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Siberia's Academic Complex: The History of an Experiment

by Evgenii Vodichev

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SIBERIA'S ACADEMIC COMPLEX: THE HISTORY OF AN EXPERIMENT

I. INTRODUCTION

The development of academic science is a favorite theme among those who study the growing scientific capacity of eastern Russia. To specialists and laymen alike, the phrase "Siberia and science" means, above all, progress in the field of fundamental research—traditionally considered the prerogative of the Academy of Sciences. Academy science in Siberia is revered due to the numerous prominent Russian scholars who have worked in the region and the national and international renown their work there has achieved. The Siberian Division of the Russian Academy of Sciences is now the most prominent regional division of the Academy.[1] About 11,000 researchers, or approximately 20 percent, of all scientific workers (*nauchnye rabotniki*) employed by the Academy work there. The division includes nine scientific centers located in different cities of Siberia, the largest which is the Novosibirsk scientific center, more commonly known as Akademgorodok. Without a doubt, there are important historical foundations for the widespread fame of Akademgorodok—its very name often evokes more associations than that of Novosibirsk, the city to which it is adjacent. Akademgorodok consists of 33 scientific research organizations and employs half of all Siberian Division personnel.

The creation of a comprehensive scientific center in Siberia was an innovation not only in Russian, but world scientific organization. To a significant degree, the Siberian Division of the USSR Academy of Sciences liberated Soviet science from the dead end to which its highly centralized system had led it by the end of the 1950s. That system—limited to a few, single-discipline fields and located in the center of the country—offered little potential for new avenues of scientific research. The creation of the Siberian complex fundamentally changed the nature of the region's scientific capacity through quantitative growth in new scientific institutions (which strengthened the Academy's presence in the east) and qualitative changes in staff qualification levels, the structure of the institutions themselves, and their principally new orientation. From its very beginnings, the Siberian Division prompted foreign commentators to predict that the development of Siberia would be based on cheap energy and science.[2]

Until now, positive evaluations have exclusively dominated analysis of the creation and development of the Academy's Siberian Division. In reality, despite numerous achievements, the situation was more complicated. First, as one can imagine, far from all proposed plans

1. After the dissolution of the USSR in December 1991, the Russian state assumed responsibility for the administration of those institutions of the USSR Academy of Sciences located within the Russian Federation. The Russian acronym for the Siberian Division was accordingly changed from SO AN SSSR *(Sibirskoe otdelenie Akademii nauk Soiuza Sovetskikh Sotsialisticheskikh Respublik)* to SO RAN *(Sibirskoe otdelenia Rossiiskoi Akademii nauk).*

2. Harrison Evans Salisbury, *To Moscow and Beyond: A Reporter's Narrative* (New York: 1960), 187.

for the Division were successfully realized in practice. Real life and concrete social, economic, and political processes led to a series of modifications that fundamentally changed the original conception for expanding science in the east of the country. Second, one cannot from today's perspective view the experiment of the Siberian Division as unconditionally successful—had it been so, the Division would not be facing the multitude of serious problems that have, since the beginning of the 1990s, cast doubt on its future existence. In fact, Akademgorodok veterans recall that several of these problems were predicted by foreign scholars who visited the Novosibirsk center three decades ago. Finally, the opportunities the center provided for increasing the efficiency of the scientific complex in the region as a whole were not used effectively.

This paper will analyze the formation and subsequent development of the Academy's Siberian complex, with a principal focus on Akademgorodok. The core of the Siberian Division and at one time the object of special pride in the Soviet Union, Akademgorodok now presents the Russian government with a major headache. This study has three aims: to explain the imperatives of building a scientific complex in Siberia that led to its rapid success in the late 1950s and 1960s; to show how and why the complex deviated from its initial strategy of development; and to reveal the historical roots of its contemporary crisis. The study will use the structural development of Academy institutions of the Division and the dynamics of personnel policy in these institutions as the basic parameters for evaluating the state of science in the region.

II. Background: Branches of the USSR Academy of Sciences in Siberia

In order to evaluate the scale of changes that occurred in the Academy of Sciences in connection with the establishment of the Siberian complex, it is necessary to examine the state of Academy institutions in the region before and after its creation. Even before the second half of the 1950s, when the Division was created, Siberia was far from a scientific "virgin soil," as is sometimes claimed. The idea of enhancing the potential of the Academy of Sciences in the eastern territories of Russia had arisen in the pre-war period, but its fulfillment was fraught with economic, financial, organizational, and even political difficulties.[3] Nevertheless, by the mid-1950s academic scientific institutions were held together by a stable structure that united three separate branches (*filialy*) of the USSR Academy of Sciences.

The western Siberian branch was the largest of the three branches. Created in 1944, it consisted of four scientific research institutes by the mid-fifties (the Mineral-Geological, Transport and Energy, Chemical-Metallurgical, and Medical-Biological institutes) and employed over 220 researchers, including more than 100 doctors and candidates of the sciences.[4] A scientific research base of the Academy that began operating in Iakutia in 1947 was two years later reorganized into the Iakutsk Branch. By the mid-1950s, this branch included two institutes (the Institute of Biology and Language and the

3. See E.T. Artemov and E.G. Vodichev, "The Expansion of Science in Siberia: The Political Aspect," in *Actual Problems of the History of Soviet Siberia*, 202–20.

4. Scientific Archives of the Siberian Division of the Russian Academy of Sciences (Russian acronym, NASO), fund 1, inventory 1, file 1, file 905, 9.

Institute of Literature and History), two departments, and three laboratories, and employed approximately 100 researchers, almost half of whom had doctorates or candidate of the sciences degrees.[5]

Proceeding chronologically, the eastern Siberian branch of the Academy, uniting scholars from the Irkutsk and Chitinsk *oblasti* as well as the Buriat-Mongol Republic, was organized in the city of Irkutsk in February 1949. By the mid-1950s, this branch comprised the Institute of Geology, the Institute of Energy and Chemistry, the Baikal Limnological Station, plus two departments, and employed more than 100 researchers, including almost 60 doctors and candidates of the sciences.[6]

Together with other scientific research institutions (SRIs) in the region, the eastern branches of the USSR Academy of Sciences were staffed by the region's most highly qualified researchers. Two-thirds of all doctors and one-third of all candidates of the sciences who worked in scientific establishments in Siberia worked in these SRIs. In eastern Siberia, where research institutions dedicated to specific disciplines were less well represented, researchers with doctorates and candidate of the sciences degrees were concentrated to an even greater degree in SRIs. In the Academy's Iakutiia branch, for example, which included institutes as well as other research facilities, all researchers in the region without exception who possessed doctorates and more than four-fifths of those who possessed candidate of the sciences degrees worked in the branch's institutes and other establishments. Even in Novosibirsk, where many more opportunities for relevant employment existed for scholars, work in research institutions was nevertheless considered more prestigious and over 80 percent of all doctors and more than one-half of all candidates of the sciences in the area were concentrated in such organizations.

Clearly then, Siberia possessed concentrated scientific potential. By the end of the 1950s, however, it became obvious that the institutions of the Academy of Sciences in eastern Russia lacked the fashionable "big science" image enjoyed by the Academy as a whole at that time and was considered "peripheral." There were several reasons for this state of affairs. First, very few permanent Academy institutions existed in Siberia. As Table 1 shows (see next page), SRIs based in Siberia accounted for only about 8 percent of all such Academy institutions.

The slightly higher figures for eastern Siberia are explained by the presence of a number of Academy science stations in the region (geocriological, climatological, and others) that studied aspects of nature and climate unique to the region. Research institutes (as opposed to research institutions), which already defined the structure of the Academy network—in 1956 they accounted for more than 47 percent of all Academy research establishments[7]—were represented equally in western and eastern Siberia, each region possessing four.

A second reason for the peripheral status of Siberian science in the mid-1950s was due to

5. Scientific Archives of the Iakutsk Branch of the Siberian Division of the RAS (Russian acronym, NAIaF), fund 1, inventory 1, file 338, 69.

6. Scientific Archives of the Eastern Siberian Branch of the Siberian Division of the RAS (Russian acronym, NAVSF), fund 1, inventory 1, file 17, 8.

7. This figure was calculated on the basis of data from the Russian State Archive of the Economy (Russian acronym, RGAE) fund 1562, inventory 17, file 2871, 10–11.

Table 1. Proportion of Scientific Research Institutions (SRIs) of the USSR Academy of Sciences located in Siberia, in percents.

	1956		1961		1966	
	SRIs*	RIs**	SRIs	RIs	SRIs	RIs
Region						
Western Siberia	3.24	4.6	8.30	12.06	11.40	14.18
Eastern Siberia	4.86	4.6	6.64	8.51	10.36	13.22
Siberia as a Whole	8.11	9.2	14.94	20.57	21.76	28.10

* Scientific research institutions (*nauchno-issledovatel'skie uchrezhdeniia*)
** Scientific research institutes (*nauchno-issledovatel'skie instituty*)

Source: Russian State Archive of the Economy (Russian acronym, RGAE), fund 1562, inventory 17, file 2871, 10–11; ibid., inventory 337, file 2574, 38–46; ibid., inventory 44, file 2954, 143 and 147–53.

inefficient management and coordination of the research activities of Academy institutions in Siberia. The lack of necessary cooperation between the eastern divisions of the Academy and their parent institutes in Moscow was obvious to both Siberian institute heads and the Presidium of the USSR Academy of Sciences. Prior to 1955, the activities of various branches of the Academy were coordinated by a special administrative body, the Council of Branches, headed in its last years by Academician I.P. Bardin, who was well acquainted with the details of developing science in peripheral regions of the country. In 1955, however, the Council of Branches was abolished, and responsibility for coordinating the research institutions (SRIs) of the Academy was transferred to the relevant disciplinary divisions of the central apparatus of the Academy itself.[8] This appears to have had a negative impact on the institutions of the different divisions, which were often overlooked by department heads at the center.

A third reason for the inferior status of science in Siberia was the virtual absence of horizontal management links among regional research institutions. Direct contacts between local Academy institutes were extremely weak and such irregular communication diminished their opportunities to cooperate in resolving fundamental questions of science, which, incidentally, rarely figured in their work.

