Science in Russia Is Already in a Coma

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In Chinese, the concept of crisis is written with two pictographs, one representing the character "danger" and the other signifying "a way out." The common understanding is that science in Russia is now in a state of crisis. This, however, is an excessively rosy view of its condition. In recent years our science has been subjected to such a series of therapeutic shocks that it would be more accurate to describe its current condition as comatose. It is true that the asinine barriers to international scientific cooperation have been removed, and contrived ideological and administrative mechanisms for regulating scientific creativity have been eliminated or weakened, respectively; however, amidst the recent socioeconomic changes, Russian science has encountered the grimmest difficulties which it can scarcely count on overcoming without decisive support from society and the state.

In recent years expenditures for scientific research have been cut by a factor of 30 to 50. Science's share of budgetary allocations as a percentage of Russia's gross domestic product has shrunk to an absurdly low 0.5%, a level on par with those of underdeveloped nations. India, Brazil, and Mexico now spend a greater percentage of their budgets on science than we do. In any science library in Russia it is possible to find foreign journals from the period 1941 to 1945; even during the battle for Stalingrad subscriptions to them were not canceled. Today, what meager trickle of foreign scientific literature reaches us is largely thanks to the philanthropic initiatives of the George Soros Foundation.

According to the data of the State Committee on Statistics (Goskomstat) only 17% of scientists and scholars are receiving a salary greater than the one officially designated as minimally adequate for survival, whereas the average salary of scientists ranks a solid 10th out of the 11 major categories of employment in Russia. This, of course, is completely out of line with the sophisticated skill levels required by scientists in their work. The inevitable result of all of this is the wholesale drain of Russian scientists—to employment possibilities abroad or to other kinds of opportunities in nonscientific areas at home.

The brain drain flowing abroad, although typical for weakly developed countries of the Third World, constitutes a national shame for us and has now assumed the proportions of mass flight. And although older or middle-aged scientists might have difficulty, young people in science have little problem finding work in the West. Indeed, practically speaking there are no alternatives to emigration; a graduate student's stipend even in the prestigious Moscow Institute for Physics and Technology in August 1994 amounted to a mere 25,000 rubles per month, one-sixth of the officially designated survival minimum. Mechanisms to transport talented upper level students and graduate students to the West are already in place and functioning seamlessly. Another problem of the first magnitude is the internal brain drain: the abandonment of science by young researchers, mainly for business. Statistics indicate that 80% of students in technical higher educational institutions in Russia do not intend to work in their areas of specialization and will leave the country or will leave science for business—in a word, they will be lost to science and to education.

The majority of our economic and social problems are reversible. The fall in production could, under favorable circumstances, turn around into a rapid growth mode, such as happened in Germany, China, and Japan. Even our demographic problems could be tackled, although with greater effort. But the destruction of science, if it should go beyond a critical threshold, will become irreversible. Science, even more so than art, relies on tradition and a rigorously professional school. In all of the narrow fields of science the circle of current specialists is small, and their loss would quickly lead to the decomposition of entire research directions. This, in fact, is what is happening in Russia in almost all of the natural and exact sciences.

Of course, our science has in the recent past become burdened with a heavy load of various types of problems and requires reform. But this reform must proceed with forethought and with the participation of scientists themselves. It also must take into account international experience and be the subject of broad discussions in the public arena.

Reciprocal relations in science have an analog to those in horticulture. In the latter, there are those who plant and cultivate the orchard trees (basic science) and those who collect and process the fruit (applied science). It is naïve to think that the planters would permit the harvesters into the orchard during the season in which the fruit was only beginning to ripen. For that reason, all countries that endeavor to be technologically up-to-date cultivate their own basic research. Global experience has shown that these countries attain real economic and social successes, even with only a modest quantity of natural resources (for example, Japan, England, Germany, and the Scandinavian countries). At the same time, many countries that have a surfeit of resources (for example, Africa and Latin America) but which do not have a developed scientific and technological potential are unable to break out of poverty and economic backwardness. It is obvious to us that currently our government is placing too much hope on the natural resources of Russia and has thoughtlessly dissipated the nation's scientific and technological potential. This path bodes us no good.

Science has another, less obvious but no less important role to play in society. From within its midst emerge the most active, passionate members of civil society. The dissident movement in our country was born in the scientific community, beginning with the letters of Petr L. Kapitsa to the regime. During that movement's entire existence scientists played the most active, decisive part in it. We need only recall the towering moral figure of Andrei D. Sakharov and his role in the dissident movement—democrats of the first wave. Thus, the moral influence of science and scientists on promoting the psychological health and clarity of mind of the people, so indispensable for the functioning of democratic mechanisms, cannot be overestimated.

