

“Civilization” and its Insecurities: Traveling Scientists, Global Science, and National Progress in the Novosibirsk Akademgorodok

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No civilized society can exist without science.

—Vasilii Ivanovich, physicist, May 1999

In the Siberian science city of Akademgorodok, located hundreds of miles within Russia’s territory, scientists move across international borders every day. Many participate in international research groups; some travel abroad to jobs and conferences several times a year. Others stay at home and “telecommute” by phone and e-mail with their colleagues and employers abroad. Nearly all depend in some way on foreign producers of equipment and reagents. Yet all this movement has not made borders—what lies within them, or what lies without—any less meaningful for Akademgorodok’s scientists or the state for which many of them continue to work. As Akademgorodok has become more international, anxieties about scientists’ position in the Russian nation-state have also developed. In this essay, I want to move across borders—from the story of an immigrant scientist in the United States to traveling scientists in Siberia—to open up a perspective on how former Soviet scientists are understood, perhaps paradoxically, as simultaneously essential to and threatening to the Russian nation-state. While it is easy to understand why traveling weapons scientists can be seen as threats to national security, the construction of civilian scientists as potential dangers to the nation requires an examination of the role scientists have played in constructing modernity in the Soviet Union and in post-Soviet Russia. In thinking about how scientists who move are simultaneously the focus of criticism and hope in Russia, I emphasize how a spatial narrative about the globalization of science shifts meanings as it intersects with Soviet and post-Soviet temporal narratives about national progress and decay.

After socialism, former Soviet scientists became, in the eyes of Western and Russian states alike, particularly vulnerable. On both sides, newspapers and legislatures worry that these highly-trained and cash-starved producers of knowledge might take “privatization” too far. Ex-Soviet scientists are portrayed as easily—though understandably, given their dire financial situation—tempted to claim ownership of and commodify the knowledge they produce (formerly the property of the state). In the worst case scenario, they would sell their knowledge to what the United States government has deemed a “rogue state,” which offers cash in exchange for the key to building nuclear or biological weapons. Only a handful of such cases

have been reported among the thousands of former Soviet scientific workers who have traveled abroad in the past decade. Nonetheless, scientists—including those who work on civilian and fundamental research, as the vast majority of Akademgorodok's scientific personnel do—have become a focal point of anxieties not simply about the security of Russia's nuclear arsenals, but about the very form of the nation-state and the nature of modernity and progress in the absence of Cold War competition as a driving force. These anxieties are not limited to Russia, but extend across the post-Cold War "securityscape," articulating with local constructions of nation, race, modernity, and science (Gusterson 1998). The complex construction of "insecurity" (Weldes, et. al. 1999) that surrounds globally mobile scientists is, in fact, intrinsic to the tandem histories of scientific knowledge and the nation-state (see also Fuller 2000:95; Prakash 1999).

It is not unusual for national aspirations to be couched in scientific language. More importantly for this discussion, however, science is also used as a powerful symbol of national modernity, internal order, and coherence. Scientists as symbolic resources of the nation, however, simultaneously are central to the construction of national boundaries—local modernities, so to speak—and transgress those boundaries by their participation in the ostensibly transcultural language and discourse of science. The uneasiness of the conjunction between these multiple contexts is exacerbated when, as in the former Soviet Union, the nation-state's coherence comes to be seen as unstable; science and scientists must be reincorporated, even if incompletely, into the national narrative. Indeed, Handler (1988) argues that a "negative vision" of disintegration and decay, in which "the conjunction of inviolable categories" is intolerable, and a "positive vision" of national coherence and boundedness, work together to reinforce "the nation" (or, in this case, its security) as a salient category of cultural reality (47-50).

In their complex critique of state policies, Akademgorodok's scientists claim to be both the constructive agents of a modern, "civilized," coherent culture and the victims of state-sponsored backwardness, fragmentation, and non-modernity. Such claims, which ascribe to scientists the role of agents in the positive vision of national progress, simultaneously locate traveling scientists within the negative vision of decay and dissolution, as threats to the nation and its security. While concerns for the security of weapons of mass destruction and the technologies of their manufacture can most easily be seen as concerns about boundaries, I argue that non-weapons scientists, such as the majority of those in Akademgorodok, are equally important to visions of national order, modernity, and progress. In postsocialist Russia, then, the "traveling scientist" has become an ambiguously-located, boundary-crossing figure around which the construction of both "national security" and national (in)stability takes place, offering simultaneously the hope of progress toward an ever-elusive modernity, and the fear of leaky boundaries, disintegration, and disorder.

Talking about Borders: From Los Alamos to Akademgorodok

The Novosibirsk Scientific Center, commonly called Akademgorodok, is a research complex comprising more than 30 institutes and Novosibirsk State University, located about 25 kilometers south of central Novosibirsk. Akademgorodok's institutes make up the main part of the Siberian Division of the Russian Academy of Sciences. The Siberian Divisions of the Academy of Medical Sciences and the Academy of Agricultural Sciences are located nearby. The town was, from its founding in 1957, deeply embedded in a vision of state-directed national progress and modernity; it was designed as a showplace for the ability of the Soviet system to modernize and incorporate a marginal place. Khrushchev gave his personal support to the vision of the town's founder, Mikhail Alekseevich Lavrent'ev, and to the prominent role given to Soviet science in the development of Siberia, by visiting twice during the construction (see Josephson 1997:15, 36). Yet the town's incorporation into such state and official narratives was never total. Particularly in the late 1960s, and again in the 1990s, residents of the town formed alternative visions of what it meant to modernize the nation and Siberia, and of what their role as scientists would be in producing modernity.