The considerable difference in the typical scientific specialization of the Academy's Siberian branches and that of its central SRIs constituted a fourth reason for the peripheral status of Siberian science. This difference in specializations was largely due to the fact that the Siberian branches were, from the very first, oriented towards the needs of local industry, an orientation that led to a significant degree of regional specialization and a high proportion of applied research in their work.

The fields of specialization of the individual Siberian branches were distinct. The western Siberian branch focused on the study of western Siberia in depth, including the development of new methods for mineral extraction, creation of new technologies for refining raw materials found in the region, implementation of regional energy and transport systems, and resolution of specialized technical problems. The eastern Siberian

8. A.V. Kol'tsov, *The Role of the Academy of Sciences in the Organization of Regional Scientific Centers of the USSR, 1917–1961* (Leningrad: 1988), 228.

branch specialized in the study of the region's natural and energy resources—their distribution and use in the national Soviet economy—as well as the development of technologies for refining local mineral ores. In Iakutiia, scholars primarily investigated problems of geology, including deposit formations of useful minerals located in the region, as well as the ecology, history, and culture of northeastern Siberia. Due to the requirement of developing agriculture and forestry, all three branches devoted considerable attention to questions of biology.[9]

The three branches also differed structurally. By the mid-1950s, research institutes already dominated the structure of the western Siberian branch, whereas laboratories, departments, and scientific stations played a major role in the eastern Siberian and, especially, the Iakutiian branches. On the whole, the branches represented integrated scientific institutions composed of different kinds of research bodies: institutes, departments, sectors, laboratories, and auxiliary subdivisions. The presidiums of the three branches were responsible not only for administrative, but also scientific and methodological management of their subordinate institutions. This management structure facilitated a service orientation towards the needs of region-specific industries on the part of subdivisions that were later added to the divisions.

Aside from the branches, two other Academy institutions existed in the region by the time the Siberian Division was created in 1957: the northeast division of the V.A. Obrucheva Institute for the Study of Permafrost in Iakutsk and the Institute of Physics in Krasnoiarsk. In 1957, however, neither institute had gone beyond the organizational planning stage.

Academy branches in Siberia performed highly specific functions which differed from those of academic institutes in the center of the country. Unlike the latter, their mandate was not so much fundamental research as applied research with a regional orientation. Broadly speaking, the branches were supposed to compensate for the limitations placed on scientific development by a system of research institutions dedicated to specific disciplines. In view of the functions and character of their tasks, however, the differences between branch research institutions and large, discipline-specific institutes were to a great extent nominal—this lack of differentiation was the basic feature of the branch structure of the Academy of Sciences in eastern Russia.

During the 1950s, the Siberian branches did not stagnate, but developed quite rapidly. Even at their peak, however, no more than 3.5 percent of all Academy researchers worked in the eastern branches (including the branch located in the Russian Far East).[10] At the same time, the branches' potential was underexploited due to their underdeveloped material and technical base. Appropriations per person, for example, were several times less in the country's eastern branches than in the Academy's central institutes.[11] To a great extent, the inequality in budget

9. E.T. Artemov, *The Formation and Development of the Network of Scientific Institutions of the AS USSR* [Academy of Sciences of the USSR] *in Siberia, 1944–1980s* (Novosibirsk: Nauka, 1990), 23–54.

10. E.G. Vodichev, *The Formation and Development of International Contacts of Academic Science in Siberia* (Novosibirsk: 1990), 53.

11. E.T. Artemov, *Formation and Development of the Network*, 52.

appropriations reflected the center's policy with regard to its peripheral institutions and placed the future of the latter in doubt.

Until the end of the 1950s, then, the development of Academy institutions in the eastern USSR followed an evolutionary path in which the industrializing logic of organizing science by region was preserved. Although the Siberian branches had been created precisely according to this organizational concept, possibilities for their further development were practically exhausted by the late fifties. The eastern branches faced the prospect of rapidly being transformed into centers of applied scientific research and development (*tsentry nauchno-issledovatel'skikh i opytno-konstruktorskikh rabot*, or *NIKOR*) oriented almost exclusively towards serving regional requirements.

This situation posed a serious threat to the future of fundamental scientific research in Siberia, the quantity of which was already severely limited. The threat was all the more real because the branches did not possess the means to increase their own scientific potential, as they lacked the materials, finances, and even manpower for such a task. Individual territories and economic enterprises in these territories could be counted on to allocate resources from their budgets only if the branches' service orientation towards their needs was strengthened even further. This danger was confirmed several years later, when, due to the 1961 reorganization of the Academy of Sciences, the RSFSR Council of Ministers took over the management of the branches. Fortunately, the Siberian branches were already subordinate to the Siberian Division at the time and were not included in the takeover.[12]

Most important, perhaps, the personnel profile of Academy research institutions in the region during the 1950s fully reflected the branches' mission to provide scientific support for Siberian regional development. This personnel profile, seen in the educational specializations of the branches' scientific cadres, differed from corresponding indicators for the Academy of Sciences as a whole.

As Table 2 shows, specialists in the fields of life and earth sciences in 1956 accounted for over 60 percent of all doctors and candidates of the sciences working in Academy research institutions in the eastern territories. Typical of branch institutions, the life and earth sciences orientation would present a serious obstacle to reorienting Siberian science towards new problems in science and the economy related to scientific and technical progress. The extraordinarily low proportion (less than 1 percent) of specialists (*spetsialisty*) with advanced educations in physics and mathematics was particularly revealing; researchers (*nauchnye sotrudniki*) with this background were equally scarce among employees of the Siberian branches.[13] Practical experience, meanwhile, showed that only workers with backgrounds in physics and mathematics were capable of integrating specialists from various scientific disciplines to conduct complex, interdisciplinary research.

12. A.V. Kol'tsov, *The Role of the Academy*, 249–50.

13. V.A. Lamin, "The Sources and Forms of Building Up the Personnel of the Scientific Institutions of the Siberian Division of the AS USSR," in *Historical Aspects of Siberia's Economic, Cultural, and Social Development* (Novosibirsk: 1978), 260.

Table 2. Specialization of senior Siberian Division personnel, expressed as a percentage of all Academy personnel with identical specializations.

Years*	1956	1961	1966	1971
Specialization				
Physics/Mathematics	0.73	17.38	25.50	29.73
Technical sciences	15.13	22.59	14.32	15.39
Chemical sciences	12.40	13.71	13.29	11.56
Life sciences**	36.35	20.57	18.59	17.67
Earth sciences***	25.35	17.74	19.53	16.20
Social sciences	10.06	7.21	8.18	8.66
Other	0.00	0.84	0.58	0.79

* 1956 figures include specialists from the Far Eastern Branch of the USSR Academy of Sciences; the 1961 and 1966 figures include personnel from institutions transferred to the Far Eastern Scientific Center in 1970.

** Biology, agriculture, and medicine.

*** Geology, mineralogy, and geography.

Sources: Personnel Directorate of the Siberian Division of the Russian Academy of Sciences; and N.A. Kupershtokh, "The Development of Principles for Increasing the Staff Potential of Siberia's Academic Science in the Second Half of the 1950s," in *Science Personnel of Soviet Siberia: Problems of History*, 181.

The work of the branches gave rise to varied evaluations. According to Academician I.P. Bardin in 1957, "the [branch] organization of science has justified itself brilliantly in the provinces." [14] Certainly, it was fair to say that the branches were an improvement over what had preceded them. However, the chairman of the Western Siberian Branch Presidium, Professor T.F. Gorbachëv, held a decidedly negative view of future scientific development within the branch structure. Writing in the same edition of *News of the Eastern Branches of the AS USSR* dedicated to the twenty-fifth anniversary of the branches' existence, Gorbachëv unceremoniously concluded that the western Siberian branch met the requirements of the region's economy only "to a small degree."[15]

III. Choosing a Concept for the Regional Development of Science

By the second half of the 1950s, the time had clearly come to strengthen the Academy's presence in Siberia. (Given the political pronouncements of Communist Party congresses at the time, the issue was inevitable.) The 1956 annual meeting of the USSR Academy of Sciences paid a great deal of attention to the distribution of resources for conducting scientific research. In a more or less standard pronouncement, the Academy adopted a resolution concerning the necessity of guaranteeing the priority development of academic institutions in the east—increasing their staff levels, reviewing the branch structure and, using the branches as a foundation, creating

14. I.P. Bardin, "Twenty-five Years of Developing the Scientific Institutions of the Academy of Sciences of the USSR in the Provinces," *News of the Eastern Branches of the AS USSR*, no. 8 (1957): 23.

15. T.F. Gorbachëv, "The Western Siberian Branch of the AS USSR," *News of the Eastern Branches of the AS USSR*, no. 8 (1957): 65.

large scientific centers in the provinces.[16] The question was: To what extent was the Academy prepared and able to change the situation that had developed in the regions? The idea of creating large scientific centers appears to have been motivated by the politics of the day, as the formulation adopted in February 1956 contained no concrete proposals outlining a fundamentally new strategy for developing science in the country's outlying regions.

Any radical reform of the region's Academy structure would inevitably come up against the problem of cadres. Rapid growth in Academy science that relied solely on the resources of the eastern branches would be limited to a very narrow spectrum of scientific fields. Moreover, as a rule, these fields were not identified by scientific and technical progress as those holding the most promise for scientific progress. On the contrary, the number of scientific specialists in the Academy's eastern research institutions with advanced educations in mathematics, physics, chemistry, and the technical sciences was insufficient to guarantee the development of these fields without outside help. It was equally naive to expect to solve a problem of this magnitude by attracting specialists from those institutions of higher education (*vysshie ochobnye zavedeniia*, or *VUZy*) and discipline-specific research institutions located in the region.

Looking ahead, we can affirm that a significant crossover of personnel from these institutions did, in fact, occur after the Siberian Division was created. In the majority of cases, however, this influx was not the deciding factor in creating new directions in scientific research within the Academy. Existing exceptions—the Institute of Physics in Krasnoiarsk was created almost entirely on the foundation of a local pedagogical institute, for example—only confirmed the general rule. In the end, the only solution was to bring in specialists from outside the region, a solution that required something more than substantial effort and financial means. As experience showed, high salaries alone could not entice specialists from European Russia to Siberia. Both the eastern Siberian and Iakutsk branches had ample negative experience in this area by the end of the 1950s.

