of most of the inventions. Many specialists, however, were not outspoken about this topic in public because they did not want to appear politically disloyal to the Stalinist regime, which insisted on support of the movement for political purposes. Some specialists boldly stated their opposition to the worker-inventor movement, arguing that it was not worth their time to spend energy on social projects that did not pay them extra money or had no real practical applications. John Littlepage, an American engineer working in the Soviet gold-mining industry, was furious about the regime’s demands on engineers in this regard: “One small and unimportant example will serve to show as well as anything else how the busiest and best-trained engineers are bogged down in routine and pestered by political control. I refer to the perpetual nuisance of so-called inventors, crack-brained persons who are convinced they have made some amazing mechanical discovery, a type that seems to be more numerous in Soviet Russia than elsewhere.”

The post-1928, state-sponsored worker-inventor movement differed dramatically from the initiative of editors and science-popularizers in the popular media of the NEP era. During the twenties the solicitation of workers’ inventions by journals was geared toward establishing a form of discourse between scientist/educator and amateur. Sections in the popular journals did not emphasize the practical application of amateur inventions, nor did they focus on how Soviet workers could outpace inventors in the capitalist West. Instead, these sections stressed the importance of amateur inspiration in the conception of new technologies and devices. Even though specialists, who evaluated the projects sent in by amateurs, were typically doubtful about their potential application, responses never questioned the worth of exciting amateurs to invent contraptions and to think about how they could technologically operate, based on certain scientific principles. The goals of the editors and scientists in the mid-1920s were, above all, educational.

The correspondences between scientists and readers in the 1920s did not emphasize the importance of worker-inventors as a superior class, nor did they exclude examples of Western technological ingenuity. Furthermore, in
the early to mid-1920s (in contrast to the 1930s), editors never suggested that these inventors and their work represented something solely unique to Russia. Editorials stressed the need both to understand foreign technology and to improve on its foundations. Much of this editorial content would change in the late 1920s and early 1930s as the importance of “Soviet technology” was emphasized more in the popular media. By the mid-1930s, Stalinist culture would add a nationalistic component to the public discourse between scientists and laymen, attempting to break the cosmopolitan perspective that Soviet readers used as a framework for understanding global technology in the 1920s.

POPULAR AIR FLIGHT AND THE COSMOS BEYOND

Air flight was an especially popular theme in the mass-science media at the turn of the century. In cities throughout Russia, journals on airplanes and aviation were extremely popular with readers. In the post-October period, many of the new journals were organs of various scientific and voluntary aviation societies. These journals focused on a range of topics, some concentrating on specific types of airships like dirigibles. Others were general popular-scientific journals on air flight, like the Moscow journal entitled Vozdushnoe plavanie (air flight), founded in 1922. These journals arose in a wide range of Soviet cities in diverse areas such as Leningrad, Novgorod, and Novonikolaevsk. The Soviet regime also supported five key aviation institutes in the 1920s, which were extensively involved in publishing their proceedings for the public. Some of these institutes sponsored popular lectures and the publication of popular journals and pamphlets. Those particular institutes were in Voronezh, Kazan, Kiev, Moscow, and Khar’kov. Various air institutes were keenly aware of the practical importance of popularizing air-flight but also of how fixated the Russian public was on this topic.

In the 1920s, air flight was not only popular but actually became a craze in Soviet Russia. Professors like N. A. Rynin in Leningrad were popularizers of air and space literature. During the NEP, government and amateur societies popularized air study and travel in many ways. Certainly, both the Soviet state and voluntary organizations were interested in the development of aviation for the purposes of military defense, and the building of a civilian air fleet during the NEP was important to the regime. An air transportation system could be used to integrate the Soviet Union and transport products and supplies to the far reaches of the empire. There was also a popular fascination with the air-flight development. Many articles in the scientific mass media were particularly devoted to popular analysis and conceptualization of new flying machines, and the public eagerly consumed journals devoted to air flight.

This air-flight craze was an integral part of a European and international phenomenon. In Europe the reporting of aeronautical feats became popular news items and were anticipated well ahead of time—much in the way that rocket flights by the United States and USSR in the 1960s were portrayed by television reporters. Before the First World War, popular air shows in the United States and Europe helped foster international interest in how air flight technology could alter human relationships with the natural world. Feats of modern aviation were closely tied to nationalistic and patriotic sentiment. In his work on German aviation and popular culture, Peter Fritzsche has convincingly argued that in Germany, both before and after the First World War, technological change and nationalism intersected in the development of aviation. Many countries would subsequently become competitors in developing faster and larger airplanes.

The case study of German aviation is a good example of the ubiquitous links connecting technological development, modernity, and the nation-state. However, after the Bolshevik Revolution in Soviet Russia, air flight did not acquire the nationalistic tendencies that Fritzsche sees in Germany. Because of the development of a different sociopolitical context, it was not until the 1930s that a nationalistic resurgence came to characterize Soviet aviation, with the emphasis of Russian cultural themes under Stalin. Part of this delay can be explained by the underdeveloped nature of Soviet aviation in the 1920s, which led to an emphasis on foreign models. But it mainly had to do with the Soviet public’s fascination with foreign technology in general in the 1920s. Soviet Russia did not close itself off from Western technological development in the 1920s, and readers eagerly consumed news items on Western and international feats of flight.

One of the more popular Soviet journals on air flight during the twenties was Samolet (airplane). Samolet was a monthly popular-scientific journal devoted to aviation published by the “Society of the Friends of the Air Force” (ODVF), which in the 1920s claimed over 100,000 active members. The journal was founded in 1923 and had a print-run of over fifteen thousand copies per month. Articles in Samolet were quite diverse in subject matter. The editors of the journal strove to discuss a wide range of issues relating to aviation: “The goal of our journal is not only to discuss the building of airplanes or the Air Force itself. Ultimately we want to spread knowledge about aviation: construction of airplanes, their multifaceted use, their history and development in various countries.” Articles in the journal emphasized how important airplanes would be for civilian use. After the First World War, aviation
factories all over the world became free of the burden of defense orders and could begin to prepare planes for peacetime use. Popular articles emphasized the use of airplanes internationally in a variety of areas: passenger service, postal transport, aerial photography, and observation of natural disasters from above. Another popular journal published in the 1920s was Aviatia i khimia (aviation and chemistry), published by the Union of Societies of Aviation in the USSR. Some sections in this journal did concentrate on national defense and the air industry, but many of the articles emphasized the applications of airplanes to the civilian economy. Airplanes would be able to carry large numbers of passengers and parcels long distances throughout the Soviet Union. Many other articles in this popular journal described aerial photography and its practical uses for agriculture, forestry, and geology. Aeronautical technology was generally shown as contributing to practical achievements that could benefit the Soviet public.

Although many of the popular-aviation journals of the 1920s were organs of various Soviet all-union or national societies, they still emphasized advances in foreign aviation. Both the feats of foreign pilots and the construction of new airplanes abroad filled these popular journals. This lauding of foreign achievement became one of the most fascinating aspects of these journals for the popular readers. Some articles discussed new flight paths and record distance runs that were completed in the West. In 1923 a 24,000-kilometer flight path was organized and completed over parts of Western Europe. Samoleot even contained an entire section entitled “Aviation Abroad.” Much of this section during the twenties was filled with articles about dirigibles (zeppelins). Some of this was a synopsis of Western press coverage. Articles in Samoleot reproduced the American press stories on the flight of the German zeppelin ZR-3 from Berlin to America in 1924. Readers were fascinated as to the possibility of transatlantic flight in the new “airships.”

It was not until the 1930s that the feats of Soviet aviators would dominate the popular journals and media. By then, developments in Soviet aviation were portrayed as great feats for the nation. In the popular journals 1936 was characterized as a year of “Stakhanovite Socialist Aviation.” In the summer of 1936, Chkalov, Baidukov, and Beliakov flew their historic nonstop flight in a Soviet ANT-25. In 1936 Levanovskii and Levchenko flew from Los Angeles to Moscow, and Molokov flew along the arctic seaboard of the USSR. In the 1920s, however, international aeronautical feats were covered with the same frequency as equivalent Russian achievements. These events captivated a Russian audience not yet subjected to “blackouts” of information that would later characterize coverage of foreign technology, like the space race and U.S. rocket launches. Furthermore, the Stalinist 1930s would soon represent a departure point as the popular press began to cover aeronautical developments in an increasingly nationalistic, triumphal manner. Coverage of international air flight in the NEP era clearly distinguished the cultural arena in the first decade of Soviet power from the 1930s and beyond.

Air flight was not the only popular aeronautical craze in Soviet Russia during the nineteen twenties. The exploration of space was also a popular theme in the mass media. Some of that interest in Russia predated the 1917 Revolution and was tied to the philosophical ideas of Nikolai Fedorov. Fedorov’s vague notions of space travel as a way to achieve immortality were at the crux of his mystical and scientific utopia, and his ideas were popular among many Russian intellectuals.

Fedorov worried that the Earth itself was overcrowded, and he believed fervently that the only way to relieve this Malthusian pressure was to explore and colonize space. In the 1870s and 1880s, Fedorov helped a number of young scholars finance their studies. Many of these scholars had come to Moscow to study various scientific and philosophical topics. One of these disciples was K. E. Tsiolkovsky, a mathematics student from Kaluga, who would later become a visionary scientist and among the first to analyze the possibility of space flight using rocket-fuel propulsion. According to V. L’yov, Tsiolkovskii learned about the possibility of space travel from his conversations with Fedorov, becoming his greatest disciple. Victor Shklovskii also describes how Fedorov hoped the young mathematician would popularize the notion of space flight among the Russian public. Shklovskii quoted Fedorov as once telling Tsiolkovskii: “I’m going to do mathematics with you, and you’ll help mankind build rockets so that we will finally be able to know more than earth and so that we can see our earth. People need a distant look, because only those people who are thinking about the future are real and present.”

In the Soviet period, the Biocosmists became devout disciples of Fedorov’s basic visions, as their beliefs centered around interplanetary flight and immortality. Besides Tsiolkovskii, other followers of Fedorov in the Soviet period included Valerian Muraviev (the editor of Alexei Gavest’s journal at the Central Institute of Labor), Leonid Krasin, and even the renowned geochemist and science popularizer V. I. Vernadskii. The Biocosmists spread Fedorov’s and Tsiolkovskii’s ideas in the popular media for an eager public willingly consuming articles on space travel.

Along with Tsiolkovskii and the Biocosmists, probably the best-known popularizer of space travel and astronomy in the 1920s was the physics professor Ia. I. Perel’man. In the 1910s, Perel’man was the editor of the popular-scientific journal Priroda i ljudi (nature and people). After the revolution, he served in the Commissariat of Enlightenment working in the department on
school reform. He also became editor of the popular journal *V masterskoj prirody* (in nature’s workshop), in which he published many articles on rocket science and space travel.

Perelman saw Tsiolkovskii, the inventor and teacher of physics in Kaluga, as the pioneer theoretician of space flight in Soviet Russia in the post-1917 era. Thanks to Perelman’s editorial initiative, Tsiolkovskii’s theories and drawings about rockets were featured in the popular-scientific journals during the twenties. Drawings of his rocket ships appeared in his scientific tale “Beyond the Earth,” which initially appeared in *Priroda i ludi* in 1918. Earlier in 1903 Tsiolkovskii had published an article in the journal *Nauchnoe obozrenie* (scientific review) entitled “The Research of Cosmic Space with the Help of Rocket Devices.” In his article the theoretician proposed that flight in interplanetary space was possible with a rocket. He believed such a rocket could be propelled forward with enormous speed from the combustion of fuel. According to his calculations the rocket would have to be traveling at eleven kilometers per second to overcome the force of the Earth’s gravity.54

In the 1920s Perelman popularized Tsiolkovskii’s theories in his book *Mezhplosnevnoe puteshestvie* (interplanetary travel). Perelman defended the notion of space flight against skeptics by noting that at one time people thought air flight itself was simply impossible. He offered the Russian reader a basic analysis of gravitational forces and how they could be overcome by a projectile traveling at high speeds.55 For Perelman, a technical solution to space flight had been worked out in theory by Tsiolkovskii and other European scientists, “and that which is worked on today, can be brought to practical existence tomorrow.”56

Tsiolkovskii himself was active in popularizing ideas about space travel. In the 1920s and 1930s he printed pamphlets out of his own publishing house in Kaluga, where he lived and taught. His private press became quite an unusual venture in Stalin’s Russia of the 1930s. Russians were especially fascinated during this time with dirigibles, so much so that Tsiolkovskii spent as much time writing popular pamphlets on this topic as he did on rocket flight. He published a popular atlas on blimps and analyzed their design and function. He also published several popular pamphlets on his own inventions, which included diagrams of rockets and other contraptions.57

Rocket science and space travel were only part of a more general interest on the part of the Russian reader of popular science during the twenties in astronomy, the cosmos, and the exploration of the solar system. They also expressed special interest in research on planets and the solar system. Scientific societies sponsored public disputations in Leningrad and Moscow on the planet Mars, which drew huge audiences. There was also an upsurge in the number of amateur astronomical observers who joined various organiza-

tions in Russia’s major cities. The study of the formation of the other planets in the solar system fascinated Russians of the early 1920s. Mars was an especially hot topic during this period. In 1921 at the Moscow Polytechnic Museum, A. A. Mikhailov delivered a series of popular lectures about Mars that were very well attended by Muscovites. He helped the Moscow Society for the Amateurs of Astronomy organize over twenty popular-scientific lectures at the Polytechnic Museum on astronomical themes in the first half of 1921 alone. These lectures packed the Polytechnical Museum’s main auditorium, as eager citizens marveled and imagined planetary histories. Society members even noted how eager spectators waited patiently in long lines to get good seats in the museum’s main hall on the day of a presentation that usually included awe-inspiring photographs of stellar configurations.58

K. I. Baev, a well-known Russian astronomer, wrote and edited an enormous quantity of popular articles on astronomy in the journals during the twenties. He gave several of the more popular lectures in Moscow at the Polytechnical Museum. His articles appeared both in Communist journals—*Molodaja guardia* (young guard), for instance—as well as non-party publications like *V masterskoj prirody*. Many of his articles concentrated on the formation and composition of planets in the solar system. Some of his articles were historical in nature, discussing the various scientific conceptions of how planets developed in the solar system.

In general, Russian astronomers wrote many articles in the popular media about the work of American researchers. Baev himself found the hypothesis of the geologist Thomas Chrowder Chamberlain and the astronomer Forest Ray Moulton, both professors at the University of Chicago, to be instrumental in understanding how the Earth formed. Their hypothesis on nebulas was part of well-known investigations conducted at the Likov Observatory in California at Mount Hamilton. Those studies systematically photographed large and small nebula-like objects that today we know as galaxies.59 Baev and other Russian specialists eagerly transposed that research through the popular media for consumption by amateur astronomers in Soviet Russia. They editorialized on how Russian amateur astronomers needed to be connected to the findings of those in the West.

Practically every popular-scientific journal in the 1920s carried a section listing amateur observations of astronomical occurrences. *V masterskoj prirody* had a section entitled “Stellar Appearances.” Readers could send in the date of their observation and a description of exactly what they thought they saw in layman’s terms. These sections enabled amateur observers to begin a dialogue with scientific experts who would occasionally discuss the nature of these observances in the journals. This aeronautical and astronomical literature furthered the dialogue between amateurs and scientists and helped
foster an active interest in science among nonspecialists. In turn, this literature reflected the imaginative potential of the urban Russian reader in envisioning the world and cosmos beyond. Readers relied on an international base of information regarding technological developments that included research outside the borders of socialist Russia.

GEOGRAPHY, GEOLOGY, AND THE EXPLORATION OF THE SOVIET LANDSCAPE

The popularization of geography was particularly important to prerevolutionary academics and Soviet scientists in the 1920s. Many science popularizers, beginning in late Imperial Russia, were trained as geologists or geochemists. They included the geologist V. Obruchev, the famous geochemist V. Vernadskii, and the well known mineralogist A. Fersman. These specialists were prominent, respected Russian academics, and their popular works and lectures were valued and appreciated by the public. They wrote about the vast mineral resources and natural wealth of the Russian empire. Their popular writings displayed a nationalistic sentiment and glorified the enormous resource potential of the Russian land. Many of the popular-scientific journals in the late nineteenth and early twentieth centuries were also filled with articles about world exploration. Those articles captured the popular imagination of Russian readers and inspired their desire to learn more about newly discovered areas and peoples all over the globe. Popular literature on geography, particularly, displays both an informative and imaginative component, especially since readers were fascinated by novels, Tolstoy’s for instance, that described peripheral terrains of the Russian empire. Russian readers were keenly interested in the journeys of both Russian and foreign explorers, anthropologists, and geologists.

The popular media was filled with articles on geography that concentrated on two general themes. The first encompassed description of the natural resources and vast landscape of the Russian empire. That theme combined the scientific description of the immense potential of fossil resources and also glorified the Russian empire’s natural wealth. The second theme looked at exploration of the Russian landscape and the globe. The focus on global exploration stressed the importance of world geography, while capturing the popular imagination with themes on distant lands and peoples. In the Russian popular journals of the late imperial period, descriptions of world exploration also emphasized superficial ethnographic analysis filled with Eurocentric descriptions of indigenous peoples.

Many of the popular geographic journals of the late imperial period offered mixed messages and signs. On the one hand, such articles provided Russian readers with sophisticated geological and geographical notes on and analysis of the world’s more remote areas—the terrain of the island of Formosa or the jungles of parts of the African interior continent, for example. These descriptions grew from eclectic observations and analyses of plant and animal life, mineralogical formations, and topographical points. Within many of the popular journals, with the exception of the Academy of Sciences’ Priroda, geological analysis was always intermixed with a type of pseudo-ethnography. Editors of these journals felt the need to include descriptions of the peoples of these areas in an exotic manner, defining them as different from civilized Europeans or Russians. In an article describing the geology and geography of the island of Formosa, the editors of Vokrug sveta (around the world) gave readers a detailed account of the terrain, flora and fauna, and mineralogical content of that area. However, they painted images of the people who inhabited the island as “wild natives” who were absolutely bewildered by Western dress and customs.40

Many of these articles focused on foreign explorers and their exploits, coloring the Eurocentric descriptions of remote global areas and peoples. The articles often described the scientific analysis of Russian naturalists and the travels of Russian tourists. A strange duality obtained with regard to these popular-geographic journals; while they educated, they also reinforced images of the “other,” encouraging colonial and imperial responses to these encounters.41 For example, in some of the first issues of the popular journal Estestvoznanie i geografia (natural science and geography) in the 1890s, a series of articles appeared describing the geography and peoples of Siberia. Like the Russian North and the Caucasus, Siberia was a remote location and a popular topic for those readers living in the major urban centers of European Russia. Many of these articles were unsophisticated ethnographic treatises. In an article on the exploration of south-western Siberia, K. Nosilov described a boat expedition to Semipalatinsk, where his entourage came upon “wild tribes” of indigenous Siberians living along the waterways. His record of encounters with the local Kirghiz, an indigenous Mongol people of the area, describes their native political orientation as overtly despotic and hierarchical, even though they had had contacts with “other civilizations.”42

An article in Vokrug sveta in 1895 described a Russian naturalist and his entourage on their trip to Sumatra. The article spent time describing the “savage Batak” people who had practiced cannibalism for ages. Interestingly enough, the author of this article had spent several months living near and among these peoples, and, at the outset, described them as not so “uncivilized” as Europeans had typically thought. The author concluded his article by saying that after living for months among the Batak, he never once had
any serious misunderstanding with them. Yet the tone of his article mimicked the nineteenth-century “civilized tourist” moving among a native people, whom he categorized for public consumption back in Russia. The author’s frequent use of phrases like “savage natives” reinforced for the reader a culturally constructed distance between the “civilized” and “uncivilized” world.43

Thematic articles of the period often described global exploratory trips and expeditions to the periphery of Russia’s vast empire. In contrast to articles like those in Estestvoznaniye i geografija, shaped by a colonial ethnographic perspective, many others presented a more sophisticated scientific and geographic analysis of places most Russian citizens would never venture to explore. By the turn of the century the Academy of Sciences’ popular-scientific journal Priroda carried a specific subsection on geology and mineralogy. A. E. Fersman, one of the members of the journal’s editorial board, always insisted that the public understood the importance of these new disciplines. The Academy’s journal carried a more sophisticated section on “Geographical News” and ran commentary on exploration all over the globe.

Even prior to the 1917 Russian Revolution, Fersman, as an editor of articles on these topics, conjured up a nationalistic perspective about Russia’s wealth and potential strength as a country. In an editorial in March of 1915 in Priroda, Fersman argued that the fossil wealth of a country could influence the industry, culture, and even military strength of its whole people. Many articles that he edited or wrote himself developed this general perspective in more detail. In an article in early 1915 describing the natural wealth of Galicia, recently seized by the Russian Army from the Austro-Hungarian Empire, Fersman tried to describe how the resources of this new possession could affect Russia’s geopolitical importance. As the oil industry grew and advances in technology made extraction easier, Galicia had become a rich resource of oil by the turn of century. Fersman believed that Galicia, Bukovina, and the entire Carpathian region was infested not just with oil but other important natural resources and that the area had to be further developed by Russian industrial investors.44

As editor of geographical essays in Priroda, Fersman encouraged other geologists and explorers to write popular articles for the Russian layman, describing the exotic borderlands of the Russian empire. Just before the onset of World War I a Professor Mashasek, interested in the morphology of rock and mountain formation, contributed many popular articles to Priroda that described his trips and research as he traveled east of Tashkent in the Ferghana region. His series of articles offered readers fantastic images and detailed descriptions of that area, along with scientific analysis of its geological construction.45

Many articles also described the expeditions of explorers and geographers to the north of Russia, especially to areas around Archangel. Professor L. L. Ivanova wrote a series of articles describing the expeditions of academics aboard the vessel RuÌrìk around the arctic north as they steamed from Archangel. Professor Ivanova’s descriptions detailed the terrain, soil, and plant life. People were curious about these far reaches of the north and what type of fauna and flora characterized the area. Clearly, Ivanova took advantage of a natural sense of adventure among Russian readers following these expeditions, as she detailed news of the exploratory missions to these isolated areas. But her articles, at times, could also be quite specific, written in a dry, perfunctory scientific style. She described the terrain in a mundane manner by saying that “the severe climate of the area around Novaya Zemlya [new land] contained very little diversity of plant-life and we found an abundance of short grasses.”46 All in all, these series of articles represented excellent condensed versions of detailed scientific, exploratory trips for the Russian reader.

News and information on exploration certainly captivated the Russian reader in the late imperial period. Popular-scientific journals like Estestvoznaniye i geografija (the natural sciences and geography) carried articles on the terrain and cultures of the periphery of the vast Russian empire. Vokrug sveta, the most popular of Russian journals covering global exploration, carried descriptions of Russian and world expeditions, anthropological missions, geographic and geological analysis, and travel logs of Russians who visited distant lands. Both Estestvoznaniye i geografija and Vokrug sveta carried articles on regions that had recently been colonized by the Russian empire. Several articles in the 1860s appeared in Vokrug sveta describing expeditions to the Caucasus mountains and surrounding area. A particularly popular series of articles, which appeared in 1864, described the expeditions of Prince A. I. Bariatinskyi and his entourage as they traversed the Caucasus range, analyzing both the terrain and indigenous peoples they encountered.47 Serial entries of his expedition enticed readers and hooked subscribers who eagerly awaited news of the entourage in the next issue.

This fascination on the part of the popular reader with geographical expeditions continued after the First World War and across the revolutionary divide. Journals continued to meet the demand for news on exploration, for descriptions of the terrain of Russia’s empire, as well as for fantastic stories of newly discovered lands. Soviet Geologists like Vladimir Obruchev, who originally went along with ethnologists in the late nineteenth century on trips to Central Asia, emphasized the importance of studying the geological deposits of the new Soviet empire and making this information known to a broad readership. As a propagandist of geology, he believed a minimum knowledge of geology and physical geography was necessary to every cultured person.
In the popular-scientific journals of the 1920s, geographic/geologic expeditions were always noted and highlighted in articles.

After the Bolshevik Revolution the stress shifted even more to studying the “little-known” geography of Soviet Russia’s empire. The popular journals of the Soviet 1920s placed a more consistent emphasis on studying the vast mineral deposits of Russia for their potential utility. The Soviet state saw these geologists as orators of the glorification and natural geological wealth of new Soviet lands. The state’s interests converged with the popularizers in spreading information about Soviet Russia’s mineral wealth and natural resources.

Fersman was active once again in producing a series of popular-scientific books and articles on mineralogy and geochemistry. He was also secretary of the Commission for Studying the Natural Productive Forces of Russia (KEPS), a body of the Russian Academy of Sciences. The recurrent theme of “the productive strengths of the country” was part of the overarching Bolshevik public modernization campaign. The need to define the utility of the Russian landscape was inherently tied to post-1917 Bolshevik visions of the conquest of nature. Such national pride in the mineral wealth of Russia foreshadowed the overtly nationalist portrayal of scientific feats in the Soviet press during the Stalinist 1930s.

The emphasis on utilitarianism and the resource potential of the Soviet landscape was also reflected in the focus on regional studies in the 1920s. Popular-scientific journals and newsletters in the 1920s, like Maksim Gorky’s Nauka i ee rabotniki (science and its workers), periodically listed the various organizations for regional studies (kraevedenie) created during the revolutionary and Civil War periods that aided in the spread and popularization of science. Regional studies were publicized as part of a campaign to encourage the reading public to understand the geographical diversity of the USSR. Not only did the number of these societies grow tremendously (from 160 institutions in 1917 to 516 by 1923), but their emphasis shifted toward the study of natural productive resources and local demography and economy. They popularized studies on the fauna, flora, and mineral wealth of the Russian periphery. Although these kraeved organizations were composed mainly of amateurs, the Academy of Sciences saw them as bases for the popularization of scientific research and a scientific world view. During 1918–1920, the years of the Russian Civil War, large numbers of scientists were forced out of the major urban capitals and to provincial cities and towns such as Iaroslavl’ or Ekaterinburg. This movement of scientists to provincial areas fostered new contacts between some major scholars and many organizations for regional studies.

Editors of both private and state-published journals connected the themes of utilitarianism and resource potential with the overarching interests of the new Soviet state. The popular journal Iskra developed a series of articles on the regional mineral wealth of the country. They introduced this series with the following note: “The editors would like to meet our readers half way and foster their natural desire to broaden their horizons. In the following series of articles, we hope they will get a clearer representation of the natural wealth of the USSR. Therefore, on a regular basis, we hope to publish a series of articles that will inform our readers about our regional natural resources, and how we can exploit these resources for the benefit of our national economy.” This stated objective exemplifies an editorial process combining an interest in propagating solid scientific analysis with the nationalist overtones reinforced by Bolshevik rhetoric from above.

A number of the articles featured in Iskra were written by such expert geologists as Obruchev. Many articles discussed mineral resources in the USSR and their practical economic use. The first article in the series by Obruchev was entitled “Fossil Wealth of Siberia: Its Contemporary Use and Meaning.” Obruchev informed his readers of the immense quantities of valuable metals in the vast landscape of Siberia, noting the large quantities of gold, silver, zinc, and iron. He claimed in 1927 that preliminary estimates of coal deposits were significantly higher than deposits in the rest of the USSR. He also emphasized the enormous deposits of graphite in the Tungus Basin. According to Obruchev, that basin could fulfill the world demand for graphite for many years to come. Obruchev believed that, with the exception of gold, these resources had not been significantly mined.

Maksim Gorky’s journal Nauka i ee rabotniki featured articles on specific areas of the Soviet Union and the research conducted by various organizations on mineral deposits. Many of the articles described remote areas like the polar north, which was rich in coal, graphite, oil, and precious metals. Journals, like Gorky’s, focused on particular Soviet research institutions and emphasized the extensive nature of their work in outlying areas. Research on the polar north was conducted after the revolution by three organizations of the Russian Academy of Sciences. KEPS conducted investigations on climate and waterways. The Russian Polar Commission organized expeditions to the Northern Urals by explorers like the Kunetsov brothers. The third organization was the Academy’s Commission for the Study of the Tribal Composition of the Population of Russia (KIPS), which investigated and studied various peoples of the northern regions of Russia. Lastly, the Scientific-Technical Department of Vesenkhorskoye was interested in excavating the vast resources of the North for industrial use. Gorky’s journal was filled with articles and
reports based on the activities of these commissions. As editor, Gorky insisted that these notes on state-sponsored research be written in a popular, accessible form for the average and educated Russian reader.

Along with this more utilitarian perspective came an imaginative, even fictional quality to many of the articles and popular books written on exploration and geography in the 1920s. Unlike glorified utilitarian themes, this imaginative component would vanish in the 1930s. Various popularizers wrote articles on fantastic voyages to fictitious and even actual lands in newspapers such as Pionerskaia pravda and Kommomolskaia pravda and in popular-scientific journals such as Vokrug sveta, Pioner, Smena, and Tekhnika-molodezhi. The fictionalized geographic stories were remarkably consistent in tone and appeal, whether in Communist or non-Communist publications that had survived the Revolution intact. That consistency attests to how journals backed by a variety of institutional sponsors attempted to compete for the interests of active Russian readers.

Obruchev's serialized science-fiction novels of the 1920s are the perfect example of those works that enticed many, especially younger, readers to understand better their geographic surroundings through imaginative writing. The first of these science-fiction novels, entitled Plutonia (Plutonia), describes the voyage to an unknown land, entered through a hole in the icefields of the Arctic to get to its underground void. The imaginary land was an underground world of rivers, lakes, volcanoes, and strange vegetation, a world with its own sun, Pluto, and inhabited by monstrous animals and primitive people. Another of Obruchev's popular science-fiction novels, Zemli sannikova (Sannikov's land), was actually based on historical incidents. In 1810 the industrialist Iakov Sannikov, who was investigating near the Arctic Ocean, noticed mountains of an unknown land far off on the horizon. In the following years he noticed various rising contours. In 1886, in the same area, the geologist E. Toll also saw an uncharted land on the horizon. Toll, in 1900 on the ship Zoria, organized an expedition to find and explore the land, but he and his ship perished in the Arctic Ocean.

The heroes of Obruchev's novels found islands, lived on them, and observed the existence and disposition of their inhabitants; in Zemli sannikova they are the Onklons. From serialized novels like these a reader could gain a sense of the many scientific problems that geographers encountered in places like northern Siberia. Later in the 1920s Obruchev published a series of popular articles on the exploration of the Arctic Ocean. He believed that this type of scientific-artistic story gave incentives to future generations to pursue research and help further geographic investigations. The utopian met the practical in this genre of popular-scientific novels, and it captured the imagination of young urban readers, especially as their minds ventured to uncharted waters and places. These novels added to the preexisting literature inviting readers to learn about lands in the distant reaches of the Soviet empire. Furthermore, this literature might have indirectly prepared Soviet youth for the voluntaristic and utopian 'storming'-of-nature campaigns of the Stalinist 1930s.