About halfway through my fieldwork in Akademgorodok, I learned that a Taiwanese-American scientist named Wen Ho Lee, who worked at the Los Alamos National Laboratory—another site where the hopes of a nation had rested on the shoulders of scientists—had been arrested on suspicion of divulging information related to the design of a United States nuclear warhead to Chinese intelligence agents. The Federal Bureau of Investigation (FBI) had become suspicious of Lee, it was reported, because he frequently traveled to China to attend scientific conferences and had failed to report his contacts with Chinese scientists, as was required by laboratory policy. The case, as is well known, set off a frenzy of reciprocal accusations. The FBI and Congress, on one hand, blamed Los Alamos and the Department of Energy for what was widely characterized as a cavalier attitude toward security procedures. Scientists and other critics fired back at the FBI and news media with charges that they were not only singling out and stereotyping Wen Ho Lee because of his race, but misunderstanding the contacts and conversations that are routine to the production of scientific knowledge in a global context. After nine months in solitary confinement, Lee plead guilty to one count of illegally gathering and retaining national security data. He did not admit to the more serious charges of intending to harm the United States and aid a foreign country, charges that were then dropped. He was sentenced to time served and released, with an unusual apology from the judge on behalf of the United States. Thus rehabilitated by the courts, Lee has signed contracts for a book and a mini-series about his experience, though a cloud of media and Justice Department suspicion remains (see Purdy 2001; Purdy and Sterngold 2001).

I discussed Wen Ho Lee with an Akademgorodok scientist who has participated in the globalization of post-Soviet science in a variety of ways. Aleksei, a physicist, used to work on non-classified research with potential military applications, and he has collaborated with French researchers intermittently since the late 1980s.¹ He traveled to France on short trips for scientific business several times, and had shortly before this conversation returned from a trip to France related to what had replaced physics as his primary income-generating activity: making jewelry, decorative boxes, and other craft items from birch bark. He continued, however, to work at his laboratory. Sometimes he liked to portray himself as having been a near-dissident critic of the Soviet system, one who even outsmarted the KGB on one occasion, though by all appearances his was the same kind of everyday resistance engaged in by millions of Soviet citizens: critiques offered within a circle of friends around the kitchen table, “appropriation” of state property, interest in unofficial literature and music, and mischievous behavior (see, for example, Ries 1997:21, 80-82; Verdery 1996:23-29). He was a vocal critic of the Yeltsin government, at least in his own living room, and his political views tended toward a kind of liberal Siberian nationalism.

“People are calling science a ‘sieve’,” I told Aleksei after receiving in the mail a newspaper clipping about the aftermath of Wen Ho Lee’s arrest. The article, from the *Washington Post* (Loeb 1999), named Russia, along with India and China, as “sensitive countries” whose cooperative relationships with Los Alamos and other US nuclear labs were suddenly under scrutiny by Republicans in Congress. According to critics alarmed by the Wen Ho Lee case, American scientists’ international travel, the presence of foreign scientists at US laboratories, and many scientists’ disinclination to concern themselves with security issues (which they perceived as bureaucratic distractions from scientific work) combined to make Los Alamos a site where dangerous scientific secrets were highly likely to leak out. I sat down at the kitchen table, set down the clipping from the *Post*, poured myself a cup of tea, and leaned back against the wall, settling in, I thought, for a familiar long diatribe on how the Russian state has abandoned science and it’s no wonder scientists leave for other countries or sell their knowledge. I was surprised when I heard my friend insisting that scientists’ primary obligation is not to open intellectual exchange across borders, but to the interests of the state in its own security. “Well, can’t the scientists be trusted to police this themselves?” I asked, making the argument with which many Los Alamos scientists responded to the stepped-up surveillance of their activities; “Isn’t it their responsibility not to reveal information they know is secret?” He surprised me again by responding that scientists, who were mostly interested in showing off their knowledge to other scientists, could not be trusted to protect national security. He insisted that only agents of the state could do this, that the state had a right—indeed, a responsibility—to control scientific exchanges and transnational flows of knowledge. He was puzzled by my lack of alarm at the situation at Los Alamos: “China *bought secrets* from your nuclear laboratories, you understand? A state must protect its security!”

At the time, I could not comprehend this response; I had expected Aleksei to be rather more sympathetic to Wen Ho Lee than to the FBI. Instead, he was shocked that I was not outraged by the apparently blasé attitude of American scientists toward national security, and I was puzzled by his unusually favorable view of state surveillance of transnational flows of knowledge. Apparently, scientists’ views of the state were neither consistent nor black-and-white. I began to pay attention to the contradictions and ironies inherent in how scientists were positioning themselves in relation to the state in various contexts, and to think about how that positioning was producing the sense that scientists as a category were potentially “insecure.”