Attempts to transfer entire scientific institutions to the region from the center of the country met with a similar lack of success since the majority of researchers, particularly the most highly qualified, preferred to change their place of employment rather than move east. The problem of radically strengthening Academy cadres in Siberia would be solved only by a serious, comprehensive approach. An article entitled "Urgent Tasks of the Organization of Scientific Work," published in *Pravda* in February 1956 by the well-known scholars S.A. Khristianovich, M.A. Lavrent'ev, and S.A. Lebedev, laid the groundwork for subsequent action. The article, which attracted a great deal of attention, noted that the country's primary scientific capacity was concentrated in a few centers that were isolated from the industrial base; what was needed was a radical redistribution of scientific institutions around the country. The article did not, however, go so far as to outline concrete proposals for such a redistribution.[17]

16. *Bulletin of the AS USSR*, no. 2 (1956): 7.

17. S.A. Khristianovich, M.A. Lavrent'ev, and S.A. Lebedev, "Nazrevshie zadachi organizatsii nauchnoi raboty," *Pravda*, 14 February 1956.

These issues received much greater attention at a Scholars' Assembly in Novosibirsk two months later that was attended by leaders and officials of the Ural, Far Eastern, and three Siberian branches of the USSR Academy of Sciences. A delegation from Moscow headed by Academy President Academician A.N. Nesmeianov and including Academicians I.P. Bardin, M.M. Dubinin, V.S. Nemchinov, and V.A. Engel'gardt also attended. At this assembly, Academy leaders formulated plans to reform its eastern branches. Their central aim was to strengthen the specialization of the branches and to increase their efficiency by eliminating duplication (this idea was particularly popular among Soviet science administrators at the end of the 1950s). The Academy leadership also proposed that in the future, the branches should channel all resources allocated to them into developing the most promising directions in scientific research. The Academy's scientific capacity in the east would be consolidated by transferring individual scientific institutes and laboratories to Siberia, including the Institute for the Study of Permafrost, the laboratory of the Institute of Energy, and the Institute of Oil. Despite certain objections, the plan won general acceptance and became the strategic premise for the future development of Academy potential.[18]

On the whole, the strategy did not fundamentally alter the previous, evolutionary path of development that the eastern academic institutions had followed until that time. Effective implementation of this strategy, moreover, was highly doubtful. The elaboration of such a strategy cannot be explained simply by the Academy leadership's poor understanding of its palliative effect; some researchers have plausibly suggested that strategies for developing science, including that in the east, were the result of a struggle for spheres of influence among various groups in the Academy leadership.[19] (What was a strategy for the eastern branches, for example, was only a tactical move for the Presidium of the Academy of Sciences.)

Political battles accounted for the vicissitudes in the debate over the role of applied research and development in the Academy's work that ultimately led to its reorganization in 1961 and 1963, together with corresponding changes in its leadership. A similar situation had occurred five years previously. At that time, a radical shift in the development of the eastern branches would have required sending substantial additional financing to the eastern regions. Academy policymakers, however, were then planning the construction of a biological center at Pushchino and were clearly disinterested in redistributing funds to create a solid scientific base for the Academy in the east.[20]

In the end, reality exceeded the wildest dreams of those who advocated strengthening the Academy's presence in the east. The scenario realized in practice was not, however, based on the branch structure, but on a new scientific-organizational concept embodied in the one of the world's largest scientific research centers.

18. See "At the Assembly in Novosibirsk," *Bulletin of the AS USSR*, no. 6 (1956): 29, 31, 32, 72.

19. Stephen Fortescue, *The Academy Reorganized: The R&D Role of the Soviet Academy of Sciences since 1961* (Canberra: Department of Political Science, Australian National University, 1983), 7–20.

20. E.T. Artemov, *Formation and Development of the Network*, 69.

Several circumstances allowed this conception of the Siberian Division to be realized. In the first place, Academicians Lavrent'ev and Khristianovich promoted the idea of creating a powerful scientific center in Siberia unlike any other in the country in terms of its scale and principles of scientific organization. This idea responded to the demands of scientific and technical progress to a far greater degree than had decisions previously adopted on the matter, as current trends in scientific and technical development suggested that institutions specializing in a variety of scientific disciplines be united under one roof—linked not only by spacial proximity, but a single administrative structure and communications system. Given the tremendous sluggishness of the Soviet scientific system, it was much simpler to realize this idea in regions such as Siberia—especially western Siberia—which, although they had not been spoiled by the attention of "big science," nevertheless possessed an infrastructure that could serve the subsequent stage of national scientific development.

Second, plans to organize a powerful scientific center would have been unlikely to succeed without a declared policy giving priority to the economic development of the USSR's eastern regions. New industries would require scientific support and the scale of plans to transform Siberia and the Far East, together with the shift in the economy towards scientific-industrial production, made it relatively easy to promote the idea that science had to be organized in an entirely new way as well. A radical reorganization of science now had much greater chances for success.

A third circumstance favoring the creation of the Siberian Division was the decision to reorganize the administration of industry and construction in the Soviet Union along territorial lines. The *sovnarkhozy* reforms of Khrushchev aimed to transfer operative management of the economy from the center to the provinces, and the idea of creating a regional scientific center far from Moscow corresponded well with the trend towards decentralization. Certain foreign experts have thus claimed that the creation of the Siberian Division should be considered one of the most interesting steps to decentralize the economy adopted in the spirit of the Twentieth Congress of the CPSU.[21] As far as one can judge, during the preceding period, both the creation and the development of the Academy's Siberian branches had been seriously hampered by political considerations, namely, the fear of increasing the power of local authorities.

Fourth, as noted above, those who initiated the creation of the Siberian Division had their own personal ambitions and were close to the leader of the country. Judging both by his past work and subsequent leadership of the Siberian center, Academician Lavrent'ev clearly did not belong to the circle of scholars who advocated an exclusively fundamental research orientation for the Academy, as did Academy President Academician Nesmeianov. Lavrent'ev was an open supporter of pragmatism in science and believed that the work conducted by Academy institutes should result in maximum practical returns. It was this attitude that enabled him, together with I.V. Kurchatov, to join Khrushchev's

21. Violette Conolly, *Beyond the Urals: Economic Development in Soviet Asia* (London and New York: 1990), 371–2.

informal group of science advisors.[22] Lavrent'ev's position and the green light given to the Siberian Division anticipated a factional struggle within the Academy which resulted in Nesmeianov's rapid resignation.

Finally, there were strategic considerations for creating a large-scale scientific center in the eastern USSR. Since the pre-war years there had been an intensive build-up of military-industrial capacity in Siberia. This rapid development of military technology in the east, noted for its considerable achievements in science, also required adequate scientific support. On the strength of this requirement, the Siberian Division became inextricably linked by "bonds of friendship" to the military-industrial complex.[23] (Lavrent'ev had always been known for his closeness to military-industrial circles, as had Academician M.V. Keldysh, who replaced Nesmeianov as President of the Academy of Sciences in 1961.) The analysis of Western experts also pointed to continual growth in the presence of the defense sector in the Academy throughout the post-war years, as indicated by the lack of information about the workplaces and activities of scholars newly elected to its ranks.[24]

It was possible to implement the scheme to create a scientific center in the east because many Soviet scholars were looking for an opportunity to put their scientific ideas into practice, improve their living and working conditions, and achieve success and rapid promotion in the scientific world. These goals were not easy to achieve in the central institutes of the Academy, which were overstaffed and lacked the flexibility to adapt themselves to new directions in research. Scholars' hopes for the Siberian center proved, for the most part, well-founded. Foreign researchers who visited Akademgorodok in the 1960s repeatedly emphasized not only the good working and living conditions of Siberian Division scholars, but also their intellectual and financial wealth and freedom of thought and discussion.[25]

In this atmosphere of general enthusiasm, two popular theses—the conquest of science and the conquest of Siberia—merged to create the Siberian Division. Plans for the proposed center were presented at the General Assembly of the Academy of Sciences as well as published in the press. Although reactions to the idea of the center demonstrated that a majority of future Division officials were driven by motives that did not always coincide with the grand strategy of its initiators, the magnitude of support for the initiative confirmed its timeliness.

IV. Realization of the Concept: Initial Results

Upon completion of the necessary preparatory work, the USSR Council of Ministers adopted a resolution on 18 May 1957 entitled "On the Creation of the Siberian Division of the Academy of Sciences of the USSR."[26] Novosibirsk or,

22. Stephen Fortescue, *Science Policy in the Soviet Union* (London and New York: 1990), 21.
23. A. Perry, *Russian Scientists from Mendeleyev and Pavlov to the Brilliant Scientists and Technologies of Today's USSR* (New York and London: 1973), 157.
24. See Fortescue, *Science Policy*, 46–7; and *USSR Academy of Sciences, Siberian Division: Staff* (Novosibirsk: 1982).
25. Conolly, *Beyond the Urals*, 384.
26. *Decisions of the Party and Government on Economic Questions*, vol. 4, 347–9.

more precisely, Akademgorodok—to be located about twenty-five kilometers from the former—became the center of the Division and home to its supervisory bodies. The new center faced the task of developing theoretical and experimental research in the fields of applied physics, the natural sciences, and economics, as well as facilitating the successful development of industry in Siberia and the Far East.[27] The Siberian Division took control of all scientific institutions of the Academy of Sciences located in Siberia and the Far East at the time. Simultaneously, a considerable number of new scientific research institutes were planned. In accordance with the recommendations of the Academy's Presidium, the Division's first ten institutes were expediently organized: those of hydrodynamics, theoretical and applied mechanics, mathematics (this institute included a computer center), robotics, geology and geophysics, thermal physics, physics, cytology and genetics, experimental biology and medicine, and, finally, economics and statistics. It was decided to create the Institute of Chemical Kinetics and Combustion and the Institute of Inorganic Chemistry later that same year and, the following year, the Institute of Organic Chemistry and the Institute of Catalysis.[28] The names and profiles of several of these institutes were subsequently changed. Together with the Novosibirsk center, a number of new institutes were also organized in Irkutsk, including those of geochemistry, geography, and organic chemistry.[29]

The quantitative growth of Academy institutes was, of course, not the only, or even the most important, development in Siberian Academy science. The creation of the Siberian Division fundamentally changed the system of organizing and managing scientific research in the Academy as a whole—the division was the first to be organized along territorial lines and its presidium was granted wide authority to manage the complex of Academy institutes in the region. This authority made it possible to conduct interdisciplinary research and coordinate the potential of individual Academy institutions and their staffs in accordance with overall program goals. The territorial proximity of the various research institutes, their unified administrative and informational links, and their common developmental goals ensured such an approach, laying the foundation for a regional system of coordinating research.