SCIENCE AND RELIGION IN THE POPULAR-SCIENCE MEDIA

The topic of science combating religious and superstitious behavior was a popular theme among editors of popular-scientific journals in Soviet Russia during the twenties. The idea of science struggling with religion was emblematic of the Bolshevik cultural revolution in the 1920s, and Lenin expressed that viewpoint quite fervently. Editors of popular journals believed that antireligious articles must go hand in hand with those that emphasized the importance of the natural sciences to readers. Popular-scientific journals served as a key medium in the broader effort to combat superstition in Soviet Russia with the spread of scientific achievements and progress.

A. V. Nemilov, editor of the popular journal Chelovek i priroda (man and nature), believed that if he was going to emphasize natural-scientific articles in his periodical, he also had to spread the importance of materialist philosophy: "Revolutionary work must be antireligious. It must underscore that the world is materialistic, that there is no spirit or secret mystical component to development. Furthermore, nature can be mastered by man." Editors of journals like Chelovek i priroda believed that enlightenment in the 1920s meant making science accessible to the public. Editor Nemilov believed that the prerevolutionary Russian intelligentsia did not favor spreading antireligious propaganda and were far too idealistic in their notion of spreading "pure" science. However, in the 1920s a close correlation existed between, on the one hand, Bolshevik antireligious ideas and, on the other, the messianic notion of spreading nauka (science) propagated by the prerevolutionary elite in Russia. In a 1926 article in Chelovek i priroda L. Eliazhevich argued that Lenin believed it was tactically permissible to use antireligious material written by bourgeois authors, even if it did not stress class struggle and only developed the importance of the sciences. According to the author, Lenin argued that scientific enlightenment was the way to combat religion and that Bolsheviks must use all available resources. This line of Bolshevik reasoning asserted that editors did not necessarily need to propagandize materialism or antireligious themes overtly; it was sufficient to develop notions of basic scientific explanations for the origin of the Earth and mankind.

Editors of popular-scientific journals believed that articles on human evolution and on the evolution of the Earth could disuade readers from religious
explanations and offer evidence for natural, organic development. In a 1925 article in Chelovek i priroda S. M. Selivanov discussed the importance of explaining, with hard factual evidence, how the Earth was formed. He argued that the study of gaseous formations and volcanic development provided essential knowledge for readers upon which to build a solid, scientific understanding of evolution. Selivanov himself monitored the work of amateur science societies and was particularly interested in those involved in the study of astronomy. He fervently believed in public access to scientific information about new astronomical discoveries, hoping such knowledge would draw people closer to an understanding of the thoroughly natural processes behind the formation of stars, various planets, and the Earth.58

Other popular journals carried a series of articles throughout the course of the 1920s on the history of anthropological research and evidence for evolutionary development. Articles in Iskra nauki, the publishing house Gudok's popular science journal, took readers back to turn-of-the-century discoveries of anthropologists in various parts of Africa and Europe. Articles were generally accompanied by photographs of craniums of various early human or simian ancestors. In many articles the work of American and Western European specialists was praised for its sophistication. In a 1925 article in Iskra nauki the American scholar Henry Fairfield Osborn was lauded for his discoveries and analysis of human fossil remains.59 This was hard evidence against any creationist theory for the public, as it based itself on the authority of Western specialists.

In popular journals like Iskra, authors attempted to explain organic evolution from a gradualist perspective. G. Azimov gave readers a detailed explanation of how the Earth was first populated by single- and multicellular organisms that eventually evolved into more complicated living beings.60 Authors not only provided explanations of the fossil record as proof of evolutionary change, but they also tried to show the concrete links between various animals on the evolutionary chain.61 Some authors showed how professionals identify fossil remains to delineate specifically how various species evolved. Much of their analysis was filled with Darwinian concepts, even if they did not specifically refer to Darwin. Darwin's theories were generally submerged in their popular texts.62 The use of various Darwinian terms, such as "survival of the fittest" and the "struggle for existence," was a common technique among popularizers; and these phrases became tropes for explaining the metaphoric and literal power of the modern concept of organic evolution.

Of all the potential methods for using scientific arguments against religion, evolutionary theory and evidence was perhaps the most persuasive weapon in the popular-science media. Bolshevik antireligious activists also astutely realized the potential of evolutionary theory in combating religious doctrine. Scientists of the late tsarist and early Soviet period, though for distinct purposes, worked with some success to bring science and Darwinism to the people. In the Bolsheviks' mind-set, antireligious doctrine (and an assault on creationist theory) would therefore be a potent means of creating a secular, scientized culture.
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РБА за атом
НАУЧНО-ФАНТАСТИЧЕСКИЙ РОМАН ВИНЬОЛЯ И НОКС.
Перевод с англ. Г. Ландура.

ГЛАВА ПЕРВАЯ.

Роберт занимался наладкой моделей межзвёздной кораблиной, находясь на орбитальной станции в космическом пространстве.

— Давайте, — сказал он, и все, что ему нужно было сделать, — нажать пару кнопок.

— Но ведь это ужасно... — вздохнула Мария, которая стояла рядом.

— Нет, — улыбнулся Роберт. — Я много раз это делал.

Изображение книги: "РБА за атом" (The Struggle for the Atom), Иско, no. 1, April, 1923. Иско serialized many science fiction novels like this one by authors Vincola and Knox which were popular among Soviet readers in the 1920s. Like many, this one was translated from English to Russian.

Lev B. Kamenev, "Рабочая революция и наука" (Workers' Revolution and Science), cover of a 1925 pamphlet published by the Moscow City Soviet. In the 1920s it was not atypical of key Bolsheviks, such as Kamenev, to write basic politicized primers on popular scientific topics for a working audience.
ПОВСТВИ ВОЗДУХОПЛАВАНИЯ.

ПОСАДКА ВОЗДУХОПЛАВАЛЬНЫХ КОРАБЛЕЙ НА ЗЕМЛЮ И ВОДУ.

Некоторые блюмперы коммунистической партии и газеты говорят о новых воздушных кораблях на земле и в воде.

Для этого был разработан новый тип корабля, который может работать как на земле, так и в воде. Корабль имеет два двигателя, один из которых работает на земле, другой — в воде.

На месте взлета корабль сначала опускается, а затем начинает двигаться по земле. Когда он долетает до водной поверхности, второй двигатель включается и корабль постепенно опускается на воду.

Водная поверхность не должна быть слишком гладкой, чтобы корабль мог с легкостью сесть на воду. Кроме того, для успешной посадки кораблю нужна определенная скорость.

Рис. 1.

ИСКРА

ЮНИ 1928

ГОСУДАРСТВЕННОЕ ИЗДАТЕЛЬСТВО

ОРГАН ВСЕСОЮЗНОГО ОБЩЕСТВА ТЕХНИКА — МАССАМ

"Flight over Land and Water of Blimps/Zeppelins," Nauka i tehnika (Science and Technology), no. 3, January, 1926. This journal frequently ran sections on news of scientific and technological developments. News of blimps and air flight were quite popular topics among Soviet readers of the 1920s.

Iskra, no. 6, June, 1928. By the late 1920s this journal was the organ of the All-Union Society "Technology for the Masses," and it was published under the auspices of Gosizdat (Soviet State Publishing House). This cover was an ominous yet ubiquitous symbol of Soviet technology reaching the masses. An emblem of scientific progress from Lenin's time, here electrification was more exemplary of the Stalinist industrialization drive.
Chapter 6

TRANSFORMING THE SPIRIT WITH SCIENCE

Evolution, Antireligion, and the Soviet State in the 1920s

A genuine appreciation for the revolutionary importance of evolutionary thought and Darwin's theories cut across ideological and generational lines in the Russian scientific community in both the tsarist and Soviet eras. Science popularizers of varied political and scientific backgrounds believed in the need to spread Darwin's ideas in the public realm. In the prerevolutionary era, scientists had to battle the church, censors, and the imperial regime in order to publish popular tracts on evolution and Darwinism. Conversely, there were those who popularized critiques of Darwin's theories and were apprehensive about the spread of evolutionary ideas beyond the walls of academe. In the Soviet era, however, diverse scientific thinkers used Darwin's ideas, and evolutionary theory in general, for a variety of political and apolitical purposes. Bolsheviks and non-Communist scientists alike used antireligionist thought and antireligious propaganda as tools against the persistence of superstition and nonscientific belief.

DARWINISM, SCIENCE EDUCATION, AND THE SPREAD OF EVOLUTIONARY THOUGHT

In the pre-Darwinian era in Russia, the idea of evolution received support from scholars representing a wide range of disciplines in the natural sciences. 1 During the 1840s and 1850s a number of professors at Moscow University became interested in studying the evolutionary development of the organic world. Professor Karl F. Rouillier was probably the first biologist-evolutionist in Russia to spread ideas about changes in various species over time. Rouillier and his colleagues laid the groundwork for the reception of more advanced Darwinian evolutionary theory in Russia. 2

In 1845 Rouillier, chair of the zoology department at Moscow University, gave a series of public lectures on evolutionary theory and morphology and the habitual activity of animals. His lectures were quite popular and gave him
a public reputation. Alexander Herzen, the Russian socialist, was taken by Roullier’s lectures and wrote an article publicizing them in the Moskovskie vedomosti (Moscow gazette). Mikhail Katkov, the editor of Moskovskie vedomosti, published half of Roullier’s second lecture verbatim. B. E. Raikov, the Petersburg science educator, argued that the lectures clearly stated that animals were in a continual historical process of change and evolutionary development. Although the outline for the lectures was approved in advance by the Ministry of Education, the public speech and published contents was alarming to Minister of Education Prince Shirinski-Shikhmatov. The minister viewed the lectures as a direct affront to the teaching of the scriptures. Roullier’s lectures and book on this topic received permission for publication on the condition that he amend his conclusions to acknowledge that his scientific arguments are of value only to the degree in which they accord to God’s word. Roullier was very careful in his lecture notes, which he lithographed for his students, to state that humans were not derived from animals but separately from simian ancestors.

During the intellectually progressive period of the 1860s, Russian scientists continued to develop and spread evolutionary ideas of organic development. I. I. Mechnikov and Alexander Kovalevskii belonged to a group of Russian scientists whose studies linked the comparative embryology of marine invertebrates with Darwin’s theory of evolution. Kovalevskii was a pioneering evolutionary embryologist who was later praised by Darwin in The Descent of Man and Selection in Relation to Sex (1871). Mechnikov, a microbiologist and immunologist, developed an explanation of how organisms defend against inflammation caused by destructive cells.

Mechnikov was originally critical of Darwin’s competitive theory of survival of the fittest. He later became one of his most avid supporters in Russia. He was also involved in popularizing Darwin’s theories and by the turn of the century had published a popular tract entitled Izuchenii vrode cheloveka (studies on the nature of man). The book was edited by N. A. Umov, a Moscow University physics professor, and was a popular explication of the organic development of humanoids from apes.

During the 1860s news about Darwin’s recently published On the Origin of Species was analyzed publicly in journals published by scientific societies like the Moscow Society of Naturalists. Darwin’s theory was also mentioned in biology classes in Moscow and St. Petersburg. Professor S. S. Kutorga, at St. Petersburg University, advocated that students in his well-attended lectures should pay especially close attention to Darwin’s groundbreaking theory. Furthermore, a number of young Russian scientists started an avid correspondence with Darwin. Those like V. O. Kovalevskii, the paleontologist, were interested in incorporating Darwin’s theories into their specific branch of science.

Alexander Vucinich has argued that during the 1870s Darwin’s theories came under increased criticism. With the publication of Darwin’s Descent of Man in 1871, the number of antievolutionists attacking transformist ideas increased in Russia. Attacks on Darwin’s theories came from a wide range of intellectuals, such as defenders of the Russian autocracy, theologians, conservative scientists, and philosophers. Anti-Darwinian arguments were popularized in Russia during the 1870s in the conservative journal Russkii vestnik (Russian herald). The editors translated contemporary English anti-evolutionist essays for popular consumption. Those essays included John Tyndall’s attack on the theory of pangeneses and on the notion that all species derived from one primordial organism. Michael Pogodin, the conservative essayist and defender of the Russian autocracy, was critical of the materialistic basis of contemporary science.

Although popular forms of antievolutionist criticism were on the rise during this period, this did not quell the countervailing popular interest in Darwin’s theories among educated Russians. Popular tracts explicating Darwin’s theories were printed in large numbers in Russia at the turn of the century. Those tracts were not written only by scientists interested in popularizing evolutionary thought. Some popularizers were involved in adult education and had no specific scientific training. In his own popular-scientific works, the library scholar Nicholas Rubakin concentrated much effort on popularizing Darwinian evolutionary theory. In the 1880s Rubakin lectured to workmen at his father’s paper mill near St. Petersburg on scientific subjects like evolutionary theory, and in 1891 he became one of the leaders of the Committee for the Fight Against Illiteracy. Rubakin’s Istoriia russkoi zemli (history of the Russian land) illustrates how he attempted to spread evolutionary theory on a popular level. In this book Rubakin discussed plant and animal life in the sea and introduced the concept of speciation. It is clear that he used distinctly Darwinian evolutionary concepts without specifically referring to them as such. Rubakin commented on how new species of crayfish, mussels, seaweed, and other marine life seemed to appear all at once. He thus posed the question to his readers: From where did these new species appear and how and why? According to Rubakin, the appearance of new species on the Earth did not occur instantaneously but over great spans of time—hundreds of thousands of years. He believed that no species of plant or animal just appeared suddenly out of nowhere but from an earlier known species through a very slow process of evolution.

Another popularizer of biological thought at the turn of the century was
the historian of science V. V. Lunkevich (1866–1941). Although Lunkevich originally held no academic position, in the last decade of his life he became head of the faculty of Darwinism at the Moscow Pedagogical Institute. Many of his key biological articles appeared before the revolution in both popular and scholarly journals, like Russkoe bogatstvo (Russian wealth). His life’s major work, Osnova zhizni (the basis of life), was originally published as a series of several entries in popular journals. Like Rubakin and others, Lunkevich believed that Darwinism explained some of the key factors in the transformation of species: adaptive mechanisms, natural selection, and the struggle for existence. However, Lunkevich argued publicly that Darwinism could not explain the complexity of living organisms. He advocated an evolutionary theory that was a synthesis of Darwin’s concepts and new theories put forth by scholars in the experimental sciences.

Between 1908 and 1910 a number of societies, scholars, and editors took part in the celebrations commemorating the fiftieth anniversary of the publication of Darwin’s On the Origin of Species. These celebrations helped further popularize the ideas of Darwin and evolutionary theory in general in Russia. Many popular journals, such as Natural Science and Geography, published essays on Darwinian themes. The editors of Vestnik znaniya (herald of knowledge) dedicated an entire issue of the journal to the Darwin festivities. They published various essays that provided the lay-reader with an overview of Darwin’s evolutionary theories. In 1910 the journal published an inexpensive edition of On the Origin of Species and also part of the Descent of Man.

Vucinich has shown how various learned societies paid tribute to Darwin’s theories by sponsoring popular lectures by Russian scientists. In 1908 and 1909 both the Moscow and St. Petersburg naturalist societies sponsored public lectures and gatherings in honor of Darwin. Newspapers like Russkie vedomosti (Russian gazette) published commemorative articles on Darwin’s evolutionary thought. In January of 1909, in an article in Russkie vedomosti, the plant physiologist K. A. Timiriazev described his visit with Darwin at the author’s home in England. Timiriazev noted that Darwin acknowledged the important contribution to evolutionary theory made by Russian scholars such as Kovalevskii and Mechnikov.

Timiriazev himself wrote voluminous popular tracts on the revolutionary importance of Charles Darwin’s theories. He was one of the first to promote and spread Darwinism in Russia, especially in his public lectures at several Russian museums. He regarded Darwin’s biological theory as one of the greatest achievements of nineteenth-century social thought. In his book Darwin i ego teorii (Darwin and his theory, 1882), Timiriazev made Darwin’s theories accessible to the educated Russian layman. He also published popular articles on Darwinism in the “thick” journal Otechestvennye zapiski (notes of the fatherland).

Timiriazev had translated into Russian Darwin’s On the Origin of Species and introduced the book with an analysis of evolutionary theory. He believed that Darwin’s key to understanding the basis of selection came from his reading of Malthus’s work on population, especially Malthus’s concept of the survival of a limited number of organisms from the stressed total. Timiriazev believed that it was the work of Malthus that brought Darwin and Alfred Russel Wallace independently to similar conclusions.

Between 1908 and 1910, in celebration of the fiftieth anniversary of Darwin’s publication of On the Origin of Species, Timiriazev published a series of articles in which he promoted Darwinism and defended it publicly against the attacks of more conservative natural scientists. A series of lectures by Timiriazev entitled “The Historical Method in Biology” were published. In these essays Timiriazev attempted to identify problems of morphology and physiology and suggested ways to solve them through the study of the historical process of the origin of form and function. Timiriazev continued to publicize evolutionary thought in postrevolutionary Russia.

The spread of evolutionary theory continued to be important to many scientists and educators in post-1917 Russia. In the Soviet era, scientists were especially interested in placing evolutionary theory in all secondary-school curricula as the basis for understanding animal and human development. Both liberal educators and Marxists alike during the twenties believed in the power of evolutionary theory as a progressive scientific force against religious explanations of creation. The Soviet state, particularly Narkompros’s Glavnauka, supported this agenda and funded scientific organizations that promoted evolutionary thought and antireligion.

B. E. Raikov was one prominent science pedagogue and member of the Petrograd prerevolutionary intelligentsia involved in the popularization of evolutionary thought. Raikov worked on a four-volume series that analyzed biological-evolutionary theory in the pre-Darwinian era. According to Raikov, the growth of transformist ideas in Russia before Darwin had support from a diverse group of intellectuals in a variety of natural sciences. Raikov was responsible for writing popular articles on the development of Lamarckian and Darwinian thought in Russia. He published several treatises critical of creationist theories.

In 1907, ten years before the revolution, Raikov was one of the key founders of the Russian Society for the Spread of Natural-Historical Education. Raikov’s organization survived the tumultuous Russian Revolution of 1917, as well as the Civil War, and continued to operate during the NEP era.
After 1917 Raikov and his society played an important role in the movement
to insert evolutionary theory into secondary-school curricula. Narkompros
vigorously supported Raikov’s organization and promoted the populariza-
tion of evolutionary ideas. Glavnauka had at times even saved Raikov’s or-
ganization from the clutches of the NKVD, viewing it as a critical venue of
public science education. The NKVD had hoped to subsume Raikov’s organi-
zation under the rubric of newer Soviet scientific umbrella groups.

In post-1917 Russia, Raikov’s Russian Society for the Spread of Natural-
Historical Education continued to train natural-science teachers and to popu-
larize knowledge of evolutionary theory. Raikov gave the opening address
at the 1918 general meeting of the society in the post-October era. The meet-
ing was held in Petrograd on December 20, 1918, and Raikov delivered a
speech entitled “Evolutionary Theory and School Teaching: A Means to
Struggle with Problems in Teaching the Biological Method.” Raikov’s mes-
gage to teachers was a plea to introduce evolutionary theory into the sec-
ondary schools. He particularly stressed the importance of using logical ex-
amples to explain evolutionary theories to make them more naturally
comprehensible to students.

At a meeting of the society on January 24, 1919, Iu. P. Frolov, a research
associate in the laboratory of I. P. Pavlov, delivered another argument in favor
of teaching evolutionary theory in secondary schools. In his report Frolov
argued that “the teaching of the natural sciences in the secondary schools
should include an expliation of how animal species undergo change over
time: we must spread the idea of evolution.” Frolov believed that evolutionary
theory could also help explain to students the various structural and func-
tional differences of organs in higher and lower animal species. He argued
that teaching the basis of evolutionary thought was absolutely crucial to any
diverse scientific curriculum and that the teaching of evolutionary theory
would help break religion’s hold over many students.

Raikov’s society was integrally involved in the adult-education movement,
and here, too, the program fit well into Glavnauka’s agenda to popularize evolu-
tionary theory in an extracurricular arena. On December 20, 1918, Narkompros
helped open the Institute for Adult Education in Petrograd. Members of
the Russian Natural-History Society played a critical role in the lecture activi-
ties of the institute, and Narkompros allocated three million rubles in 1919 for
the institute’s budget. Raikov was mostly involved in the Scientific Excursion
Department of the Adult-Education Section of Narkompros and, along with
others in the society, believed that organized scientific excursions were the
best way for adults to learn about the natural sciences. They set up excursion
programs with the Petrograd Zoological and Geological Museum, and the Pet-
rograd Botanical Gardens. These excursions placed much emphasis on de-
mystifying occurrences in nature and on searching for natural and scientific
explanations for evolutionary phenomena.

Raikov successfully lobbied Narkompros officials to fund all of these adult-education programs.

The society continued its educational activities in the 1920s. In 1922
Raikov traveled to various parts of Russia lecturing on evolution and the
teaching of natural history in the schools. He stopped at various educational
conferences attended by teachers, and his speeches and the proceedings of
these meetings were generally covered in the popular press and major educa-
tional journals, like Na putakh k novoi shkole (On the path towards a new
school), the organ of the scientific-pedagogical section of the State Academic
Council of Narkompros. In March of 1922 Raikov attended the Moscow
Conference of the Teachers of the Natural Sciences, where he gave the key-
note address on the importance of using the biological method in the teach-
ing of evolution. According to Raikov, teachers needed to use more concrete
examples in the classroom and had to concentrate on the study of morphology
when analyzing how animals change their structural composition over time. He believed this would make evolutionary concepts sound more plausible
to skeptics.

In 1923 Raikov and other members of the Russian Society for the Spread of
Natural-Historical Education helped organize the first All-Russian Congress
on Natural-Historical Education. The congress opened at Petrograd Uni-
versity on August 10, 1923, and close to fifteen hundred delegates from prov-
inces all across Russia attended. This was the largest congregation of Rus-

sian naturalists and pedagogues ever assembled to discuss the spread of
natural-scientific and evolutionary curricula in schools and in adult-education
courses.

Teaching methodology was once again stressed at this conference. The
delegates believed that a course on natural science must include evolution-
ary theory as the basis for understanding organic change. They also uni-
amously stressed the need to use excursions and laboratory experiments in
natural-scientific courses. At the congress, established scholars read a series
of scientific reports explaining which popular-scientific texts were the best in
various new fields, especially evolutionary theory.

In the post-October period, Marxist popularizers, like B. M. Zavadov-
skii, were also eager to spread evolutionary theory and the ideas of Darwin.
Zavadovskii was a key scientific propagandist in the Militant League of the
Godless, and also wrote articles for the newspaper Bezbozhnik (the godless).
Zavadovskii was a professor at the Sverdlov Communist University in Mos-
cow between 1920 and 1930 and founder and director of the Timiriazev Bio-
logical Museum. During the twenties, the Timiriazev Scientific Research In-
stitute became a haven for many Marxist science propagandists.
For Marxists, Darwin’s biological theories helped form a new social morality based on a materialist perspective. With Darwin’s publication of *On the Origin of Species* in 1859, a radical change occurred in biological thought that complemented the transformations in sociology developed by Marx. However, some of the radical intellectuals of the late nineteenth century, like Peter Kropotkin, were highly critical of Darwin’s theory of natural selection. They believed the Malthusian components of Darwin’s theory were antithetical to any type of social theory based on altruistic notions. Kropotkin posited a theory of mutual aid in opposition to Darwin’s struggle for existence. Leading Russian sociologists of the nineteenth century, such as M. M. Kovalevskii and N. K. Mikhailovskii, also expressed an extreme opposition to any type of social Darwinism. Many radical intellectuals believed that cooperation rather than competition was a better mechanism for transformation.\(^{50}\)

Yet Marxists of the early twentieth century believed Darwin’s theories of evolution underscored the causal, material factors of organic development. In popular pamphlets Marxists like Zavadovskii pointed out the parallels between Darwin’s explanation of the biological process and Marx’s scientific explanation of the social process. As Darwin found an explanation for the origin of organic forms in the material conditions of their development, so Marx opposed metaphysical explanations with his developmental theory of dialectical materialism.\(^{51}\)

Various Communist educational journals of the 1920s carried articles on the importance of teaching evolutionary theory in order to combat religious superstition. Many articles were carried in the journal of the Central Bureau of Proletarian Students, entitled *Krasnoe studenchesko* (red students). Marxist pedagogues argued in the pages of this journal that antireligious activists must be armed with better propaganda and that science and philosophy teachers must be at the forefront of providing activists with educational material. Marxists were especially concerned with arming antireligious propagandists with pamphlets on evolution and Darwinism.\(^{52}\)

Within the pages of those educational journals, activists discussed various problems they incurred while spreading evolutionary doctrine in the universities. Marxist pedagogues complained about the lack of student antireligious cells in Soviet schools. A. Lukacheskii, a member of the Central Committee of the Militant League of the Godless, argued that many students in Soviet Russia looked down on antireligious activity, being more concerned with their potential careers, especially those who were taking courses in the sciences.\(^{53}\) Others supporting Lukacheskii’s viewpoint complained that “bourgeois” professors in the social sciences and humanities continued to spread idealistic philosophies among students in the higher schools, hampering students’ ability to absorb evolutionary theory. N. Chelianov argued that many philosophy professors took a Kantian approach to explaining the history of ideas. Chelianov believed that supporting a theory of a priori knowledge was a potential threat to evolutionary theories and scientific materialist philosophy in general.\(^{54}\)

Even the Komsomol journal *Molodoia guardiia* continually carried articles on evolution and Darwinism. On occasion the journal provided bibliographic programs for the teaching of evolution in the schools and for readers to work through at home. The journal stressed programs of home study constructed by Zavadovskii, which covered various aspects of evolutionary thought. In his home-study courses, Zavadovskii included works by Timiriazev on Darwin, books on the development of the organic world, and the origins of humans from simian ancestors.\(^{55}\)

Although Marxist educators placed Darwinism on the forefront of evolutionary theory, they were interested first and foremost in how various developmental biological theories could substantiate scientific materialist philosophy. Articles in general stressed how the natural sciences could buttress the theories of Marx regarding social change over time. On occasion Marxists argued that although Darwin had provided a sound theory for change in the organic world, other biological theorists, like Lamarck, could be enlisted to combat creationism. In a 1923 article in *Molodoia guardiia*, Professor A. N. Bartenev argued that both Lamarck and Darwin had provided Marxists with the biological method of teaching people that the history of organic development must have a materialist foundation and that spiritual explanations of creation are ridiculous.\(^{56}\) In essence, Lamarckian (witness Raikov’s Lamarckianism) and Darwinian evolutionary conceptions coincided in the Soviet 1920s.

The Darwinian and Marxist conception of developmental change, therefore, did not always overlap. On the one hand, Darwin’s conception of the mechanics of evolution focused on a gradual process of change over time. That concept had been partly borrowed from Newton’s conception of change in mechanics as a continuous process. On the other hand, the Marxist or Hegelian theory assumed a discontinuous mechanism of change based on the concept of the dialectic.\(^{57}\) Darwin’s theories also did not contain any teleological component, only a mechanism for change and a description of how new organisms developed. He did not posit any doctrine of certain ends imminent in nature.

All the same, of all scientific concepts, evolutionary theory was able to unify all liberal and radical thinkers in Russia, especially in the 1920s. Even those as diverse politically and intellectually as Raikov and Zavadovskii could find consensus on the need to spread evolutionary theory, because the
materialistic basis of evolutionary theories provided a critique of all transcendental causation and religious creationism. In this sense, for Russian thinkers, evolution was one of the most striking manifestations of natural-scientific materialist thought. For this reason, Russian conservative thinkers of the nineteenth century, such as Pobedonostsev and Pogodin, had worried over the popularization of Darwinian thought in Russia, seeing that it emphasized positivism, rationalism, and scientific materialism over dependence on religious faith. In contrast, both liberals and radicals believed Darwinism was a great triumph for scientific and secular thought. Marxists in the 1920s, like Zavadovskii, could support Raikov's movement to inject evolutionary teaching into the schools and, more importantly, into the public debate. At this intersection Marxists and liberals alike could temporarily converge on the battlefield in their quest to make evolutionary theory the crux of antireligious activity. However, this alliance would not last, as Stalin's revolution from above provided an arena for young radicals to criticize the moderate prerevolutionary scientific elite, the generation of Raikov, Lunchevich, and Rubakin.

SCIENTIFIC-ENLIGHTENMENT, ANIRELIGIOUS PROPAGANDA, AND THE BEZBOZHNIKI

In the prerevolutionary period, two of the big components in the Social Democratic worker-education programs were antireligion and Darwinism. Intellectuals who led workers' circles (rabochie kruzhi) emphasized the importance of topics they themselves first became interested in: the "origin of the universe" and "the origin of species." After the October Revolution the popularization of natural-scientific knowledge was an important means by which the young Soviet regime believed it could struggle with religious ideas and superstition. In the course of the 1920s, the Communist Party's antireligious campaign moved away from crude attacks on religion toward scientific enlightenment. The Communist Party and the Militant League of the Godless (whose members were called bezbozhniki) came to support the spread of scientific information as one of the major elements in their antireligious programs. Science popularizers, like Zavadovskii, were active in the Militant League of the Godless, and vigorously supported a campaign to spread science among the Russian populace. These science specialists' role in antireligious campaigns has generally been overlooked. The party's failures in the arena of antireligious propaganda made it more dependent on science popularizers and more willing to take a secondary role in the process as it became more concerned with the outcome.

In the post-October and Civil War period, a coordinated propaganda program against religion was not succinctly outlined by the Bolshevik state. Instead, much of the struggle was concentrated on exposing the reactionary role of the church and implementing the January 1918 government decree on the separation of church from state, and school from church. A commission, headed by Emelian laroslavskii and attached to the Central Committee, coordinated the execution of this decree during the Civil War. The actual task of initiating an antireligious campaign in 1918 was originally in the hands of the Commissariat of Justice, which organized scientific lectures and debates and arranged for the preparation of posters and leaflets. It also published one of the early journals entitled Revoliutsiia i tserkov' (the revolution and the church), which contained propaganda articles by key Bolshevik luminaries, like A. Lunacharskii. The Red Army and the Commissariat of Enlightenment also took part in antireligious propaganda in the aftermath of the Bolshevik Revolution.