Globalization and Insecurity in Akademgorodok Science

In Akademgorodok, the Wen Ho Lee case was viewed with interest. It seemed to confirm people’s suspicions that there were dangers inherent in the globalization of science. Scientists in Akademgorodok had, throughout the town’s history, maintained ambivalent relationships with state intelligence services and particular configurations of national borders. The founder of the Institute of Nuclear Physics, Gersh Budker, “hated the secrecy and bureaucracy of Minsredmash [the Soviet ministry in charge of the country’s nuclear research program] and vowed to avoid its characteristics.” Budker decided to accept only money, not secrecy, from the Soviet atomic energy establishment—money that eventually went to more cooperative institutes in the country’s closed nuclear cities (Josephson 1997:50, 62). Also by contrast to the closed cities, and perhaps unexpectedly given its distance from Moscow, Akademgorodok was always a fairly international place. Western scientific delegations visited as early as 1963, and a Chinese graduate student was among the “aboriginal” settlers of the community, when it was little more than a few peasant huts along a creek (Marchuk 1997:12, 42-47; see also Vodichev 1988). Neil Armstrong was a guest of the Institute of Nuclear Physics not long after his moon landing, in May 1970 (see Krugliakov 1997:34). On the other hand, Akademgorodok’s institutes were deeply invested in state projects driven not by international cooperation but by Cold War competition; indeed, Khrushchev supported the construction of Akademgorodok and other science cities in part because he believed that the United States was constructing cities of science, and that the Soviet Union needed to catch up (Josephson 1997).

Since *perestroika*, the increasing influence of transnational capital in the production of scientific knowledge worldwide (see Rabinow 1996; Haraway 1997; Fuller 2000) has begun to transform this former showplace for state-sponsored science. Since the 1970s, throughout the world private interests, often organized as small-science entrepreneurs, have increasingly challenged states for the responsibility of funding scientific research and for control over its uses, particularly in molecular biology, biotechnology, and genetics. This global transformation in the mode of production of knowledge has taken a particular cast in Russia, where a decade of economic crisis and questions about the stability, if not the very nature, of the state

have left the remains of the Soviet Union's state-sponsored "big science" apparatus without the economic means necessary to support its highly diversified research.

Akademgorodok's scientists have responded to the near-complete collapse of what was reliable, if not overly generous, state funding for research by looking outside the Academy of Sciences for individual and collective support. Some get by selling vegetables they grow in their gardens, installing "Euro-standard" kitchens and bathrooms in the apartments of "New Russians" moving from central Novosibirsk to Akademgorodok's relatively uncrowded, quiet, wooded streets, or writing computer software on the side. Others—the luckier ones, people say—are able to find grants or contracts with foreign universities, foundations, or companies that will not only pay a livable salary but also provide the means to purchase the instruments, computers, reagents, and raw materials necessary for contemporary scientific research. Still others—and it is this group which is the focus of much of the contradictory discourse on scientific migration—travel abroad on short or long-term contracts to fill temporary positions in foreign laboratories. The diversity of such positions is immense: from postdocs to visiting professors in academia, and all manner of jobs in the private sector.

The scientific workers I interviewed—physicists, historians, chemists, philosophers, biologists, geologists, engineers, mathematicians, computer programmers, and research physicians²—had worked in 29 countries, with the top destinations being the United States, Germany, Japan, France, Britain, and Israel, but also including most other Western European countries, Turkey, China, Taiwan, Australia, South Africa, Swaziland, Malaysia, Hong Kong, Vietnam, India, Brazil, Mexico, Thailand, the Philippines, and others. According to a study published in the weekly newspaper of the Siberian Division of the Russian Academy of Sciences, *Nauka v Sibiri*, in 1997 Novosibirsk scientists co-authored 253 published articles with researchers from six countries, an increase from only 14 a decade earlier (Kasimova 1999). High energy physicists, computer programmers, molecular biologists, biochemists, and geneticists seem to be in the most demand abroad, historians, philosophers, and ethnographers the least.

Although generalizations are, again, difficult to make, Akademgorodok's traveling scientists—that is, those who work abroad temporarily, for periods ranging from a few weeks to a few years, as well as those who emigrate permanently—tend to fall into one of two career-stage categories: they are either ambitious young scientists just embarking on their careers and desiring the greater opportunities to do cutting-edge research that are available abroad, or respected senior researchers with established records of publication in their fields and networks of colleagues abroad. They are predominantly male, since in most fields of Russian natural science there is a preponderance of men, though women—particularly unmarried women without children, or with grown children—may travel as well. As we will see, each of these characteristics of traveling scientists, along with their broad economic insecurity,

forms an important piece of the cultural logic in which they appear as “insecure” from the point of view of the nation-state.³

The ways scientists travel on these temporary contracts is highly variable and contingent; however, there are some broad patterns that bear on this discussion of the construction of scientists as “insecure.” Although researchers sometimes obtain positions abroad by going through “blind” bureaucratic processes like grant applications, more often they use personal contacts with foreign colleagues or with Russian colleagues already working abroad to gain access to positions. For example, Ivan, a physicist working for the past five years in Tsukuba, a science city in Japan, looked through journals for foreign colleagues working in the same field and wrote letters to them inquiring about possible jobs.⁴ An answer and an offer quickly came from Japan, and his stay has since been extended several times. Vadim, another physicist, was not looking for work abroad at all until an old friend from Novosibirsk State University, now working at Emory University in Atlanta, sent him an e-mail about a position in the US. Vadim applied for, but did not get, the job. Vera, a chemist, sought and received a travel grant to go to an international conference, where she lobbied foreign colleagues for work. She accepted a postdoctoral position in Germany, where she stayed for over a year. When I met her in 1999, she was in the midst of several trips to conferences in Europe, where she hoped to secure a job in the US or France.