Although it took several years to establish the Division, the majority of new institutes were able to begin working by the early 1960s. At its closing session in 1961, the Presidium of the Academy of Sciences in Novosibirsk concluded that the formation of scientific centers in Novosibirsk and Irkutsk had been more or less completed.[30] As a result of the Division's creation, the network of Academy institutions in Siberia changed radically. By 1 January 1961, Siberia's share of total Academy research institutions (SRIs) had doubled and its share of institutes had almost tripled, accounting for 15 percent and 20.5 percent of all such establishments, respectively (see Table 1). Data on

27. Ibid.
28. *The Novosibirsk Scientific Center* (Novosibirsk, 1962): 12.
29. *Bulletin of the AS USSR*, no. 1 (1958): 120.
30. NASO, fund 10, inventory 3, file 182, 1.

Table 3. Growth in Academy research organizations, shown in percentages of 1956 figures.

	1961		1966	
	SRIs*	RIs**	SRIs	RIs
USSR Academy of Sciences	130.27	162.07	104.32	39.08
Academy organizations in Siberia	240.00	362.50	280.0	425.00

* *nauchno-issledovatel'skie uchrezdeniia*
** *nauchno-issledovatel'skie instituty*

Source: RGAE, fund 1562, inventory 17, file 2871, 10–11; inventory 337, file 2547, 38–46; inventory 44, file 2954, 143, 147–53.

the growth rates of these Academy subdivisions are cited in Table 3.

As Table 3 suggests, the Academy developed mainly by increasing the number of research institutes, a tendency that was particularly apparent in Siberia. However, the difference between growth in Academy research organizations overall and growth in Academy institutes in Siberia was even more marked. The creation of the Siberian Division led to a qualitative leap in this area—development rates for its network of institutes was several times greater than the average rate for the Academy as a whole. Average Academy growth figures, moreover, were themselves largely determined by the creation of new research institutions in the east. Over the five year period 1961–66, total Academy research institutions and institutes—excluding those of the Siberian and Far Eastern subdivisions—grew by 108 percent and 125 percent, respectively.[31]

Certain changes also occurred in the territorial distribution of academic facilities in individual *kraiia*, *olbasti*, and autonomous republics of Siberia (see Table 4, following page). At the beginning of the 1960s, western and eastern Siberia changed places in terms of concentration of Academy institutions. As a consequence of the Siberian Division's early emphasis on developing the Novosibirsk group of institutes, more than one-half of all Academy research organizations in Siberia were now located in the western Siberian economic region. Absolutely all western Siberian institutes were situated in Novosibirsk or, to be more exact, were divided between Novosibirsk and rapidly growing Akademgorodok. The picture in eastern Siberia was different. Irkutsk, where the eastern Siberian branch, now part of the Siberian Division, continued to operate (the western Siberian branch was eliminated in 1959), remained the focal point for research institutions in the east, uniting over one-quarter of all such establishments within the Siberian Division. The remaining one-quarter of Division institutes and other organizations was distributed among Krasnoiarsk, Iakutsk, Chita, and Ulan-Ude, with comprehensive scientific research institutes operating in the latter two. Although the absolute number of institutions located in Iakutsk was not reduced, its share of total Siberian Division institutions dropped significantly. The Iakutsk branch of the Academy also continued to exist, becoming an

31. Calculated on the basis of data from RGAE, fund 1562, inventory 17, file 2871, 10; and ibid., inventory 337, file 2574, 38.

Table 4. Territorial distribution of Academy research institutions in Siberia, as a percentage of total SRIs.

	1956	1961	1966	1971
Region				
Novosibirsk *oblast'*	40.0	55.3	52.38	54.6
Tomsk *oblast'*	—	—	—	4.5
*Western Siberia**	40.0	55.3	52.38	59.1
Krasnoiarsk *krai*	—	5.3	4.76	4.5
Irkutsk *oblast'*	26.67	23.7	21.43	18.2
Chitinsk *oblast'*	—	2.6	—	—
Buriat ASSR	—	2.6	2.38	4.5
Iakut ASSR	33.33	10.5	19.05	13.7
*Eastern Siberia**	60.00	44.7	47.62	40.9

* Academy research institutions existed only in the administrative categories of western and eastern Siberia.

Source: E.T. Artemov, *The Formation and Development of the Network of AS USSR Scientific Institutions in Siberia, 1944–1980* (Novosibirsk, 1990): 155; RGAE, fund 1562, inventory 17, file 2871, 10–11; ibid., inventory 337, file 2574, 38–46; and ibid., inventory 44, file 2954, 143, 147–53.

integral part of the Siberian Division.

V. Prospects for Developing the Scientific Complex: Changes in Long-Term Strategy

The main principles for developing the network of academic institutions in Siberia were established at the General Assemblies of the Siberian Division during the years 1958–59, when it was agreed that a comprehensive approach should guide the organization of scientific research. New scientific institutions in the region would be created only on the basis of their compatibility and complementarity, as well as their suitability for promoting the development of the entire center. This thesis was widely publicized and began to be perceived as the principal strategy for developing Academy science in the future. The leaders of the Siberian Division constantly cited the thesis when interpreting the creation of the Division, especially when speaking with foreign scholars and correspondents. As a result, by the end of the 1950s some of the latter discerned in Irkutsk an exact copy of the Novosibirsk center, only on a smaller scale.[32] Because the Siberian Division was initially geared towards research in priority fields of science, it was deemed necessary to create new research institutions exclusively devoted to important trends in modern science that had been insufficiently developed in other scientific centers and sectors of science.

The conception of the Siberian Division was also initially based on a careful study of personnel trends in science. Academician Lavrent'ev and his closest associates clearly understood that the success of their organizational plans, as well as the life expectancy of the new center, depended to a great extent on who could be persuaded to work in the new institutes and how such research collectives could be expanded in the future. According to Lavrent'ev, the personnel problem

32. Salisbury, *To Moscow and Beyond*, 188.

concerned those "who, in the end, will decide our success in science."[33]

In this author's opinion, the organizers managed to rely on three categories of scholars when creating the division, a strategy that to a large degree determined the success of the entire scheme. The first of these categories was a group of authoritative researchers—members of the USSR Academy of Sciences, for the most part—who were dissatisfied with the state of scientific research in the country and with the position of the Academy of Sciences in the organization of science as a whole. As mentioned earlier, a fairly open struggle was taking place in the late 1950s and early 1960s between supporters of "pure," or fundamental, research and those who believed the Academy should seek to resolve problems not only of fundamental, but also of applied science. The Academy leadership, in the person of its president, Aleksander Nesmeianov, inclined toward the first argument, prompting the opposing side to search for alternative solutions in order to secure the Academy's place of pride in the national system of science, a position that, with its preference for fundamental research, the Academy was in danger of losing.

It seems that the initiators of the Siberian center, Academicians Lavrent'ev and Khristianovich, together with such supporters of the center as Academician Kurchatov, corresponding Academy member A.A. Trofimykh, and others, belonged precisely to this first group. The personal ambitions of these authoritative scholars and leaders of science, who sought to strengthen their positions in Soviet science by means of the Siberian center, should not be dismissed.

The second group of scholars that became a fulcrum of the Siberian Division consisted of prominent researchers who led their own scientific "schools"or had made significant progress in developing promising avenues of scientific research, but had been unable, for reasons noted earlier, to realize their ideas in scientific institutes located at the country's center. By virtue of their scientific achievements, many of these researchers should have been entitled to become elected members of the Academy. They were liable to wait in line for membership for a long time, however, and even then, there was no guarantee they would be elected. Such people were prepared to change their residence and place of employment, provided they were given broad opportunities to pursue their research, continue their careers, and rise in the organizational hierarchy. This group of researchers included a fairly wide circle of people who later formed the leading core of the Siberian Division's institutes.

The third and final group of scholars to form the foundation of Siberian Division personnel were young researchers who were students and followers of the first two groups. They, too, were concerned with acquiring sufficient creative opportunities to realize their own scientific ideas. Transferring to the newly created institutes opened up the possiblity of rapidly advancing in their careers, an impossibility within traditional scientific structures at the country's center. The initiators (and subsequent leaders) of the Siberian Division overcame this problem of rapid career advancement by obtaining a number of benefits for researchers at Division institutes, for example, the right to occupy the

33. *Beyond Science in Siberia*, 30 January 1961.

post of senior researcher (*starshii sotrudnik*) without having to undergo a competition or completing a minimum period of practical work.[34]

As subsequently became clear, two other factors played a part in resolving the personnel problem of the new academic institutes: the Academy's right to priority selection of *VUZ* graduates and the right of scholars who transferred to Siberia to secure apartments in their previous places of residence, including Moscow and Leningrad. Also significant was that transfer to the Siberian Division implied support for an idea considered of prime importance to the state and therefore associated with social prestige.

In this manner, everyone got what they wanted. The first group secured key leadership positions in Soviet science; the second, prospects for rapidly advancing in their careers; and the third, excellent living and working conditions. As a result, plans to create the Siberian Division were supported by several social strata of scholars and the scientific center itself had good chances of succeeding.

