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***USSR: Science &
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Science & Technology

USSR: Science & Technology Policy

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Institutional Barriers to S&T Financial Reforms

917A0089A Moscow PRIRODA in Russian No 12,
Dec 90 pp 3-8

[Article by Doctor of Chemical Sciences Stanislav Aleksandrovich Volfson, head of a laboratory of the Institute of Chemical Physics imeni N.N. Semenov of the USSR Academy of Sciences, under the rubric "The Organization of Science": "How Science Is To Earn Money Under the Conditions of Perestroyka"]

[Text] The rapid changes in the economic life of the country has roused the scientific world: Economists and sociologists have already dashed into the middle of the struggle, historians are revising their works, while natural scientists and engineers have started to make money. After all, when the management of an institute warns that it will provide only 50 percent of the wage fund, even people, who are not very experienced in economics, begin to understand that it is necessary to do something. But here there is also the rapid rise of inflation, when even the salaries of doctors of sciences, which in the past were sizable, have depreciated. To say nothing of the basic scientific forces and young people, to whom a starting salary obviously below the invisible poverty level is offered.

The market economy, which just recently was cursed, is now the motto of perestroyka. We understood long ago that wherever it thrives, scientists live rather well—they enjoy respect, dividing their interests according to their tastes and abilities between firms and universities. And whereas earlier mainly their salaries and opportunities to travel interested us, now it worries us where they get the assets and for what they are paid.

The Recent Past

To tell the honest truth, it was not that bad. They respected scientists (of course, prominent ones, who occupied the top rungs of the hierarchical ladder), asked their advice, quite often openhandedly released assets, and put them in charge of major projects and programs. They did not simply trust them, they had faith in them.

True, as we now know, scientific and technical progress in the West was set into motion not only by scientists—there were engineers, inventors, managers, banks, and, finally, the consumer market, which craved for new goods and services, but then demanded ecologically clean products and technologies. It appears that precisely it, and not a group of "eggheads," started the scientific and technical revolution.

However, under our conditions, when not the people themselves, but the government was responsible for the well-being of the people, it was difficult to understand the complexities of the market economy. It is easier to make science responsible for the consequences of scientific and technical progress and to commission it, more precisely, its hierarchies, to formulate the corresponding programs.

These programs were accepted, approved,...and not fulfilled (or were fulfilled, but often led to undesirable results). In some cases scientists did not take something into account in their calculations, in others the performers got something mixed up, but in the enormous majority of cases industry and agriculture seized in concert the fruits of the scientific and technical revolution and preferred to live and work in the old way, by the most extensive method there is.

How many hundreds, no, thousands of arrows the press shot at the opponents of the most useful inventions. And there was no result. How many examples there are of when unclaimed inventions drifted abroad, and then returned, but for hard currency.

It was particularly irritating that the calculations of the standard economic impact from scientific developments yielded a stunning result. However, the attempts to analyze in depth the causes of the low efficiency of real work led to the depths of the economy and quickly came into conflict with ideological doctrines.

The aspiration to restructure science from above and to achieve its greater effectiveness, without changing anything in so doing in industry and agriculture, led nowhere.

So just where were the strategic miscalculations made? For given any economic reforms state scientific programs will remain. In the United States the Congress annually approves them on the representation of the president. A similar procedure, perhaps, will also be developed in our country. But for the making of a sound decision first of all an expert examination is needed.

The Three Components of Science and Technology Policy

The institution of the expert examination, departmental and extradepartmental, has existed many years in our country. But until recently the very principle of the selection of experts, their total independence, and the absolute lack of responsibility for the made decisions had the result that the expert examination was an obedient appendage of the state bureaucratic machinery. (Moreover, an expert examination was not made at all with respect to many strategic questions of the development of the economy.)

Here are examples from the field close to me. The development of the production and consumption of synthetic polymers caused uneasiness over the last 30 years. It is well known what kind of industrial boom in the West followed after the development in the late 1950's of a wide range of new plastics, the discovery of stereospecific polymerization, and other achievements of the science of polymers. The corresponding sectors of industry, including machine building, the production of motor vehicles and household electrical appliances, construction, and so on, began to develop rapidly.

Domestic science also reacted in good time to these changes. Subdivisions, which engaged in the study of polymers, appeared at nearly all academic institutes and higher educational institutions of the chemical type. And nevertheless domestic industry fell disastrously behind.

What is the reason? The directors of the economic services of the main planning organs, who lost their head in face of the abundance of new problems, developed "the criterion of irreplaceability," in conformity with which only the production of irreplaceable materials should be developed. Among such, as they explained to us, are: synthetic rubber, fluorinated and organosilicon polymers, which are necessary for defense sectors; after lengthy disputes they also included polyethylene here.

But they gave polypropylene a hostile reception, inasmuch as it was believed that it is entirely possible to replace it with polyethylene. As a result the ratio between the production of polyethylene and polypropylene in our country comes to approximately 15:1, while in the world it comes to 2.5-3:1.