Whole institutes, too, use personal connections to access sources of foreign capital: the Institute of Nuclear Physics (*Institut iadernoi fiziki*, or IIf), Akademgorodok’s flagship, relies heavily on cooperative research projects with and apparatus manufacturing contracts for foreign high energy physics research facilities, such as the European Organization for Nuclear Research (CERN) in Switzerland, the Stanford Linear Accelerator Center (SLAC), Fermilab, and Brookhaven in the United States, and KEK in Japan. IIf listed 33 ongoing cooperative agreements with foreign labs in its 1997 annual report (Budker Institute 1998:235-236), and the deputy director of the institute told me that about 10 million dollars a year—80% of the institute’s income—now comes from sources other than the Russian state (that is, the portion of the federal budget allocated for science plus contracts with various government ministries). Many of these international collaborations are facilitated by former IIf researchers now living and working abroad.⁵ Through such projects, concluded between foreign labs or firms and individual researchers, laboratories, or institutes, many of Akademgorodok’s scientists effectively “work abroad” in their local laboratories. In short, Akademgorodok is becoming more tightly linked to global scientific structures, as state, corporate, non-profit, and private forms of organizing science are making inroads into this Academy of Sciences “company town.” These transnational links allow many of Akademgorodok’s scientists to continue their research, but also create the conditions under which they can be seen as potentially undermining national boundaries.

Akademgorodok's civilian scientists and their knowledge move around the globe against the background of a deep fear about other categories of post-Soviet scientists taking their knowledge on the move. Scientists with expertise in nuclear, chemical, and biological weapons, particularly those in Russia's impoverished closed cities, are thought by many observers to be among the most vulnerable to seduction by "rogue states" interested in their knowledge as well as the raw materials—anthrax, plutonium—to which they have access (see, for example, Schweitzer 2000, Alibek and Handelman 1999; Guillemin 1999; Moody 1996). The United States and the European Community—along with George Soros—have instituted various programs of grants, contracts, joint ventures, and visa waivers for scientists thought to be particularly at risk of emigration bearing dangerous knowledge or technologies. It was with precisely such a scenario in mind that the United States Congress passed the Soviet Scientists Immigration Act of 1992 (Public Law 102-509, 24 October 1992), which waived the job offer requirement for up to 750 former Soviet scientists having expertise in "nuclear, chemical, biological or other high-technology defense projects" and seeking entry to the United States. During the debate on the bill, Senator Edward Kennedy remarked, "noted Soviet scientists who now feel they must leave their country because they do not have jobs should be able to come here, instead of to Iraq or Libya" (Congressional Record 1992). In the late 1990s, however, many of these programs came under criticism on both the donor and Russian sides, and not a few have been discontinued (see Miller 1999).⁶

In Russia and the US, rumors swirled that North Korea, Iran, Iraq, and Libya were making impoverished former Soviet scientists offers they could not refuse. Typical of these suspicions was a question and answer printed in the national newspaper *Argumenty i Fakty* in August 1999, under the headline "To Iraq for 'Bucks'":

Is it true that now many of our specialists find work in Third World countries, because there they are paid much more than in the USA, Germany, or France? —N. Mamontov, Riazan

Indeed, if Russian specialists used to be limited to the USA, Germany, and Israel, now they go to work in South Korea, Australia, Paraguay, and Iraq. The salary of Russian specialists abroad depends directly on their qualifications. By some reports, the president of Iraq Saddam Hussein will pay our highly-qualified nuclear physicists up to 300,000 dollars a year. [16]

Yet to posit that the nature of the problem scientific travel poses for the Russian nation-state (and nation-states in general) is limited to practical concerns about weapons proliferation is to miss half the picture. The security of the territorial boundaries defended by weapons systems is only one of the stakes when scientists travel. I do not mean to dismiss the danger of the spread of nuclear, chemical, or

biological weapons technologies from the former Soviet Union, but a focus on proliferation begs the question of why so much rhetoric surrounds the travel of civilian scientists, who work on research with few or no military applications, and in open research facilities. Instead, the travel practices of civilian scientists are problematic because they draw attention to the prominent role scientists claim in producing progress, civilization, and modernity, the nationalist “positive vision” of order and coherence. Scientists who travel stand to threaten not just the geopolitical territory claimed by the nation, but the very content and existence of a “civilized” national future.