Immediately after Academicians Lavrent'ev and Khristianovich promulgated the idea of creating a large center in Siberia, the idea was publicly supported by such authoritative scholars as Academicians A.A. Artsimovich, P.L. Kapitsa, N.N. Semënov, S.L. Sobolev, I.V. Kurchatov, and others.[35] All of these scholars declared themselves ready to help realize the center in any way possible. The Division's right to elect its own members of the Academy, that is, to elect members to the *Siberian Division* of the Academy of Sciences, proved exceptionally important to its fate. Only those scholars who expressed a wish to transfer to the newly created Academy institutes in Siberia and the Far East were permitted to stand for these elections. During the Division's first elections, which took place on 28 May 1958, eight academicians and twenty-seven corresponding members of the USSR Academy of Sciences were elected to the Siberian Division, including such well-known scholars as I.N. Vekua, P. Ia. Kochina, A.I. Malt'sev, Iu. N. Rabotnov, V.S. Sobolev, A.A. Trofimukh, A.L. Ianshin, G.K. Boreskov, G.I. Budker, V.V. Voevodskii, and Iu.A. Kosygin.[36]

These scholars took charge of bringing research collectives up to full strength in anticipation of their transfer to Siberia. This approach to the personnel problem, based on creating active groups of scholars headed by scientific leaders and united by a common objective, made it possible to complete the organizational stage of restructuring and begin concrete research in the shortest period of time possible. The presence of proficient groups of scholars capable of their own further self-development became the fundamental prerequisite for organizing Siberian Division research institutes. These groups principally took shape in some of the country's leading scientific centers—not only Academy institutions, but *VUZy* and discipline-specific research institutions as well. Thus, one of the most prominent institutes of the Siberian Division, the Institute of

34. NASO, fund 10, inventory 1, file 5, 58.

35. *Bulletin of the AS USSR*, no. 12 (1957): 3–14.

36. *Bulletin of the AS USSR*, no. 5 (1958): 45–7; and S.A. Krasil'nikov, "A Scientific Metric Analysis of the Personnel of the Siberian Division of the AS USSR," *Questions of History in the Natural Sciences and Technology*, no. 3 (1987): 25.

Nuclear Physics, grew out of the Institute of Atomic Energy's laboratory for new methods of acceleration headed by G.I. Budker. Researchers at the Institute of Chemical Physics of USSR Academy of Sciences, headed by Corresponding Academy Members V.V Voedvodskii and A.A. Koval'skii, formed the basis of the creative research collective of the Institute of Chemical Kinetics and Combustion. The Institute of Robotics and Electrometry likewise grew out of several laboratories at the L'vov Polytechnic Institute and the Institute of Machinery and Robotics of the Academy of Sciences of the Ukrainian Republic.[37]

The creation of research collectives by authoritative scholars made possible a second principle of Division institutes: creating institutes under the direction of a specific director. As subsequent practice confirmed, this principle proved highly effective.[38] At the same time, it should be stressed that this principle primarily characterized the institutes of the Novosibirsk center. In eastern Siberia, by contrast, it proved necessary to rely on the region's own strengths when building institute staffs.

From the very moment the Siberian Division became operational, its development strategy paid particular attention to assuring rational growth of the Division's individual scientific centers. Given the enormity of the tasks facing the Division, it seemed unrealistic to attempt simultaneous and equally rapid development of Academy centers in Novosibirsk, Irkutsk, Iakutsk, and other cities of Siberia and the Far East. Instead, a strategy for the consecutive establishment and development of Academy science in the region was advanced. As has been mentioned, the priority development of the Novosibirsk center had been the dominant thesis of the Division's development strategy since the end of the 1950s. Analysis of the development of the Division's research institutions along territorial lines demonstrates that this thesis was fully upheld.

Development of the Novosibirsk center was, however, only the first stage of the strategy. The strategy itself was substantially altered in the 1960s during preparation of the government resolution, "General Prospects for the Development of the National Economy of the USSR through 1980."[39] The general principles governing the development of the Siberian Division's network of research institutions remained unchanged, but quantitative criteria for their development were substantially increased. The creation of new scientific institutions now became tied to trends of utmost importance in both science and economic practice. Eighty-nine such trends were named for the Siberian Division; in contrast with the past, many more of these trends were of a regional nature. The experience of having successfully realized the idea of the Siberian center, the authors of which had invoked the greater practical returns to be provided by new Academy institutions (including their regional relevancy), made it logical to assume they would be tempted to use the regional line once again.

37. Artemov, *Formation and Development of the Network*, 83.

38. Mikhail Alekseevich Lavrent'ev, *Siberia Will Grow* (Moscow: Molodaia gvardiia, 1980), 24.

39. State Archives of the Russian Federation (Russian acronymn, GARF), fund 262, inventory 5, file 8999, 1–154.

According to the projections of the "General Prospects" resolution, the overall number of scientific institutions of the Division was to increase two and one-half times over the 1961 level; research institutions (SRIs) alone were slated to reach a total of 82. And, although 14 new institutes were to be created in Novosibirsk, the majority were to be opened outside of Novosibirsk. Almost half of these new establishments were to be created by decentralizing institutes already in existence. Other centers were allotted a share of 35 new institutes, reflecting a change of priorities in the geographic distribution of research institutions within the Division. As a result, roughly equal levels of scientific capacity were to be provided to the individual economic districts of the Siberian region.[40]

As noted earlier, the scientific orientation of the newly created SRIs had already changed substantially. Now, however, the majority of new institutes were called to support the development of the region's economic complex. Fundamental research was in no way forbidden, but was supposed to adhere closely to those avenues of inquiry that served economic needs. This imperative was reflected in the scientific orientations of the research institutes proposed for the region, almost a third of which were due to conduct research in the earth sciences. A considerable number were slated to undertake research and development in the interest of developing production, particularly in the machine-building and chemical industries.

The applied science orientation of Siberian Division activities was thus significantly strengthened in accordance with the "General Prospects" resolution. This orientation can be explained by several factors: in some measure, it was a sign of the times, which, as noted in Section I, demanded contemporary, practical results from science; in some measure, it was a tactical step in the battle for resources and the right to create new scientific institutions; and, finally, in some measure it was a reflection of the personal positions of scientific leaders at the beginning of the 1960s. Be that as it may, realization of this strategy, guaranteeing as it did an enormous quantitative growth in Academy science in Siberia, threatened to reduce the very "academic" nature of research of which the Academy was particularly proud.

The leaders of the Siberian Division understood that creating new institutes on the foundation of research collectives of central institutions was only the first step in resolving the cadres problem—the key to the new center. It was not incidental that the training of scientific personnel became one of the leading issues in Division policy during the 1960s, a focus that coincided with the general priorities of the Soviet state.[41] It was necessary to provide an effective mechanism for replenishing Division personnel with specialists of varying levels of qualification and, simultaneously, to create a system that would guarantee the scientific development of researchers at the new institutes. The system included

40. E.T. Artemov, *Formation and Development*, 101–3.

41. Due to a considerable deterioration in the quality of science as well as the quality of scientific-pedagogical personnel produced by the rapid extensive development of science in the 1960s, the Communist Party and the Soviet government adopted a series of resolutions aimed at correcting the situation in this field. See *The Communist Party of the USSR in Resolutions*, 8th ed., vol. 8 (Moscow: 1972): 163–7; vol. 9 (Moscow: 1972), 386–95.

both innovative and traditional elements. One innovation was the idea of establishing a university within the Siberian center that would be original in terms of its status, manner of selecting students, teaching staff, orientation, and qualification levels. Although founded only in 1959, the idea for such a university, albeit in the most general terms, had been promulgated by Academician Lavrent'ev as early as 1957.[42] I.N. Vekua, one of the country's most prominent mathematicians, became the university's first rector.[43]

The educational conception that had been tested earlier in the Moscow Physics-Technical Institute, of which Lavrent'ev was an initiator, was continued at Novosibirsk University. The idea of the "*fiztek*" (a school specializing in physics and the technical sciences) itself seems to have been engendered by attempts to close the gulf between science and education that had arisen in the USSR. The essence of the idea was to attract a broad range of scientific researchers to teach in the institute, a policy that was not, it must be noted, encouraged in the Soviet system of higher education. Students were guaranteed a thorough training in mathematics and the natural sciences, as well as experience working in laboratories on real scientific problems under the direction of active researchers; upon graduation, they were directed towards research work. The concept of the *fiztek* was, on the whole, very close to the organizational principles of the so-called "research university" in the United States that began to develop especially rapidly during the 1950s.

Novosibirsk State University (NGU) was from the very beginning planned as a "scientific" university and was joined to the Novosibirsk center both methodologically and organizationally. It was also linked to the center by means of concrete scholars—members of the Siberian Division of the Academy of Sciences—who simultaneously worked as researchers in Academy institutes and taught at the university. The university received the right to design individual study plans and programs and to use Division researchers (*sotrudniki*) in a double capacity as teachers. Such researchers accounted for 75 percent of all instructors and 90 percent of all doctors and candidates of sciences at the university by the mid-1960s. Close integration with the Siberian Division made it possible for NGU to use Academy institute laboratories for practical studies. On the whole, the successful organization of the university, certain aspects of which were extended to other institutions of higher learning in the region (e.g., the Novosibirsk Electrotechnical Institute and the Krasnoiarsk Branch of NGU), enabled the Siberian Division to effectively solve the problem of training cadres not only for the Novosibirsk center, but for the Division's peripheral centers as well.[44]

The problem of training highly qualified scientific workers was another aspect of Division personnel

42. Mikhail Alekseevich Lavrent'ev, *Science – Technical Progress – Personnel* (Novosibirsk: Nauka, 1980), 101.

43. *USSR Academy of Sciences, Siberian Division: Chronicle, 1957–1982* (Novosibirsk: Nauka, 1982), 33–4.