The first official party position on antireligious propaganda was articulated in the program of the Eighth Party Congress in March 1919: "The party aims at the complete destruction of the link between the exploiting classes and the organization of religious propaganda, while assisting the actual liberation of the working masses from religious prejudices and organizing the widest possible scientific-educational antireligious propaganda." It was not until after the Civil War that antireligious campaigns became more organized and systematic. By 1922 a few short-lived popular-scientific and antireligious journals appeared in Moscow and Petrograd, including Nauka i religiia (science and religion), edited by Mikhail Gorev. This was the first Soviet-era publication to highlight the role of science in the antireligious campaign. Gorev prefaced the first issue in 1922 with a statement of purpose declaring that the journal would attempt to unite all social groups that decisively broke with the old world and grasped the importance of scientific progress. This first issue of Nauka i religiia in 1922 featured articles criticizing the Russian Orthodox Church for not offering its valuable collections of gold and silver to aid the starving peasantry during the famine. Gorev stressed that a significant reason for the famine was the peasants' reluctance to accept more scientific approaches to agriculture. Finally, he asked his readers: "Isn't it better, having been cast under the spell of the old religious order, to come forth and trust science?"

At the end of 1922 the weekly newspaper Bezbozhnik appeared in Moscow replacing Nauka i religiia. Its editor was E. laroslavskii, and it played a crucial role in antireligious propaganda. One of laroslavskii's key editorial pronouncements emphasized the importance of a more long-term, scientific-enlightenment campaign to stamp out religion in Russia. In January of 1923
Bezbozhnik u stanku (the godless at the workbench), an antireligious journal edited by M. M. Kostelovskaja (a Moscow antireligious activist), started up in Moscow. It emphasized exposure of the class role of religion and criticized the scientific-educational approach for not having benefited from proper class analysis. According to Kostelovskaja science popularization was a “bourgeois” educational program and obstructed activists from showing how religious beliefs were constructed by elite social groups.  

That debate between rival journals highlighted an important issue: Should scientific enlightenment be brought into the antireligious campaign at all? Kostelovskaja argued that bringing science into the picture was dangerous because that would only help refine religious belief, enabling it to adapt to and accommodate scientific discoveries. However, in Iaroslavskii’s view, religion could only be eliminated by propaganda based on the achievements of science. Eventually, the party backed Iaroslavskii’s position, stressing that activists should be found to promote antireligious and scientific-enlightenment work simultaneously.

By 1925 a shift had occurred in the emphasis of the party’s antireligious propaganda campaign, which moved away from crude attacks on religion and toward scientific-educational propaganda. The Communist Party began to criticize coarse antireligious methods, like the mockery of Christmas festivities conducted by the Komsomol in December of 1922. During the early twenties rural Komkomol groups sometimes staged such sarcastic antireligious festivals and carnival, crudely mocking the Russian Orthodox Church and peasant religiosity, and angering many peasants who feared the Komkomol’s aggressive intervention in the countryside. According to party leaders like Iaroslavskii, these sardonic methods would only alienate true believers and ultimately lead to the failure of the antireligious movement. Supplanting these tactics with scientific educational methods, from Iaroslavskii’s perspective, would be far more effective.

In 1923 the party’s Central Committee issued a statement in support of moderating antireligious activity, while placing emphasis instead on scientific enlightenment: “Take all steps to avoid giving offense to religious feelings, shifting the weight of the work to a scientific explanation of the origin of religious holidays, especially of Easter.” At the Twelfth Party Congress of 1923, the party in a special resolution saw the need to emphasize that the antireligious campaign could be successful only by depending on science education to help stamp out both illiteracy and religious fervor: “But the party must not forget that all our antireligious agitation and propaganda will fail to affect the masses until long-term educational programs stressing natural-scientific knowledge are fully organized in the urban and rural areas.”

The head of the Central Committee’s Agit-Prop Branch, Ia. Iakovlev, expressed this view in an earlier February 1922 circular to party organizations. Referring to the “General Directive on Antireligious Propaganda, Decree of the Tenth party Congress of the Central Committee,” Iakovlev noted that antireligious propagandists must use scientific knowledge as their key tool, and that activists must be prepared to conduct a wide scientific-enlightenment campaign. He urged that antireligious propagandists must concentrate on a science program that included the following two themes: the origins of the Earth and the solar system, and also the origins and development of organic life and humans. According to Iakovlev, antireligious propagandists must also be trained in circles and courses centering around the following two themes: natural sciences, including a short course on the study of the evolution of the organic and inorganic world, and the history of scientific materialism.

At a September 1923 Agit-Prop meeting of the committee of antireligious propaganda, Iaroslavskii suggested that the program of antireligious propaganda should contain popular lectures on physics and other natural scientific disciplines. The committee believed “antireligious propaganda should primarily spread elementary natural-scientific and agronomic knowledge in order to combat technical backwardness.” The Komkomol was instructed to get involved in spreading scientific information in the countryside. After 1923 the youth organization pursued this task through science reading circles, where activists encouraged peasants to utilize scientific agricultural techniques with the help of agronomists. Komkomol activists mounted a lecture series on scientific topics, organized atheist reading circles, and created antireligious evenings featuring its natural-science circles. These developments made the party and the Komkomol more dependent on science educators who could write cogent technical pamphlets on various topics that included basic evolutionary theories.

The Komkomol’s scientific-education program included a series of lectures devoted to themes such as the evolution of the Earth and the origin of species. Komkomol lecturers were instructed to emphasize the inherent contradictions between scientific theories and religious teachings found in the Bible. Even this less-combative, long-term, scientific-educational approach often alienated peasants, and some peasant communities reacted forcefully against Komkomol science lectures. Peasants maintained strong spiritual values and regularly practiced religious rites, sometimes reflecting eclectic beliefs. The Russian rural religious universe embraced different “subsystems”—Old Believer, Russian Orthodox, pagan, magical, miracle. These religious subsystems survived despite the Communist Party and the Komkomol’s concerted effort to wipe out religion with science.

A study of popular values in Tver’ province in the 1920s illustrates how
Christian and pagan customs merged in popular religiosity in the villages. The Bolshevik attack on religion in the Tver' newspaper, which often criticized Christian dogma, overlooked the central importance of popular faith. Certain peasant religious rites and customs were based on deeply embedded beliefs. Bolshevik attempts to combat religious values with scientific explanations of natural occurrences did not succeed in the Russian villages.69

Ethnographic reports of anthropologists like V. G. Bogoraz-Tan testify to the fact that folk religion was positively flourishing in Russia in the 1920s.70 Alongside the tenacity of popular religion, historians have also noted a rise of Christian sectarian influence in the provinces and countryside during the twenties. A. Angarov estimated that the membership of Christian sects had increased almost four fold during the period 1917–27.61 Within the general framework of peasant conservatism toward scientific and political propaganda, the climate in the village for reception of new religious ideas was quite favorable during the NEP.62

In areas like laroslav' on the Northern Volga, Agit-Prop antireligious activists delivered lectures on utilitarian scientific themes along with general scientific material: for instance, “Evolution of the Organic World” and “The Origins of Plant Life on the Earth.” The local Agit-Otdel (Agitational Department) of the Gubkom (Regional Party Committee) found that more practical science lectures, such as those on medical topics, were more popular with local people. A series of lectures, organized by the laroslav' Agit-Prop Department, on the effects of cholera were well attended. People on the Northern Volga were worried about the spread of the epidemic in the 1920s. Lectures on disease that affected humans and animals, or practical topics on how to purify water, consistently attracted participants to Agit-Prop events.63

However, Agit-Prop officials consistently confronted more problems than success. The minutes of a July 1923 meeting of the Central Committee’s Commission on Propaganda are quite revealing of the problems the party encountered with antireligious propaganda throughout Soviet Russia. Agit-Prop official Shaineевич argued that in the Ukraine and in the Western Russian oblasti, antireligious propaganda was successful only among small segments of the population. In most cases activists alienated the majority of peasants with science lectures. Kratin noted that the Communist Party’s journals were weak and did not contain sufficient material concerning questions of scientific-enlightenment. Galkin spoke the longest at the meeting, and his speech is especially revealing: “The antireligious campaign is hardly being conducted at all in the localities; and where it is being conducted in the countryside, such as in Cherepovets, activists are using old, outdated texts. In Novgorod, for example, antireligious, propaganda material looks like the old, thick journals of the nineteenth century. In general the situation of an-
tireligious propaganda in the provinces is very bad. We have no effective means to struggle against priests in the localities. It is necessary for the party to provide the provincial party committees with contemporary scientific literature.”64

The reports that Agit-Prop’s political and propaganda instructors in the provinces periodically sent to central authorities confirm these problems. In August of 1926 A. Saikin, a political instructor working in Smolenks province, noted that during agitational events and popular lectures, peasants and workers in Smolenks fervently and quite frequently castigated Communist activists with a variety of complaints regarding scientific propaganda.65

Large turnout at Agit-Prop events did not necessarily reflect peasants’ interest in natural-scientific propaganda lectures. On the contrary, in many instances peasants actually came to popular lectures to air their grievances with the party and to argue forcefully that science could not replace their religious rituals. In an October 1923 report on antireligious propaganda in various central provinces, activists acknowledged that in Riazan’, Smolenks, and other areas intense interest centered on religious questions at popular lectures. In Riazan’ public debates with peasants dragged on for hours, and peasants hurled hundreds of questions and criticisms at the propagandists. The report noted that in Kostroma province lengthy disputes arose between activists and participants at over thirty scientific and antireligious lectures.66 Paradoxically, to the party’s dismay, Agit-Prop science lectures became spheres for public protest, arenas for popular debate, platforms for the expression of religious fervor in a time when the state was openly squelching political disputation.

Activists complained about perpetual arguments between lecturers and priests who came to Agit-Prop’s science lectures to complain in public about how they had been harassed and beaten by communist agitators. Priests generally opposed scientific explanations of the origin of the universe and man and tried to combat such arguments with expressions of creationist belief. At Agit-Prop lectures, particularly, priests fervently rebutted scientific criticism of church doctrine.67

In the 1920s local Agit-Prop departments began to evaluate their scientific propaganda, and the results were disconcerting to central officials. In 1927 and 1928, in laroslav’ province, the Agit-Prop branch of the local party organization evaluated its activity over the preceding few years. It found that Agit-Prop pamphlets on scientific themes were never sold in the markets or book kiosks. Night courses and lectures never attracted more than twenty individuals at a time, and most of those who came were already party members. Antireligious activists consistently tried to set up scientific lectures on various religious holidays, especially Easter, but found few participants. One
of the lectures read on a regular basis by local activists was entitled “Is It Scientifically and Naturally Possible for a Dead Person (Namely Jesus) to Rise from the Dead?” This particular lecture, naturally, infuriated local clergy.60

At a July 1927 meeting of the Iaroslavl’ Agit-Prop Collegium, several activists were dismayed by the problems they encountered with regard to scientific propaganda. Comrade Muratov argued that “for some time, I have been conducting lectures amongst seasonal workers in factories on antireligious themes. The general sentiment of most workers, however, is both negative and ubiquitous: ‘anti-religious propaganda develops hooliganism.’” He optimistically (or naively) believed that “the masses still demand the demystifying of religion,” but he candidly admitted that this would not be easily accomplished. He noted the very low numbers and quality of natural-science teachers in rural schools as a major problem in getting the public to trust scientific explanations. Comrade Kashnikov added that “our biggest obstacles in antireligious work seem to be our inattentiveness to using the widest scientific apparatuses in our struggle. All the time we are nudging forward, but we need to take more definitive action.”66

The meeting in Iaroslavl’ concluded with sharp and critical remarks by an Agit-Prop official named Egorov, who was in charge of the local antireligious sector. He argued that the party had been developing many cells of antireligious workers, yet they needed more  stroloch’ or tolly (more punch). He suggested that perhaps antireligious workers could learn from voluntary scientific associations, such as the OSO-Avikiham (Society of the Friends of Defense and Aviation-Chemical Construction),67 and how they conducted their popular lectures. Antireligious activists wanted to emulate the activities of natural-science specialists, and co-opt them to join their struggle. They found it disconcerting that naturalists’ lectures and science museums were popular in provincial areas, while Agit-Prop science lectures were viewed with disdain.68

Between July and October 1927, the Iaroslavl’ Agit-Prop Ordel (section) in charge of antireligious and scientific propaganda began to meet after every lecture in the province to “evaluate” various problems. One basic problem was the alienation people felt in response to harsh ideological material. They continuously agreed that less dogmatic, more practical scientific lectures would be more palatable to the local public. The lack of well-trained leaders in the natural sciences working for the party was yet another problem addressed.69

Agit-Prop activists focused on the prospect that their “weak activism” could be resuscitated by uniting more with nonparty activists, such as members of the Militant League of the Godless and science educators. Comrade Kamenskii, an antireligious activist, argued that “we still know very little about antireligious propaganda. . . . We need to take account of the antireligious work of nonparty activists, like the League of the Godless, as well as scientific societies.”70 In closing, Comrade Egorov proposed that Agit-Prop officials coordinate their work in the locales with existing antireligious and scientific voluntary societies.71

At the national level, Iaroslavskii arrived at similar conclusions. In 1924, in coordination with his anti-religious newspaper, Iaroslavskii helped form the Obshchestvo druza gazety Bezbozhnik (society of friends of the newspaper Bezbozhnik), the most important voluntary association of opponents of religion. The society was one of the key voluntary groups involved in spreading both scientific and antireligious propaganda in urban and rural Russia during the twenties. In June 1925 the organization became the League of the Godless72 and in 1929, the Militant League of the Godless.73

Meeting for the first time in April of 1925 at Smolensk, the first All-Union Congress of Atheists heard a report stating that atheists must work in full contact with party and Komsomol organizations. Many delegates reiterated Iaroslavskii’s position that voluntary atheist groups should work in close contact with party activists. Although only 18 percent of the delegates to that congress were party members, 34 percent were Komsomol members.74

At that first All-Union Congress of Atheists, T. Gagarin emphasized in his report the need to imbue antireligious propaganda with a natural-scientific, materialistic perspective. Like the party, the Bezbozhnik believed in creating a scientific-enlightenment program that would be the focus of a less combative antireligious campaign. Gagarin recommended that certain themes relating to the spread of science be included in all discussions in peasant antireligious circles: (1) a scientific, rational explanation of the development of life on the Earth and the origin of man; (2) science and technology in the service of mankind; (3) a belief in science and agronomy; and (4) a belief in science as key in the struggle against sickness.75

T. Varbanchika’s report on disease stressed the need to instill in peasants the idea that science can be successful in combating sickness. Science could therefore offer some utilitarian benefits to agricultural communities. Her approach was to show delegates at the congress the need to explain to peasants that science had discovered the nature of, prevention of, and cure for many diseases, that the infection of malaria, for instance, is transmitted to humans by the bite of a particular mosquito living in stagnant waters.76 The head of the Smolensk provincial education department, a teacher named Lebedeva, gave a report on antireligious work in the schools and in adult education courses. She believed that a special effort was needed to spread natural-scientific themes in the school curricula.77 She emphasized that without basic science education the antireligious propaganda would “fall on deaf ears.”
Various resolutions adopted at the January 1926 All-Union Congress of Atheists in Smolensk highlighted the need to popularize science as part of a broader educational antireligious campaign. Atheists requested, through Communist Party officials, the use of several rooms in the ethnographic and archaeological museum to create a standing antireligious exhibition. The exhibit would concentrate on combating superstition with scientific knowledge and included the following themes: (1) the struggle between science and faith in history, (2) scientific explanations of the origin of the Earth, (5) the use of the barometer and the lightning conductor in the scientific struggle with religious superstition, (4) the development of life on the planet: evolution of humans and animals, (5) science and agriculture, (6) the development of understanding of how microbes carry disease, and (7) the importance of chemistry and physics, especially regarding such practical matters as the phenomenon of boiling and the need to sterilize liquids and surfaces.

During the twenties, cells of the League of the Godless had spread throughout Soviet Russia. On the Northern Volga, to the Northeast of Moscow, as in Smolensk in western Russia, the League established elaborate programs to spread science and antireligious doctrine. By the end of the decade, in the Iaroslavl' region, they claimed they had over twelve thousand members, with seventy-five hundred in the cities of Iaroslavl' province alone. They particularly took pride in their collaborative work with the party Agit-Prop activists. The League of the Godless in Iaroslavl' helped organize detailed lecture series in such scientific areas as the evolution of organic and organic matter. On Orthodox holidays in particular, they attacked creationism with lectures describing the development of the universe and the evolution of animal and plant life-forms.

Leaders of the atheists kept close contacts with local gubkoms in provincial areas such as Iaroslavl'. Furthermore, the Communist Party Agit-Otdel monitored antireligious activity in various provinces. In Iaroslavl' it noted that atheist-training seminars in October of 1927 contained many workshops on materialistic thought, and voluntary activists were in contact with Communist science popularizers. Party activists were concerned by the low number of those actually finishing the courses, as well as by the lower number of those who could eventually be used as leaders of antireligious cells (the ultimate goal). All the same, the atheist's natural-science programs gained praise from local party Agit-Prop leaders.

One of the secretaries of the Beskozhnikh in Iaroslavl', identified only as Shalygin, persistently urged Communist Party Agit-Prop officials to use their resources to build exhibits, museums, and workshops to spread natural-scientific thought in the area. The atheists lobbied the local Gubkom to send them funds to support scientific lecture series, the building of herbariums and aquariums in local museums, and workshops to train activists. Most importantly, Shalygin emphasized that antireligious activists needed to coordinate their activities with local natural and physical scientists and to persuade geologists, naturalists, evolutionary biologists, and other scientists to give time voluntarily to their antireligious organizations. Shalygin believed it was both practical and economical to reach out to sympathetic scientists: "With the goal of economizing, it is only practical that at these exhibits one should use specialists from local universities and organizations in the sciences."

The League of the Godless successfully attracted radical science specialists to their meetings but did not draw in the majority of less-politicized scientists in provincial areas. At these meetings Marxist science popularizers such as Zavadovskii (a professor of biology at the Sverdlov University) and I. D. Prashun emphasized that popularization of the natural sciences was the best method for wiping out superstition among the populace. At the All-Union Congress of Atheists in April 1925, Shalygin delivered a lecture on how activists must be able to teach people how sickness in humans, animals, and plants derives from biological causes and not from any spiritual deprivation. He believed that popular-science lecturers, especially in the countryside, had to teach peasants about infectious diseases and how they are spread by microbial bacteria and viruses invisible to the human eye. Shalygin also urged the connection between disease and social-living conditions, that tuberculosis, for instance, is a disease of the urban proletariat. Shalygin also emphasized the importance of teaching practical scientific principles to rural Russians.

At the same congress Zavadovskii delivered a speech entitled "The Natural Sciences and Religion." Zavadovskii was critical of Western scientists who still believed that the soul was the main motivator of human will. For example, Alfred Wallace, one of Darwin's better known associates, was ready to accept the idea that man evolved from simian ancestors but still believed that the soul came from God. Even more dumbfounding to Zavadovskii were popular-scientific articles in contemporary Western journals by scientists who saw no diametrical opposition between science and religious doctrines.

As Marxists, Zavadovskii and Shalygin agreed that science popularization must be imbued with the notion of class conflict and must stress dialectical, materialist theory. Zavadovskii would lead a virulent attack on the older generation of science popularizers both before and during Stalin's revolution from above. However, he and his colleagues still supported E. Iaroslavskii's view that the "scientific-educational approach" to antireligious propaganda was appropriate in the effort to wipe out superstition in the 1920s.

These Marxists also concurred with those in the League of the Godless who supported this approach to propaganda. As evidenced at their con-
gresses, they actively pursued a program of science education as their main tool in the mid-1920s. Agit-Prop and voluntary atheists, however, found the Russian public in provincial areas unreceptive to propaganda lectures, regardless of the tactical approach. On the contrary, citizens instead frequented science lectures and museums that were not associated with the Communist Party or radical atheists and preferred to interact with scientists who could teach them practical methods. Even those radical atheists who chose to tone down political rhetoric, focusing on science education, still found they were competing to some extent with less politicized scientists and popularizers of the older generation. The Russian public, particularly those in provincial towns where most of the successful science popularization occurred, chose to attend popular lectures on astronomy, air flight, and exploration because they offered more imaginative approaches to understanding the world around them.

While the party’s and the Bezbozhniki’s lectures seemed tainted with political overtones, local naturalists and scientists offered the public a means to understand their immediate surroundings with no doctrinal strings attached. This further infuriated Marxist science popularizers and antireligious activists alike. Though Zavadovskii’s support of laroislavskii’s gradualist antireligious campaign was in keeping with the limited tolerance of the NEP overall, that support did not signify a rapprochement between radicals and the older scientific intelligentsia. Indeed, the limited freedom the prerevolutionary educators enjoyed in the mid-1920s would soon become even more tenuous as activists stepped up their criticisms. That intensification of criticism became especially true after 1928, when the state from above and radicals from below placed prerevolutionary scientists in the grip of a politico-doctrinal vise.
Chapter 7

TECHNOLOGY SOLVES EVERYTHING

Science Popularization and the Stalinist Great Break, 1928–32

Changes in 1928, with Stalin’s revolution from above, created a serious situation for Soviet science. During the Stalinist cultural revolution, liberal scientists and societies came under harsh attack by leftist professors and organizations. However, some of those radical forces had already established themselves in various Marxist institutes prior to 1928 and had attempted unsuccessfully to instigate both generational and ideological conflict. Many of the key Marxist science popularizers in that effort, like Zavadovskii, worked at the Timiriazev Institute in Moscow during the mid-1920s. During the post-1928 era, Marxists successfully put established science educators on the defensive, as the Stalinist cultural revolution created a tragic situation for Soviet science in general.

RADICAL CRITICS AND SCIENCE POPULARIZATION
ON THE EVE OF THE GREAT BREAK

Though generally underemphasized in the historical literature, Moscow’s Timiriazev Institute was the focal point for the radical assault on the older generation of science educators. The director of the institute was Academic S. G. Navashin, and the assistant director was A. K. Timiriazev (physicist, Marxist polemicist, and son of the famous K. A. Timiriazev who had died in 1920). Approximately one hundred associates at the institute received generous state salary subsidies and support per year. This institute and its staff, along with other voluntary Communist associations, were influential in spearheading the assault on public science both before and during the cultural revolution.

The main goal of the institute was, ultimately, the propagation of the mechanistic view of dialectical materialism. The institute’s experts consulted the Communist Party with regard to popularizing the latest developments in scientific research. The institute helped the Moscow Raikom (district party
committee) by conducting scientific lectures for party activists. Besides giving periodic lectures for party associations, members of the institute also conducted systematic scientific courses for party activists.5

Between 1924 and 1925 the institute continued its work of political and scientific enlightenment among party activists. Members of the institute published articles in popular-scientific journals and also some Communist newspapers. The newspaper Komsomolskaia pravda had a section entitled “Science and Technology.” Science popularizers from the institute would regularly publish articles in the paper on popular natural-scientific themes such as Darwinism.4 The institute’s cooperation with the Communist Party offered it ideological sanctioning and political patronage during tumultuous times—the eve of Stalin’s revolution from above in the late 1920s, for instance.

The institute’s popularization branch included several Marxist science popularizers. They not only wrote popular-scientific works but also developed a methodology for Marxist science popularization. One of those individuals was the biologist B. M. Zavadovskii, who led the science popularization work of the institute. Another key staff worker, B. G. Andreev, edited and recommended popular-scientific works for publication, and also conducted popular-scientific lectures. Andreev helped edit the natural-scientific section of the periodical Rabfak na domu (workers’ faculty in the home).6 He also wrote short entries on chemistry and physics for Communist encyclopedias and anthologies, like the Malaiia sovetskaiia entsiklopediia (short soviet encyclopedia). Andreev participated in a natural-scientific lecture series on the radio, where he read lectures on chemistry and physics. He helped edit and write a number of popular-scientific works and pamphlets, including Chemistry is a Friend of the Peasants and Physics at the Service of Mankind.8

Another popularizer who worked on the institute’s staff was M. A. Gremiatskii, the Moscow University professor of biological and natural sciences. Gremiatskii wrote popular-scientific books and pamphlets for many years. His works include books such as Life: Its Nature and Origins and also How Did Man Appear on the Earth? Gremiatskii read public lectures on popular-scientific themes and offered editorial advice to the institute with regard to popular-scientific publications. He was the editor for the section on the biological sciences in the periodical Rabfak na domu.7 Gremiatskii and other popularizers also helped various publishing houses by reviewing popular-scientific books. These publishers included Gosizdat, Molodaiia Gvardiia, and the bibliographic branch of Glavpolitprosvet.8

The institute’s popularization and propaganda branch published several series of popular-scientific works. The series titles produced by the institute included “On the Path to Materialism (Tools for Self-Education),” and “Library of the Materialist.” The print-run of these popular works averaged five thousand copies per title. The publications varied from works on Darwinism, like B. M. Kozio-Polianski’s Darwinism and the Theory of Natural Selection, to works on heredity, including M. S. Navashin’s The Reproduction of Oneself in Offspring.9 Evolutionary themes and the theoretical elements and components of Darwinism were critical components of the publishing goals of the editorial staff at the institute.

In the NEP period well-known prerevolutionary popularizers, such as N. A. Rubakin, V. V. Lunkevich, B. E. Raikov, and Ia. I. Perelman, were attacked by Marxist propagandists centered at the institute. Those attacked were all prominent science educators who had worked hard to continue their activities after 1917. Radical popularizers believed that scientific popular works must be imbued with a dialectical, materialist perspective. Rubakin, particularly, came under increased criticism by more dogmatic Soviet science propagandists during the course of the twenties. The first of these attacks was written by a popularizer of unknown identity in a 1920 article in the journal Kniga i revoliutsia (the book and revolution). Under the pseudonym Periskop (periscope), the author argued that the root deficiencies of Rubakin’s brochures did not lie in mistakes of information or technical slips but in Rubakin’s incurably flawed approach to the task of being a Soviet-era popularizer.10

Periskop believed that Rubakin’s errors repeated the elementary mistakes of those “naive people who, speaking with children or foreigners, distort the language in the hope that it will be easier to understand.” According to Periskop, this crudely constructed “falsification” of “people’s language” sounded terrible in a popular-scientific work. (Periskop relied heavily on Soviet-era phraseology, like “people’s language,” in his attacks without clearly explaining what that loaded terminology meant.) Periskop believed that Rubakin’s simplistic works were positively confusing if given to the “more advanced Soviet masses” of the 1920s.11

In his own analysis of popular texts, Rubakin criticized Periskop’s and other radical Communists’ overtly politicized constructions of public culture and the popular reader. He carried out his own analysis of the mass Soviet reader, observing readers’ habits and conducting sociological surveys of the reception of popular science texts. He published the results of those studies in a series of articles in 1927. In a retort to Marxist analysts, Rubakin argued that word usage was an important factor in the creation of a popular-scientific text, arguing that at least 60 percent of the scientific terms used in the works of well-known science popularizers (both Russian and foreign), such as Timiriazev, Belshe, and Flammarion, could not be comprehended by the average Russian reader. He charged, therefore, that many of these Soviet-
era popularizers, like Periskop, did no significant research into the psychology of the mass science-reading audience. After studying several thousand popular-scientific books that were published in the USSR during the twenties, Rubakin came to the conclusion that they were not giving the readers what they wanted. Again, he found too many words incomprehensible to the basic reader. Most works were written for educated people, not for the broader public.12

Professional public educators and scholars of reader receptivity, especially those who survived the upheavals of the 1917 Revolution, therefore began to engage Soviet-era popularizers in fundamental debates on broad issues that had educational and political ramifications for the average Russian. According to Rubakin and other prerevolutionary popularizers, the Soviet reader was changing, and as the reader changed, the content of the text itself could also change. According to this view, content exists only to the extent that it affects the reader; that is, the essence of a book is not in the book itself but in its functional dependence on the reader's receptivity.13

Communist popularizers in the Soviet Union during the twenties were unwilling to accept this notion of the reader's capabilities to decipher a popular-scientific text. They saw Rubakin's methodology as giving too much initiative to the individual reader, thus downplaying the authorial role and the content of the text (especially political content). This methodological argument had broad political ramifications beyond the debates of science popularizers. Rubakin and other prerevolutionary educators were actually contesting the Soviet Marxist belief that readers could be led by enlightened, politicized intellectuals or party bureaucrats. Rubakin believed that readers instead should be enticed, if not nurtured, to understand new scientific concepts on their own terms. Furthermore, Rubakin believed that this was a professional endeavor, not a political issue; in other words, the writing of popular educational and scientific tracts had to be conducted by those who had studied the reader and conducted scientific research in a particular discipline. Ultimately, this debate contested the intrusion into educational disciplines by those Marxists who seemed incapable of professionally understanding the educational and psychological problems of the under-developed reader.

Soviet-era popularizers, spearheaded by those in the Timiriazev Institute, continued their assault on Rubakin because he represented the most vocal of the prerevolutionary science popularizers. From his base in the institute, Zavadovskii probably articulated the strongest attack. In a series of articles on the principles of the popularization of the natural sciences (published in 1923), Zavadovskii included criticism of Rubakin's works. Although he admitted that Rubakin was one of the pioneers in this field, Zavadovskii claimed that Rubakin was not well versed in many of the scientific questions he wrote about.14

In a later piece entitled "Failures of a Popularizer," Zavadovskii argued that authors such as the biologist Lunkevich15 and Rubakin, who were popular during the Civil War and the period just following, were of no use to the Soviet reader of the mid-twenties. He argued that Lunkevich remained on the level of the explicator of anecdotal facts and completely missed the viewpoint of the progressive or ideological side of science. He believed that Rubakin's explanations were a vulgarization of scientific facts, and he pointed to scientific mistakes in Rubakin's work. Finally, he believed that there was a perversion of language in Rubakin's popular works that tried to "falsify" the Russian language under the guise of a people's language.16

Lunkevich wrote over sixty popular-scientific works during his long, industrious career. His Osnova zhizni (basis of life) was a two-volume biological encyclopedia written for the common reader, which included various illustrations. Marxists argued that he had a tendency to use outdated material and an oversimplified language. In reality Lunkevich's work was well researched and aimed at those who had both elementary reading skills and basic scientific knowledge.

Soviet radicals were also critical of foreign authors of the older generation. Their criticisms were anchored in their ideological orientations but also reflected a subtle parochial, nationalistic tendency in their Marxist approach.17 The works of V. Belshe, the German biologist and talented popularizer, were translated into Russian both before and after the October Revolution. Yet Marxists criticized his books—Ernst Haeckel, for instance—for not combining popular-scientific explicature with a sociological analysis of the era. According to critics like Zavadovskii, Belshe was completely oblivious to social problems in Germany at the time and how they affected scientific development. Further, his critics charged Belshe with the ultimate sin of attempting to combine a belief in Darwinism with a faith in God. Indeed, in his Religion of Our Time Belshe defended Darwinism yet maintained his religious belief in God.