A “Civilized Country”: Past, Present, and Future

A broad discourse centered on images of a “normal” or “civilized” country or society frames scientists’ international travel practices. Commenting on post-Soviet indignities as diverse as the rising price of bread, rude treatment by shopkeepers, the proliferation of ultra-violent Hollywood action movies on television, the lack of reagents and instruments for research, and official and bureaucratic corruption, Akademgorodok scientists tied these phenomena together into a narrative which pointed to an as-yet-unachieved “civilization” at the root. Images of disintegration and collapse—or at best, stasis—were widespread in tales of the absurdities one was forced to endure in managing everyday life—not to mention conducting scientific research—in conditions of rapid inflation, salary arrears, and above all, the state’s unpredictable and unreliable responses to these circumstances. “If Russia were a civilized country...” or “In a normal society...” began so many of these narratives, which Nancy Ries (1997) has called “perestroika epics,” particularized for the scientific aftermath of the August 1998 Russian financial crisis. Akademgorodok scientists and non-scientists alike invoked “civilization” as a potential, rather than actual, state. In such formulations, “civilization” was not a state that had once existed and then disintegrated, but rather was always only an illusion that had now lifted, though it could eventually be achieved. The elusiveness of Russian “civilization,” always seemingly receding not into the past, but into the more and more distant future, emerged from the contradiction between a discourse in which Russia was undergoing a “transition” to a “higher” stage of development, capitalism and democracy, and one in which the country was sliding backward, standing still, or falling apart at the seams.⁷ Having once felt more or less secure in the essential progressiveness and modernity of their country, the painful “discovery” that those goals had not yet been achieved did not seem to make Akademgorodok scientists, deeply committed to scientific notions of progress, any less desirous of them.

In fact, civilian scientists like those traveling in and out of Akademgorodok are understood to represent the nation’s economic and spiritual “potential” for future progress. The ubiquity of the idea of “potential” in discussions of “brain drain” reflects an implicit association between scientists and national progress—or, conversely, the absence of scientists and national retrogression and backwardness. A

molecular biologist, visiting Akademgorodok from his position in Germany, explicitly connected the exodus of scientists—like himself—with an exodus of culture and civilization: “It’s precisely the cultured layer of society that is leaving. In principle, the people who are leaving are the ones who have carried the cultural load.” Analysts of “brain drain” also formulate the danger to the nation posed by mobile scientists by linking the “level” of future social development to today’s “potential”:

The erosion of the educated elite undermines the possibilities of the workforce, weakens the intellectual potential of the nation, and in the end the possibilities for social reformation....In the long term the outflow of a significant percentage of the scientific elite may lead to a genetic weakening of an entire generation of Russia’s population. [Ikonnikov 1993:54-55]

That scientists are characterized as the bearers of the nation’s culture—past, present, and future—makes their border-crossing potentially subversive of cultural coherence. A particular emphasis on the loss of young scientists and the disinterest of young people in scientific careers—widely bemoaned by scientists and policy makers alike—suggests moreover that the agents of the nation’s future progress are young people. This negative vision of the loss of a (potential) national future discursively parallels the more frequently discussed nationalist focus on the loss of a pure, essential cultural past. While the anxieties about cultural disintegration work in parallel ways in both instances, in this case the nationalist negative vision intersects with and works in concert with scientific discourses about progress and development. At this confluence of progress and decay, temporal movement across eras and spatial movement across national boundaries come to be seen as congruent, such that scientists can claim that their transnational movement makes them simultaneously agents in the construction of a national future, and bystanders to a state-sponsored national retrogression.

Within this framework, it is the Soviet and then Russian states that have ruined the nation’s science by effectively forcing scientists beyond the country’s borders, thereby postponing the achievement of Russian society’s “civilization.” State sponsorship and direction of science were understood to be critical to the achievement of Soviet modernity, as this paragraph from an early-1960s text about Akademgorodok’s construction attests:

The Twentieth Party Congress laid out the grand prospects for the construction of communism in our country. It assigned a special, paramount role in its plans for the construction of communism in the USSR to the eastern regions....The rich land needed patient, courageous, and strong people, ready to engage in a struggle with harsh nature: explorers and prospectors for minerals, builders of roads, tractor drivers and lumberjacks—anyone who was ready to set

out on the difficult march to the East. Scientists were summoned to play not the last role in this march. Without them it is impossible to master the immense riches of Siberia and raise the culture of this land in the short period envisaged by the Communist Party. [Migirenko 1962:7-8]

Yet scientists pointed to bloated bureaucracy, a heavy hand directing certain aspects of scientific research, and a poor system for integrating scientific and technological innovations into industrial production, as ways in which the Soviet state, despite the narrative of the party-state-directed march toward modernity, had in fact constructed post-Soviet non-modernity. The Russian state had exacerbated the problem, scientists argued, through its financial neglect and failure to mobilize and direct the nation's scientific resources. A conversation between two Akademgorodok scientists in 1999 contrasts profoundly—and perhaps consciously—with the Soviet-scientific tale of progress, order, discovery, and control: in short, all the markers of state-sponsored modernity (see Scott 1998).

Galia, chemist: [They say] the situation will improve, but it's not improving, it's stabilized on a very low level, and even getting relatively worse, because the government gives us nothing. You can wait for improvement, hope that things will get better, but....Now I see clearly that in the next 15 years there won't be a good salary here. I was more optimistic when I returned from Germany [in 1995], but now I see clearly.