44. On the creation of Novsibirsk State University, see E.T. Artemov and S.A. Krasil'nikov, "Cooperation Between Academic Science and the VUZy of Siberia: The Experience of Creating a System of Personnel Training," in *The Social-Economic Development of Soviet Science: Historical Experience and the Present* (Novosibirsk: 1984), 268–73.

policy. Although considered a priority issue, the problem was resolved by traditional means. Two basic channels were used to prepare candidates of science: training through independent research, i.e., without interrupting a student's concrete, on-the-job research, and training through graduate education programs.[45] That the United Scholar Councils of the Siberian Division immediately obtained the right to hear the defense of dissertations for candidate and doctor of sciences degrees for the principal disciplines represented in the Division attested to the importance the Division assigned to the training of qualified scientific cadres.[46] In the mere five years between 1958 and 1962, 28 doctoral and 167 candidate of the sciences' dissertations were defended at the Novosibirsk center.[47] Altogether, a total of 1,584 candidates' dissertations were defended during the first decade of the Division's operation, almost half of which represented the work of Division graduate students. The Division's postgraduate program developed rapidly, increasing almost eightfold in size between 1958 and 1970. Graduate programs in physics and mathematics, together with those in the technical sciences, grew particularly intensively; by 1968, students in these programs accounted for one-third of all Division graduate students. According to available data, the rate of preparation of both candidates and doctors of the sciences in the Siberian Division was not inferior to those rates characteristic of Moscow and Leningrad.[48]

The intensive training of doctors and candidates of the sciences during the first half of the 1960s led to a change in the principal source of staff for Siberian Division research institutes. In 1963, specialists who had transferred to the Division accounted for 70 percent of all doctors and 55 percent of all candidates of the sciences employed there. Beginning in the mid-1960s, however, the Division was able to hire nearly all the highly qualified personnel it required from its own institutions. An analogous situation held for *VUZ* graduates.[49] Until the early 1970s, the system for training

45. In the Soviet education system, these approaches were respectively identified as *soiskatel'stvo* and *aspirantura*. Both programs of study culminated in the award of the *kandidat nauk*, or candidate of sciences, degree—roughly equivalent to the American Ph.D.—based on the defense of a written dissertation. In certain cases, generally in the hard sciences, a considerably shorter written report was submitted for defense. (Similarly, the *soiskatel'stvo* and the *doktorantura* led to the degree of *doktor nauk*, or doctor of sciences.)
The circumstances of study differed in the two programs. A *soiskatel'* was by definition an individual who held a full-time job and worked independently on his or her dissertation. He or she was registered with a university or a research institution, assigned a dissertation advisor (*nauchnyi rukovoditel'*), and given a four-year time period to complete a dissertation. Such students attended no classes but were required to pass a series of exams. An *aspirant* was a full-time graduate student on scholarship at a university or a research institution who was obligated to complete a specific program of graduate courses at an institution of higher education and to write a dissertation within a three-year time period.
In Novosibirsk, the *soiskatel'stvo* track allowed university graduates to work full-time in scientific institutions and use their research in these jobs as the basis of their dissertations. This conjunction of work and research was not the general rule for *soiskateli* outside of Novosibirsk.—Ed.

46. *Chronicle, 1957–1982*, 33.

47. *The Novosibirsk Scientific Center*, 205.

48. See N.A. Kupershtokh, "The Development of the Postgraduate Program of the Siberian Division of the AS USSR as a Form of Training of Scientific Personnel (1958–1980)," in *The Social-Historical Aspects of the Organization of Science in Siberia* (Novosibirsk: 1989), 115–24.

Siberian Division personnel was chiefly oriented towards meeting the requirements of the Academy. Given continued extensive development of Academy science in Siberia, practically all specialists who received candidate or doctor of the sciences degrees from the Division remained within the Academy institute structure; neither the *VUZy* nor discipline-specific sectors of science were able to rely on the Division to fulfill their needs for highly qualified personnel.[50]

The creation of the Siberian Division and the special attention it devoted to personnel led to an accelerated growth in Academy science personnel in Siberia, the scale and rates of which are indicated in Table 5. As the table demonstrates, the growth rate for scientific personnel in Siberia during the late 1950s and early 1960s was much greater than that for the Academy as a whole, although during the second half of the 1960s, the opposite tendency became true. The growth rate held for all categories of employees—scientific workers (*nauchnye rabotniki*), doctors of the sciences, and candidates of the sciences—for the group of institutes located throughout Siberia. (Despite the enormous difference between the growth rates of the Siberian Division and the Academy as a whole, the proportional increase in the number of employees by category was almost identical.) By the beginning of the 1970s, the actual number of scientific workers in Academy institutions in Siberia had increased by a quantity far greater than the norm. The creation of the Division and the swift build-up of its personnel also led to a radical alteration in the territorial distribution of Academy researchers (*sotrudniki*), as shown in Table 6 (see following page).

As Table 6 demonstrates, the proportion of scientific workers in Academy research institutions in Siberia had grown roughly fourfold by the beginning of the 1970s, reaching a level of approximately 16 percent of all such Academy workers. This growth had occurred entirely during the first half of the 1960s. The proportional growth in personnel lagged somewhat behind growth in Academy institutions in Siberia, suggesting that the institutes of the Siberian Division were, in terms of number of employees, inferior to those in the European part of the country. Nevertheless, these figures reflected a territorial redistribution of personnel capacity within the Academy. Its most powerful scientific complex had

Table 5. Growth in the number of scientific employees of USSR Academy of Sciences, in percentages of 1956 levels.

	1961			1966			1971		
	TSW*	DS**	CS***	TSW	DS	CS	TSW	DS	CS
Academy of Sciences as a whole	167.0	112.0	146.9	182.3	124.6	170.2	258.5	200.0	271.2
Academy Institutions in Siberia	587.9	434.8	334.9	980.4	887.0	676.0	1221.1	1065.2	1212.5

* Total scientific workers. ** Doctors of sciences. *** Candidates of sciences.

Source: RGAE SSSR, inventory 2871, 10–11; ibid., inventory 337, file 2574, 138-46; and ibid., inventory 44, file 2554, 134, 148–51.

49. E.T. Artemov, *Formation and Development of the Network*, 149–50.

50. N.A. Kupershtokh, "Development of the Postgraduate Program," 122.

Table 6. Territorial distribution of scientific workers of the USSR Academy of Sciences at year's end, expressed as a percentage of total Academy workers.

	1958	1965	1970
Region			
Moscow and Moscow *oblast'*	67.9	57.4	57.4
Leningrad and Leningrad *oblast'*	14.7	13.6	11.4
Siberia as a whole	4.4	16.55	15.7

Source: Personnel Directorate of the Russian Academy of Sciences.

arisen in Siberia and this center now exceeded the Leningrad group of institutes—until then the second most important in the country—in number of employees.

Although the Academy's Siberian institutions possessed highly qualified personnel, as the number of scientific workers grew rapidly during the 1960s, their average qualification level declined slightly. The decline, however, was characteristic of personnel in all sectors of science and did not affect the research institutions of the Siberian Division to the same degree that it affected the Academy of Sciences as a whole. By the early 1970s, qualification levels characteristic of the mid-1950s had once again been achieved. The only aspect in which the personnel composition of the Siberian Division continued to lag, albeit insignificantly, behind overall Academy parameters was in the proportion of its staff who were doctors of the sciences. At the same time, Siberian science gained something it had never before possessed in its history: a large number of Academicians and Corresponding Members of the USSR Academy of Sciences who worked in Siberian research institutes.

By the early 1970s, 22 full members and 46 Corresponding Members of the Academy were employed in the Siberian Division, accounting for approximately 10 percent of Academy members.[51] The share of Siberian Academy members not only formally acknowledged the authority of a significant group of scholars and the scientific schools they headed, it allowed Siberian science to influence the elaboration of policy in the Academy.

The concentration of researchers with higher educations also continued to increase in Academy institutes. Doctors of the sciences working as researchers in the Siberian Division accounted for almost 80 percent of all doctors of the sciences working in the region; candidates of sciences, for over one-half. These numbers indicate that Academy structures in Siberia had a more effective system of training doctors and candidates than did other scientific sectors; these structures were also far more attractive to potential employees, pulling in specialists from both beyond the region and from other scientific organizations.

Extremely vital changes also occurred in the personnel structure of Siberian Academy research institutions (see Table 2). By the early 1970s, almost every third candidate or doctor of the sciences in the Siberian Division had a background in physics and mathematics; together with candidates and doctors of the

51. V. Ia. Atavina and N.A. Kupershtokh, "The Dynamics of Scientific Personnel of the Siberian Division of the AS USSR (1957–1987)," in *The Great October Revolution and Socialist Reforms in Siberia*, sections IV, V, VI (Novosibirsk: 1987), 152.

technical sciences, they accounted for almost one-half of all personnel with higher educations working in the Division. The proportion of specialists in life and earth sciences, on the other hand, fell from almost two-thirds to just one-third of all employees. These trends reflected the orientation of new scientific schools and research collectives that had developed in Siberia following the decision to create the Siberian Division.

Thus by the early 1970s, the character of Academy personnel in Siberian institutions had changed radically—quantitatively and qualitatively, as well as in terms of their scientific orientations. Due to the creation of the powerful and highly qualified research collective of the Siberian Division, the complex of Academy institutions in Siberia became qualitatively more important within the overall Academy system, just as the Division's research institutions became more important within the regional structure of science. Because the Division's concentration of scientific cadres allowed it to resolve problems of fundamental and applied science at virtually any level of difficulty, the Division became the core of the region's network of scientific institutions.

Having seen that the Siberian Division successfully resolved its personnel problem, let us turn to its strategy of territorial development. To what extent were plans for a system of scientific centers in Siberia realized? As Table 3 shows, the network of Academy institutions in Siberia continued to develop at a fairly rapid rate in the 1960s. This development, however, was nowhere near as rapid as that which had been stipulated in "General Prospects" resolution. In fact, the number of scientific institutions in Siberia grew principally during the late 1950s and early 1960s, not later. Although the rate of increase appeared impressive during the first half of the 1960s—especially when compared with overall figures for the Academy, which experienced a dramatic decline at this time—the apparent increase in the Siberian Division in these years can be explained by the fact that the Academy as a whole lost a number of technical establishments and applied science research institutions when it was reorganized early in the decade. Not only did the reorganization cause the Academy to lose a significant number of institutes, just prior to the reorganization the Academy had temporarily lost all of its branches, with the exception of those that became part of the Siberian Division.[52] The Siberian Division lost far less in the reorganization—five research institutions altogether: the Transport and Energy Institute and the Institute of Experimental Biology and Medicine (in Novosibirsk), the Institute of Oil and Coal Chemicals Synthesis (in Angarsk, Irkutsk *oblast'*), and the Transbaikal Comprehensive Science Research Institute (in Chita), which were transferred to the jurisdiction of state committees and other departments for the relevant branches of industry.[53] Despite the loss of only five establishments, the number of scientific research institutions in the Division nevertheless dropped significantly in the first half of the 1960s, nearly reaching the level of the previous decade. At the same time, the number of institutions joining the Division grew substantially. Nevertheless, the growth rate of the

52. A.V. Kol'tsov, *The Role of the Academy of Sciences*, 250.

53. *Chronicle, 1957–1982*, 65.

Division remained far from that prescribed by the "General Prospects" resolution.