Supporters of Rubakin's generation argued that their popular-scientific works captured the beginning reader and played an important role in introducing readers to basic scientific concepts. Librarians especially objected to Zavadovskii's criticism of Rubakin's works, asserting that in their popular libraries, Rubakin's works received the greatest demand among readers. These anecdotal responses by librarians were confirmed by sociological studies of the scientific tastes of readers in Soviet libraries. A survey published in the Soviet library journal Krasnyi bibliotekev (red librarian), measuring the use of
books in a Moscow lending library that served factory workers, found that between 1928 and 1924 there was a greater demand for Rubakin’s popular works on nature and geography than for the work of any other single author, including literary figures such as Tolstoy and Gorky. The survey also found that Rubakin’s works were read by old and young, men and women and that Rubakin had a significant influence on new readers, some of whom read his books several times. The survey found that books written by Lunkevich and Perel’man were also popular among workers. The works of more politicized Soviet science popularizers, such as Zavadovskii, were barely mentioned by readers in that particular study. 19

Zavadovskii argued that it was unfortunate that librarians and readers still valued the books of Rubakin, Lunkevich, and other prerevolutionary popularizers. He believed readers needed to look at works written by K. Timiriazev or E. Elachich, 20 who, in Zavadovskii’s view, provided the reader with more contemporary, scientific argumentation. 21 Librarians, though, were some of the best judges of readers’ tastes, since they interacted with them on a daily basis and advised them on books to read. Thus, Zavadovskii’s assertions were directly contradicted by some reader surveys. 22

The science popularizer M. Greimatskii 23 was critical of the way Zavadovskii analyzed the works of Rubakin and others of the older generation. Greimatskii, although a member of the Timiriazev Institute in Moscow, was a lone voice disputing Zavadovskii’s claims at that radical institution. Greimatski argued that Zavadovskii’s critique of Rubakin was one-sided and failed to point out the worthy aspects of Rubakin’s popular-scientific works. Furthermore, he argued that Zavadovskii did not take into consideration the wide popularity of Rubakin’s books and how the beginning reader was especially drawn to them. Greimatskii pointed out that Rubakin and Lunkevich were the only popularizers serving the worker and peasant reader. Rubakin’s works, according to Greimatskii, contained interesting facts and good, solid conclusions that were comprehensible to the average reader. Greimatskii believed criticizing prerevolutionary science popularizers for not understanding the ideological side of science was problematic if the reading public demanded their works. He added, however, that more carefully defined popular-scientific works, by Soviet scientists, would soon eclipse the older prerevolutionary writers. Unlike Zavadovskii, Greimatskii believed that patience was a virtue and that time would show the positive tendencies of Soviet science popularization. 24

During the twenties Marxist propagandists started to criticize openly those popularizers who did not infuse their published work with ideology. That campaign met with only limited success. Librarians, educators, and even other propagandists (like Greimatskii) actually defended the work of the older generation. More importantly, as evidenced through reader surveys, workers were especially attracted to the popular works of Rubakin and Lunkevich and others of their generation. Some of those fundamental readers needed a popular work written in a simplified manner so that they could fully understand the scientific arguments put forth. The Marxist or politicized science activists could not yet displace the older prerevolutionary cohort involved in popular science education who were still professionally grounded and well liked by readers. However, propagandists like Zavadovskii would be critical players in radical organizations—for instance, VARNITSO (All Union Society of the Workers of Science and Technology for the Promotion of Socialist Construction)—which would be more successful after 1928 in crushing the prerevolutionary popularizers. Although the prerevolutionary scientific intelligentsia was temporarily successful under the NEP in fending off criticisms by Marxist popularizers, eventually a host of radical scientists, institutions, and societies, coordinated through the Stalinist cultural revolution, would inaugurate a barrage of successful professional attacks on Rubakin and his ilk. Furthermore, Zavadovskii and others would launch a public attack in the press, with devastating ramifications.

CULTURAL REVOLUTION AND SCIENCE EDUCATORS

The cultural revolution was a tragedy for Soviet science and science educators who had recently survived the upheavals of the first decade of Soviet power. Condemnation and arrests of scientists, which began in 1929, usually encouraged their opponents to declare whole branches of science to be “bourgeois” and “reactionary.” Some of the condemned scientists had been the leaders of whole schools of science. In this social context the tragic events of the purges of the Soviet Academy of Sciences and similar upheavals occurred in 1929 and 1930. 25 During this first major purge of the Academy, scientists were criticized for being too concerned with “pure science.” Any form of “academic individualism” was also condemned as a bourgeois holdover that needed to be expunged. 26 In 1930 a new charter for the academy was promulgated, stating that all scientific research would be appraised according to its usefulness to practical problems. The charter also stated that the Soviet Academy of Sciences must begin a program of strict centralized planning. 27

The cultural revolution brought an increase in “specialist-baiting” of the older bourgeois technical intelligentsia. 28 During those years several show trials were held in which several thousand engineers were implicated. Most were accused of systematically sabotaging the Soviet economy in the interests of Western capitalist nations. Many of the specialists had received their education during the tsarist period and had held positions in tsarist ministries
and educational institutions. However, none of the trials received as much publicity as the Shakhtr trial of 1928. That legal travesty focused on a number of engineers, who were dubbed “saboteurs and wreckers,” and marked the beginning of a campaign directed not only against old specialists who may have been hostile to the Soviet regime but also against those who were merely politically neutral or indifferent.

Radical science popularizers had already begun to draw battle lines during the mid-twenties but were unable to muster enough support to purge the older generation of popularizers. Because scientific societies, for example, were able to garner institutional and financial support from Glavnauka or other major Soviet patrons, they could fend off attacks by Marxist radicals prior to 1928. Additionally, those societies had formed complex symbiotic relationships with Soviet cultural and educational institutions, fulfilling, as required, important educational tasks for the state. During the cultural revolution, however, the political-cultural assault played out in the scientific realm would be amplified and spearheaded by new radical associations of technical specialists and scientists, including those members of VARNITSO, some of whom were less-than-respected scholars in their fields.

The editorial boards of popular-scientific journals, for instance, were infiltrated and influenced by a variety of Marxists. In 1928 the popular scientific journal Iskra became the organ of the all-union voluntary society called TekhMass. The new editorial board consisted of Zavadovskii and V. Sverdlov (president of the All-Union Association of Engineers), who wanted to inculcate a scientific-materialist point of view in their readers. In a 1928 editorial Zavadovskii and Sverdlov wrote that the journal would cover a number of scientific and technological topics that were closely tied to the socialist reconstruction of industry and the economy. They noted that special attention would be paid to the resolutions of the Fifteenth Party Congress, which meant that issues of cultural enlightenment would be united with plans to develop the Soviet national economy. Though Zavadovskii had previous institutional support at the Timiriazev Institute, he would soon form VARNITSO as a radical network to launch his assault against major scientific organizations.

Another example of how Marxists encroached on popular-scientific journals and societies involved the fate of amateur astronomy societies during the cultural revolution. Many prominent astronomers (for example, Nikolai Kozyrev, 1908–83) had started as amateurs, but Vartan T. Ter-Oganesov (1890–1963), who barely graduated with a scientific degree from Petrograd University in 1916, occupied posts after 1917 in Narkompros and was a delegate to the All-Union Central Executive Committee. Ter-Oganesov used his position to advance the amateur societies as promising routes for the vys-
would not go down without a fight. They continued to devise complex rhetorical strategies to survive the changing political tides of Soviet politics, even under Stalin.

EDITING SCIENCE: THE POPULAR THEMATICS OF CULTURAL REVOLUTION

During the Stalinist cultural revolution (1928–31), editors of popular-scientific journals were quite explicit about stressing something much different from the previous goal of broad, popular enlightenment in the sciences. Militant editors and Marxist scientists believed in linking science education to the needs of an industrial developing economy. That emphasis became a critical focus throughout the period and culminated in the August 15, 1931, Central Committee decree that underscored the need for workers of the new Soviet state, in Stalin’s words, to “master technology,” Stalin’s phrase was repeated in countless editorial statements, in virtually all newspapers, and on ubiquitous posters plastered throughout the nation.

Science in the broad sense became subsumed by the narrowly focused, yet more powerful and utilitarian, signifier of progress—applied technology. Though the Bolsheviks had stressed since 1917 the utility of technology, they had maintained an appreciation for the imaginative impulse of science. Journals had flourished that published scientific fantasies, revered feats of aeronautical heroism, documented the wonders of astronomical and planetary discoveries, and linked Russia to a global technological revolution. With the onset of Stalin’s grandiose industrial revolution, however, popular science focused more on themes like the practical side of science—how science could benefit particular social groups, like workers, and how the Soviet Union was building a new economic system. The newer utilitarian and economic emphasis did not necessarily ruin the effort to popularize science; in fact, practical science was in popular demand as never before from a new generation of under-educated laborers from the countryside. But journals began to shed their more creative components, opting for articles and editorials that linked technological discoveries to the demands of an expanding, planned Communist economy.

For example, the popular-scientific journal, Priroda i ludi (nature and people), changed its name in October of 1931 to Revolutsia i priroda (revolution and nature). The editors made a long and polemical statement that the new task of the journal would be to begin a “war to popularize socialist technology.” The task of socialist workers, according to these editors, was to master technology as Comrade Stalin had so clearly enunciated in his party speech. With the help of technological advances, the Soviet people would be able to conquer nature, as well as fulfill the industrial five-year plans. The technological struggle with nature thus also became a prominent theme in the popular journals of this early Stalinist period.39

The first issue of Revolutsia i priroda, with its new title and orientation, included a long editorial entitled “Technology for the Masses.” The editors stressed Stalin’s new propaganda phrase “technology in the period of reconstruction decides all.” The earlier phrase “technology for the masses” became a catchword for linking the propaganda of science and technology with the industrialization drive of the First Five-Year Plan (FFYP). A new, pointed thrust of discourse was emerging from the party and directed at the people: technical literacy, not simply a general nebulous sense of scientific enlightenment, must be acquired by all. The Revoltsia i priroda editorial stressed this new orientation quite emphatically: “The growth of our new industries is dependent on the raising of the technical educational and literacy level of our working classes.”40 Empowering workers with the tools of science was a theme in most of the popular articles extolling the advances in Soviet technology. The emphasis of journal articles focused on science, in this sense, as both a democratic and utilitarian force and even as an alternative to the more academically oriented science of the capitalist West. This approach differed strongly from the more cosmopolitan content of and approach to science and technology in the early to mid-1920s.

During the cultural revolution radical Communists took over the editorial boards of numerous journals and in some cases dramatically altered their content. The popular journal Mirovedenie, under Ter-Oganesov’s editorship, became a vehicle by 1930 to propagate not only dialectical materialist philosophy, but also the utilitarian applications of astronomy. Previously, the journal had maintained an independent stance for quite some time as a proponent of the importance of amateur astronomy. Mirovedenie had had an eclectic thematic approach, dedicated to the spread of knowledge on new astronomical discoveries by global specialists, while sponsoring the work of aspiring amateur scientists. It had provided its readers with sound but popular scientific analysis and information on astronomical sightings, meteorology, and stellar configurations. In contrast, the new editorial orientation caused problems and conflict between the radical editor and the older members of the amateur community.41 Avid members of the Russian Amateur Astronomy Society fled in protest as the organization took on a politicized focus.

The popular journal Iskra also altered its direction, although not as dramatically as Mirovedenie. Like other journals after 1930, Iskra took up the call of the Communist Party and began to emphasize the importance of practical
applications of technological discoveries. In a 1930 editorial entitled “Bolshevik Five-Year Plan in Four,” the journal’s editorial chief explained the importance of the intensification of industry and the tempo of development during this period of the FFYP. The journal’s responsibility to Soviet society was therefore to focus on the industrialization of the country. For the years 1930 and 1931, approximately 45 percent of all the journal’s articles appeared under an expansive section entitled “Technology, Work, and Industry.”

Other editors of popular journals, like Revoliutsia i priroda, also began to ex- tol articles focusing more on applied technological developments. Some discussed the importance of new metals and their production in various parts of the Soviet Union. One article looked at the development of aluminum production and the various industrial centers involved in this endeavor. The article described how, in Dnepropetrovsk and Leningrad, new industrial centers were able to produce and test the strength of aluminum components. Some articles analyzed applications of scientific discoveries to the development of military technology. An article in Revoliutsia i priroda focused on how Soviet artillery, aviation, and naval power would be advanced in the future as a result of investment in arms technology by the Soviet state.

Popular journals devoted an enormous amount of print space to new Soviet technological discoveries and their immediate utility. The editors of Iskra donated much space in their journal to a large section entitled “Novosti nauki i tekhniki” (news of science and technology), which generally contained articles on a variety of topics from aero-technology to electro-technology. Basic technological advances were generally covered in full-page, highlighted articles—for instance, the christening of a new sugar refinery in Smolensk oblast in 1931. New techniques for refining sugar were discussed in this article along with descriptions of various vacuum devices used in heating and drying sugar solutions. The iconography of photographs was generally clear and straightforward: workers grasping the importance of technological advances alongside engineers and factory directors. In this case, workers were learning about the importance of new vacuum technology for sugar refinement at the Smolensk Sugar Factory in the Shevrekovskii region. Direct hands-on technological education was the message of the article and its accompanying photographs. Articles like these extolled Soviet industrial and technological advances and offered photos of workers together with engineers to depict visual images of how technology had broken down class barriers in the USSR. Compared to 1920s science literature, which clearly emphasized Western technology, Soviet technological advances during the FFYP were prominently displayed and shown to be the joint product of scientific specialists and workers alike.

Many of the popular-scientific journals of the FFYP era carried a section that dealt exclusively with inventions and their application to technological innovation. In the journal Revoliutsia i priroda the section was entitled “The Value of Invention.” During the FFYP this section carried articles mostly on Soviet inventors and stressed the importance of encouraging indigenous scientific invention. Such journal sections pushed the notion that workers should be the most daring of inventors. Unlike the popular-science media of twenties, the media of the thirties placed foreign technological advances in the back seat, behind Soviet discoveries. Invention seemed less a part of an educational process and more a venue for the laboring classes to excel in the process of discovery. Workers were shown in pictures, and described in editorials, eclipsing the former technical intelligentsia as the purveyors of scientific potential. Although Stalin issued his famous speech in July 1931 signaling an end to the distrust of so-called “bourgeois specialists,” the new policy did not preclude science editors from emphasizing how workers could learn from specialists to build and reinvent a new type of engineer.

An article in Revoliutsia i priroda extolled the importance of workshops sponsored by various Moscow factories to encourage workers on the shop floor to share their ideas for technological change with engineers and technical specialists. This particular article championed the Borets factory in Moscow for sponsoring talks and workshops organized to urge workers to display their inventions and to urge “specialists” to critique their work. Many foreign technical specialists working in Russia, however, noted how this put enormous pressure on Soviet engineers during the early Stalinist years to critique an abundance of mediocre designs and blueprints by amateur worker-inventors.

Many of the articles and short pieces in Iskra’s section on “News of Science and Technology” covered Soviet inventors and their projects. The emphasis in such articles was on amateur inventors who came from the shop floor and were, therefore, on the cutting edge of change, since they knew from hands-on experience what was actually needed in the factories. This editorial strategy fit into the Stalinist rhetoric of the period and emphasized “the mastering of technology by the working class.” Unlike articles appearing in the 1920s, newer articles and editorials did not necessarily stress the importance of learning from the specialists. Instead, formally trained technical specialists were seen more as useful critics of a new class of praktiki (rapidly promoted specialists) who would eventually supplant the technical specialists once the cultural revolution had taken its due course.

Lastly, editors believed that journals should emphasize the importance of the natural wealth and resources of the country. The vast expanse of the Soviet empire was rich in everything from oil to precious metals. Articles emphasizing important national treasures were placed prominently at the
beginning of issues. Furthermore, prominent academicians were urged and solicited to write articles with nationalistic thematic content. Stalinism placed great importance on extracting the maximum from the vast resources of the empire, emphasizing a need to command and conquer nature. In one lead article in Revoliutsia i priroda, Academician A. E. Fersman wrote a tract entitled “All of Our Land,” where he surveyed the metallic resources of the Urals. The thesis of such articles, consistently set out through the words and pictures, was anchored in the notion of utilizing the potential of Russian resources, not just in understanding their nature and worth.

These nationalistic tracts were not as introverted and exclusive as those to come in the middle through the late thirties. The scientific writing of era of the cultural revolution still contained peripheral commentary about Western technology and resources, but their value was not underscored as it had been in the mid-1920s. A reverence for the West and the need to learn from Western scientists and engineers are clearly missing in texts of popular journals published during the cultural revolution. That absence hints at what was to come, a rising tide of rhetorical and popular articles glorifying the wealth of the Soviet empire. That tide would utterly divide Russia of the mid-1930s from the international nexus so vital to building scientific and technological networks. In the period of the Stalinist cultural revolution, the emphasis on the feats of Soviet technology and invention had initiated a slow process of excluding commentary on the virtues of Western advances. Soon, discussion of the Western scientific and technical world would vanish from the pages of the public media for a long time to come.

Chapter 8
CULTURAL CONVEYOR BELTS

Public Science on the Retreat, 1928–32

During the period of the New Economic Policy (NEP), the Communist Party and Soviet state (specifically the Ministry of Education’s Scientific Branch, Glavnauka) generously sponsored the popular-enlightenment efforts of many scientific societies, institutions, and publishers while avoiding any severe political interference in their work. With the end of the NEP in 1928, the Soviet state continued as the prime funding source for those societies and their enlightenment work. However, radical Communist factions and groups of intellectuals then launched an aggressive challenge to the authority of the prerevolutionary intelligentsia. While the initiative came from below, these groups lent support to party resolutions and directives from above, which demanded that all enlightenment activities buttress the socialist reconstruction of the economy.¹

In the period of the Stalinist Great Break (Velikii Perelom), young militant Communists successfully infiltrated the editorial boards of popular-scientific journals, with the tacit support of more-militant Narkompros and central Agit-Prop officials. Their efforts mimicked similar developments across all disciplines, especially in some of the important central and regional educational journals. Larry Holmes has shown that after the autumn of 1928 at both the central and provincial levels, purges of editors and educators accompanied changes in the content of articles in educational journals. Furthermore, science and educational periodicals increasingly highlighted articles relevant to social and industrial tasks.²

Throughout the course of the cultural revolution, tensions grew between young militants and older professors in the sciences. In the scientific realm specific institutions, VARNITSO being the best example, helped to coalesce attacks against prerevolutionary societies and served as a spearhead for further criticism. The attacks against the prerevolutionary intellectuals greatly restricted the extent and nature of the public discussion of scientific issues during the 1930s. VARNITSO began to dictate to older established institutions the parameters of popular scientific and technical education.
The scientific intelligentsia’s ordinary, daily survival tactics highlight the human drama of the era. Their struggles display and emphasize basic human emotions such as the new militancy’s jealousy of the old scientific elite and the radical Communists’ contempt for how the Soviet regime patronized these specialists earlier in the decade. This contempt would drive young Communist militants, on their own accord, to undermine the symbiotic relationships created between the regime and the prerevolutionary scientific intelligentsia, complicating that very assault which had also been launched from above.

VARNITSO AND THE ASSAULT ON CENTRAL SCIENTIFIC SOCIETIES

During the Great Break, Bolshevik science pedagogues, grouped in VARNITSO and other organizations, criticized those educators who did not link science education to practical economic tasks. Even within Glav nauka, an earlier patron of scientific societies, these pedagogues openly challenged their associates who were accused of propagating material and a point of view divorced from immediate economic and industrial needs. VARNITSO overtly extinguished the process of public debate and discussion of science education during this period. Once Stalin unleashed the rhetorical constructs of practicality, various science educators used these models to serve their own purposes, simultaneously fulfilling the Stalinist state’s dictates. Through the period of the cultural revolution VARNITSO led a campaign against liberal, prerevolutionary scientists, educators, and scientific societies. The history of this agency reflects, in some ways, a history of science education in general, over the course of the late 1920s and 1930s in the USSR. From the outset of the new nation, Communist organizations interacted and collided with preexisting voluntary and learned societies, fostering institutional and ideological conflict. Back on April 27, 1927, a group of leftist professors met to draft the outlines of what would soon become VARNITSO. Those Communists, with particularly high connections within the Bolshevik party, were specifically insistent on linking all science education and popularization to practical economic tasks of the FFYE. Their number included B. M. Zavadovskii, V. M. Sverdlov, M. M. Zavadovskii (head of the Biology Department at Moscow State University), and also A. N. Bakh (director of the Karpov Chemical Institute). On September 26, 1927, they and their like-minded colleagues signed a declaration creating a new organization to promote science education at production sites and to propagate technical knowledge among the masses. The declaration also stated that one of the main functions of the group was to unite and organize socialist thinking among scientific and technical workers of the Soviet Union. The Bolsheviks gave direct support to their efforts, and a Council of People’s Commissars (Sovnarkom) resolution of February 13, 1928, endorsed the declarations and formation of the organization that came to be known as VARNITSO.

VARNITSO’s initial founders and supporters included members of the scientific and technical intelligentsia who held particularly high positions in educational and industrial institutions. More-radical professors at the Timiriazev Institute, like B. M. Zavadovskii, had been critical of prerevolutionary societies and popularizers in the debates of the 1920s. The radicals’ intended purpose was to win over specialists to a mechanistic, Marxist worldview, to cooperate with the Soviet government and Communist Party in building socialism, and to propagate scientific and technical information among the Soviet masses. VARNITSO and its members thereby helped create several Communist voluntary technical societies, TekhMass for one, offering workers with limited skills politicized classes in the sciences in factories after work hours.

From its inception VARNITSO used the revolutionary rhetoric of class war and international struggle to set itself apart from other mass scientific organizations. Its organizing group argued that science and technology were instruments in a struggle between two world systems—capitalism and socialism. As part of that effort, the society also encouraged graduate students in the sciences to join their group and take part in proselytizing for the organization. In a letter to People’s Commissar of Enlightenment Lunacharskii in December of 1927, a group of young Communist graduate students declared that Glav nauka must support the funding of VARNITSO to unite scientific enlightenment with industrial tasks. The students complained that “we have had a series of good scientific research institutes with decent facilities, yet we lack scientists engaged in applied research. We must focus the work of our educational departments and research institutes on the needs of agriculture, industry, national health, and sanitation.” These students wanted to re-focus the emphasis of science enlightenment on the utilitarian needs of a developing economy. The students were also taking advantage of the growing trend to criticize Glav nauka’s previous support of prerevolutionary “bourgeois” societies.

The issue of the practicality of scientific research and education was stressed in Bolshevik rhetoric of the Stalinist Great Break era. Although it may have rung hollow at times, many organizations felt they needed either to pay lip service to the Bolshevized term practicality or to use it as a means to focus attention on their particular organization. In the NEP era, these societies had to justify their funding requests to Glav nauka officials by underscoring their “cultural-enlightenment” efforts. Now, during the cultural revo-
lution, they felt pressured to convince state officials that their societies could also fulfill the more utilitarian purpose of aiding the development of the Stalinist industrial complex.

VARNITSO spearheaded an attack against the institutional power of the Academy of Sciences as a bastion of the old bourgeois order and as an institution with privileged backing from Glavnauka. In appeals sent to Glavnauka in 1927 and 1928, VARNITSO officials argued that the academy monopolized international contacts and funding for scientific conferences and expeditions within the Soviet Union. In April 1927, founding members of VARNITSO drafted letters that were sent to F. N. Petrov, head of Glavnauka, insisting that "the Academy of Sciences was a right-leaning organization, concentrating too much power in its own hands." VARNITSO warned Petrov and Glavnauka that the academy opposed "Sovietization" and would develop contacts only with those Western scientists who supported alternative socioeconomic systems of power. The overall tone of the April 1927 meeting indicates a vindictive attitude toward the privileged academy and the sense that new Communist organizations should end the academy's dominance over scientific institutions in the USSR.

VARNITSO slowly gained some support from moderate Narkompros officials like Petrov who had been open to diversified opinions. VARNITSO's campaign gained practical ground as it targeted those Narkompros officials who had control over funding, as well as the direction of science-education policy. Petrov was also present at some of the initial organizational meetings of VARNITSO in the Spring of 1927, and he, too, echoed similar criticisms of the academy as a privileged organization of the old bourgeois elite. Whether Petrov, a supporter of less-ideological science education in the NEP era, was rethinking his position or merely pandering to the young radicals is difficult to assess. However, VARNITSO was successfully putting pressure on Glavnauka and its leaders, who believed they needed to respond to the growing ideological debates on the horizon.

VARNITSO's aggressive competition with other institutions for limited funds and support reflected not only the younger radical generation's ideological distaste for the standards of the prerevolutionary bourgeois scientific establishment but also the radicals' jealousy of the older generation's academic privileges. Moreover, VARNITSO lobbied for its members' own professional interests. That was especially important for chemists and other scientists within several distinct disciplines who were members of VARNITSO. These subgroups of scientists acted as ideological combatants both against other disciplines in the sciences and as political agents protecting and advancing the needs and interests of their members against non-Communist scientists. For instance, chemists in VARNITSO argued that their research had practical applications to the developing Stalinist industrial economy, over against the work of theoretical physicists, whom they criticized for reclining into their insular laboratories. Although by 1928 VARNITSO still had fewer than a thousand members, that number included many prominent applied scientists, engineers, and Marxist scholars. Over the next two years, the organization rapidly expanded to three thousand members. By the end of 1928 it boasted a membership exceeding eleven thousand members.

As it advanced the political interests of its members, the society infused its scientific propaganda with the "practical economic" rhetoric of the Stalinist FFYP. VARNITSO members urged all individuals and organizations to contribute to the USSR's industrial reconstruction. In pursuit of this goal, VARNITSO, at its very inception, sought to assist Agit-Prop. The close ties that developed between the two agencies aided VARNITSO in fulfilling the party's requisite tasks, while enabling it to use the party's initiatives for its own ends. In 1928 Agit-Prop requested that VARNITSO produce materials propagating the utilitarian and economic relevance of science and technology. A. I. Kriutskii, head of Agit-Prop, urged VARNITSO members to stress the links between scientific knowledge and socialist ideology, and he asked VARNITSO to help set up technical circles and stations in factories to educate workers. Kriutskii specifically wanted to involve the organization in training under-skilled workers in basic science education on the shop floor and in producing practical pamphlets for various courses. The program fit well with plans by Communist educators to unite all educational efforts with the remedial technical needs of under-skilled factory workers.

VARNITSO launched a campaign in the popular press against mainline, "bourgeois" scientific societies and their popular-enlightenment work. That effort climaxed at a March 1931 meeting in Moscow of VARNITSO's Central Bureau, to which most of the major pre- and post-revolutionary scientific and voluntary societies in Moscow and Petrograd were invited to send representatives. VARNITSO hoped to use the meeting to condemn non-Communist educators and scientists while promoting the interests of its own members and the Communist Party's agenda. However, most of these non-Marxist organizations—including the Society of the Amateurs of Natural Sciences, the Society of the Investigators of Nature, Raikov's Leningrad Society for the Spread of Natural-Historical Education, among others—refused to fall into the trap and declined to send anyone to the gathering.

At the meeting VARNITSO's Zavadovskii gave a critical report on "The Restructuring of Work of Scientific Societies." With few exceptions most scientific societies, he claimed, were still "citadels of bourgeois intellectuals." Furthermore, their major purpose remained the pursuit of pure scientific...
research. Zavadovskii insisted that such societies now demonstrate their relevance to Russia’s industrial and overall economic development. Following the meeting, Zavadovskii and his colleagues continued their attack in various periodicals and in the daily press. In an article in *Za kommunisticheskoe prosveshchenie*, Zavadovskii argued that societies like the Society of the Investigators of Nature had forfeited their right to funds from the Soviet government, even their right to exist, because of their preoccupation with theoretical work at the expense of tasks associated with popular education, economic utility, and industrial development. In addition he pointedly declared that few of their members came from worker or peasant origins. Finally, he urged the revolutionary intelligentsia to restructure scientific organizations, opening them to the masses and dedicating them to the cause of “socialist reconstruction.” His proposal echoed suggestions from other VARNITSO members to consolidate many of the uncooperative societies into new organizations, thereby depriving them of their independent status and threatening them all with eventual extinction. VARNITSO wanted to upset the delicate balance between patron (Glav nauka/Narkompros) and client (prerevolutionary societies), which had been symbiotically structured in such a delicate manner during the NEP era. Ultimately, this destabilizing effort initiated a battle between Communist militants and the old prerevolutionary intelligentsia, who had previously enjoyed institutional support among Soviet state leaders during the NEP. VARNITSO members used the Communist Party’s rhetorical constructs against their rivals, urging them to create voluntary societies that had utilitarian platforms and workers as members.

Zavadovskii, A. N. Bakh (Director of the Karpov Chemical Institute), and other members of VARNITSO continuously sent letters to Stalin and other Politburo members regarding the issue of “older bourgeois scientific” educators. In a 1931 letter to Stalin, these Communist professors argued that while VARNITSO was helping to build socialism, “Menshevik enemies of the state and older intelligentsia” still lurked in older bourgeois scientific societies. Their appeals for financial aid always stressed how VARNITSO was promoting science and technology that would support both workers and the Soviet state’s industrial needs. They vigorously protested the continued funding of many of the older societies by Glav nauka.

VARNITSO officials also lobbied Narkompros to put pressure on the prerevolutionary scientific societies. They were especially concerned that the societies actively recruit workers and peasants and show evidence of direct and immediate contributions to the transformation of the nation’s economy. At the same time, the Stalinist state and the Communist Party officially issued a similar requirement that all voluntary scientific and technical societies contribute in a practical way to economic development. At the first All-Union Conference of the Workers of Socialist Industry (February 1931), Communist Party representatives proclaimed: “The Bolsheviks should master technology. . . . Technology in the period of reconstruction decides all.” VARNITSO became the leading agent of the new line to pressure voluntary scientific societies to take up utilitarian goals.

Many of the old, established societies responded by training workers and new specialists and by conducting science short courses on the shop floor in factories. They then submitted to VARNITSO accounts of their attempts to aid “socialist construction.” Their reports were testimony to VARNITSO’s direct pressure on these organizations and to VARNITSO’s ability to associate itself with the party’s public policy and rhetorical constructs handed down from above. For the prerevolutionary scientific societies and educators, VARNITSO was an ideological threat, a competitor for funds from Glav nauka, and a carrier of the party’s anti-pure-science line. During the 1920s Narkompros officials, like Lunacharski, intervened directly and personally to buttress the budgetary needs and claims of prerevolutionary societies. After 1928 that budgetary policy became difficult for Glav nauka to continue, especially since Glav nauka itself was being pressured from two sides, by Communist Party departments like Agit-Prop and by new Communist voluntary organizations like VARNITSO.