Oleg, biologist: I think that in Russia... I could say what I think *should* be, but I'll tell you what *will* be: it will be like in India, very weak science....Science will be just as sickly as in India.

Galia: Actually, in India it's very, very uneven.

Oleg: Well, let's say in comparison to Europe.⁸

In short, scientists make use of a kind of discursive negation of the Soviet emphasis on progress to frame their current circumstances as decidedly “non-modern.” Galia and Oleg referenced this contrast between state-constructed modernity and non-modernity in the opposition between “India” and “Europe.” In their view, Russian science was becoming weaker—rather than stronger, as a narrative based on constant and inevitable progress might predict—with the passage of time. While Soviet science was about active movement forward—marching, exploring, prospecting, expanding Eastward, and being the agents of development—post-Soviet science is about standing still, waiting, moving backward, and becoming the passive citizenry of an “undeveloped” country.

This link between national progress and scientific strength was formulated clearly in the headline on an open letter to President Yeltsin, published in *Literaturnaia gazeta*: “To let science perish is to destroy the country” (Shnol' 1998).

The letter was written by a researcher in the biology city of Pushchino, near Moscow, but Akademgorodok scientists repeated similar formulations over and over as well. Scientists in Akademgorodok in the late 1990s often made the claim, echoing Soviet models, that they—or, rather, the knowledge they produce, appropriately applied by the state—were the engines driving the nation toward modernity and progress. They cited the sociological, economic, political, and symbolic functions of science to back their assertions that without scientific knowledge and scientists as a group, the nation could not progress. Some argued that scientists, as part of the intelligentsia, tend to be a force for progressive political change: an organic chemist became excited nearly to tears as we sat in her kitchen one spring afternoon, saying, “Why did we support Gorbachev? Why the intelligentsia in particular? We suffered most of all, but the intelligentsia more than anyone supported Yeltsin and Gorbachev, because these people understood that your own material well-being is not the most important thing in life. The most important thing is the future! The most important thing is movement forward!” Others suggested that without science to develop technological innovation and map out how it could be incorporated quickly and efficiently into production—an “old Russian problem,” they emphasized, that the Soviet system of central planning had failed to solve—Russia’s industrial economy would continue to stagnate. And others believed that a country that produced cutting-edge science projected an international image of modernity, progress, and future-orientation, which would undermine the West’s (and their own) images of postsocialist Russia as a backward and corrupt country.

Even though their despair about the future of Russian state-supported science has led them to engage non-state and non-Russian sciences for support, Akademgorodok scientists have mobilized a link between national scientific achievement and state power into a critique of the post-*perestroika* decline of Russian science. The state, they asserted, has a central role to play in the promotion and direction of science, particularly fundamental science—a configuration which, many argued, is historically and culturally particular to Russia (see Semenov 1996:14). The state’s responsibility was to provide for science, which in turn served as the engine of progress and constructor of modernity. But scientists understood these mutual obligations to have been violated—the state, either willfully or through neglect, had declared the “contract” null and void. “[Support for science is] so low that it seems the state endlessly robs you and humiliates you,” said a chemist, who was hoping to find work abroad. “The state doesn’t fulfill any of its obligations to us.” If the state would fulfill its obligations, scientists asserted, Russia could begin to move forward toward that ever-elusive “civilization” again. In this sense, scientists’ talk of movement backward and disintegration plays on an older logic in which progress and modernity are produced by the state directing science, and science working toward the goals of the state—both, ostensibly, for the good of society.

Yet, much as Pesmen (2000:282-287) found in Omsk, where people both bemoaned their “backwardness” and incorporated it into their notions of what it is to

be Russian, scientists in Akademgorodok emphasized not only the disorderly conditions under which they had to work, but also their ability to find order in this chaos. They took a kind of pride in relating how their seemingly absurd tales of hardship and endurance were met with disbelief by Western colleagues. “To this day our colleagues abroad don’t believe it. They don’t think it’s propaganda, because communication is supposed to be free. But they don’t believe that a doctor of science, a professor can earn less than 100 dollars a month and somehow live. They look at you suspiciously, like you’re a little crazy, like maybe this person is making something up,” a hydrodynamicist told me. Scientists frequently related—not without pride—how they jury-rigged instruments with scrap materials, assembled and repaired their own computers, and performed complicated calculations with paper and pencil, all the while “maintaining the level” of their research.

Narratives of “anti-progress,” then, combine with the suspended hope of future civilization in a kind of doubling-back in time that turns on science. Science, in this logic, is the engine of progress and modernity, which seem to be receding ever farther, asymptotically, into the future. Bruce Grant (2001) has described how the recent construction of state-sponsored storybook-fantasy monuments in Moscow represents, in part, “a *deferral* of expectations for a rise in standards of governance and standards of living among many Russian citizens” (351; emphasis in original). Grant’s point resonates with the ways the deferral of Akademgorodok scientists’ hopes for future “civilization” have been incorporated into a claim on state resources and state responsibility, while leaving open the possibility—even probability—that they may never be fulfilled. In fact, such claims were often characterized by a kind of melancholy or irony, because scientists were, even as they ascribed a central social role to scientific knowledge, well aware that science was hardly driving anything—the economy, politics, or “national progress”—in postsocialist Russia. As a mathematician concluded his list of proposals for everything from improving tax collection to structural reform of the Academy of Sciences, he sighed, “but for the present, this is all from the realm of sweet dreams.”