The second tenet of this strategic document also turned out to be inconsistent. An analysis of Table 3 shows that growth in the scientific capacity of the Siberian Division in the 1960s, as seen in the development of scientific institutions, followed a trend that had already taken shape during the creation of the Division. As before, priority was given to the Novosibirsk complex. By the early 1970s, the proportion of research institutions in the Division located in Novosibirsk and Akademgorodok had increased significantly, representing almost two-thirds of all such institutions in the Academy system. As a result, the proportion of institutions that joined the eastern Siberian branch of the Division was somewhat reduced. (The creation of the Buriat Branch by dividing the Comprehensive Scientific Research Institute did not affect the distribution of Academy research institutions in the region.)

In 1964, the issue of the territorial distribution of Academy potential in Siberia came to the attention of the Russian government. Reminding the Siberian Division of its earlier plans, the government called for a sharp acceleration in the development of research institutions outside of the Novosibirsk center—above all, in Irkutsk. Plans were formed to organize several new institutes in the Irkutsk center during the second half of the 1960s, including those of mathematics, economics, mining, agrochemistry, as well as one of physics and the technical sciences. Great importance was attached to these plans—they were treated very seriously and repeatedly discussed in the Party hierarchy. Particular attention was devoted to the plans at a 1966 conference of the Irkutsk *oblast'* Party organization, especially in the report of M.S. Odinstov, Chairman of the Presidium of the Eastern Siberian Branch of the Siberian Division. Realization of plans for Academy construction in Irkutsk was considered a highly prestigious matter.[54] Moreover, questions concerning not only the Irkutsk center, but the entire system of territorial distribution of Academy science in Siberia were repeatedly raised during the 1960s. According to Academician L.V. Kirenskii, director of the Institute of Physics in Krasnoiarsk, the distribution of science in Russia continued to be inadequate. The creation of the Siberian Division had, in his opinion, ameliorated the situation only to an insignificant degree since, for the most part, only the Nosovibirsk center had been developed. Kirenskii remarked on the need to create prominent new academic centers in Siberia, particularly in Krasnoiarsk, by supplementing those institutes which already existed in the Siberian Division. He specifically recommended that a magnetics laboratory be organized in Krasnoiarsk as quickly as possible. Such a laboratory would, in essence, be a large-scale physics institute modelled on a similar laboratory complex in Boston, the concept of which had already been supported by the Academy of Sciences' Division of General and Applied Physics. In Kirenskii's opinion, the proposed laboratory would immediately make Krasnoiarsk one of the largest physics centers in the world. In addition, he proposed that a chemistry institute be created in Krasnoiarsk that would provide

54. Storage Center for Contemporary Documentation (Russian acronym, TsKhSD), fund 17, inventory 102, file 288, 221.

scientific support to the chemical industry that was rapidly developing in the *krai*.[55]

These plans did not, however, come to fruition, either in the 1960s or afterwards. Neither did it prove possible to fulfill instructions contained in a joint resolution of the CPSU Central Committee and the RSFSR Council of Ministers of August 1969 entitled "On the development of scientific institutions in individual economic regions of the RSFSR."[56] The latter document had been intended to guarantee that the development of science in the periphery of the Russian Republic, including the peripheral centers of the Siberian Division, would outpace that in any other region. The main ideas of the resolution represented a basic development strategy for the Division during the 1970s, yet by decade's end, they, too, remained only on paper. It was proving difficult enough to develop existing scientific research institutions—there was simply no energy left to create new ones.

The third strategic principle of the strategy for developing Academy science in Siberia prescribed by the "General Prospects" resolution was also not successfully realized. In accordance with the plans of the early 1960s, the scientific research institutions of the Siberian Division were to have been radically reoriented towards regional issues and problems of applied science. These goals were reflected in the intent to create a large group of geological institutes, institutes which were never, in fact, created. Table 7 gives us an idea of the character of scientific research conducted in Siberian Academy institutes. Although atypical of Academy science in Siberia in its earlier incarnation, the Siberian Division from its very creation was dominated by institutions of physics and mathematics, as well as those of physics and the technical sciences. This characteristic predominance of institutions with a physics profile attested to the Division's overwhelming emphasis on fundamental research in priority fields of scientific and technical progress.

The preponderance of physics establishments also guaranteed that other institutes would receive mathematical support, which in the 1960s became the hallmark of sophisticated research methodology.

Table 7. Distribution of scientific research institutes and design offices of the USSR Academy of Sciences in Siberia, shown in percentages of total such institutions.

	1961	1970
Institutional Profile		
Physics and Mathematics/ Technical Sciences	31.6	36.4
Chemical sciences	18.04	15.0
Biological sciences	18.4	20.4
Earth sciences	8.4	15.9
Social sciences	5.3	9.1
Comprehensive Research Institutes	7.9	2.3

Source: Artemov, *Formation and Development of the Network.* Data on Comprehensive Research Institutes *(kompleksnye nauchnye issledovatel'nye*

55. Ibid., inventory 107, file 523, 141–3.

56. *The Communist Party of the Soviet Union in Resolutions*, vol. 10 (Moscow: 1972), 81–4.

As can be seen in Table 7, institutes of physics, mathematics, and the technical sciences continued to dominate the Division in the 1970s. Moreover, the proportion of such institutes grew slightly at the same time as that of geological institutes decreased. Obviously, a complete reorientation of the scientific complex in the direction of servicing regional requirements did not occur and a profound emphasis on fundamental research continued to be the distinctive feature of Academy institutes in Siberia.

Unfortunately, another strategic principle for developing the network of Siberian Division institutions remained unfulfilled: that of the successive development of comprehensive scientific centers in Siberia. This principle had been one of the cornerstones of the very idea of the Division in the late fifties and early sixties. Initially, it was proposed that, subsequent to the creation of the Novosibirsk center, a series of similar academic centers based on the Novosibirsk model would be created in different Siberian cities. In reality, none of the peripheral centers of the Siberian Division ever reached the level of the Novosibirsk center, either quantitatively or with respect to the organizational principles governing their scientific activities. Even the Irkutsk center, the next most important after Novosibirsk, was far more specialized and narrowly focused, pursuing regionally oriented research to a much greater extent. Its lack of an institute of physics and mathematics reduced the capabilities of the entire group of Irkutsk institutes. For Irkutsk, the integration achieved within the Novosibirsk center remained an unreachable dream.

The failure to build several Siberian centers in succession can be attributed to many varied reasons, but two factors principally hindered the strategy. First, miscalculations affected the elaboration of the strategy itself. The orientation of the "General Prospects" resolution, as noted earlier, was largely a product of its time. A passion for large figures was in vogue, but the methodology used to calculate them left much to be desired. Projections were based on the assumption of exceptionally favorable rates of economic growth in the country as a whole and in Siberia in particular. Such growth did not occur in reality and plans were accordingly revised and reduced in absolute terms. This explains the quantitative aspect of the problem.

Second, plans to establish comprehensive scientific centers in stages throughout Siberia were based on the hope that the Novosibirsk center could be reproduced in other cities of Siberia, which proved impossible. Given the nature and climate of eastern Siberia, creating such a scientific center in Irkutsk or Iakutsk would have required far greater financial outlays and funds of such magnitude were already scarce. The poor financial climate became particularly noticeable during the second half of the 1960s, when Khrushchev—the person who had approved the idea of organizing the Siberian Division and had openly sympathized with its leadership—ceased to be leader of the country. Even had it been possible to obtain the necessary funds, the situation would not have improved because, with the possible exception of Irkutsk, eastern Siberia lacked the necessary scientific infrastructure to take on such a large-scale center and assure its future development on its own resource base. Inevitably, the much harsher living and working conditions of eastern Siberia, its far greater distance from the center of the country, and the region's

minimal prestige on the scale of territorial priorities also influenced the situation.

The success of the Siberian Division was largely—even fundamentally—due to the fact that many prominent scholars, together with their students and colleagues, agreed to move to Siberia. This phenomenon, however, was characteristic only of Novosibirsk—not of the entire Division—and did not repeat itself during the development of the Division's peripheral scientific centers. This outcome did not need explaining to anyone who had seen the science towns of Irkutsk, Ulan-Ude, or Iakutsk with their own eyes and could compare them with Novosibirsk-Akademgorodok. Finally, unlike science establishments at the center, Akademgorodok in the mid-1960s had not reached a dead end in developing priority avenues of scientific and technical progress and still had sufficient room to encourage new initiatives and pursue new directions in science.

Despite the above considerations, the creation of the Siberian Division of the USSR Academy of Sciences was nevertheless a colossal success with long-term significance for Soviet science. Although numerous plans were destined to remain unrealized in practice, the accelerated development of Academy science in the east during the 1960s sharply decentralized the structure of the Academy. This decentralization was reflected in the territorial distribution of scientific capacity: by the mid-1960s, the share of Academy research institutions in Moscow and Leningrad was reduced to 65 percent, down from their 1951 level of 90 percent. Fifteen years later, their share would be only 40 percent of all such Academy institutions.[57] Thus the trend that had developed in the late 1950s and early 1960s was subsequently confirmed by the Academy's development. The actual contribution of Academy science to aggregate scientific activity conducted in Siberia was much higher than 25 percent. Obviously, the institutes of the Academy possessed far greater capabilities for conducting scientific research, more highly qualified personnel, and far better quality equipment. Novosibirsk-Akademgorodok and the peripheral centers of the Siberian Division deservedly earned a reputation as one of the world's leading scientific complexes.

VI. General and Particular Factors of Crisis in the Siberian Scientific Complex

It is now evident that many of the proposed plans for developing the Siberian complex were not realized in the 1960s or early 1970s. Even the "Golden Age" of Siberian science did not signify its exclusively positive development, as is often claimed both in the historical literature and in the memoirs of those who participated in the events themselves. True, in terms of accumulated scientific capacity, financing, living and working conditions, and the social-psychological climate of the local scientific community, the situation in the Novosibirsk-Akademgorodok—the Division's "heart and soul"—was far better than that in other scientific centers of the region. Yet a process of inertia began to take hold of the Siberian centers during the 1970s and throughout a considerable part of the 1980s. Already in these years people began to speak about the relative monopoly of individual

57. E.A. Beliaev and N.S. Pyshkova, *The Formation and Development of the Network of Scientific Institutions of the USSR* (Moscow: 1979), 168.

scientific leaders, the aging of research collectives, and the isolation of Akademgorodok from other sectors of science in the USSR. A swift and violent destruction of the "Akademgorodok aura"—that special psychological microclimate of which Siberian scholars were so proud—unquestionably took place. These scholars' claims to genuine academic liberty collapsed within an hour after the Soviet political regime hardened in the late sixties and early seventies.