A number of prerevolutionary societies responded to VARNITSO with an effort to improve their standing with the agency by demonstrating efforts at cooperation. For example, in 1931 the Moscow Society of the Investigators of Nature wrote VARNITSO a letter explaining that “since 1929 it has been involved in a number of science educational activities which have utilitarian economic goals.” Its members had successfully disseminated scientific information among the populace and had participated in a variety of public educational lectures and courses analyzing the mineral wealth of the country. Another organization, the Russian Association of Physicists, responded in a similar fashion to VARNITSO’s attacks. In April 1931 the physics association’s vice president, Professor V. Romanov, insisted that his organization was not solely preoccupied with theoretical problems: “At the last congress we addressed issues focusing physics on industrial development and the preparation of Communist cadres in the physical sciences.” Romanov argued moreover that A. F. Ioffe, president of the association, had undertaken a thorough reorganization in order to correct what VARNITSO characterized as the physicists’ insular orientation and lack of applied research. There is no direct archival evidence to confirm Romanov’s assertion that Ioffe had indeed carried out such a “thorough investigation,” but both Romanov and Ioffe knew that they had to position the association in this way to deflect
criticism by VARNITSO and other Communist organizations. Many other societies argued that they actively engaged in cultural-enlightenment work by consulting workers at Moscow factories on the practical applications of new theoretical work. Nevertheless, many other scientific societies, including the Moscow Society of the Investigators of Nature, protested to VARNITSO that involving workers and peasants in the organization’s work was a more complex matter than VARNITSO was willing to admit.²⁶

During the period of the Stalinist Great Break scientific societies, with few exceptions, eagerly showed that they were not insular bastions of the older scientific intelligentsia and supporters of merely pure scientific research. They well understood how crucial their effort was to continued state funding. They were highly sensitive to VARNITSO’s openly public criticisms, given the fact that those criticisms might be representative of the shifting political trends in the Soviet regime above. Scientific societies with a long tradition dating from the prerevolutionary era of societal independence now found legitimizing their existence especially difficult. They were overwhelmed by the flurry of criticisms hurled at them during the era of the Stalinist cultural revolution and Great Break. Furthermore, they now had to compete with new Communist voluntary societies that emphasized popular education for workers and stressed utilitarian goals linked to the expansion of the Soviet industrial complex. Ultimately, Communist organizations such as VARNITSO worked the party and state bureaucracy in pursuit of their own budgetary needs in direct competition with preexisting scientific societies. VARNITSO successfully combined the ideological weaponry of the cultural revolution with their political skills at in-fighting to pursue their quest for funding and resources.

In the light of these complex internecine wars, the cultural revolution becomes a more nuanced and complicated process involving state dictums from above, militancy from below, and aggressive struggle for institutional hegemony and control over funding and limited resources. VARNITSO effectively used the Soviet state’s rhetorical statements regarding “practicality” to its advantage, as it aggressively attacked prerevolutionary “bourgeois” scientific societies. On some level, VARNITSO’s critique of the agendas of the old societies, with respect to practicality, rang hollow, given that the old societies had been linked to public educational goals and civic service during the 1920s. Yet, as VARNITSO argued, those societies were still run by intellectuals and not sufficiently engaged in providing technical advice to industrial workers. As their alternative, VARNITSO spawned many technical associations, TekhMass for instance, which more assiduously taught workers in factories remedial science education. VARNITSO’s societies were still mainly run by intellectuals—though true Communists—but were more directed toward Stalin’s insistence on specifically tying scientific enlightenment to industrial productivity.

Even toward the end of the cultural revolution in late 1931, Communist Party leaders continued to emphasize the popularization of technological information for Soviet workers. Party leaders like Nikolai Bukharin were seriously distressed over technical illiteracy, especially among the working class, and stressed the need for more technological education outside of formal institutions.²⁷ VARNITSO’s call for “practicality” in adult education was therefore echoed by Communist Party leaders as the thirties began. The militants effectively placed the issue of utilitarianism in technical and science education firmly within the technological agenda of party leaders. In short, VARNITSO had taken up the call from above and skillfully used it both to solidify its own position vis-à-vis the government and to reinforce the party’s rhetorical strategies. Despite the efforts of older societies to adjust rhetorically to criticism by radicals, the real repercussions of this trend for public science education were devastating for prerevolutionary societies but simultaneously transformative for the new radicals.

REGIONAL STUDIES, PUBLIC SCIENCE, AND STALINIST DISCONTENTS

As VARNITSO concentrated its attacks on the urban mainline institutions, a similar conflict played out more gradually in the provinces. Although perhaps not with the same ideological intensity, that conflict’s final effects were equally devastating to science educators outside the urban mainstream. Provincial scientific societies had also maintained a precarious existence during the NEP era, as they, too, lobbied Glavnauka for funding while maintaining some sense of relative independence. Iaroslavl’ naturalist societies had been particularly successful in advocating their cause, especially since they made up some of the oldest and best organized prerevolutionary voluntary scientific societies in the Russian provinces. Their liquidation during the cultural revolution reflected how the political tensions of that era had a lethal effect on scientific organizations outside the urban capitals.

The Iaroslavl’ provincial natural-history societies were well funded during the NEP era, and they developed strong branches in cities such as Rostov, Rybinsk, and Kostroma. However, Glavnauka demanded more and more meticulous documentation from these organizations as the twenties came to an end. Furthermore, the encroaching state was involved in reorganizing such societies to fit them into new centralized bureaucratic structures. Although relatively independent, the scientific societies were subjected to the Soviet
state’s bureaucratic reshuffling throughout the 1920s. Additionally, every piece of equipment was inventoried, all budgets meticulously analyzed by Glavnauka, and all members required to fill out yearly reports on their activities. This centralizing process would become even more accentuated during the period 1928–31. As Stalin’s revolution from above grew, other overlapping Soviet institutions, both within and outside Narkompros, began to place more and more demands on the provincial societies. The Stalinist institutions interfered in the societies’ ability to make independent decisions and ultimately infringed on their viability as independent purveyors of civic culture in Russia. Furthermore, incremental Soviet kontrand evolved into a hegemonic power struggle between the central state and scientific organizations on the periphery.

In the summer of 1918 the Soviet Ministry of Enlightenment (Narkompros) created the Central Kraivedcheskoe Obschestvo (Regional Studies Society). The purpose of this organization, and its many local affiliates, was to unite scholars interested in regional issues, entice them to educate local communities, and further study the resource potential of various geographic areas. The kraved regional studies movement intersected with the science-popularization trend in the Soviet state’s effort to engage regional specialists in the spread of science widely among the populace. As the twenties progressed, the kraved movement became overwhelmed by demands, especially from such institutions as Vesenka, to concentrate its work on local resource analysis for more utilitarian and industrial purposes.

Three simultaneously occurring factors placed pressure on provincial naturalist societies in the Northern Volga region, finally culminating in their liquidation in 1931. One factor was the requirement to place more emphasis on regional-resource development and study. The Iaroslavl’ Natural-History Society’s name was officially changed in 1924 (approved by Narkompros’s Glavnauka) to the Iaroslavl’ Natural-Historical and Regional Studies (Kraivedycleskoe) Society. In November 1930 the age-old function and designation of the society, natural history, was deleted, and it was renamed the Iaroslavl’ City-Oblast Regional Studies Society. It continued to exist under that designation until April of 1931, when the society was officially dissolved by the Central Bureau of Regional Studies under the authority of Narkompros. A second, and equally ruinous, factor affecting the Iaroslavl’ society was the pressure exerted by local and central “productive forces” associations. These organizations, with strong ties to Vesenka, pressured local scientific societies to place more emphasis on natural-resource utilization and applied-science research. Lastly, a third pressuring factor emerged because Glavnauka representatives themselves felt the pressure to force provincial societies to conform more explicitly to centralized dictates. Glavnauka demanded that these voluntary scientific organizations take part in utilitarian endeavors having clearly direct links to the developing economy.

By the late 1920s local associations for the study of the productive forces sprouted up all over provincial Russia. The most active along the northern Volga, ASSOSIATSIJA PO IZUcheniyu PROIZVOLITEL’NYkh SIIL IAROSLAVLSKOI GUBERNII (Association for the Study of the Productive Strength of Iaroslavl’ Province) had been involved in regional studies beginning in 1923. Yet as the decade progressed, these local associations competed for funds and legitimacy alongside the Iaroslavl’ Natural-History Society. The “productive forces” organizations appealed to local executive committees by arguing that they were uncovering information that would be valuable to local and central industrial institutions in ways that purely scientific investigations could not be. The Iaroslavl’ Society for the Study of Productive Forces was especially involved in hydro-biological analysis of the Northern Volga River Basin. Between 1924 and 1926 one investigator for the society, V. I. Koshelev, launched a study that looked at the history of industries that developed along the river and how they used the waterway as a practical resource and foundation for economic development. Natural-resource potential was critical to these organizations, as they extensively surveyed rock, fossil fuels, and indigenous deposits in the area. By 1927 local engineers and professors (who were associated with the organization) lobbied for local-government funds to continue studying the “productivity” of the area. Professor B. C. Greze of Iaroslavl’ University began a study in 1927 to look at the fishing industries on the northern Volga. He was especially interested in how sustainable those fisheries would be over time. Records show that this organization particularly appealed to the Regional Central Executive Committee for funding, as well as the Regional Party Section (Gubkommunistotdel), arguing with the needed rhetorical skill that this organization was more beneficial to the state’s industrial needs than older naturalist societies.

These “productive forces” organizations created local agendas designed to compete with broader voluntary scientific societies for funding from regional Soviet-state and Communist Party institutions. Furthermore, they wrapped themselves in the rhetorical cloak of the Stalinist themes of utilization and resource potential of a given region. Between 1928 to 1932 local scientific societies, like the Iaroslavl’ Natural-History Society, were pressured to engage more directly in the Stalinist industrialization and collectivization programs. Central dictates from above made the need to study the “productivity” of a Russian provincial region the most critical element of any society’s agenda if it was to survive as a public institution.

Beginning in early 1929 the Iaroslavl’ Natural-History Society started sending letters to Glavnauka and local authorities, like the gubispolkom, informing
them that they were now giving lectures and workshops on scientific topics having relevance to the national and local economic plans. These letters contained appeals similar to those that the scientific societies of the major cities had sent along to VARNITSO, to show that they were cooperating with the state’s economic goals. In 1929 the Iaroslavl’ naturalists held a series of lectures in the area for local engineers and farm administrators on the importance of chemical fertilizers and pesticides for agriculture. They developed a series of technical and scientific lectures for local factory workers. Most of the lectures for workers in the past had been designed to supplement their basic scientific grounding—broad workshops on math, physics, and even astronomy (still a popular topic among laborers). 32 After 1928, however, the old-line societies tried to adapt to the changing tides and to lobby state institutions using the new rhetoric of economic utility and industrial productivity.

By late 1930 a steady stream of central dictates from officials of the Glavnauka department of Narkompros laid out a practical agenda of activities in which the societies needed to engage if they were to remain afloat. Their once benevolent patron, Glavnauka, also capitulated to the driving forces from above and below to link science education with economic productivity. By the winter of 1931 Glavnauka had launched a campaign to make sure the scientific societies conformed to a program of strict requirements. In February of 1931 the agency sent out a circular to all provincial scientific societies and regional museums in the USSR requesting a detailed survey and account of their activities by March 1, 1931. Glavnauka demanded that voluntary scientific organizations educate the local public on the importance of the Soviet military-industrial complex during the FFYP, the role of the Red Army in the collectivization drive, and the fight against class enemies in local regions. 33

Approximately one week later M. P. Potemkin, head of the Central Regional Studies Bureau in Moscow, sent a directive to all local regional studies organizations with an even more utilitarian, and equally coercive, demand. Potemkin insisted that regional study societies and naturalists develop exhibits and workshops lauding recent industrial achievements in the USSR. They were particularly instructed to focus their attention on exhibits that would look at the industrial capacities, as well as natural-resource potential, of the local region. 34 On February 20, 1931, the Glavnauka department of Narkompros sent to regional scientific and kraevo organizations directives addressing the need to campaign for the party on local collective farms. Narkompros argued that those groups had to conduct technical seminars and lectures on the introduction of machinery and chemical fertilizers. 35

With their backs to the wall, societies responded promptly to criticisms by setting up popular seminars and scientific lectures geared to those social groups that the regime supported. The organization of Iaroslavl’ naturalists went to great lengths to describe to Glavnauka officials their lectures for Soviet workers and the short courses they organized for Red Army soldiers in the area. Although the actual topics did not always develop from utilitarian, industrial themes, the society nevertheless offered short courses to particular social groups targeted by Narkompros. Since the society had always popularized astronomy at its observatory, it set up particular nights exclusively for workers to observe stellar sightings and to consult with local astronomy specialists. 36

But their previous patron, Glavnauka, could no longer come to their rescue, especially financially. Budget records show a steady stream of complaints from provincial scientific organizations to Glavnauka’s financial department beginning in 1929 and ending with their liquidation in 1931. The records indicate that these societies were hanging on by a thread during the period of the cultural revolution.

A January 25, 1929, letter from the Iaroslavl’ society to Glavnauka complains about the lack of funding to pay wages. The letter states that if the government were to discontinue its subsidy for the society, the society would lose not just scientists but also basic necessities for its facilities. Society officials argued that for the three months following October 1, 1928, the society received only twenty-eight rubles of its budgetary request sent to Glavnauka. 37 Clearly, this was not just a time of ideological change but also of financial privation. The 1929–1930 smeta (estimate) sent to Glavnauka included an attached memo protesting the lack of funds distributed to local scientific societies on the northern Volga. They especially berated government officials for the condition into which the society had fallen because of a lack of funding: wages were not being paid to employees of the museum, exhibits were suffering, and lectures were becoming more sparsely attended. The societies had to rely more on their voluntary scientific staff, which was supposed to concentrate mostly on educational activity, not basic upkeep of facilities. 38

By mid-1930 financial tensions would be the least of the Iaroslavl’ society’s worries. The first frontal assault came from the Central Bureau of Regional Studies in Moscow. Claiming, as a Narkompros organization, it had jurisdiction over the Iaroslavl’ society, the bureau asserted that the society should be dissolved and its membership subsumed under a more centralized subsection based in Ivanovo (a larger industrial center to the east). 39 The central Ivanovo organization agreed with the bureau’s assessment, adding that the Iaroslavl society was oriented toward narrow, myopic studies of flora and fauna that were irrelevant to the broader economic and industrial topics of the entire Northern Volga area. 40 The stinging critique fit well with the
rhetorical fervor of the FFYP era regarding economic utility and with the Stalinist trend toward more-centralized organizations.

The destruction of some provincial societies was also linked to general bureaucratic reorganization after 1929. Between 1929 and 1936 Iaroslavl' became part of the Ivanovo Industrial Oblast Obkom (or Regional Party Headquarters), during a time when the older gubkomi (or Gubernia Communist Party Organizations) were being subsumed under obkomi (Regional/Oblast Communist Party Structures). Cultural, scientific, and regional reshuffling might have been replicating broader geopolitical reorganizations occurring in the party itself. These reorganizations were critical in an era when the party in Moscow was becoming more suspicious of local independence.

The local regional society attempted to strike back by holding a membership meeting in early August. On August 8, 1930, it sent a memorandum to the Ivanovo Regional Studies Headquarters in its own defense. The members who signed the memorandum argued that the society was never "organized on a very narrow basis" and that it had a regional and economic scope to its work that focused on research in areas beyond the town of Iaroslavl'. Unfortunately, the Ivanovo Central Bureau refused to listen to these entreaties pleading that the Iaroslavl' society remain independent and did not approve the request.

On November 3, 1930, the Ivanovo Central Bureau changed the name of the Iaroslavl' naturalist society to the Iaroslavl' City-Oblast Regional Studies Society. The naturalist section of the newly named society appealed, in January 1931, to the All-Union Society of the Lovers of Nature in Moscow for help and affiliation. The local naturalists argued that although they had always been interested in "regional studies" they were actually more associated with all Russian naturalists who study their various locales. The records, however, show no response to this appeal. Increasingly, provincial naturalists were having difficulty finding supplemental regional studies groups and trying to affiliate themselves with other major naturalist organizations in Moscow that continued to enjoy state sanctioning. Glavnauka, once the supporter of amateur scientific societies, seemed to have completely abandoned provincial naturalists and scientific societies to the whims of the centralized regional-studies organizations within Narkompros.

In November 1930, Glavnauka itself sent a circular to all regional scientific societies in the provinces warning them that they should try to affiliate themselves with central organizations based in Moscow or risk complete liquidation. Signed and presumably written by I. Kancheev, an assistant director of Glavnauka, it argued that provincial scientific organizations must realize that "the present movement, to centralize all scientific and cultural organizations in Soviet Russia, will serve the purpose of maximizing our scientific workers"

to take part in the greater goal of the socialist reconstruction of the industrial sector." This statement, probably more than any other, speaks clearly to the extent to which Glavnauka, itself under great pressure, would go to support centralizing tendencies by the end of the cultural revolution. The statement was a far cry from the days when Glavnauka intervened in the earlier 1920s to help these societies maintain their local independence.

With no central or local patrons left to turn to for help, the oldest provincial scientific organization in Russia was finally dissolved on April 25, 1931, by a decree from Narkompros's central office, which was effected by the local Iaroslavl' Branch of the Commissariat of Enlightenment. The liquidation order, which affected all naturalist branches on the northern Volga, ended with a demand that all property of the organization (and its remaining budgetary funds) be transferred to the local Narkompros bureau. The society made a final appeal to Narkompros itself at the end of April, but it was of no avail since the society was officially extinguished.

After 1929 when Communist Party political organizations were being reorganized from the center, provincial scientific societies found themselves subsumed under larger oblast organizations by Narkompros. This grand reorganization reflected the scope of the center's hold over peripheral organizations during that period. At an earlier point in time, local science and public culture in the Russian provinces had been an important component of a developing civil society. However, by the early thirties these communities of provincial science educators had all but dried up, with their civic tasks forcibly linked to utilitarian ventures. As conveyor belts for the Communist Party's propaganda campaigns, the scientific societies no longer represented the vestiges of independent civic activity, a role they had defended in the twenties.

SCIENCE, MASS-AGITATIONAL PROPAGANDA, AND THE COMMUNIST PARTY'S PERILS IN THE PROVINCES

As VARNITSO and the Soviet state were attacking central scientific societies, local societies were simultaneously under pressure to link their public activities to economic and utilitarian goals. Meanwhile, during the cultural revolution, the Agitational-Propaganda Sector of the Communist Party resuscitated its own scientific-enlightenment campaign in the provinces, even attempting at times to use the facilities of these local scientific societies for its own radicalized and more politicalized ends. In the provinces this became especially pronounced, and Agit-Prop's local cells stressed not only utilitarian goals but also antireligion as a key weapon in its assault on the public's
so-called “antiquated and superstitious values.” Mass-agitational activity along these lines would fail miserably in local areas, as party cells sent back frank accounts of critical problems to the central and regional headquarters. Those failures reveal the party’s ineffectiveness in scientific propaganda in outlying regions and explain why the Communist Party would become so dependent on Communist voluntary societies in the period 1928–34 to carry out public science education.

Beginning in late 1928 the Iaroslavl’ Gubkom (Regional Party Committee), in collaboration with the provincial League of the Godless, began to draft plans for joint antireligious activity and the construction of a substantial, local antireligion museum. The gubkom was especially interested in this aspect of scientific enlightenment, hoping that if successful the museum could hold agitational-propaganda lectures on scientific themes. Gubkom members believed that two large scientific departments were needed in the museum. One department would deal exclusively with inorganic sciences, such as geography, geology, and the evolution of the earth. The other department would deal with the organic world and focus on the evolution of animals, plants, and, of course, Homo sapiens. The first department’s emphasis would debunk religious and superstitious representation of the inorganic world and focus on the replacement of superstition with developmental geological and evolutionary theories. The second department’s thrust would be on spreading evolutionary theories of the organic world, especially Darwinism, to inculcate a materialist perspective among the local peoples.47

All of these plans were based on two premises: that the local party activists in the gubkom could successfully put together a good “scientific” museum, lecture series, and public exhibits to serve as antireligious propaganda; that they could independently train new party activists to successfully conduct scientific lectures on basic topics for the public. As evidenced in party records, both failed miserably. To begin, the local party activists, alongside antireligious groups, began to collect technical and medical diagrams, posters, and equipment (such as skeletal replicas and microscopes) to teach various scientific disciplines in public workshops. They hoped to construct herbariums and aquariums in order to create public exhibitions. However, due to lack of funds and qualified scientific personnel, the local gubkom began in November and December of 1928 to instruct Communist Party activists to rely instead on local naturalists, as well as on the use of part of the state’s natural-history museum department for agitational purposes. In essence, even local League of the Godless members were suggesting to the regional party heads that they should rely on existing science-museum staff and lecturers and that setting up new facilities might be difficult.48 The funds did not exist, nor did the scientific personnel or momentum within local Agit-Prop cells, to conduct that kind of widespread science-educational activity. Furthermore, the whole effort seemed redundant if the State Museum, reorganized in 1924 in Iaroslavl’, already had these detailed scientific exhibits.

According to local party activists, all that was needed was to give the pre-existing scientific exhibits more of an ideological, politicized thrust when explaining various natural occurrences. One of the first-developed antireligious museums funded by the Communist Party itself opened in Iaroslavl’, but not until much later, in October 1938 at the height of the Stalinist purges, when one was built on the premises of the old church Ill’i Prorok.49 However, the local bezbozhniki (members of the League of the Godless) began a small atheist museum in April 1930. Although the bezbozhniki claimed to have elaborate exhibits on natural science and the history of atheism in the USSR, this and others of their small, hastily constructed museums could not compare to the regional natural history museum that had attracted loyal visitors for decades.50 The original naturalist-science museum exhibitions, of course, were never stifled with political rhetoric.

Not long before the bezbozhniki opened their small museum on Iaroslavl’, the local Agit-Prop department of the gubkom began a campaign to train local natural-scientific activists who could take part in antireligious activity for the party. In late 1928 and early 1929, they set up scientific workshops for older and new party recruits in the Iaroslavl’ and Ivanovo regions. The courses, for the few who attended, were rigorous. Out of a total of 288 hours of class work, close to 140 were devoted strictly to themes in the natural sciences, lecture subjects ranging from astronomy to general biology.51 The training program for local party activists was designed to train leaders in the provinces through a course sequence focused heavily on inorganic and organic evolutionary themes. Part 1 dealt with the foundations of physical-chemical laws of nature, atmospheric phenomena, and the construction and evolution of the universe. Part 2 of the workshops, generally taught by Communist Party activists with little advanced training in the sciences, dealt with the evolution of animal, plant, and human life forms on earth. The workshops used popular texts and pamphlets, accessible to the average layman, for example, Azimov’s “O proiskhozhdenei zhizni na zemli” (on the origin of life on earth). The instructors usually helped participants through the readings of short scientific pamphlets and served more as guides than teachers of natural science.52 They sometimes tried to enlist the more advanced students from the Iaroslavl’ Higher Party School to teach courses in mathematics, geography, and physics, as a way to entice workers and others to attend party activist courses.53

Problems were rife in these so-called “natural-scientific training courses.” Party activists complained of a lack of reading materials for all participants;
attendants were under-educated; retention of key material was abysmally low. Participants came only from the towns, as it was difficult to attract those from rural areas who might then be sent back to the countryside to conduct propaganda. Activists stated that attendance rates never exceeded 60 percent of enrollment because most of the courses were held at night, and most participants could not get out of work early enough to attend all sessions. They were tired after work and therefore could not pay close attention, often dozing off during lectures.\textsuperscript{54} Agit-Prop members complained that few women came to the workshops, and classes generally never exceeded enrollments of thirty individuals. In addition, few actually completed the training. Even the workshop leaders themselves admitted that they were not trained science teachers and could only serve superficially as instructors on topics they found overly technical, given their educational background. Sometimes the Agit-Prop officials serving as teachers were engaged in other local activities for the party; the training workshops were therefore intermittently interrupted.\textsuperscript{55} In spite of a Communist Party announcing itself the herald of a “scientized culture” for the future, few involved activists could claim they were well versed in their subjects or even in basic scientific analysis.

Beginning in 1930 the Agit-Prop Sector of the Jaroslav' Okruzkhom (Area Party Committee) tried to focus its attention on the cities and factories in the region. They set up cells and scientific seminars in textile factories and other industries in the Upper Volga River Basin. Many of the night lectures and courses were aimed at uniting science and antireligious theory. Some dealt with more utilitarian subjects focusing on the economics of the FFYP, but those types of scientific lectures were rare.\textsuperscript{56} At a cultural-enlightenment meeting of the Jaroslav' Party Committee in September 1930, one activist admitted that “worker disillusionment with scientific agitational programs can be attributed to high rates of illiteracy in textile factories on the Volga.”\textsuperscript{57} Another argued that “we organize these workshops on science and religion, but few workers actually come, since they have no direct relevance to their occupation or leisurely interests.”\textsuperscript{58} In response, a committee member argued that the Communist Party must mix agitational lecture material with activities in the worker clubs to attract workers’ interest more effectively. Otherwise, he believed, the party’s attempt to create scientific, antireligious activists would fail in the locales.\textsuperscript{59}

In the early winter months of 1931, local party activists and leaders, distressed by the poor results of agitational lectures, began to organize self-studies of Agit-Prop work. The reports from those studies reveal the failure of Agit-Prop activists to convert workers in factories scattered throughout the Northern Volga region. Agit-Prop workers candidly criticized their own failures, even admitting problems in attracting new members to the Communist Party itself. In the week of February 3–9, 1931, the local Agit-Prop Sector conducted a survey of its activities in various factories around Jaroslav'. Activists stated that their work was largely ineffective, especially among workers. They were especially distressed over the lack of qualified leaders and instructors for workshops on political, scientific, and anti-religious themes.\textsuperscript{60} The head of the Agit-Prop Sector in Jaroslav', Comrade Grigor'ev, argued: “Our Agit-Prop Sector work is so weak in the provinces, and it has no direction or leadership. Mobilization of broader networks does not exist, and we are not paying ample attention to voluntary scientific organizations which could help us.”

In April 1931 the Jaroslav' Party Committee instructed its Agitational-Mass Sector to explore the results of scientific propaganda in specific factories and to report back to local party leaders. At the Red Hammer textile factory in Jaroslav', activists had to concede that workers were not attending science propaganda lectures and that efforts to attract workers to lead antireligious cells had failed. Agit-Prop activists were particularly frustrated by the fact that engineers and scientists constituted only a small percentage of the party’s antireligious propaganda sector and did not volunteer regularly as instructors in their workshops.\textsuperscript{61}

These self-studies are vivid testimony that the Communist Party had to rely on independent voluntary associations for scientific, technical education, especially in the factories. The tragic irony is that these self-studies were being carried out in the Spring of 1931, at the same time that the local pre-revolutionary scientific societies were being attacked and dissolved as “bourgeois vestiges” of the past. With the dissolution of old-line scientific societies combining with the party’s inability to attract workers and others to their agitational work, Agit-Prop officials began to rely on radical technical voluntary societies that had been formed by Communist-oriented engineers and technical specialists. The success, attributes, and problems of those radical groups is the epilogue to the long history of scientific and technical popularization in Russia as it began to dissipate in the early Stalinist era. New workers, who streamed into the cities during the FFYP, would be interested in utilitarian technical lectures that benefited their chances of social mobility. They were still taken by the imaginative impulses of scientific topics but had little patience with Agit-Prop’s science lectures, which, in their minds, improperly mixed education with political rhetoric.
Chapter 9

TECHNOLOGY FOR THE MASSES

Technical Societies, Stalinist Culture, and Soviet Labor, 1928–34

During the Stalinist Great Break, Communist science educators demanded that scientists not only increase their voluntary, enlightenment work but also get more thoroughly involved in aiding industrial development in the USSR. The state believed that popular-scientific enlightenment had to coalesce with the Communist Party’s utilitarian needs to construct the industrial sector of the economy. Initially, radical scientists and propagandists attacked older prerevolutionary voluntary societies for not aiding the socialist construction of the economy. Eventually, however, they organized their own mass organizations, outside the purview of Agit-Prop, to aid the economy and to fulfill other tasks, among them educating workers. TekhMass was organized in 1928 as a new Communist voluntary organization designed to promote the education of workers to integrate them more effectively into the factory environment of the Five-Year Plan. This organization would compete with prerevolutionary science societies in its attempt to educate the masses in technological matters. It would also promote the Party’s mass-cultural rhetoric of advanced technology as the ubiquitous signifier of Soviet modernization.

TekhMass, like other radical organizations of the cultural-revolutionary era, skillfully placed the discussion of public scientific and technical education within a larger struggle to refocus enlightenment toward the more utilitarian needs of the developing industrial economy. TekhMass engaged the popular educational slogans rhetorically stressed by Communist Party leaders, namely, terms linking scientific and technical education to practical ends. Some organizations felt the need to pay lip service to the Bolsh evized term “practicality,” but TekhMass members not only wholeheartedly believed in serving the public in utilitarian ways but also used that platform as a means to focus attention on their particular organization. Key members of both VARNITSO and TekhMass, especially N. Krupskaia, had supported the more radical pedagogues in the 1920s who trumpeted this movement of the “practicality of education.” Then, a decision in 1930 by the Congress of Polytechnical Education began an effort to link some primary schools with neighboring factories and kolhozi (collective farms). TekhMass activities became part of a general movement in technical education, a project especially supported by the regime.

Although they originally fostered the party’s mass propagandistic, educational, and economic agendas, Communist voluntary societies, like TekhMass, also provided basic needs for those laborers who wanted more guidance in areas in which they never received formal educational training. Unlike workers’ aversion to the impractical Agit-Prop lectures, laborers were keenly interested in courses and workshops that could help benefit their careers and offer them technical education. Workers actually attended the classes, lectures, and events offered by Communist voluntary organizations. They honestly discussed their needs in written responses to questionnaires, and their aspirations were captured in the archival records of these new organizations. Their responses attest to the fact that workers had their own agendas to fulfill. They found individual spaces even within the institutional and cultural arenas constructed for them by the Stalinist state and Communist intellectuals where they could articulate their needs. They even found ways to criticize Soviet propaganda, while clearly articulating their own educational needs to Communist specialists.

Workers not only maneuvered their way through the Stalinist system; they also contested the cultural constraints placed on them by activists and Soviet officials alike and found ways to express their complaints in direct ways to authorities through letters or through their responses to TekhMass questionnaires. Workers strongly vocalized the inconsistencies of Soviet educational policy and technical propaganda. The new Communist technical societies even had to rethink and reshape their educational programs and tactics continually to meet the demands of workers.