Since there was no demand for propylene, methods of the deep refining of petroleum, in which the yield of propylene was greater than the yield of ethylene (3:1), were not developed. And now we are reaping the bitter fruits of such a shortsighted policy, for the work on the development of a domestic technology of the synthesis of polypropylene was frozen and it is necessary to buy the entire technology.

The incident was repeated during the discussion of the program of the production of low-density linear polyethylene. The head scientific research institute—the Plastopolimer ONPO—and the former Ministry of the Chemical Industry came out in a united front against it. The "sectorial" point of view won, and 10 years later we are buying the corresponding works from western firms.

The "criterion of irreplaceability" struck a terrible blow to the development of engineering plastics—polyamides, polyformaldehyde, linear polyesters, and polycarbonates, which replace metals in machine building, the automotive industry, instrument making, and so forth. They make it possible to decrease the weight, to reduce the losses from corrosion, and, what is the main thing, to increase labor productivity and to decrease expenditures.

Precisely engineering plastics ensured enormous progress in the automotive industry and the production of household appliances. But in the early 1960's the "criterion of irreplaceability," which was multiplied by the lack of interest of the monopolist consumers, blocked like a toll gate the paths of development of this direction. The numerous appeals of scientists to the government were useless. Now we produce one-fortieth as much of these plastics as in the United States and are annually forced to buy tens of millions of dollars of them.

The institution of scientific and technical forecasts is closely connected with the institution of the expert

examination. Until the middle of the 1960's forecasting in our country was not in fashion, the analysis of foreign scientific and technical information completely replaced it. But even after emerging, it remained unclaimed, since neither planning organs nor sectorial ministries used it and took it into account in their work.

It is possible to explain the distortions in the development of the production of mineral fertilizers, pesticides, and synthetic proteins and many other state programs, which required many billions of rubles of outlays and did not yield adequate results, precisely by the lack of an independent expert examination and serious scientific forecasting.

Unfortunately, hardly anything has also changed now. The expert councils and their directors, which distribute on a competitive basis assets for the implementation of state scientific and technical programs, again consist of specialists who are interested in pushing through their own projects.

An interesting detail. The analysis of the composition of the expert councils for the North Siberian Gas Chemistry Complex showed that Muscovites make up 90 percent of them. The reason is trivial: The State Committee for Protection of the Environment does not have the assets to pay for business trips and the opportunity to reserve rooms at hotels.

True, public opinion is raising its voice, demanding an objective, competent expert examination and the enlistment of foreign specialists, to which we, incidentally, are not accustomed, but which is widespread in the world.

The third component of any science and technology policy is the analysis of the results of the fulfillment (or nonfulfillment) of state programs: Were the expenditures justified, did the national economy obtain the expected impact?

Here, too, for many years we have been faced with the obvious reluctance to analyze the committed miscalculations and mistakes and with the unconcealed camouflaging or the cunning replacement of some figures with others. No sooner does the term of some programs manage to expire, when new ones are developed with much pomp, moreover, it is considered good form not to mention or to talk in passing about the old ones. The lack of an open objective analysis led to enormous losses and distortions in development.

The Purchase of Technologies and Equipment in the West

It is possible to judge the effectiveness of these purchases from the declared value of never installed equipment—5 billion foreign exchange rubles. But knowing how zealously managers of enterprises to avoid fines conceal from the bank and control organs this uninstalled equipment, one can safely double this amount. If you take into account its inefficient use and the perpetual lack of spare parts, the losses will be astronomical.

When analyzing the reasons for the organization of these purchases, starting with the drawing up of requests and ending with the decisions of the USSR State Planning Committee and the government, you are struck by the complete irresponsibility of all the participants.

A vivid example is the attempt made in the 1970's to repeat the Japanese version of development, which is based on mass purchases of works of general-purpose plastics: polyethylene, polypropylene, high-impact polystyrene, and polyvinyl chloride. Favorable international market conditions made it possible to make these purchases on a compensatory basis, when over seven-10 years it was necessary to pay for the equipment and technology with products, having turned over 40-50 percent of their output.

The estimates of the effectiveness of such operations are contradictory. The firms, which are the suppliers of the equipment and technology, as well as the banks, which grant them credits, do not remain at a loss. The amount of the payments is approximately 30 percent greater than the cost of the equipment. However, it is a matter of something else: The experience of Japan, when, having made in a short time mass purchases of licenses and equipment and having established joint ventures, the country was able to develop its own scientific and technical potential and to take second place in the world in the production of plastics and first place in the sale of licenses, astonished everyone. And this is given the nearly complete lack of raw material resources.

A similar move was also planned in our country. But the mechanisms of the enlistment of scientific collectives and design organizations in the assimilation of the purchased technologies not only were not developed, but in general dropped from the field of view. The many volumes of descriptions of "know-how," which were purchased together with the licenses, were sent unclaimed to the archives. For the purpose of "saving" pilot-scale plants, without which the improvement of technology is impossible, were also not ordered. Of course, any fundamentally new developments were out of the question.

In general the vogue of buying "turnkey" technology and equipment as a complete set reduced to a minimum the opportunity for domestic science to participate in the development of the latest works. And here is the result: During the planning of the Tyumen Gas Chemistry Complex it turned out that it is impossible to use there any domestic technology—either they do not exist at all or they are unreliable and inefficient.