The Progress of Global Science

Rather than simply writing off scientists’ claims on the state as wishful thinking or the nostalgia of the newly-irrelevant, I argue that we should attempt to understand why Akademgorodok’s scientists were mobilizing models of the relationship between science and the state that they, at least at some level, understood to be unrealistic in the present context. What did it mean to make claims on the state that were not about to be answered, that scientists were circumventing anyway by engaging transnational capital and globalizing their local science, and about which, in fact, they were often ambivalent? How were these claims incorporated into the construction of traveling scientists as insecure? In thinking about these questions, I turn to the ways in which spatial configurations of “world science” attended Soviet and post-Soviet temporal narratives of progress. Scientists imagined a transnational

Russian science not simply as an indication of how far backward the Russian state had allowed its science to slide, but also as a sign of science's central role in generating progress toward a reconfigured, global modernity and universal "civilization." Playing on these apparent contradictions, scientists countered claims that their global travel was necessarily generative of national insecurity.

Soviet science's drive toward modernity during the Cold War included a prominent role for international competition—and sometimes even outright duplication of effort by the superpowers—in industrial production, space exploration, and the nuclear arms race—all in the service of the state.⁹ Despite Neil Armstrong's pronouncements from the moon about "giant leaps for mankind," whether a scientific fact, achievement, or technique was Soviet or American mattered during the Cold War (see Karash 2001; Letokhov 2001). Yet Soviet science's relative isolation from "world science"—exemplified by restrictions on travel, small readership of Soviet journals abroad, and even, according to some Western historians and sociologists of Soviet science, the proportionally fewer Nobel prizes awarded to Soviet scientists—is now framed by scientists as having been, despite its successes, something of a distortion, both scientifically and politically. Scientific travel, in this view, is the natural state of science: international collaboration—and competition—are beneficial to both Russian and "world" sciences, indeed essential to their proper functioning, insofar as they entail lifting, rather than imposing, certain barriers to "free" communication between scientists.¹⁰

[Travel] is a source of new ideas; you get new information that you might not have gotten here. So in general, you can't say that the reforms of the past eight years have been especially negative. The most important thing is that they gave scientists freedom. And thanks to that we can stay home and work here, because we can go abroad for contract work from time to time, or just for short term trips sponsored by the other side. So the state has already done the main thing, a very big thing, having given scientists freedom. [Andrei, mathematician]

In our country there was a so-called Iron Curtain for many, many years. And we didn't know what went on abroad. They always taught us that people there were hostile, that they didn't like Russia, that they were trying covertly to do harm to our country as a whole and our people. And I'm a person who went abroad and returned. And I saw that just the same kind of people live there, with their virtues and their faults. That possibility is a very great blessing that's been set before us. I think that's a very great advantage of this perestroika, that they gave scientists the opportunity to go and see with their own eyes. [Katia, chemist]

There are, then, two threads in the logic that characterizes scientific travel as movement toward, rather than away from, elusive civilization. First, travel restores an ostensibly transcultural science (and, by extension, the nation) to its “natural” state of engagement with the rest of the world. As one researcher has written, “returning professionals can become a necessary element in the integration of Russian science into the world scientific community” (Ikonnikov 1993:56). Second, travel provides Russian scientists with a means of supporting and developing their specific national science, thereby ensuring its survival for the future progress of Russia, even if Russian scientists are currently working for other states or private interests. Emigrants, after all, often help obtain contracts, grants, and joint projects for the institutes they have left; for instance, Akademgorodok’s Institute of Nuclear Physics, as noted above, has come to depend on these contacts. Those who travel temporarily return bearing not only new knowledge and experience, but also grants, publications, reagents, contracts, and contacts. Nearly every bottle on a shelf in a chemistry lab I spent some time in bore a German label; several of the scientists who worked there traveled regularly to Germany. In this sense, scientists often characterize even long-term travel as a step toward progress, rather than away from it, even as they criticize the state neglect that drives them to seek work abroad. A physicist from the science city of Troitsk, in Moscow Oblast’, summed it up neatly: “‘brain drain’ is a means of maintaining Russian talents over the long term under the given emergency conditions” (Letokhov 2001). Or, as an Akademgorodok mathematician put it, “the state needs to understand that if Russian science is destroyed, you can’t bring it back.”

In these ways, post-Soviet scientists have begun to imagine their engagement with and integration into “world science” (read: Western science) as a means of overcoming what they see as state-sponsored non-modernity throughout Russian society. The Soviet-era link between state-directed science and national progress provides scientists with a point from which to launch a critique of the illusory modernity constructed by the Soviet state, the demodernization of postsocialist Russia, and the collapse of their own central social role. Scientific travel, in this context, becomes a fraught signifier of both the ruin of post-Soviet science as a metonym for the condition of postsocialism—in which Russians are forced to seek from abroad what their own country can no longer provide—and of a faith in a less-isolated Russian science to achieve a deferred, internationalist modernity.