All of this is especially relevant for today's Russia. These days, as basic science declines, its "ecological niche" in the consciousness of the average consumer of the mass media is being filled by all kinds of pseudoscience. This is by no means just a harmless little development. All of these alien visitors and time machines, divining rods, and "concentrators" and "transformers" of cosmic energy narcotize the people, deprive them of a critical perspective on the world, and render their voting behavior unpredictable. For that reason the destruction of science is dangerous in its social implications. Inside the country and abroad, many these days are apprehensive

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about the possibility of a fascist seizure of power in Russia. In fact, it is apparent that in a society deprived of its previous intellectual frame of reference, a totalitarian seizure of power is far more probable than in a psychologically healthy society. Another factor to weigh is that we have little experience with conducting ourselves according to democratic norms. Moreover, many structures essential to democracy, such as a developed justice and court system, are still absent. In point of fact, at the dawn of *perestroika* science and a good system of education were two of only a handful of attributes of civilization our society could claim to have. If we lose them, we risk falling into barbarism, where any kind of democracy would become simply a farce.

We know that our alarm and concern about the crisis of Russian basic science is shared by the scientific community all over the globe. First of all, it has become more and more apparent that Russian basic science is an international resource and that its loss would occasion an irreparable loss for humanity as a whole, comparable in scale to the loss of a whole civilization. Secondly, the international scientific community is well aware that the global problems now facing humanity may be solved more efficiently through a process of free and equal collaboration rather than through a competitive struggle for prestigious appointments in Western universities. And global problems have certainly accumulated during the period of the Cold War. Dozens of destructive earthquakes have occurred, the acquired immunodeficiency syndrome (AIDS) epidemic broke out, ecological conditions on our planet have significantly worsened, the energy situation has become critical, the ozone layer is decomposing, and global warming is taking place. To passively await future catastrophes would be the most short-sighted strategy for humanity. It would be much more reasonable to redirect the intellectual power liberated by the end of the Cold War to an analysis of potential dangers facing humanity and to working out concerted methods of dealing with them. The best way to accomplish this would be to organize a series of international projects that would be completely open and financed collectively by all of the developed countries. Even in its current financial straits, Russian basic science would be a worthy participant in such projects.

From the leadership of Russia and its Parliament we need decisive, well-thought-out, and, most important, urgent measures designed to save science. At issue here are modest sums of money (3% of the gross domestic product), the allocation of which would not noticeably affect the economy but cardinally improve the situation in science.

The top priority is to stem the brain drain out of the country. Unless this key problem is solved, all other measures in the area of science policy will be senseless. It can be done if we establish a system of targeted support for talented youth in science and, of equal importance, for exceptional scientists and their scientific schools. Of course, this support must be provided openly and by means of competitive peer review. We may use as an example the positive experience of those foundations already in operation in Russia, in particular the Soros Foundation and the Russian Foundation for Basic Research. Analogous proposals have been prepared and were discussed and approved at the Cabinet session of June 1994 that was devoted to the problem of the brain drain. According to provisional estimates, allocations of about $100 million would be needed for this purpose. This is the average revenue generated by one oil well.

In addition to mobilizing our internal resources, we should direct attention to the capacities of the Group of Seven. This organization has already established for Russia a system of foundations with a capital endowment of $10 million (for example, the Foundation for Support of Privatization, the Foundation for Small Business, and the Foundation for Stabilization of the Ruble). Creating a new fund for the support of basic research and education in Russia under the aegis of the Group of Seven with an annual budget of $1 million to function for 5 years would be a logical extension of this activity and a real contribution by the West to the cause of creating a new democratic Russia. The activity of this foundation would not be on a purely philanthropic basis, but would be characterized by collaboration with Western scientists and directed toward the completion of scientific and technological projects that could benefit all nations. Of particular interest could be projects that would make use of unique Russian scientific experimental sites and equipment, whose duplication in the West would involve disproportionately high costs and expenditure of labor. Our foreign colleagues have reacted with interest to this idea and are prepared to provide concrete proposals to their governments. The fund in question constitutes about 10% of the funds already allocated by the Group of Seven and which could be partially allotted on the basis of a loan. A corresponding proposal has been sent by a number of members of the Russian Academy of Sciences to the President of Russia.

The urgent measures that we propose are short-term in character and would be in force for about 5 years. Over this time, we hope, the economic situation in Russia will be stabilized and the country will become capable of supporting its science on its own. For the time being, though, the situation is catastrophic and demands emergency measures.