Right up until the end of the 1980s, however, it seemed that the Siberian academic centers had a relatively large margin of safety that would allow them sufficient time to gradually adjust their development strategy. Yet in the late 1980s and early 1990s, everything changed radically. The situation in Siberia's "science towns" began to be described exclusively in dramatic terms: "crisis" was no longer even the most prevalent epithet, eclipsed by "catastrophe." What was the reason for such a sharp deterioration in the situation? The standard response is to cite the general state of affairs in contemporary Russian science. On one hand, this was undoubtedly the case. The crisis of science in Russia could not help but influence the development of analogous phenomena in the Siberian complex. The crisis was particularly visible in several trends: the sharp reduction in financing (science received a 3.7 percent share of the total Russian budget in 1993, although a significant part of this allocation was never actually received by scientific institutions); the increasing outflow of workers from scientific institutions (in 1992, the outflow represented up to 10 percent of the total Academy workforce, up to 15 percent in certain disciplines); and, finally, the acute drop in real salary levels. As a result of the latter, by 1994 Russian scholars found themselves one of the lowest-paid professional groups in the working population.[58]

On the other hand, in this author's opinion, certain specific problems make the crisis of science in Novosibirsk-Akademgorodok even more acute. The paradox of the situation lies in the fact that Akademgorodok is currently devouring the fruits of successes that it achieved thirty years ago. One must look for the roots of present problems in the historical particulars of the center's creation. From the outset, several basic principles underlay the very conception of Akademgorodok. First, from the moment of its creation and for several years thereafter, Akademgorodok profited from the keen attention of state and Communist Party administrative organs. In a hierarchical society divided into priorities of the first, second, and third order, Akademgorodok was considered a top priority. This status enabled the center to create much better working conditions (including better supply of scientific instruments and equipment), establish higher salaries than those scholars could expect to receive in *VUZy* or departmental (*vedomstvennye*) research institutions, and to raise the standard of living of its employees. Scholars, moreover, considered work in Academy institutes the most prestigious. Akademgorodok became a symbol of "grand science" and, accordingly, attracted highly qualified personnel. It absorbed its core intellectual capacity not only from within Siberia, but from far beyond its borders. This process led to a colossal concentration of scholars with advanced degrees in the institutes of Akademgorodok.

58. *Financial News*, no. 48 (1-7 October 1993); and *Izvestiia*, 12 March 1994.

Second, Akademgorodok was created within the Academy structure. Given the significant departmental barriers that existed not only within Soviet science itself, but between both science and education and science and production, its organizational framework inevitably isolated Akademgorodok from other sectors of science in the country and the region, as well as from the system of industrial production. Akademgorodok was obliged to support this isolation against its will, as it might otherwise have lost its priority status and dissolved into its surroundings.

Third, the scientific institutions of Akademgorodok were oriented first and foremost towards fundamental problems of modern science, an emphasis that promoted breakthroughs in scientific knowledge rather than immediate practical gains. This orientation made the center extremely dependent on central funding and determined the character of the scientific training and qualifications of its personnel, as well as its primary focus on exploratory research. Fourth, Akademgorodok managed to perfect its own system for reproducing scientific personnel based on a cycle beginning with the *fiztek* and ending with the preparation of doctors of the sciences. The elite university that became part of the center was the key element in this system, all aspects of which were designed to meet the extremely high standard set by the center and to train personnel adapted to its specific needs and not those of the average scientific research institution or, more importantly, of the industrial sphere. Anyone who has ever worked in the research institutes of Akademgorodok has encountered the need to requalify upon transferring to a new workplace.

Fifth and final, the process of forming a local fellowship of scientists went further in Akademgorodok than in other places due to the territorial nature of its scholarly community. The center developed ethics and a culture of scientific activity that differed from those norms and stereotypes accepted in ordinary society. This culture was distinctively elitist in character and thus inhibited the ability of its scholars to adapt to new living and working conditions.

When Akademgorodok was on the rise, the influence of these factors was more positive than negative. Yet each factor carried a potential threat to the existence of the center that would inevitably become a reality when the general situation in the country changed. This is precisely what has happened today. The number of research collectives of Akademgorodok turned out to be excessive. A state in transition from a "frontal attack" on science toward a more selective science policy clearly could not afford such a large number of researchers engaged primarily in fundamental research. The research collectives of Akademgorodok had been created on the basis of centralized, "bloc" financing and could not be fully adapted to a research grant system. Reductions in the staffs of Academy institutes became inevitable, but were delayed by the absence of a mechanism for redeploying scientific personnel. Today, virtually no system regulates the employment of those involved in intellectual work in Akademgorodok. The chances of placing "science town" scholars in jobs outside of Academy institutes are, moreover, practically nil.

Another factor contributing to the problem is that Akademgorodok constitutes a formal city district almost thirty kilometers from Novosibirsk and the transport

system between them leaves much to be desired. The only real chance scholars have of finding work at this point is to leave Akademgorodok altogether. Very few people wish to take this step, however, because the center's favorable physical location has, in the eyes of many, transformed Akademgorodok into the "dacha suburb" of uncomfortable, industrial Novosibirsk. Even if researchers at Academy institutes were to decide to change their professions and find new jobs outside of the Academy sphere, they would in many cases experience an extremely difficult and painful period of psychological adaptation due to the social and cultural personality peculiar to Akademgorodok scholars.

Finally, the physical community of Akademgorodok and its high concentration of scholars, where many know one another by sight, has created a special psychological atmosphere. The collisions of recent years, fear of cut-backs, apprehension about losing one's job and being left without the means of survival are constantly discussed not only within research collectives, but among individual scholars in their social lives. This creates an extremely nervous atmosphere and negatively affects scientific work in the center. Unsuprisingly, the question of the center's survival has become one of the most popular themes in Akademgorodok's newspaper, *Nauka v Sibiri* (Science in Siberia), and speculation on its fate is dominated by a mood of impending doom and alarm.

Against the background of the general crisis in Russian science, then, the situation of Novosibirsk-Akademgorodok, not to mention the Siberian Division of the (now) Russian Academy of Sciences as a whole, is exceptional. Resolution of the situation requires a non-standard policy based on an understanding of the unique creation and development of this center.

VII. In Place of a Conclusion

Such are the principal evolutionary milestones and current condition of the largest regional scientific center in either Russia or the former Soviet Union. Historical interpretation of these facts makes it possible to comprehend the reasons behind the success of this gigantic experiment as well as the roots of its present-day problems. The conclusion that grows out of these facts is unequivocal. The creation of the Siberian Division of the USSR Academy of Sciences was, within the context of Soviet politics, an entirely Soviet act whereby the Soviet leadership successfully realized a cumbersome project by maximum concentration of effort and means. As a rule, possible long-term negative consequences of such projects were not taken into account and appropriate mechanisms to offset these consequences were not established.

The paradox of Akademgorodok lies in the fact that, although it came into being during the Khrushchev "thaw," the center itself embodied the most powerful impulse of the classic Soviet administrative-command system. In its early days, positive factors clearly predominated and, to a certain extent, prevented Soviet science as a whole from stagnating. However, the novelty of the experiment wore off and when it did, to the surprise of many, it turned out that the Siberian Division in general and Akademgorodok in particular had been created in the image of the Soviet system, with all its weaknesses and shortcomings. It was only a matter of time before science in Akademgorodok, like science in Russia as a whole, reached a state of crisis. In this context, it is,

to say the least, extremely naive to echo the call of the "directors' corp" of the Siberian complex to restore previous levels of funding as the principal means of improving the situation. Alas, from the psychological point of view, this "nostalgia for the good old days" is completely understandable.

The heart of the matter is that Akademgorodok in its previous form could only exist within the Soviet system of organizing science, even though it differed advantageously from the latter in a number of particulars. The transition to a new social and economic order in the country is, however, inevitably destroying this system. Accordingly, in addition to the crisis in guaranteed budget financing, the reduction of orders from the military-industrial complex, and the onset of political, economic, and scientific openness in the country, the former "life support system" of the Academy complex in Siberia is being destroyed. What is required is a radical restructuring of the organization of science within the Novosibirsk-Akademgorodok center. Given that the extent of change has already made a return to the old system impossible, restructuring is all the more necessary.

The main problem here is the danger of throwing the baby out with the bath water. Although radical change in the organization of science is inevitable, if the crisis of transition drags on too long, the scientific capacity of both the country and the Siberian region are in danger of being drastically impaired. This outcome is in fact happening before our very eyes—many scholars and political figures have already succeeded in burying Russian science, especially in the regional scientific centers. All the same, it seems that rumors of the death of science in Siberia are at present exaggerated. According to data of the Personnel Directorate of the Siberian Division, in 1992 the Division's contingent of scholars shrank for the first time in many years. This reduction was by no means dramatic, however, representing only about 4 percent of total staff. The numerical strength of the Siberian Division's scientific community was also reduced, but this reduction was significantly less than those in the national science sector or the Academy of Sciences as a whole. These figures understandably do not reflect hidden unemployment whereby researchers who are formally registered as Academy employees are actually engaged in other business. Nor do they reflect the hidden "brain drain" in which Siberian scholars work in foreign scientific research centers on long-term contracts, the number of which has grown rapidly since 1990. Yet there are positive signs as well. According to interviews and sociological studies conducted in Siberian research collectives, many scholars who are giving up active research within the walls of the Siberian Division are doing so to work in the new organizational structure of Russian science—that is, to work in various innovative firms, think-tanks, non-governmental educational institutions, and the like. As for the "brain drain," in my view it is not necessarily permanent—viewed with the proper attitude, it can even be seen as a form of international cooperation in science.

The general conclusion is thus obvious. Alarmist appeals and nostalgia for the past in Akademgorodok must give way to a constructive search for new ways of organizing science on a regional basis. This reorganization should occur within the context of international experience and the

transformations now underway in Russia. Precisely such an approach will prevent the disintegration of the scientific capacity accumulated in the regional Siberian Academy complex while strengthening its role in national economic development and enhancing its contribution to world scientific progress.