However, the dialogue worked both ways, as the state eventually changed the name of TekhMass to Obshchestva Za Ovladenie Tekhnikoi, or ZOT (all-union society for the mastering of technology) in order to harness its resources for use in its mass propaganda campaign, “The Party and Workers Should Master Technology . . . Technology Decides All.” With the demise of many prerevolutionary scientific societies and the failure of Agit-Prop work, the Soviet state realized the potential of the radical voluntary organizations to aid its own scientific popularization campaign. After 1932 even the Communist science educators who were militant members of those organizations had come under the firm control of the party. Societies like TekhMass were reorganized, given new names, and became conveyor belts for Stalinist cultural campaigns in the 1930s.

Ultimately, a series of convergences bringing together the Soviet state,
activists, and society occurred in the arena of mass-technical education and Stalinist culture. Workers, who did not have any formal training in specific areas, received needed scientific advice and technical courses at night to improve their qualifications during a tumultuous period. The modernist, technological program and vision of various Communists in the voluntary organizations was supported by their targeted audience from below and reinforced by the regime from above. Finally, the Stalinist state harnessed young Communist scientific activists to fulfill its utilitarian goals of practical technical education, while promoting its own cultural vision of the new modernized, futuristic society. This Stalinist vision emphasized applied science and how the Soviet Union would become a technologically advanced society. It was a futuristic cultural vision of technology shaping and supporting Soviet society. Stalinist mass culture can be understood through the prism of converging agendas that reflect the development of both state and society. The science-popularization movement was shaped and transformed both from above and below during the early Stalinist era when vestiges of prerevolutionary scientific organizations were being extinguished.

TECHNOLOGY FOR THE MASSES, 1928–31

Key members of the VARNITSO supported the formation of voluntary technical-education societies like TekhMass. VARNITSO subsequently encouraged various science professors to take an active part in the voluntary work of this new society. These professors included M. M. Zavadovskii (Biology Department, Moscow State University), A. N. Bakh (Director of the Karpov Chemical Institute), and also A. I. Oparin (Moscow State University). They encouraged the growth of Communist science societies as vehicles to spread Marxist propaganda and to inculcate a scientific weltanshauung in the minds of the Soviet people. TekhMass was indeed a logical outgrowth of VARNITSO’s broader plans and visions to restructure scientific and popular enlightenment in Soviet Russia. As VARNITSO attempted to extinguish pre-revolutionary scientific organizations, it was simultaneously cultivating the development of new Communist, technically oriented voluntary groups. The birth of these new scientific and technical societies in the Stalinist era signaled a dramatic turn in the history of the science-popularization movement in Russia.

During the First Five-Year Plan the Communist Party itself emphasized the popularization of technological information. Bukharin and Stalin, among other Communist Party officials, wrote a number of articles on the topic during the period. In a 1931 piece in Za industrializatsiui (for industrialization), Bukharin described the Central Committee’s distress over technical illiteracy, especially among workers. He argued that a lack of understanding of basic scientific concepts among the working class would prevent any growth in the industrial sector. As a solution Bukharin suggested more technological education be made available outside of formal institutions, an effort to include more correspondence courses, and the publication of technological information in the popular press.

Like Bukharin, many members of the Communist Party during the late twenties and early thirties had called for the need to fund organizations that would better satisfy the technical-educational needs of workers on the shop floor. Furthermore, they argued that the party needed to support the efforts of those science popularizers who focused on the technical needs of the new working class. N. Krupskaia and V. Sverdlov were two important Communist Party members involved in mass-technical enlightenment during this period. They were part of the organizational group that formed the voluntary society TekhMass. At a November 1927 meeting of the organizational committee of the society, Krupskaia argued that a national organization like TekhMass was needed in order to spread the latest movements in technology to the widest audience possible throughout the USSR. She argued that Soviet scientists and engineers had an obligation to write popular-technical works and serve as consultants at factories to answer workers’ questions. She echoed others in the party who believed that scientists must serve the working class by providing practical technical advice to laborers.

The initial plan of the society included organizing popular-science reading circles, lectures, and consultations in factories on all technical subjects. The society also organized an editorial board to create close ties with publishers in order to produce popular-scientific works. The board especially worked toward creation of technological sections in existing popular journals, particularly those aimed at workers.

TekhMass was organized as an all-union voluntary society to spread and popularize technological and scientific information, and cells of the society were primarily organized within factories. Though the organization was based in Moscow, it had an important early branch located in Leningrad. The society would eventually have branches in republics all over the former Soviet Union, including Khar’kov, Minsk, Tbilisi, and Ashkhabad. Since key members of VARNITSO had helped organize TekhMass, they held most of the important central posts at the society’s headquarters in Moscow. The chairman of the organization was V. M. Sverdlov, president of the All-Union Association of Engineers. Other prominent members of the society included biologists M. M. and B. M. Zavadovskii, A. N. Bakh, and N. Krupsakaia. According to a 1928 survey, most of the leading members of the group were Communist Party members and had joined the party either before or just
after the 1917 revolution during the Civil War era. They also held significant positions in the Soviet trade-union structure or in Narkompros, or they were directors of technical institutes.10

From its inception, TekhMass had been involved in popularizing scientific and technical information. In 1928 the Moscow branch of the society organized a series of lectures in factories by various scientists including the Zavadovskii. The title of the series of popular-scientific lectures was “The Meaning of Science in the Period of Construction,” reflecting the orientation of the society (and the Communist Party) in this era of hyper-industrialization.11 A cycle of lectures prepared for various Moscow factories emphasized the practical applications of technological and scientific theory. The lectures focused on the technological applications in various industrial efforts, including the chemical, food, metal, and textile industries.12

The society worked closely with the Moscow provincial political-education department on a program of scientific courses for workers in people’s universities. These were general courses in the evenings on natural-scientific and physical-mathematical topics. The society worked with the Moscow Komsomol on spreading scientific information among the youth of the city. The society also networked among other voluntary enlightenment organizations in the city to develop science-education programs.13

The Leningrad oblast section of TekhMass became one of the largest branches of the society. It had been quite active during the course of 1928 and 1929, and by 1930 it had over fifty thousand members. The Leningrad oblast branch emphasized enhancing workers’ qualifications and the training of new cadres in various polytechnic courses sponsored by the society. Between late 1930 and early 1931 alone, over eleven thousand new, first-time TekhMass students studied in these courses. Workers at over 183 Leningrad factories took part in various scientific and technical courses conducted by TekhMass, including the factories of Krasny Putilovets and also Krasnyi Treugol’nik.14

In the TekhMass circles at factories in Leningrad, instructors encountered a variety of telling problems. Sometimes workers were not prepared for a given level of scientific instruction. Because courses were taught mostly at production sites, the classes sometimes met irregularly, and good textbooks were in short supply.15 Despite such problems, the Leningrad Oblast and City Party Committee maintained that by late 1931, TekhMass had registered over forty-three thousand students in their courses.16 That number, of course, does not take into account the large numbers who attended organized lectures, technical evenings, and film showings.

At TekhMass national conventions held in Moscow, open discussion occurred among delegates concerning various problems regarding technical education in Stalin’s Russia. The delegates included both Communist leaders of the organization, including Sverdlov, as well as those directors and factory foremen who had more hands-on experience with problems on the shop floor. At a February 28, 1928, convention of the organization in Moscow, Sverdlov argued that raising the level of Soviet economic production was only part of the problem the USSR had to face. According to Sverdlov, economic organizations and institutions in the past paid little attention to technical education and issues of the popularization of science at the shop-floor level.17 I. Berman, the general secretary of TekhMass, took this concern one step further by fervently arguing that production was completely detached from the technical level of workers and peasants in the country. He mentioned as an example that tractors and other new farm equipment would be pouring into the countryside without anyone there who had the ability to repair or properly run this machinery.18

Other delegates to the conference, especially teachers, managers, and collective farm administrators, were less abstract in their comments and urged delegates to understand the basic needs of workers and peasants. One delegate read letters sent to him from peasants and workers expressing what they believed was needed in the area of Soviet mass-technical education outside of formal institutions. Several of the letters pointed to an inability to follow complicated books on technology and even basic manuals for repair of machinery.19 Another delegate—named Timokhov, a foreman in a metalworkers factory—argued that technical books and pamphlets in the workers’ clubs libraries in the factories were generally not written in a colloquial or accessible language. Timokhov believed that books for metalworkers were geared to the most highly skilled masters and not to the semiskilled workers who were then flooding into the factories.20 He based his criticisms on discussions with metalworkers, as well as on the complaints they wrote down and passed to him and factory directors. He argued that even when workers’ clubs organized courses, only the apprentices of masters would come. Stashevy (trainees), according to Timokhov, felt intimidated at these settings, which only contributed to the lack of communication between the masters and new workers.21

Workers, and even some peasants on collective farms, literally bombarded local authorities and TekhMass leaders with complaints and advice on better ways to construct technical educational material for the public. At the February 1928 conference in Moscow, many delegates read to participants countless letters sent to them. One of the delegates exclaimed that workers and peasants had been writing TekhMass representatives complaining about the lack of accessible textbooks on general topics in the natural sciences and technology. The delegate reiterated earlier statements at the conference
bemoaning the lack of specific manuals on the maintenance of machinery in urban and rural areas. Some of the letters were anonymous, but others were signed. One TekhMass delegate read a series of anonymous letters he had received from peasants. One typical letter from a peasant read as follows: “Scientists and educators need to make books and pamphlets which have practical use and purpose. For example, you could write pamphlets instructing us on how to construct better and more efficient water wells and shafts.” Another peasant sent a letter with the following observation and request: “We are interested in articles and even pamphlets explaining how we can accurately build wells and then connect them together in sequence—please write in your journals about practical matters such as this, which affect our daily lives. Engineers need to show how basic mathematics and geometry classes can apply to practical construction needs.”

To address the educational needs of workers more effectively, the organization decided to introduce a system whereby participants in TekhMass night classes, lectures, and seminars would fill out questionnaires, which asked for basic information such as age, skill, and educational level. The questionnaire included ample room at the end for participants to explain why they attended sessions and what their educational goals were. The responses to this questionnaire reveal workers’ aspirations during this tumultuous time of rapid migration of semiskilled laborers into the urban work force.

Most of the respondents had finished, on average, approximately five to six years of schooling, and the level of writing and grammatical structure of their responses is generally low. Many who came to the classes—the age varied from the late teens through the early thirties—were working temporarily in heavy industries, like the metalworks. All respondents were forthright in their demands and needs, many wanting to be masters or skilled metalworkers and some expressing interest in training for positions in new electrical-power stations. Many indicated that seasonal work in the factories was inadequate for them financially and that they wanted to better their qualifications for permanent positions in specific industries. Their responses expressed a desire to settle into a permanent trade, instead of moving from job to job. Many answered that they would not be satisfied with simply fulfilling their qualifications for jobs, but would like to continue in night courses once they found permanent jobs. These workers were not shortsighted in the least and realized the potential for social mobility if they chose to further their education consistently. However, they also displayed a vivacious drive to expand their scientific and technical knowledge base.

Because some participants were only semiliterate, a single worker sometimes filled out a questionnaire in the name of several of his coworkers. One such response came indirectly in this way from M. K. Nikolovich, a seasonal cabinet maker with only four years of schooling. He answered that many workers “wanted to learn an industrial specialty such as metal work because the job would be yearlong and interesting, while most of our work is seasonal.” He went on to say that “if I can get the qualifications to work in a metal factory, I would still want to continue my technical studies at night, especially if they were at or near the factory.”

Many respondents certainly wanted to receive enough practical instruction to gain the necessary qualifications that were prerequisites for the permanent job of their choice. A. I. Kolobaev, a sixteen-year-old stazhet, had no real specialty training and only four years of formal education when he enrolled in the TekhMass night courses. Kolobaev wanted to learn how to improve his skill at operating a metal lathe, his father being a lathe operator with the requisite qualifications. He responded in his questionnaire that “I want to know as much as I can about operating a lathe, and receive the qualifications so that I can perform this trade for some time to come.” Many of the respondents, although eager to learn, were certainly obsessed and focused on acquiring their requisite qualifications, either to advance in the factory or to move off the shop floor into the new universities and technical schools for workers.

Victor M. Kulikovskii, a twenty-eight-year-old metal worker with nine years of formal education, wanted to learn a more specialized part of his trade. However, he was not particularly satisfied with the limited knowledge he had of metalwork, and he came to the TekhMass classes to learn more scientific theory, perhaps even to get into an advanced technical school or university. On his questionnaire, he wrote: “I want to continue further in my part-time studies and even get the necessary qualifications to enter a higher technical school or university.” Kulikovskii reflected on how workers, though exhausted, were still driven to study at night in science classes that could offer them the basic theory they missed because they had not completed their primary or secondary education. His enthusiasm echoed the strivings of other workers who also came to these courses to learn not just practical applied science, but also to take classes on leisure topics like “the technical aspects of photography,” which integrated chemical and physical principles into the study of photographic technique. Courses in photography provided workers with an understanding of how light spectra and ionization of chemical elements affected photographic paper and images. In this way, Tekhmass instructors could promote a type of utilitarian physics and chemistry through the medium of a leisure activity.

The variety of short courses and technical aid that TekhMass members offered to workers throughout Soviet Russia was impressive. The curricula
varied from courses focusing on basic scientific educational themes, such as algebra or calculus, to more vocational, technical courses like electro-welding technique. They met in a variety of venues including factories after hours, local school houses at night, and buildings procured by the society. Detailed lesson plans and curricula, unfortunately, have not survived in the archival record, but records do exist that suggest broad programs of study, as well as the extensive nature of course offerings.

TekhMass cells were set up all over industrial Russia, not just in the major capital cities of Moscow and Leningrad. For example, by April of 1928 an active cell was set up in the city of Penza. On the one hand, this cell broke up its course offerings into basic extension learning: courses in algebra, geometry, physics, and basic arithmetic. However, on the other hand, it also ran an extensive technical, vocational program of courses, including electro-welding, properties of metals, and elementary principles of electrical engineering. Hobby courses, including photography, proved popular in Penza, and the society’s courses built technological concepts into that part of the curriculum as well. According to the Penza cell’s records, a course taught in the Spring of 1928 on amateur photo-developing proved particularly popular among local workers with little access to expensive photographic equipment or darkrooms, and the course frequently had a waiting list. At the Revolution Factory in Penza, a workers’ inventors kruzhok (circle) was also well attended. Local engineers (in this case volunteer members of TekhMass) were encouraged by Soviet officials to evaluate the amateur inventions of workers during the early Stalin era. The workshop setting at the Revolution Factory was particularly valuable to workers who could get expert advice on the technical drawbacks of their inventions and proposals. Even though it met at night, the inventors workshop was well attended and fostered lively interaction between amateurs and technical specialists.

On the middle Volga and centered in Samara, TekhMass formed a branch of its society in August of 1928. By January of 1930 it had 258 cells in various surrounding towns and registered over twenty-one thousand members. In the course of the years 1929 to 1930, it provided formal technology lectures, technical workshops, and short courses. They registered over 123,000 students and visitors combined to these varied events. Members of the organization were especially helpful in setting up a Dom Tekhniki (House of Technology) in Samara to serve as both a headquarters for TekhMass cells and as a central place to hold night classes and lectures. The House of Technology, sponsored voluntarily by TekhMass members, had a darkroom (with photographic equipment), a medium-sized auditorium, and rooms for workshops and classes.

In outlying areas in Russia and in the industrial regions of other Soviet Rep-
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As the FFYP progressed, the advancement of workers’ qualifications and the training of industrial cadres became a central task of the Communist Party and the Soviet state. This shift in responsibility became especially important because of the massive migration of unskilled peasants into cities and industry. Though elementary and secondary schooling had spread tremendously during the early Stalinist era, older peasants and workers did not benefit from those formal educational initiatives. In 1931, in combat technical illiteracy, Stalin and the party unleashed the propaganda slogan “The Bolsheviks Should Master Technology.” Workers (and specialists) were told to deepen their knowledge of science and technology to aid the country in its massive industrialization plan. In 1931, especially in Moscow and Leningrad, many institutions including TekhMass and VARNITSO became involved in the new movement to spread technical education.

In accordance with this campaign for mass-technical education, the party devised a new propaganda slogan: Za Ovladenie Tekhniki (for the mastering of technology). The slogan heralded a national effort throughout the USSR that was widely editorialized in the press. In 1932, therefore, TekhMass changed its name to Obshchestvo Za Ovladenie Tekhniki. ZOT continued the work of TekhMass but now carried out more specific requests of the party. Their assignments included the formation of technical circles at factories, the purpose of which was to introduce new technology to workers. The party also insisted that the teaching of workers stress how new technology could be applied to various branches of industry. By 1931–32 the party had begun the process of harnessing these voluntary societies to work toward increasing the number of qualified workers and specialists in industry. In many respects, from that time onward, educating and training workers and specialists became the principal task of the voluntary societies.

In Leningrad the oblast and city party committees instructed Communist Party members to volunteer their time to help ZOT form cells in a variety of factories throughout the city. With the help of the party, by May 1932 the Leningrad Branch of ZOT claimed it had over sixty-eight thousand members. ZOT organized, in that year alone, over sixty-eight new circles in factories, registering thousands of students. The Leningrad branch of ZOT estimated that during the second half of 1932 alone over thirty thousand people had participated in ZOT lectures, film evenings, technical courses and a variety of other mass-educational activities. Although fulfilling similar functions as the earlier TekhMass had done, ZOT was now much more infused with party cadres and with initiatives from above.

Like its predecessor TekhMass, ZOT attempted to use more-traditional means for spreading new technical information among Soviet laborers. The society worked with party and state publishing houses to produce pamphlets, books, and handouts on various technological processes, trying to target particular sectors of the work force in different ways. For instance, it set up a cooperative venture with the Komsomol’s publishing house Molodaia Gvardia to create a series of technical encyclopedias, which became popular among young apprentices in certain trades and industries. The volumes published in late 1932 focused on an array of practical technical topics such as metallurgy, machine-tool building, transportation industries, energy, and basic chemical processes. These encyclopedias generally related basic science-educational topics to practical branches of industry, stressing how productive, technical knowledge could be applied to the Soviet economy.

What distinguished ZOT’s activities from its predecessor TekhMass was
the emphasis on propagating popular images of how Soviet technology would soon advance beyond the capitalist West’s capabilities. ZOT had a particularly well organized subsection, its “Agit-Mass” sector, which by 1932 had links with the Communist Party’s Central Committee Agit-Prop department. To engage the public’s interest, ZOT’s Agit-Prop sector organized technology-film and discussion nights.

ZOT’s Agit-Prop department was particularly interested in expanding its film section to create films on an array of technical themes. For ZOT film was a medium by which Soviet technology could be glorified in the early Stalinist era. The department worked with other Soviet institutions creating specific types of technical films relating to various sectors of the economy. Indeed, all the films involved the application of technology to sectors of the Soviet economy. Early on, for example, the ZOT department worked in conjunction with Narkomzem (Ministry of Agriculture) to produce a series of films on the application of new technology to agricultural production. Over time, ZOT produced films on a variety of technical topics such as “Aviation and Air Flight,” “Paper and Polygraph Industry,” “Hydrotechnics,” and “Electrification and the USSR.” The films were Agit-Technical productions, and from ZOT’s standpoint they had both a propagandistic and educational importance.59

By February of 1933 ZOT worked jointly with the Tekhfilm (technical film) section of Mosfilm. They produced new, short documentary-style educational films of Soviet technological feats. ZOT, in turn, formed its own film section, with members of Tekhfilm joining the ranks of ZOT on a voluntary basis.60 Tekhfilm representatives advised ZOT on creating films with wide appeal that could capture topics in which the Soviet government had invested huge capital resources. ZOT members immediately chose to focus on electro-welding, in which millions of rubles had been invested during the FFYP alone, noting that higher educational and technical school curricula had included electro-welding technique and theory for only a year or two. Topics emphasized during the just-completed FFYP, such as machine-tool building and natural-resource potential, were especially appealing to ZOT members who believed that such themes were easily transferable to documentary film and accessible to the average worker interested in learning new techniques.61

ZOT films were generally followed by discussion sessions at a local factory, where workers were invited to air their views on the importance of the topic or elaborate on their critique of the films. Much like the TekhMass questionnaires, the transcripts from the discussions are a penetrating source for gauging workers’ interests and opinions regarding the popularization of technology. Some workers found the films of great instructional value, while others were concerned that they were not educational in their orientation at all. Those participants complained that the films only espoused the virtues of Soviet industrialization instead of focusing on educational development.

Transcripts of one particular discussion night on July 25, 1933, in the Moscow Stalin Factory No. 1, are instructive. Six hundred workers from three factories who had already seen the film entitled “Electrical Welding” packed into the auditorium for the discussion event. TekhMass volunteers were pleased by the attendance but concerned about the critical and combative interplay between participants and teachers. Eager workers attended both the film and discussion nights; however, they were mainly interested in those portions relating to their daily jobs, not cinematic praise of Soviet industrial accomplishment. Practical technological films appealed to new workers eager to supplement their spotty educational background. A worker from Stalin Factory No. 1 said, “I am a beginner to this trade, and the film showed me in a detailed fashion how other factories operate beyond my own. After watching this film, it has been easier for me to continue learning new welding techniques.”62

Other welders, though, were highly critical of the film’s educational value. One electro-welder commented, “I study the welding of non-ferrous and imperfect metals. I came here to the films and night classes to learn more about this technique. The film did not tell me anything about that technique, and I learned nothing in general.”63 An engineer who saw the film argued that the factual information regarding the technical process of welding was simply insufficient. He suggested the production of films that were more instructive and that might be accompanied by handouts or manuals when explaining the use of new machines. Other skilled engineers also participated in the criticism of ZOT’s efforts. Several expressed the view that ZOT films were not generated as educational material but designed more as newsreels extolling new Soviet industrial developments.64 A new member of the ZOT film department ended the discussion with a summary of what he saw as the film’s problems and a list of workers’ complaints concerning ZOT’s activities in general. He said that it “is obvious to many here today that these films are generally too ‘popular.’ It is necessary to view a film that will really increase our workers’ qualifications. We don’t need to hear about the ‘advantages’ of electro-welding in the Soviet Union, but need a film that is capable of giving workers a technical understanding of the process they are interested in learning more about.”65

At other discussion evenings following ZOT instructional films, similar complaints were heard time and time again. On December 9, 1933, at the “Red Proletariat” machine-tool factory in Moscow, over one hundred workers critically discussed the film shown earlier entitled “Machine Tool Industry in the USSR.” Before the discussion began, a Communist Party member
Something else had happened that was not anticipated by either the Soviet state or mass propagandists. The new technical associations attracted many semiskilled workers who found the societies useful as apolitical means to acquire technical education outside of formal institutions, to better their qualifications, and to integrate themselves permanently into factory life. Furthermore, many of these workers found the new Stalinist “technical vision” to be overlapping with their practical educational needs. To some extent there was a convergence of party vision with practical needs on the shop floor.

In retrospect one can view these Communist voluntary societies from a number of perspectives. They can be seen either as transmission belts for the industrial propaganda of the era of the FFYP or, alternatively, as arenas in which workers could engage specialists and gain technical qualifications they lacked. In this way the workers interacted with these organizations in their own utilitarian and “productive” fashion. Furthermore, workers’ responses and initiatives from below encouraged both party and nonparty specialists to question their educational methods, even during a time when the imposition of Stalinist cultural norms from above was overwhelming. Indeed, that open dialogue attests not only to the remarkable ability of workers to define their own interests during the early Stalinist era, but also indicates their ability to engage authorities outside the state bureaucracy in a limited fashion. When ZOT’s film nights started to look more and more like stagnant Agit-Prop evenings, workers emphatically told ZOT members that the approach was unproductive, and they were heard.

Ultimately, on the one hand, the educational goals of Communist organizers in these societies were fulfilled to a limited extent. They offered technical advice and education to needy individuals who fell through the cracks of the educational system for a variety of reasons. On the other hand, they served the ideological goals of the Stalinist state by eventually providing the message to the masses that Stalinist culture would be defined not just by economic progress, but by the “technological advancement” of the class providing the regime its base of support since the Revolution of 1917. Stalinist culture was driven to create an industrialized society enveloped in a modernistic technological future. TekhMass, Technology for the Masses, therefore, carried this double meaning: practical technological education for the people and the propagandistic vision of a technologically advanced USSR.

gave a short introductory lecture on the importance of film in technical instruction. Neither the lecture nor the film, for that matter, was well received by the attending workers. One worker argued fervently “that this film did not really explain anything very carefully. These ZOT films insufficiently describe how to properly work new machines, and most of us get very little out of them.” Another worker argued that “we demand instructional films that will educate us properly. Many of the machines you show us do not even exist yet in our machine-tool factory. Therefore none of this can be applied to our everyday job routine.” Workers who were more skilled and seasoned expressed the view that such films would leave the misleading impression on new workers that the level of Soviet machine-tool manufacture was far more advanced than it, in fact, was. All the same, workers consistently showed enthusiasm for lectures, films, and discussion nights—a remarkable fact given their exhaustion at the end of long days at their factory jobs. Equally remarkable is the freedom they felt in boldly criticizing what they saw as any attempt to use technical classes to valorize Soviet technology at the expense of workers’ education.

Although workers’ responses to ZOT films and lectures varied, on the whole they consistently expressed complaints regarding the applicability of the films to their job environment. Many found the films too extolling of Soviet industry instead of practically instructional of fundamental processes regarding new technology that might affect their lives more directly. Others complained that the films were not organized well and should be accompanied with handouts and pamphlets describing machines more carefully. Even Communist Party and ZOT members themselves expressed the view that the films needed to be more educational and instructional on a practical level. Party members were frank and openly critical in suggesting how institutions could learn from the criticisms of workers, while engineers openly criticized the vacuous nature of propaganda films and pamphlets that were not well suited to technical, educational seminars.

Nevertheless, even after the miserable failure of its own scientific and antireligious campaigns, Agit-Prop saw in ZOT a window of opportunity to purvey Soviet technical propaganda. What might have produced another failure in that regard actually achieved some degree of success, from Agit-Prop’s point of view. To this degree, the Soviet state and the Communist Party showed adept flexibility in harnessing the efforts of voluntary groups as in the NEP era. The difference in this case was that TekhMass and ZOT members were typically associated, not at odds, with the state’s goals and usually Communist in their political orientation. Even though they technically represented independent radical voluntary associations, their agendas converged with those of the state.
CONCLUSION

The Shop Floor as the Temple of Science

The science-popularization movement began in Russia in the eighteenth century when scholars in the Academy of Sciences saw the importance of spreading scientific ideas among the public. Enlightened publishers, like Nikolai Novikov, then followed in the traditions of their European intellectual counterparts and spread progressive scientific ideas and information through their newly established presses. Much of the early publishing of popular-scientific works was sponsored by groups like the Russian Freemasons, who shared a common vision about the importance of science, progress, and popular education.

In the nineteenth century the science-popularization movement became closely tied to the development of adult education in Russia. People from all walks of Russian life became involved in the movement, including educators, publishers, journalists, and of course scientists themselves. The broadly based participation indicated the multifaceted aspects of the movement, but also how popularizers did not represent a single cohort, corporate identity, or political orientation. Scientific societies became an integral part of the movement and helped spread scientific ideas through the journals they formed and museums they opened in both the central and provincial cities of Russia. By the turn of the twentieth century, the popular-scientific journal, particularly, became a potent means of popularizing scientific ideas. It was a cheap and accessible source of scientific information for a variety of social groups.

In the prerevolutionary era, the Russian intelligentsia believed in the importance of spreading scientific ideas beyond the walls of academe. Well-known Russian scientists, such as V. Obruchev and V. Vernadskii, took much time away from their academic work to participate in the movement. They enthusiastically wrote popular-scientific articles for journals and newspapers and edited popular-scientific books and series. Vernadskii and others imparted the importance of popularization to their students, A. E. Fersman for one, who carried on the tradition of popular education in the sciences. Russian scientists dating back to the era of Peter the Great had pursued extroverted, civic agendas.

In the pre-1917 period, Russian readers were eager to purchase popular-scientific books and journals. A significant demand developed among the reading public for scientific information, and popular journals proliferated in the late tsarist era offering readers information on astronomy, air flight, new technology, and world geography. Russian workers were keenly interested in expanding their elementary technical and scientific education, while Russian professionals in a variety of fields wanted information that could supplement their expertise.

After the October Revolution, the Soviet Commissariat of Enlightenment generously sponsored the popular-enlightenment activities of scientific societies, museums, and editorial boards. Although there were across-the-board cutbacks in state subsidies during the NEP era, the state managed to provide scientific societies with the majority of their working budgets. Policies of the NEP did not dictate a wholesale abandonment of funding for voluntary and public scientific organizations, and scientific societies successfully lobbied Glav nauka, the Scientific Department of the Ministry of Enlightenment, called Narkompros, for funding. In doing so, they used the very rhetorical catch-phrases that the Soviet state itself emphasized in its own cultural-enlightenment campaigns. This politically correct dialogue created an interesting symbiosis between Soviet state institutions and the remnants of the prerevolutionary scientific intelligentsia. As the twenties progressed, however, the relationship between Glav nauka and scientific societies (especially in the provinces) grew more complicated as Narkompros imposed more bureaucratic constraints on these institutions. Bolshevik methods of state k ontra led eventually to a hegemonic power struggle between local scientists and the political center in the early Stalinist era. Paradoxically, however, prerevolutionary organizations for most of the NEP period benefited greatly from this precarious, yet relatively stable, relationship.

Furthermore, key individual Bolshevik leaders, such as Lenin, Lunacharskii, and Petrov, supported the concept of science popularization and of initiating programs at the federal level. Lunacharskii himself personally intervened on numerous occasions on behalf of distinguished prerevolutionary intellectuals, like B. Raikov, and for the sake of a whole array of scientific organizations. The tensions between local societies, on the one hand, and the bureaus of central government, on the other, even produced institutional conflict within the Soviet state itself. Different Bolshevik administrators had varying perspectives on cultural change, and they used the institutions they controlled to combat rival proposals. Perhaps the best example of this internecine bureaucratic warfare developed between Narkompros's
Lunacharskii and Glavauka’s Petrov, on one side, and the Supreme Council of the National Economy (Vesenkha), on the other. However, the Soviet state as a whole saw the importance of maintaining nongovernmental institutions to spread science in society, as well as the significance of that form of education for economic and industrial utility. The Bolsheviks envisaged science popularization as an essential element in their cultural revolution and transformation of Russian society. Making science accessible to the masses became part of the great modernizing paradigm that Bolsheviks would stress well into the Stalinist era: the tsarist past as scientifically backward, the socialist future as radiant and technologically advanced.