Scientists in Akademgorodok insist on their importance to the nation and to representing order—social and natural—within national boundaries. Moreover, they insist that, by traveling, they are part of producing this order, the achievement of which has been postponed indefinitely by the state’s actions and inactions. Yet scientists’ participation in a transnational scientific community—largely arranged through personal, rather than state-directed, contacts—only very problematically overlaps with the nation. This spatial incommensurability, combined with a temporal narrative of progress running backward to the non-modern, foregrounds the negative vision of boundarylessness (*bespredelnost’*), disorder (*besporiadok*), disintegration,

and collapse. The particular ways in which Russian scientists are engaging transnational flows in their reconfiguring of a collapsed state science are understood, paradoxically, as simultaneously productive of progress and insecurity. Traveling scientists, with or without missile plans or lethal viruses in their suitcases, are problematic for the continued, though deferred, progress of the nation-state, even as they imagine themselves to be the only hope left for that progress.

In the end, Russian scientists' peculiar predicament is an effect not just of the collapse of Soviet state-sponsored science, but of the common histories of science and the nation-state. Both are the products of a modernist notion of an ordered, knowable world with clear boundaries between its domains, between nature and culture. But if science's power as an explanation of, model for, and manipulation of the natural world lies in its presumed cultural universality, its indifference to local models of reality, that very quality stands to threaten the constructed, though naturalized, world of nations and states into which the globe is ordered. Sciences are not only local knowledge systems, nor are they unproblematically transcultural; they exist, rather, in a space somehow between the local and the global, shifting and changing in different contexts. There is, and perhaps can only be, an uneasy and complicated truce between a boundary-crossing science and one that reinforces commonsense understandings of the existence of bounded nations.

Postscript

By the spring of 2001, the Russian state was tightening control over international scientific contacts. In late May, the radio station Ekho Moskvy made public an Academy of Sciences order requiring scientists to report all contacts with foreign researchers, including grants, contracts, trips by Russian scientists abroad, and visits by foreign scientists, and to submit for prior approval all articles for publication outside Russia. While George Soros, a long-time financial backer of Russian science, threatened to pull his philanthropic activities out of the country in response, at least one official in the Putin government denied the existence of such a directive (McLaughlin 2001; Associated Press 2001; Wines 2001). As early as March of 2001, out of the blue, in the middle of an internet chat about our families, the stormy love life of a mutual friend, the slow progress of Siberian spring, and the new American administration, a friend in Akademgorodok wrote, "You think that's bad? Here they are tightening the screws again." I shuddered and typed, "What do you mean?" She answered that scientists were now required to report the contents of all conversations with foreign researchers: "Even if you are talking about your kids, your vacation, you have to report it. I've seen the order myself." "Who?" I asked, "all scientists, or just those working on classified projects?" "People working on sensitive topics, but so many topics could be considered 'sensitive,'" she replied. I reminded her about Wen Ho Lee, whose failure to make such reports cost him months in solitary confinement; was American science any less the property of the American state? "What will you report about this conversation?" I asked. She changed the subject.

Notes

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¹Names and certain identifying details of scientists I interviewed have been changed; names that appear in published material quoted here remain the same.

²The Russian “nauka” has a definition rather broader than the usual usage of the English “science,” encompassing not only the natural sciences but all fields of scholarly endeavor. The overwhelming emphasis in my fieldwork, however, was on the natural sciences, corresponding to the preponderance of these disciplines among Akademgorodok’s institutes.

³Thanks to Jennifer Patico for pointing out the overlap between economic and national “insecurities” here.

⁴Traweek (1995) discusses the somewhat self-consciously international, cosmopolitan atmosphere in Tsukuba.

⁵The Institute of Nuclear Physics has a long history of international collaborations, going back to the 1960s (Josephson 1997; Krugliakov 1997).

⁶Whether there will be a renewed interest in such programs after the September 11, 2001 attacks in New York and Washington—and subsequent rumors that a biological or chemical attack using crop dusters may also have been planned—remains to be seen.

⁷Humphrey (1991) and Verdery (1996) have astutely examined what it might mean to imagine the Russian “transition” as leading not to capitalism, but to feudalism.

⁸Pesmen (2000:285-286) discusses Russians’ common use of “Africa” and “Papua” to code “backwardness”; in their comparisons between Russia and these imagined wild, exotic places, Russia usually comes out looking the worse. Here Oleg uses “India” in the same way, most likely because Galia studied in India on an exchange program for four months just after graduating from university.

⁹Andrei Sakharov's (1968:71-72) well-known "skiers" analogy suggests that national sciences engaged in competition with one another may be fundamentally incomparable. Sakharov gives the example of two skiers: the first gets off to a fast start, but must break through fresh snow and quickly tires; the second skis faster and gains on the first, but has the advantage of the first skier's tracks. Sakharov concludes that it is impossible to judge which skier is the stronger, as their respective tasks are so different.

¹⁰The roots of the Western ideology of scientific communication as open and free extend back to the early modern origins of experimentation. See, for example, Shapin and Schaffer (1985).

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