The Soviet central government supported an antireligious campaign during the 1920s that was less combative toward believers and more oriented toward spreading scientific information and evolutionary thought as means of progressive education. Agit-Prop’s antireligious activists, as well as the voluntary bezbozhniki, understood the importance of tempering the ideological side of antireligion and injecting that effort instead with basic scientific education. They envied the success of private scientific societies and urged their own activists to emulate those prerevolutionary scientific groups who were captivating the attention of Russian citizens. Although the Communist Party failed miserably in its effort to convert the societies into vehicles of political propaganda, it nevertheless proved resilient and adaptive. A part of that resilience was manifested in its willingness to work with supposed “bourgeois” scientific intellectuals in the 1920s. Indeed, during the NEP, the regime urged non-Communist Russian intellectuals, particularly, to promote popular-scientific information.

As it had in Western Europe, popular science caught the imagination of the general public in Russia during the early years of Soviet power throughout the 1920s, and, as a result, popular-scientific journals flourished. As the journals continued to offer the reader a broad spectrum of themes and trends in science, a convergence developed between a cosmopolitan reading public in the 1920s and a Soviet state eager to popularize scientific and technical information on global developments, even if it meant laudatory commentary on capitalist technological ingenuity. Even the Communist Party journals were filled with the same type of information as that appearing in the non-party journals. Both contained material on Western technology and inventions, and both seemed to compete for the interest of the reader. Readers from varied social groups bought these journals for different reasons. Professionals sought out information about their fields, students looked for material they could not always find in traditional curricula, and workers sought out information for understanding new technologies at their workplace. Members of all of these social groups shared a sincere fascination with learning more about a variety of scientific themes: the cosmos, air flight, geography, journals, museums, and books served as conduits through which this information reached the public.

Scientists after 1917 took part in civic organizations that continued to foster public engagement with science education, and those educators were active in developing public enlightenment outside the Soviet state’s control. Though many of these organizations were registered with the Soviet state, they continued to develop public discussion of scientific ideas in an independent fashion. This scientific public sphere would be even more hotly contested in Stalin’s Russia, though unfortunately dramatically curtailed by the mid-1930s. Open discussion of scientific topics was indicative of how vibrant that scientific public sphere was after the Bolshevik Revolution of 1917 and throughout the NEP era. Though institutionally and financially dependent on Glavauka, scientific societies were able to maintain independent programs and foster their own plan of civic action, at least in the 1920s.

With the advent of the Stalinist cultural revolution after 1928, however, the focus of science popularization underwent a radical change. The cultural signifiers or scientific tropes that the regime stressed after 1928 were more oriented toward utilitarian technological feats of the Soviet state. Technology had to serve the laboring masses and the Soviet state’s class-oriented economic and sociological agendas. In addition technology had to be inextricably linked to the developing economy and expanding industrial infrastructure. All of these cultural symbols had equivalent institutional campaigns designed to isolate and ostracize the older generation of enlightened intellectuals.

Radical organizations such as VARNITSO threw traditional scientific societies and institutions on the defensive. Editors of journals and science newsletters refashioned and purged their editorial boards, offering new cohorts of authors the chance to write articles valorizing Soviet technology and its application to industry and planned economics. Provincial scientific societies came under pressure to conform to more standardized norms, and many were subsumed under larger regional and central administrative structures. New Communist organizations, TekhMass being the outstanding example, competed with older scientific groups while offering the Soviet laborer night classes on the shop floor.

The Communist Party’s Stalinist platform of workers “should master technology” was an inherent part of many of the lengthy editorial remarks by the editors of many science journals. Furthermore, editors stressed articles that invoked the importance not just of Soviet, indigenous inventors, but those who specifically came from working-class backgrounds. Workers and the new praktiki would be leading the Soviet technological revolution; they received encouragement from central regime agencies above and were
supported from below by young Communist engineers and scientific specialists during the FFYP.

The face and the mind of Bolshevism had taken on a new cultural mask. Stalinism was offering the public new technological temples to ponder: the shop floor and the practical, technical knowledge embedded in its walls. The application of science and technology to industry, and especially its use by the new factory labor force, defined the parameters under which science educators were instructed to operate. Furthermore, Stalinism was slowly, from the period 1928 up to 1934, becoming more myopic, isolationist, and certainly less cosmopolitan, in the European sense of the word. Even though during the cultural revolution, editorials still peripherally mentioned Western technology and inventions, they focused primarily on Soviet technological feats and achievements. On the eve of the Kirov Affair in 1934, Russia was slowly closing itself off from the outside world, particularly with respect to the dissemination of scientific information to the public.

The nationalistic cultural themes of the Stalinist thirties affected the writing of popular-scientific articles. This was particularly evident in the glorification of Soviet aviation in the popular journals of the 1930s. Soviet science, technological prowess, and popular nationalism provided a potent nexus for understanding the culture of the Stalinist era. The regime favored supporting an advanced, technological revolution that would simultaneously open up the doors of the scientific temple to all who chose to enter. Before 1934 TekhMass and other similar organizations maintained a dynamic presence in the system while bringing complicated technological education in a simplified manner to the masses on the shop floor. Furthermore, the new Stalinist working class had a strong interest in popular technological information that could help them at their work. They were keenly interested in promoting their own self-education and progress up the social ladder. Although they were critical of the pedagogical methods of propagandistic organizations, as well as the propaganda of the regime itself, workers still expressed a vivacious interest in technological information. From that perspective, workers acted similarly across the 1928 divide, as they continued to search out non-institutional educational means to develop their base of technical knowledge, just as they had done before 1917 and then under the NEP.

The Stalinist regime, however, imposed constrained limits on popular science and technological education from 1928 onward. That very regime tried to control TekhMass and similar radical technological organizations after 1931, attaching them to broad Stalinist cultural conveyor belts. Public science, in the early Stalinist era, indeed went on the defensive as it was attacked from above and below. Central and provincial scientific societies and organizations were particularly criticized for not linking their institutions to campaigns to help the developing industrial economy. Communist Party Agit-Prop activists tried to infiltrate voluntary organizations like ZOT, using them for their own purpose and agenda. This had real consequences for editorial boards, volunteer organizations, and public science in general.

Nevertheless, the new Communist organizations and their associated activists believed broadly in the Stalinist regime’s vision of making technology accessible to the widest possible audience. Technological film nights and agitational lectures bred a revolutionary dynamism, though at times a dynamism born of worker frustration and criticism. The work of these organizations remained inclusive, as they reached out to Soviet laborers in an effort to encourage them to take part in technological change. The technological revolution still had a vision of science and technology as the ultimate transformers of modern culture. Though thematically more prescribed and constrained than in the earlier period of the 1920s, the technical information the new Communist organizations propagated was not always filled with empty platitudes. Actually, many of the films and lectures they presented discussed practical scientific issues that workers devoured voraciously, even after a long day of work. Although workers shunned, and sometimes slept through, the party’s Agit-Prop lectures after work, they nevertheless approached TekhMass activities with a keen interest sensing the value of technical education for their future.

The new Communist technological popularization after 1928 maintained a semblance of the prerevolutionary missionary zeal to spread nauka to the people. However, the vision after 1928 varied in its approach toward enlightened principles and inclusive thematics in comparison to the pre-Stalinist era. Stalinism and its industrialism bred a “technological future” that certainly gazed forward, yet left out parts of science that the broader public found interesting and imaginative. The more utilitarian thematics of the early Stalinist era, linking science to industrial productivity, marginalized more imaginative scientific themes. The diverse Russian readers of the 1920s had been cosmopolitan in their tastes, as they mimicked the interests of readers across continental Europe. Russian readers were particularly interested in news and information about foreign technology, air flight, astronomy, and global exploration. They consumed endless articles on daring feats of explorers, airplane pilots, and ethnographers from a variety of countries, including their own. At least in the twenties, the Bolsheviks supported this interest in international scientific and technological news and did not constrain its development as they did in the 1930s. Furthermore, the thematic content of science journals in the 1920s resembled the material in periodicals before
1917. Readers viewed such scientific information as practical, in the sense of advancing their knowledge, but also found the material engaging, lively, and part of their leisurely reading.

Stalinist industrial utilitarianism suppressed laudatory commentary on international, particularly Western, technological developments. Soviet intellectual introversion dissociated a vibrant, active science readership from its European counterpart. However, science popularization in the early Stalinist era continued to maintain the modernizing agenda it had developed immediately after the revolution. Furthermore, newly minted workers from the countryside streaming into the urban arenas found adult education in the sciences vital to their future. Early Stalinist culture, from the perspective of the changing tides of science enlightenment, was inherently paradoxical and seemed backward and constrained, yet also futuristic and visionary; myopic and anticosmopolitan, yet utilitarian and functional; directed and shaped by central bureaus from above, yet also supported and contested by the masses from below.

INTRODUCTION

1. Kendall Bailes in his biography of V. I. Vernadsky analyzes the interaction of science, politics, and culture in Revolutionary Russia, while focusing on Vernadsky’s individual, scientific worldview and how it stood out as an alternative to Stalinist dogmatism. See Kendall E. Bailes, Science and Russian Culture in an Age of Revolutions: V. I. Vernadsky and His Scientific School, 1863–1945 (1990).

2. Alexander Vucinich has looked at the importance of some early nineteenth-century professional scientific societies in his work but without primarily focusing on their contribution to public culture. See Alexander Vucinich, “Politics, Universities, and Science,” in Russia Under the Last Tsar, ed. Theofanis George Stavrou (1969).

3. Loren Graham has edited a collection of essays (Science and the Soviet Social Order, ed. Loren K. Graham [1990]) that includes chapters on the relationship of science to Russian society and culture in the Soviet era. The essays by Katerina Clark and Richard Stites look at scientific thought in literature, including science fiction. Though they analyze the changing images of science and technology in Soviet literature, as well as the world outlook of Soviet science fiction, they do not comment on the public reception of science. For a broader analysis of science and Russian society, one can also refer to Graham’s Science in Russia and the Soviet Union (1993), a voluminous overview of Russian science. In Health and Society in Revolutionary Russia, ed. Susan Gross Solomon and John F. Hutchinson (1990), Susan Solomon has looked at the relationship between Soviet social hygiene and public health in recent work.

4. Jeffrey P. Brooks, in his study of the literacy and tastes of Russian readers in the late tsarist era (When Russia Learned to Read, Literacy and Popular Literature, 1861–1917 [1985]), briefly considers the relationship between science and superstition. Brooks, however, deals mostly with the chapbook publications influenced by Russian lubok (popular prints) and their influence on readers, not with the broader popularization of scientific thought.


6. On occasion, and after much prodding by the Soviet state, they attempted to conduct mass-voluntary activity; however, according to Weiner (A Little Corner of Freedom: Russian Nature Protection from Stalin to Gorbachev [1999]), this was done mainly to convince the regime that they could take part in such Communist
activities. Nevertheless, Nathan Brooks ("Chemistry in War, Revolution, and Upheaval: Russia and the Soviet Union, 1900–1929" Centaurus [November 1997]) has shown convincingly that instead of fighting to maintain their "pure scientific pursuits," chemists, unlike ecologists and biologists, threw themselves wholeheartedly into the development of rapid industrialization of the economy during the early Stalinist era. Thus, one might need to look at histories of Russian scientific disciplines on a case-by-case basis.

7. For his broad analysis on science and the state in the late Imperial and early Soviet period, see chapter one of Nikolai Krementsov, Stalinist Science (1997).


11. For an analysis of the development of the Communist Academy and the Institute of Red Professors, see Michael David-Fox, Revolution of the Mind: Higher Learning Amongst the Bolsheviks (1997). In a recent article, however, David-Fox explores the premise that a new academic order only coalesced in Soviet Russia after a slow evolutionary process between 1917 and 1927 as "a result of a still incompletely understood historical conjunction in scholarly, scientific, and educational life." See Michael David-Fox, "The Emergence of a 1920s Academic Order in Soviet Russia," East-West Education 18, no. 2 (fall 1997): 106–42.

12. See David Jaroszky, Soviet Marxism and Natural Science, 1917–1932. (1961), 70–71. Jaroszky argues that this period of gradual cultural revolution from 1917 until 1929 (before the Great Break) had its contradictory characteristics. For example, concessions to bourgeois specialists simultaneously accompanied a gradual drive against them (63–67).

13. For a pioneering study that focuses more on the relationship between the technical intelligentsia (especially engineers and technical specialists) and society during the inter-war era, see Kendall E. Bailey, Technology and Society Under Lenin and Stalin: Origins of the Soviet Technical Intelligentsia, 1917–1941 (1978).


CHAPTER 1

1. See Mario Biagioli, Galileo, Courrier: The Practice of Science in the Culture of Absolutism (1993). Throughout the 1630s Galileo embarked on a mass-publicist campaign and published one of the first European popular-scientific prose pieces entitled Dialogues Concerning the Two Chief World Systems (1632). He sent this to bishops, cardinals, and intellectuals in an effort to convert those in the church and those residing within the walls of academia. For an analysis of Galileo as an artisan who represented the progressive forces of science and modernism see Bertolt Brecht, Galileo (1966). For a biography of the early years of Galileo's life one can refer to Stillman Drake, Galileo at Work (1978).

2. This treatise outlined a precise mathematical approach to the laws of mechanics and showed that all phenomena could be explained on the basis of simple, universal laws of motion and the law of gravitation. See Sir Isaac Newton, Mathematical Principles of Natural Philosophy, trans. and ed. Andrew Motte (1729). For a social history of Newtonian philosophy see Margaret C. Jacob, The Newtonians and the English Revolution 1689–1720 (1976).

3. See Roger Cotes, "Preface to the Second Edition (1718)," in Sir Isaac Newton, Mathematical Principles of Natural Philosophy (1938). Cotes's preface was important in the further popularization of Newtonian mechanics.


5. Scientific academies also took shape in Italy during the time of Galileo and served as a starting point for the spread of scientific ideas. Galileo was a member of the Academy of the Lynx, one of the first scientific academies in Rome. For an analysis of the nexus connecting naturalists, academies, and science museums in seventeenth century Italy, see Paula Findlen, Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy (1994). In France during the seventeenth century, governmental sponsorship and supervision of the arts and letters became more institutionalized. For an analysis of how academies in France switched from a patronage system based on direct participation to the remote nature of Royal patronage, see David Lux, Patronage and Royal Science in Seventeenth-Century France (1989).


9. The founder of the London Mechanics' Institution in Great Britain was a professor of Medicine in Glasgow; George Birkbeck. In 1800 he delivered a course of lectures to laborers in Glasgow on natural philosophy. They became a success, and eventually such institutes spread to Edinburgh and other cities. See Robert Stewart, Henry Brougham, 1778–1868: His Public Career (London), 183–85.

10. Brougham was responsible for starting and expanding the Society for the Diffusion of Useful Knowledge in 1826. This society grew out of a plan by Brougham and others to produce cheap scientific and educational books and
texts for workers. The society published cheap penny magazines and encyclopedic newspapers offering educational material to working-class Britons. Brougham published popular scientific pamphlets on mathematics and the physical sciences. Although he was criticized for his lack of scientific and theoretical grounding, Brougham, like other amateur science popularizers in Europe, believed it was significant to develop more accessible scientific texts for the common person (Stewart, Henry Brougham, 188–91).

11. In an essay drawing on the writings of the French sociologist Pierre Bourdieu, R. Charter focuses on the relationship between the text as conceived by the author and printed by the publisher, on the one hand, and as read and processed by the reader, on the other. See "Texts, Printing, and Readings," in The New Cultural History, ed. Lynn Hunt (1989).


15. B. Fontenelle, Razgovor o muzhestve mirov (1740).
17. These articles include titles such as “Kratko izjasnenie o planetes Saturse” (short explanation of the planet Saturn) (1735) and “O lune i o lunnykh piatnakah” (on the moon and on the lunar spots) (1740–41). Geography and astronomy were very popular themes with the Russian reader in the late imperial and early Soviet periods.

20. Lomonosov was also a proponent of the popularization of science in eighteenth-century Russia. He gave speeches at the public meetings of the Academy of Sciences in which he discussed the role of science as aiding Russia’s industrial development. Those speeches included his 1751 lecture entitled “Slovo o pol’’ze khimi” (words on the use of chemistry). See D. D. Blagov, “Poet uchenyi,” in Izvestiia akademii nauk SSSR, otechestvenni literatur i izushcha 1940, no. 1: 75–79.

21. The journal started out with a circulation of two thousand copies (a sizable print run for the time), but its distribution slowly came down over the next couple of years. See Petr Pečarskii, Istoriia imperatorskoii akademii nauk v Petersburgu, tom 1 (1870), 508–30.

25. Luppov, Kniga v Rossii, 50–51.
31. See Kelley, Descent of Darwinism, 10–14.
33. N. P. Pasevskii, Oshcheponovaia fizika (1852).
34. See also D. Danilevskii and A. Osovskyi, Esli siva strast svetov’ (1849), which discusses the forms of the plant and animal world and includes a discussion of the work of Copernicus and Galileo.
35. Nikolai Polevskii, Materialy po istorii russkoi literatury i zhurnalizmavi tridtsatih godov (1984), 332.
36. Ibid., 332–33.
38. The 1860s and 1870s saw an increase in the number of publications in the natural sciences. Natural scientific books made up 12.8 percent of all publications in 1876, and the average print-run of those works was twenty-five hundred copies. See M. V. Muratov, Knizhnoe delo v Rossii v XIX i XX vv., ocherki istorii knigoizdatel’stva i knigotorgovli 1800–1917 godi (1931), 106.
40. Berezina, Russkaia zhurnalista, 74. Also see A. Bestuzhev, "Vzgliad na russkoe slovesnost’ v tsene 1824 i nachalo 1825 godov," in Poliarnaya zvezda, tzedrannaia A. Bestuzheva i K. Ryleeva (1960).

CHAPTER 2

1. For overviews of the prerevolutionary adult-education movement see S. Elkins, Ocherki po agitatsii, propagande i vneskol’noi rabote v drevnevislovoi Rossi (1930) and V. P. Vakhterov, Vneskol’noe obrazovanie naroda (1917).
2. T. J. Vzdorov, Istoriia otvetit’’ia i izuchenia russkoi srednevekovoi zhiznii XIX–1917 (1980), 99–40. The popularization activities of scientific societies in Russia, like their counterparts in Western Europe, can be seen as part of a broader movement to develop voluntary organizations by the educated, middle classes of Russian society in the late nineteenth and early twentieth centuries. Joseph Bradley ("Voluntary Associations, Civic Culture, and Obschestvennost’" in Moscow," in Between Tsar and People: Educated Society and the Quest for Public Identity in Late Imperial Russia, ed. Edith Clowes et al. [1991], 146–47) suggests that volun-
tary associations contributed significantly to the development of Russian civil society (obshchestvennost'). Furthermore, Bradley argues that professionals in Russia claimed stewardship over the workers and peasants and engendered notions of self-improvement through their adult-education programs.

3. Geoffrey Eley and David Blackbourn, The Peculiarities of German History (1984), 194–96. In his “Nations, Publics, and Political Cultures: Placing Habermas in the Nineteenth Century,” in Culture/Power/History: A Reader in Contemporary Social Theory, ed. Nicholas B. Dirks et al. (1994), 303–304, Eley asserts that voluntary association in general was a main indicator of social progress as the nineteenth century unfolded in Europe. Reading, educational, and literary societies were important to the development of new public aspirations. According to Eley, voluntary association was the main context through which bourgeois society displayed its goals and aspirations as it staked out leadership within respective nations.

4. Samuel D. Kassow, “Russia’s Unrealized Civil Society,” in Between Tsar and People, 367–68. Louise McReynolds, in her study of the late-imperial Russian press (The News Under Russia’s Old Regime [1991]), shows that by catering to the broadly inclusive tastes of daily street traffic, newspaper publishers challenged the dominance that the government and intellectuals in society previously enjoyed over print communication. For McReynolds, “The collection and distribution of reader-oriented information had far-reaching political implications; newspapers opened up the ‘public sphere’ (3–5).


13. The zemstvos were created as elected, local councils in the 1860s during the reign of Alexander II and were also involved in expanding local infrastructure, schools, and public institutions.


16. Ibid.

17. “Ustavy S.Peterburgskogo obshchestva estestvospytatelei,” Tsentral’nyi gosudarstvennyi arkhiv RSFSR (hereafter GARA), f.2307, op.2, d.358, l.36.

18. Ibid., l.37.

19. See “Ustav obshchestva,” in Gosudarstvennyi arkhiv Iaroslavskoi oblasti (hereafter cited as GAI), f.1541, op.1, d.1, l.1–3.

20. GARA, f.1541, op.1, d.1, l.4–8. The society, officially named the Society for the Study of the Iaroslavl’ Gubernia from a Natural-Historical Perspective, sent its list of by-laws to the ministry on October 31, 1864, and was sanctioned as an independent voluntary naturalist society on Nov. 21, 1864. Between 1902 and 1924 the organization was renamed the Iaroslavl’ Natural-History Society, and it sought funding from a wide variety of sources.

21. GARA, f.1541, op.1, d.1, l.3.

22. A type of higher school came into existence in Iaroslavl’ on April 29, 1805. It was named after its sponsor, the Russian nobleman Pavel G. Demidov. This was unique for the time and probably only one of four of its type, the others in Moscow, Petersburg, and Vilna. In 1834 it was transformed into a lyceum, and later in 1868 into a law lyceum, which it remained until 1918, when by Lenin’s decree it became a university. See Imeni Demidova, Iaroslavskii Universitet v ego proshlom i natsyauchen (1995).

23. GAI, f.221, op.1, d.116, l.1–2. Records from the 1917 budget show the zemstvos donating even more (combined total of 1,950 rubles) than the Ministry of Education (1,500 rubles).

24. See Studii Iaroslavskogo Estestvenno-istoricheskogo Obshchestva, Tom 1, ed. A. I. Lakovleva (1902), x–xiii. L. P. Sabaneev (1844–1896), an active naturalist and zoologist and a founding member of the society, was also known for his studies of fishing and fauna. His popular texts on fishing were known and loved by Russians throughout the empire.


26. GARA, f.2306, op.19, d.52, l.4.


28. For more information on scientific and technical exhibits in late imperial Russia and especially the 1872 science and industry exhibit, see Obshchee obozrenie Moskovskoi politekhnicheskoi vystavki (1872).


30. Ibid., l.5.

31. Ibid., l.20–21.


34. "Zapiska o deleatel’nosti obschestva liubitelei estestvoznaniia, antropologii i etnografii i ego material’nych sredstvakh," GARF, f.2306, op.19, d.38, ii.4–5.
35. Ibid., l.I.5–6.
36. GARF, f.2306, op.19, d.128, ii.47–47ob.
37. Ibid., l.I.48–48ob.
39. Ibid., l.I.3ob.

CHAPTER 3

1. Though Narkompros would generally register societies promptly, it required the necessary budgetary information before releasing state funds to various organizations. For instance, in a 1918 Narkompros memorandum to the director of the respected, well-established Russian Society for the Spread of Natural-Historical Education, G. Grinberg stated that although the organization was officially registered with Narkompros, without a yearly budget estimate the ministry could not extend proper funding to the society. See "Komissariat narodnogo proveshcheniia 15 iunia 1918, predsedatel’iu russkogo obschestva," GARF, f.2307, op.2, d.362,l.2.
3. Ibid.
4. GARF, f.2307, op.2, d.365,l.11.
8. Ibid., l.11.
10. The government budgets funded for scientific institutions dropped from 11.5 percent of the total Narkompros budget for the 1922/23 fiscal year to 9.7 percent for the 1923/24 fiscal year. As the decade continued, this share showed a steady decline. See Narodnoe proveshchenie v RSFSR k 1924/25 uchenomu godu (Otchet Narkomprosa RSFSR) (1925), 81. The sum allotted for scientific insti-
tutions dropped from 8.4 percent of Narkompros’s budget for the 1924/25 fiscal year to 7.9 percent for the 1925/26 fiscal year. During the same time period the amount of the Narkompros budget allotted to adult education dropped from 19.3 percent to 15.5 percent. See Narodnoe proveshchenie v RSFSR k 1926/27 uchenomu godu (Otchet Narkomprosa RSFSR) (1927), 9–14.
11. GARF, f.2307, op.2, d.358, l.41.
17. A growing struggle between the Communist Party’s institutions and Soviet state scientific organizations after 1929 would complicate this institutional dynamic even more. According to Nikolai Kremenetsov, VSNKh’s Scientific-Technical Administration (NTU or NTO) was reorganized a year later in 1929. When its role was diminished, a number of its scientific institutions were further subordinated to appropriate agencies supervising various branches of industry. After the cultural revolution, its role diminished even more, as “in 1932, the VSNKh was liquidated and replaced by a number of new commissariats that supervised various branches of industry and assumed responsibility for the relevant scientific institutions” (Kremenetsov, Stalinist Science, 33).
21. Ibid., l.I.181–82.
22. After the Bolshevik Revolution of 1917 the Marxist historian M. N. Pokrovskii became Deputy People’s Commissar of Enlightenment and chairman of Narkompros’s State Academic Council. He was also chairman of the Presidium of the Communist Academy and rector of the Institute of Red Professors (George M. Enteen, The Soviet Scholar-Bureaucrat: M. N. Pokrovskii and the Society of Marxist Historians [1978]).
23. "V narkompros zav. tov. Pokrovskomu, ot NKVDa zav. tov. Zaitseva, 31-1-
25. Gallo, f. 221, op.1, d.116, l.5.
26. GARF, f.2306, op.19, d.27, l.I.14–14ob.
27. GARF, f.2306, op.19, d.128, l.I.78, 88.
28. GARF, f.2307, op.2, d.365, l.1.
29. People’s universities emerged in Russia at the beginning of the twentieth century. They were organized by professionals such as lawyers, doctors, and, of course, teachers. These institutions offered lectures and short courses in a variety of cultural, scientific, and technical subject areas. Soon after the Bolshevik Revolution of 1917 they were replaced by workers’ schools (rabfaks) or by other


31. See GALaO, f. 221, op. 1, d.113, II. 24 and 37.

32. GALaO, f. 221, op. 1, d.116, II. 13–15ob.

33. GALaO, f. 221, op. 1, d.116, II. 22 and 24.

34. GARE, f.2507, op.2, d.356, II.7–8.


36. See Anketa po naučnym obshchestvam, dokumenty, GALaO, f. 221, op. 1, d.190, II. 20–20ob. On July 4, 1924, a key member of Glavnaia’s collegium, I. Valkov, sent out a circular specifically indicating that all Soviet regional scientific societies had to list all members’ names, their party affiliation, their education, and the nature of their organizational involvement.

37. See a circular sent by A. Pinkevich of Glavnaia to the Iaroslav’i Gusibskolm, dated August, 28, 1924. GALaO, f. 221, op. 1, d.190, II. 58–61.

38. See V. Srochno Tsirkulniamo, R.S.F.S.R. Narkompros Glavnaia, F. Petrovo Vsem Podvedomstvennym uchrezhdienia, December 2, 1924, GALaO, f. 221, op. 1, d.189, II. 34–35. Reports sent by societies to Glavnaia encompassed: (1) detailed documentation of yearly activities; (2) lists of members and their backgrounds; (3) detailed justifications for budgetary requests; (4) an inventory of all equipment, furniture, and possessions of the scientific societies, including their affiliated museums and libraries.

39. GALaO, f. 221, op. 1, d.252, I.21.

40. GALaO, f. 221, op. 1, d.252, I.45. Severnyi rabochiy was a daily newspaper. Its predecessor Severnyi krai was the Iaroslav’ region’s first provincial newspaper of any real journalistic substance. After the Bolshevik revolution, it became the organ of the Gusibskolm and Sibirskom (the K.P.R. (Russian Communist Party). Severnyi krai, however, did compete between 1909 and 1917 with another local newspaper entitled Golas (the voice or herald).

41. GALaO, f. 221, op. 1, d.252, II.49–54ob.

42. For announcements of local science clubs, see Vlast’ Truda, no. 45, March 2, 1918. But many issues beginning in 1918 covered local science topics and events.

43. GALaO, f. 221, op. 1, d.232, II.49–54ob.

44. GALaO, f. 221, op. 1, d.189, II. 10–12.

45. Ibid., II. 114–115.

46. GALaO, f. 221, op. 1, d.217, I.53.

47. GALaO, f. 221, op. 1, d.217, I.64.


49. GALaO, f. 221, op. 1, d.217, I.65.

50. GALaO, f. 221, op. 1, d.215, II.1–5.

51. In 1923 the faculty of the university’s Law School, the most prestigious of its schools and departments, was terminated, as were some law schools elsewhere in Soviet Russia. Deprived of its law faculty, as well as Lenin’s patronage, the university was closed in 1924, only to be reopened in 1970. Temporarily, the university was replaced by the opening of a pedagogical institute in Iaroslav’ in the late 1920s. However, archival and secondary sources provide no evidence for why the university in this provincial town might have been singled out for termination by central Narkompros officials. For a complete review of these matters see I. Demidova, *Iaroslavskii Universitet v ego proshdom i nastoiaschchem* (1995).

52. Anketa Iaroslavskogo est-istorii. obshchestva, in GALaO, f. 221, op. 1, d.198, I.64.

53. Ibid., I.58.


56. GALaO, f. 221, op. 1, d.159, II. 16–18.

57. Ibid., I.15–17.


59. GALaO, f. 221, op. 1, d.189, II. 6–11.


5. NTO was headed originally by N. F. Gorbunov and later by Prof. N. M. Fedorovskii, who, along with A. A. Eikhenval’d, was sent to Berlin in August of 1920 by VSNKh to meet with foreign scientists such as Albert Einstein. On March 29, 1921, Sovarkom RSFSR created the Bureau of Foreign Science and Technology (BINT). Its task was to form ties with foreign scientific organizations, publish scientific and technical information, and also exchange scientific literature with groups abroad. See A. Ia. Cherniakh, Istoriia tekhnicheskoi knigi, chast’ II sovetskii period (1973), 15, 45–46. At this time a number of publishers of scientific information were under VSNKh’s control, including BINT’s publishing house, Gostekhizdat, and the scientific chemical-technical publishers. See Kratkie ochert’ o deiatel’nosti BINTa 1924–1924 (1924), 10–11.

6. RGAE, f. 3429, op. 61, d. 985, 158.

7. O partiinoi i sovetskoi pechati, radioveschestve i televizii (1972), 65–66.


9. Tsental’nii gosudarstvennyii arhiv oktjabr’skoi revolutsii i sotsialisticheskogo stroitel’stva SSSR (Gosudarstvennyi arhiv Rossiiskoi Federatsii, or GARP), f. 395, op. 9, d. 318, ll.39–40. By the middle of the decade the popular-scientific branch of Gosizdat had expanded its production of works considerably. During 1926 this branch produced 116 new works with a total print-run of 696,000 copies. This was a considerable increase over the previous year. In 1925 the popular-scientific branch of Gosizdat produced a total of 77 new titles with a total print-run of 549,000 (GARP, f.395, op. 14, d. 15, ll. 46, 69). The 1926 figures represented 3.0 percent of all titles produced that year by Gosizdat, and 1.4 percent of the total print-run of books. For 1925 the figures were 2.95 percent and 0.8 percent, respectively (GARP, f.395, op. 14, d. 15, ll. 17–18).

10. Cherniakh, Tekhnicheskaya kniga v period, 7–8. During the civil war, book trading decreased to a minimum. Books, however, were freely distributed by centralized means under Tsentropechat’, the central agency for the spread of printed publications.


12. Ibid., 152–53. Brooks argues that much of the printed material at this time was only reaching the urban reader; rural areas were not receiving publications due especially to the breakdown in distribution. Statistically, however, much of the "literate" reading public lived in the rural areas. According to the 1926 census, figures, over 70 percent of the nearly sixty million literate people lived in the countryside (Vsesuuznaya pererip’ naseleniia 1926 goda [1929] 17: 48–50).

13. Specific figures and data for book production in the pre- and post-World War I era can be found in a detailed study by G. I. Proshnev, Istoriia by taiskikh dela (1924), 30–36. See also Kniga v 1924 g. v SSSR, ed. N. F. Ianitskii (1925).


15. See Kniga v 1924, 210–11.


19. Pechat’ sssr za 1924 i 1925 gg., ed. I. M. Vareiks (1926), 127; and N. F. Ianitskii, Knigi i kniagi sovetskoi Rossi, 1918–1923 (1924), 15–16. By 1923 the number of titles privately published (not including works published by cooperatives) reached 25 percent of the total number of titles published. That percentage sharply declined, however, in the period between 1928 and 1931 during the Stalinist cultural revolution (down to 0.1 percent in 1931). See A. I. Nazarov, Oktjabr’ i kniga (1968), 254–55, as well as E. I. Shumutin, Sovetskaia kniga za ts v sot old (1968), 25–26.


28. B. Bank and A. Vilenkin, Krest’ianskaia molodez’ i kniga (opryt issledovaniia chitatel’skikh interesov) (1929). B. Bank and A. Vilenkin, Drevneisskaya kniazia i kniagi i kniagi (1927). Scholars such as Bank and Vilenkin continued to work in the 1930s, but found it increasingly difficult to produce less politicized sociological analysis.

CHAPTER 5


2. For a discussion of both the metaphorical and practical aspects of the Bolshevik electrification campaign after 1917, see Jonathan CooperSmith, The Electrification of Russia, 1880–1926 (1992).

3. Frederick W. Taylor was an engineer from Philadelphia who compared industry to the military order and mapped out steps for an economy of movement in the factory. After the revolution Lenin was interested in adopting Taylor's methods of labor organization. See Richard Sutes, Revolutionary Dreams, Utopian Vision and Experimental Life in the Russian Revolution (1989), 146–47. See also Samuel Haber, Efficiency and Uplift: Scientific Management in the Progressive Era, 1893–1920 (1964).


9. Molodiia gvardiia 1923, no. 2 (February–March): 231.


12. For examples of these inventions see Iskra 1924, no. 8 (August): 39–41.


15. One uniquely outspoken engineer was quoted in a journal as opposing this movement, even requesting additional pay for devoting time to evaluating worker-generated projects (Inshenkyi trud 1931, no. 8, 198).


17. Periodicheskii sbornik "SSSR notes that nineteen new journals on aviation began publication in the period 1917–32. See Periodicheskii sbornik "SSSR 1917–49, no. 4 (1955), 52–58.

18. See N. A. Byrin, Mekh. legendy. i pervye fantastii (1930); Nicholas Daniell, The Kremlin and the Cosmos (1972).

19. In an article on rural Russia and air flight in the 1920s, Scott W. Palmer focused on Soviet flight as a struggle against rural backwardness and a militaristic ideological war of dominance against the nation. However, in my view, scientists saw this not just as combating backwardness but also as engaging and catering to the public's own interest in feats of modern technology. See Palmer's article, "Peasants into Pilots: Soviet Air-Mindedness as an Ideology of Dominance," Technology and Culture 41 (January 2000): 1–26.


27. See Zamechatel'naya rabota Melkova (1930); "Tri istoriicheskikh pereleeta," Cho chita 1937, no. 1: 76–78.


29. See also Svetlana Semenova, Nikolai Fedorov (1990). According to N. P. Peterson, a Russian historian of philosophy, as early as the 1860s Fedorov had already incorporated the idea of space travel into his bizarre philosophies of resurrection.


31. Viktor Shklovskii, "Kosmonavtika ot A do Ia," *Literaturnaia gazeta*, April 7, 1971, p. 13. In 1876, after studying in Moscow for three years, Tsiolkovsky returned to provincial Kaluga and began to teach physics and mathematics. In 1879, at the young age of twenty-two, he became one of the first scholars to work out a plan for an artificial earth satellite (Young, Nikolai F. Fedorov, 34).

32. Alexei Gastev was involved in time-labor studies and founded the Central Institute of Labor in Moscow in the 1920s. He was also instrumental in developing Soviet studies of the scientific organization of labor and technology (known by its Russian acronym the "NOT" movement).


41. Cultural critics of imperialism, such as Edward Said, have argued that this notion of cultural hegemony is at the root of European narratives depicting the other as inferior people. See Edward Said, *Orientalism* (1978), 6–8, 19–21. Homi K. Bhabha and other critics believe that these nationalistic or glorifying geographic narratives leave little room for the voice of the subaltern being described. See Homi K. Bhabha, "Introduction: Narrating the Nation," in *Nation and Narration*, ed. Homi K. Bhabha (1990), 3.


48. Members of this movement helped establish museums throughout provincial Russia and encouraged local residents to gather data and artifacts about their locales (Utechin, "Bolsheviks and Their Allies,” 130–35).


56. See *Chelovek i priroda* 1925, no. 1 (January): 1.


62. For an example of this kind of analysis in a popular scientific article, see A. Bystrov, "Proishozhdenie loshadii," *Iskra* 1924, no. 11 (November): 12–14.

CHAPTER 6

1. See B. E. Raikov, *Russkie biologi-evolutionisty do Darvina* (1951–59). Raikov also discusses the importance of M. G. Pavlov (1793–1840), one of the more prominent professors in scientific studies at Moscow University in the 1820s and 1830s.


3. See Alexander Herzen’s article in *Moskovskie vedomosti*, December 8, 1845.

4. See Karl Rojulier’s article in *Moskovskie vedomosti* 1852, no. 4.


6. James Allen Rogers, "The Reception of Darwin’s *Origin of Species* by Russian Scientists," *ISIS* 64, no. 224 (1973): 945–95. Rouiller, however, had no definite answer on the process and means of evolution. Like other pre-Darwinists in Russia, he believed that changes in heredity were influenced by surrounding conditions and by the Lamarckian notion of the inheritance of acquired characteristics. See Karl Ru’e, "O viviani naruzhnykh uslovii na zhizni’ zhivotnykh," in *Izbrannye biologicheskie proizvedeniiia* (1954), 36–50.

7. Darwin had been in correspondence with Alexander’s brother Vladimir, the paleontologist. In May of 1873 Darwin sent a letter to Vladimir noting how interesting and important his brother Alexander’s doctoral dissertation was from an evolutionary standpoint. Alexander Kovalevski’s work on small marine organisms was important to some of the arguments in Darwin’s *The Descent of Man*. See Charles Darwin to Vladimir Kovalvesky, May 21, 1873, in Charles Darwin, *Iskrinye Pisma* (1950), 237.


18. Ibid., 315.
22. Along with its central organization, the society had five hundred members and twenty affiliates in other cities. The society was unique in the Russian Republic for its ability to unite pedagogues, natural scientists, and teachers in higher institutions. Raikov and V. A. Vagner edited the society's journal, *The Natural Sciences in the School*, issue 1, 2, pp. 2, 362, 1, 3–4.
25. Ibid., 60.
28. N. K. Krupskia discussed the program of various pedagogues who met at the first All-Russian Congress of National-Historical Education in Petrograd. She argued that for the most part the congress was against the various pedagogical schemata of GUS programs. See N. K. Krupskia, "Novye programmy v otsenke s'ezda po estestvenno-istoricheskomu obrazovaniiu," Estestvoznanie v shkolе 1925, no. 9 (November): 78–80.
29. Zavadovskii had graduated from Moscow University in 1919 and thus started his active scientific career under Soviet rule. He was director of the laboratory of experimental biology at the Sverdlov Communist University, but left in 1931 to join the faculty of the All-Union Institute of Animal Husbandry. In 1932 he became a member of the Communist Party (B. M. Zavadovskii, *Ocherki vnutrennei sektori* [1928]).
31. See B. M. Zavadovskii, *Darvinizm i marksizm* (1926).
38. See Allan K. Wildman, *The Making of a Workers' Revolution: Russian Social Democracy* (1967), 33–35. Richard Pipes claims that some of the workers' *krest'ianki* also studied difficult works of an advanced nature. Especially popular in this category were the writings of Darwin and Spencer. Various theories on the origin of the earth and universe were also stressed in these groups. See Richard Pipes, *Social Democracy and the St. Petersburg Labor Movement 1885–1897* (1968), 5, 29.
44. *See Nauka i religiia* 1922, no. 1, p. 10.
46. In the 1920s, Marxist propagandists were especially critical of scientists who maintained strong religious beliefs. They believed espousing science and religion would send mixed signals to the common reader and also encourage a type of scientific thinking that could coexist with religion. See E. A. Lazarevich, *Popularizatsiia nauki v Rossii* (1981), 162.
47. For a discussion of Iaroslavski's position on antireligious propaganda during NPF and the period of the First Five-Year Plan, see George L. Kline, *Religious and Anti-Religious Thought in Russia* (1968), 150–51.
49. *Kommunisticheskia partiia i sovetskoe pravitlestvo o religii i iskervei* (1959), 76.
50. *Komm. partiia sovetskogo soiuza,* 471.
51. "Tskul'kamos, 8 fevralia 1922, vsim obkomom, obliubiro i gubkom RKP, o postanovke antireligioznoi propaganda, zamenia otdel agit-prop otdel TsK RKP (b), la. lakovlev. *Tsentral'nyi partiinii arhiv Instituta Marksizma-Leninizma pri Tsentral'nom komiteete KFSS (Rossiiskii tsentr khrennianii i izucheniia dokumentov noveishei istorii)—hereafter RTHKhNDFL*, f. 17, op. 60, d. 146, 150.
52. Ibid., II.51–52.
53. *Zasedanii podkomissii po antireligioznoi propagande v derevene pri p-otdele*
propaganda TsK RKP, ot 12-go sentiabria 1923 g., "RTsKhIDNI, f.17, op.60, d.438, l.1.

54. "Protokol, soveshchanija p-otdelja propagandy agitpropa TsK RKP po antireli-

gioznoi propagande v derevne, 5-go oktiabria 1923, "RTsKhIDNI, f.17, op.60, d.438, II.9–10.

55. Komsomol'skaja paska (1924), 94–97. For a discussion of the spread of scientific

techniques in agriculture by the Komsomol, see I. Liubimov, Komsomol v sovet-


56. Peter Kenez, The Birth of the Propaganda State: Soviet Methods of Mass Mobiliza-


58. Lynne Viola, "The Peasant Nightmare: Apologies of Apocalypse in the Soviet


analysis of religious activists in the villages and their relation to the develop-

ing Soviet state under the NEP, see Glennys Young, Power and the Sacred in


59. Helmuth Altrichter, "Insoluble Conflicts: Village Life between Revolution and

Collectivization," in Russia in the Era of NEP, ed. Sheila Fitzpatrick, Alexander


60. For further analysis see Vladimir G. Bogoraz-Tan, Kristianstvo v svete etnografi-

i (1928).

61. See A. Angarov, Klassovaja bor'ba v sovetskoj derevne (1929), 32.

62. See V. A. Kumaniev, Sotsializm i vserossijskaia gramoatnost' (1967).

63. See Report by Iaroslav'! Gubkomm Agitprop Otdel sent to Narkompros, May 9,

1922, in local Iaroslavl' Communist Party archive, Tsentr Dokumentatsii

Novedishe Istorii Iaroslavskoi Oblasti, hereafter cited as TsDNIlaO (formerly,

Partarkhiv Iaroslavskogo Obkoma KPSS), TsDNIlaO, f. 1, op. 27, d.961, 1.100.

64. "Protokol zasedania komissii pri II-otdel'ke propagandy TsK RKP po vponru ob

anti-religioznoi propagandy za iulja mesjats 1923 g.," RTsKhIDNI, f.17, op.60,

d.4, II.42–42ob.

65. "Otchet politinstruktrora A. Saikina za iulja mesjats 1926 g., narasnoeia i za-

prosy krejs'tants'va," RTsKhIDNI, f.17, op.60, d.405, 1.162.

66. RTsKhIDNI, f.17, op.60, d.438, 1.35.

67. Ibid.

68. See "Itogi robytovy kursov Antireligioznikov pri APO CK, Iaroslav', VKP (b),

1927–28, in TsDNIlaO, f. 1, op. 27, d. 3409, II. 1–2, 38–39.


1, op. 27, d. 3088, 1.50.

70. Founded in 1927, the Society of Friends of Defense and Aviation-Chemical

Construction, Osoaviakhim, was one of the largest mass voluntary associations

in the USSR before WWII. Many Communist propagandists and organizers

therefore looked to it as an example of successful mass mobilization. See William

E. Odom, The Soviet Volunteers: Modernization and Bureaucracy in a Public


71. Ibid., 1.51.

72. TsDNIlaO, f. 1, op. 27, d. 3088, II. 46–47.

73. Ibid., 1.47.

74. TsDNIlaO, f. 1, op. 27, d. 3088, II. 46–48, 98–99. Many of these evaluations

dealt with antireligious and scientific propaganda in laroslav'! between June

and October of 1927.


76. For a detailed account of the Militant League see Daniel Peris, "The 1929 Con-

gress of the Godless," Soviet Studies 1991, no. 4. Peris’s article concentrates on

the period after 1929. Like Delaney, he generally argues that during the period

1923–1929 a broader educational approach to antireligious activity was

sponsored by the Bolshevik state. Though his work in general focuses on the

bureaucracy of the league and the failures of its antireligious work, he seems to

treat the scientific debates regarding religion in a more inconsequential manner.


Given at the First All-Union Congress of Atheists in Smolensk (April 1925), in

Archive of the Smolensk Oblast All-Union Communist Party SSSR 1917–41

(hereafter cited as Smolensk Archive), National Archives and Records, Wash-

ington, D.C., WKP 458, 1.

78. T. Gagarin, "Tezisy doklada: Itoji i perspektivy antireligioznoi raboty," Smolensk

Archive, WKP 458, 2.

79. T. Varbangkha, "Kak meshat' bolezni veroi i nauki," Report Given at

April 1925 All-Union Congress of Atheists in Smolensk, Smolensk Archive,

WKP 458, 1925, 1–4.

80. T. Lebedeva, "Tezisy doklada: Antirelignozaia rabota uchitelia v shkole i vseh

shkol," Smolensk Archive, WKP 458, 1925.

81. Protocol no. 1, Zasedaniia prezidiuma smolenskogo gubernskogo soveta

soiuza bezbozhnikov SSSR, ot 9 ianvarya, 1926 g., January 9, 1926, All-Union

Congress of Atheists in Smolensk, Smolensk Archive, WKP 458, 1926.

82. TsDNIlaO, f. 229, op. 9, d. 95, II. 108–109.

83. Ibid.

84. See "V Gubkomm BKP (b) o Gubsoveta Soiuza Bezbozhnikov," Nov. 22, 1926,

in TsDNIlaO, f. 1, op. 27, d. 3414, 1.12.

85. See "O sostojanii antireligioznoi raboty v 3-la raione g. Iaroslavli," analysis of

antireligious work in three regions of Iaroslav'! from mid-1927 to early 1928,

in TsDNIlaO, f. 1, op. 27, d. 3088, 1.75.

86. See Shalygin’s letters in the local party archives sent to Gubkomm leaders on the

topic of agitation-propaganda and antireligion throughout 1928, in TsDNIlaO,

f. 1, op. 27, d. 3414, II. 13–22.

87. I. D. Strashun, Bor'ba za zavorce—bor'ba s religij! (Trudy pervogo vseoiuznogo

s'ezda bezbozhnikov, vypusk 7) (1925), 5–5.

88. Prof. B. M. Zavadovskii, Estestvoznanie i religia (Lektia, prochitanina 24 apre-

lia 1925 g. dlia delegatov vseoiuznogo s'ezda bezbozhnikov stenografiieiskii

otchet, vypusk 6) (1925), 3–4, 6–10. In this speech to delegates, Zavadovskii

discussed an article in the English science journal Nature entitled "On the Prohi-

bition of Darwinism."

CHAPTER 7

1. "Izmeni tipos nauchnykh i administrativno-tehnicheskogo personala

2. G. Bosse, Protokoly soveta instituta im. Timiriazeva (1925), 9–11. The Institute, though based in Moscow, published pamphlets and distributed them throughout parts of the former USSR.


5. The rabfak, or workers' school, was a type of educational institution established during the first years of the Russian Revolution to prepare workers and peasants for higher education.

6. GARE, f.406, op.12, d.1920, I.78.

7. Ibid., I.80.

8. Ibid., II.87–88.


11. Ibid., 71.


15. V. V. Lunkevich was a biologist, science popularizer, and historian of the natural sciences. Born in 1866, he studied at Petersburg and Khar'kov Universities. From 1925 to 1933 he was in the biology faculty at Crimean University. From 1933 onward he taught biology at the Moscow Pedagogical Institute.


19. Ibid.

20. Evgenii Elachich was a science popularizer who was highly regarded by Zavadovskii. Elachich was known especially for his short popular pieces on paleontology.


23. M. Gremiatskii was a doctor of the biological sciences and after 1935 was a professor at Moscow University. He worked on anatomy, anthropology, and the history of the natural sciences. Gremiatskii wrote popular-science pamphlets that appeared in the series Nachatki nauki (rudiments of science). In one of his more popular works, the author explained the pioneering work of the Austrian monk Gregor Mendel in the study of heredity (M. Gremiatskii, Chto takoe nasledovaniia i kak ona proizvodiutsia u cheloveka (1927), 28–34.


26. The purges in the natural sciences during the Cultural Revolution had an adverse effect on the development of new technology and scientific progress in general in Soviet Russia. See Medvedev, Soviet Science (1976), 25–33.

27. Vucinich, The Soviet Academy, 9–11. An earlier 1927 charter, which replaced the 1836 charter, made the academy a truly Soviet institution with powerful secretaries, direct channels of government interference, and covert party control.

28. During this period the technical intelligentsia witnessed its own purges. Younger technicians moved upward into positions vacated by the older generation. The "practicals" or "self-taught" were a group of the technical intelligentsia who performed the work of scientists without having obtained a degree (Kendall E. Bailes, Technology and Society Under Lenin and Stalin: Origins of the Soviet Technical Intelligentsia, 1917–1941 (1978), 30–31.

29. Ibid., 69–70.

30. Ibid., 71–72.


32. The vydizhenie was the movement (during the Stalinist Cultural Revolution) for proletarian advancement.


44. Ibid., 1–2.
CHAPTER 8


4. Rossiskii gosudarstvennyi arkhiv ekonomiki (hereafter cited as RGAE), f.4394, op.1, d.1, ll.4–5.


6. On the debates within Narkompros and the debate over technical education during the mid-twenties, see Holmes, The Kremlin and the Schoolhouse, 83–92.

7. The movement of the “practicality” of education was especially trumpeted by the young radical militant pedagogue V. N. Shulgin, who had entered Narkompros in the 1920s on the invitation of Krupskaia (an initial member of VARNITSO). Shulgin’s ideas were put into practice in 1930 by a decision of the Congress on Polytechnical Education to link primary schools with neighbouring factories and kolkhozki. See Sheila Fitzpatrick, Education and Social Mobility in the Soviet Union, 1924–1934 (1979), 136–52.


10. Much to the dismay of VARNITSO members, however, by the mid-1930s, the Soviet Academy of Sciences would acquire a leading position amongst all Soviet scientific institutions. The academy would even begin to absorb laboratories and institutes previously subordinate to various commissariats after the 1917 Revolution, eventually even subsuming its major competitor, the Communist Academy (Kremetsenov, Stalinist Science, 37–59).

11. RGAE, f.4394, op.1, d.1, ll.109–10.

12. The Communist Party during the cultural revolution would ultimately support the centralized nature of the academy, with some important changes, and not support radical plans of restructuring. When an assault on the Academy of Sciences came after 1929, the young militants, realizing the party’s support for the academy, demanded not so much a reorganization of the institution as access to the privileges it provided its members. See Loren Graham, Science in Russia and the Soviet Union, A Short History (1993), 97. Also see Y. D. Esakov, Sovetskaia nauka v gody pervoi piatiletki: osnovnye napravleniia gosudarstvennogo rekonstruirushchego nauki (1971).

13. Kendall Bailey has noted that the leadership of VARNITSO contained a number of important chemistry specialists, and the society was thus particularly active in promoting the chemical industry. In March of 1928, the Soviet government responded favorably to a petition written by prominent VARNITSO members and created a Soviet Committee for Chemicalization headed by a Politburo member (Technology and Society Under Lenin and Stalin (1978), 164).


15. RGAE, f.4394, op.1, d.13, ll.5–6.

16. Protokol no. 83/4 zasedaniia TsV VARNITSO,” RGAE, f.4394, op.1, d.41, l.15.

17. RGAE, f.4394, op.1, d.41, l.16.


20. “Obrashchenie gruppy akademikov i professsorov k tovarishchu Stalinu, 1931 g.” (unsigned). RGAE, f.4394, op.1, d.41, l.5.

21. See “Tovarishchu Stalinu, ot predsedatel’ VARNITSO, Akademik Bakh, December 26, 1929,” RGAE, f.4394, op.1, d.13, l.1. No letters exist in the available archival records regarding any response by Stalin to Academician A. N. Bakh’s letters. Letters were also sent by VARNITSO to many members of the Communist Party’s Central Committee.

22. The distinctly “proletarian” aspect of the period of cultural revolution involved the promotion of workers into more responsible positions and also their recruitment into higher educational institutions. This period also witnessed an enormous increase in the overall number of administrative and professional positions. See Sheila Fitzpatrick, “Cultural Revolution as Class War,” in Cultural Revolution, ed. Sheila Fitzpatrick, 32–83.


26. RGAE, f.4394, op.1, d.57, ll.56ob., 45. In their letters to VARNITSO and other state organizations, some voluntary scientific societies emphatically declared that recruiting working class individuals into their organizations was a complicated matter. They believed that any policy of recruiting and promoting such individuals would be difficult to maintain without affecting the entire nature of their scientific societies.

27. As an example of party concern depicted in the popular press at this time, see N. Bukharin, “O tekhnicheskom propagande i ee organizatsii,” Za industrializatsii, August 9, 1931, p. 2.

28. GALO, f.221, op.1, d.1, l.4.
31. GAIAO, f. 221, op. 1, d. 296, II. 20–34.
32. See February 9, 1931, “Circular to all Scientific-Research, Museums, and Regional Studies Groups from Narkompros’s Zav. Sektorom Nauki (Luppov),” in GAIAO, f. 221, op. 1, d. 316, I.5.
33. GAIAO, f. 221, op. 1, d. 316, I.6.
34. See February 20, 1931, Narkompros “Circular to Provincial Scientific Societies and Organizations,” in GAIAO, f. 221, op. 1, d. 316, I.15.
35. GAIAO, f. 221, op. 1, d.296, II.19–20, and refer to d.285, I.24.
36. Letter dated January 25, 1929, sent to Central Glavnauka officials via the laoslavskii Guberniia Department of Narkompros, in GAIAO, f. 221, op. 1, d. 304, I.38.
37. Smetat 1929–30gg, GAIAO, f. 221, op. 1, d.304, II. 104–104ob.
38. GAIAO, f. 221, op. 1, d.310, I.1.
39. GAIAO, f. 221, op. 1, d.310, I.12.
40. GAIAO, f. 221, op. 1, d.310, I.113.
41. GAIAO, f. 221, op. 1, d.310, I.16. This denial by the Central Bureau of the Ivanovo Regional Studies Sector occurred as a result of an August 27, 1930, meeting in Ivanovo.
42. GAIAO, f. 221, op. 1, d.310, I.18.
43. GAIAO, f. 221, op. 1, d.315, I.13.
44. GAIAO, f. 221, op. 1, d.310, I.25. This was a circular sent by Narkompros’s Scientific Sector in Moscow (Glavnauka) to all provincial and local scientific organizations on November 15, 1930.
45. GAIAO, f. 221, op. 1, d.318, I.22. “V Iaroslavskoe Ob., Perepisina po likvidatsii obschestva 25 aprila 1931g.”
46. GAIAO, f. 221, op. 1, d.318, I.9.
47. Tsentr Dokumentatsii Noveishii Istori Tariushkovskoi Oblasti, hereafter cited as TsDNIaAO (formerly, Partarkhiv Iaroslavskogo Okobna KFSS), f. 1, op. 27, d. 3414, II. 12, 13, 14–22. (Material from Iaroslavskob Gubkam VKP (b), 1917–29, Agitpropdél.)
48. TsDNIaAO, f. 1, op. 27, d. 3414, II.21–23.
49. See Severnyi rabochii, January 27, 1940. In 1939 antireligious activists claimed that nearly ninety public lectures were conducted at the museum, attracting close to eight thousand participants from the local public. The museum offered photography exhibits with pictures of the solar panel and various planets, as well as a special department for children. See also Severnyi rabochii, March 22, 1940.
50. See TsDNIaAO, f. 229, op. 9, d. 95, II.108–109.
51. TsDNIaAO, f. 1, op. 27, d. 3409, I.1.
52. TsDNIaAO, f. 1, op. 27, d. 3150, II. 9–10.
53. TsDNIaAO, f. 1, op. 27, d. 1691, II.1–3. (Raspisanie zaniatiia kursal’ rabotnikov pri Gubsvyapartskole, la. Gubkom VKP [b] Agitpropdél.)
54. TsDNIaAO, f. 1, op. 27, d. 3409, II. 1–4.
55. TsDNIaAO, f. 1, op. 27, d. 3088, II. 38–46, 47–48, 98–99.
56. TsDNIaAO, f. 273, op. 68, d.49, II. 1–5 (material from Iaroslavskii Okruzhkom VKP [b] Ivanovskyi Promysshlennii Oblasti Agit-Prep Otdei Propagandi i Kulturii).
57. TsDNIaAO, f. 273, op. 68, d.49, I.10b.
58. Ibid., I.2.
59. Ibid. II.2–2ob.
60. TsDNIaAO, f. 273, op. 68, d.97, II.1ob., 50b., 48–49.
61. TsDNIaAO, f. 229, op. 9, d. 95, II. 12–14.

CHAPTER 9

1. For an in-depth analysis of radical militant pedagogues of the 1920s and early 1930s, see Sheila Fitzpatrick, Education and Social Mobility in the Soviet Union, 1916–52.
2. Donald Filtzer’s 1986 book on workers under Stalin (Soviet Workers and Stalinist Industrialization: The Formation of Modern Soviet Production Relations, 1928–1944 ([1966]) directly addresses this issue of how workers found effective means to circumvent the draconian pressures placed upon them by managers and the regime. Solomon Schwartz (Labor in the Soviet Union [New York: Praeger, 1952]) has also documented draconian labor laws under Stalin, as well as the violations and circumventions of those laws. Lewis Siegelbaum and Ronald Suny have also argued that there was a tragic irony to the early Soviet era in the labor arena: namely in an ostensibly Marxist state, workers had very little collective means to create their own agendas (“Class Backwards! In Search of the Soviet Working Class,” in Making Workers Soviet: Power, Class, and Identity, ed. Lewis H. Siegelbaum and Ronald Grigor Suny [1994], 1–26).
4. In a recent monograph on Soviet labor in Stalin’s Russia, Kenneth Strauss has attempted to describe workers not as passive resistors but as class-conscious actors during Stalin’s regime. For an analysis of how workers looked upon Soviet factories during the early Stalin era as security networks, cultural providers, as well as community organizers, see Kenneth M. Strauss, Factory and Community in Stalin’s Russia: The Making of an Industrial Working Class (1997).
5. Witness how Sarah Davies and Sheila Fitzpatrick have analyzed the tenacity of alternative discourses to the regime’s propaganda in their work on the Stalinist 1930s. Davies argues that Soviet propaganda has a multivalent nature to it since ordinary citizens invested state dictums with their own interpretive meanings. See Sarah Davies, Popular Opinion in Stalin’s Russia: Terror, Propaganda, and Dissent, 1934–41 (1997). For a recent look at dissonant public opinion during the
purge era of the Stalinist 1930s, one can also refer to Sheila Fitzpatrick, *Everyday Stalinism, Ordinary Life in Extraordinary Times: Soviet Russia in the 1930s* (1999).


7. "Zasedanie obshchestva tekhnika massom ot 22-go noyabria 1927 g.," Tsentralfnyi gosudarstvennyi arhiv oktyabr'skoi revoliutsii i sotsialisticheskogo stroitel'cta SSSR (Gosudarstvennyi arhiv Rossiskoi Federatsii, hereafter cited as GARP), f. 5576, op. 1, d. 1, l. 22–24.


10. GARP, f. 5576, op. 1, d. 1, l. 14.

11. At a February 1928 meeting of the society, Sverdlov reiterated certain points discussed at the 15th Congress of the Communist Party. He argued that the increase of technical grammar and the spread of popularization of technical knowledge was one of the more important elements for the construction of a socialist economy. See "Stenogramma 28 fevralia 1928 goda," GARP, f. 5576, op. 1, d. 12, l. 1–2.

12. The leaders of TekhMass were impressed by the fact that in Western Europe and America, large factories and industries organized scientific courses for their workers. Sverdlov argued that the Soviets must be able to learn from organizations such as US Steel, which passed out scientific literature in more comprehensible forms to both their qualified and less-qualified workers (ibid., l. 4).


14. *Iskry nauki* 1931, nos. 5–6, 172. Also see *Otchet Leningradskogo oblastnogo i gorodskogo komiteta VKP(b) IV oblastny i gorodskoi partinoi konferentsii* (1932), 127.


16. *Otchet Leningradskogo oblastnogo i gorodskogo komiteta VKP(b) IV oblastny i gorodskoi partinoi konferentsii*, 127.

17. GARP, f. 5576, op. 1, d. 12, l. 3.

18. Ibid., l. 14.

19. Ibid., l. 27.

20. Ibid., l. 36–37.

21. Ibid.

22. Ibid., l. 26–27.

23. Ibid., l. 27.

24. The author sampled approximately two hundred cases from the participants of night courses at the Central Technical Station of the All-Union Society TekhMass. The surveys were conducted in July of 1928 in Moscow. See GARP, f. 5576, op. 1, d. 17.

25. Ibid., l. 125.

26. Ibid., l. 89.