Now, when joint ventures and new forms of economic cooperation are beginning to develop rapidly, many approaches have to be revised. Apparently, "fully assembled" processes, machines, and instruments will recede into the past, the allocations for the simple reproduction of foreign equipment will be sharply reduced, but then the price of original ideas and developments, which were not claimed earlier, will increase greatly.

With Whom Is One To Trade, How, and in What?

Recent years have been marked by an ever greater flow of guests—representatives of firms which are striving to enter into business relations, particularly with our scientific research institutes. According to the ideas that have formed in the West, we have an unusually high number of scientific associates, gigantic research centers, and a quite high scientific level. At the same time everyone has heard a lot about the difficulties of our economy and the impossibility for Soviet scientists to implement their developments.

Thus, the West rates quite highly the potential of domestic science, especially basic science, while being very skeptical about the level of technology, patent studies, and information science (it reached the point that the Japanese tried to buy from the All-Union Scientific Research Institute of State Patent Examination the archive of rejected applications for inventions).

But these are preliminary evaluations. The guests want to buy developments, which have not been claimed by our industry, and to order new ones, on the basis of our original ideas. More rarely they propose to conduct research in accordance with their plan. But they treat very coldly the proposal to establish joint ventures for the assimilation of our developments. I have more than once had occasion to hear that the joint venture is the height of cooperation, the establishment of which it is possible to begin only after the partners study each other and the situation as a whole in depth.

We need to win trust: It is possible to begin with the sale of licenses and the performance of custom jobs (research projects). The proposed prices are obviously lower than the international level. Thus, in the United States a year of work of a scientific associate costs about \$100,000, of them \$30,000-40,000 are spent on the wage. However, the guests are perfectly well-informed about the fact that our spending on research is one-tenth to one-fifteenth as much (according to the official exchange rate).

So far we have had experience only in academic contact: University professors came and told about their works which were published several years ago. In turn a strictly specified contingent of scientists traveled to international conferences and on invitation, where it also reported on its published works.

Contact with firms is of a fundamentally different nature: They want to buy, we want to sell. It is impossible, unfortunately, to sell published scientific works. Ideas, which are not supported by experimental data, are also not in demand. Great importance (especially in the United States) is attached to the patenting of developments.

Firms impose protocols of the confidentiality of talks, often categorically prohibiting their names and the very fact of the talks to be mentioned. Our inexperience and ignorance in legal and financial questions are not taken into account or, on the contrary, are exploited.

I remember my discussion 20 years ago with a patent lawyer of the firm Ron-Pulenk. Having heard my arguments, the elderly gentleman suddenly asked:

"How many years have you been engaged in patent studies?"

"Already three years," I answered with the pride of an amateur.

"And we have for 300 years," the devastating response followed.

Unfortunately, over the past years hardly anything has changed.

Regular meetings with firms make it possible to look in a new way at our knowledge, experience, and organization of work; it is difficult to switch to active cooperation—the heavy burden of obsolete principles pulls down.

People are tired of talking about the constant shortage of equipment, reagents, materials, and laboratory glassware. For many years our leaders persistently "extorted" wage rates, while showing little concern for the efficient organization of labor. To date self-service in the spirit of the 18th century remains the basic job: It is considered normal when a research himself gathers literature, analyzes the patent situation, writes a survey, and seeks reagents through friends and acquaintances, organizing through them the necessary measurements and analyses.

Ridiculous restrictions are paralyzing initiative. While having the assets, a director does not have the right to increase, if only temporarily, the number of associates and to obtain credit. Theoretically an enterprise can even receive currency, but against the guarantees of...a foreign firm! It does not trust its own USSR Bank for Foreign Economic Relations. It is ridiculous and humiliating.

For the present we are for the most part confining ourselves to acquaintance with major foreign firms. Such giant firms are a difficult partner; they have their own research centers, which cost them rather dear, therefore, to farm out research projects even for a low fee means to deprive oneself.

Another peculiarity of major firms is the aspiration to buy exclusive rights to a custom job. Then the authors of the research project will not obtain information and access to the subsequent work of the firm on this project. Engineering and the stages of the production and testing of pilot equipment are the weakest points of domestic technological science, and precisely here major firms are lowering the toll gate in front of us.

Recently one major American company found in the USSR an active partner in the person of an academic scientific research institute. Without having anything directly to do with the proposed theme, it had the sense to announce an all-union competition for the best research project, that is, it acted as a mediator. There is

nothing bad in that. In the world there are a large number of consulting and intermediary firms, the fee for their services comes to 4 to 12 percent of the value of the contract. In our country intermediary cooperatives, which, I hope, will fill the existing vacuum in information exchange and the search for partners, are appearing one after another.

In this case another thing puts one on guard—a major firm, having obtained exclusive rights, will shut off opportunities for contact with other firms. But comparatively small engineering firms, which deal with the development of equipment and technology, are capable of offering far more favorable terms, for example, the joint ownership of technology.

An example already exists: The Plastmassy ONPO, after developing an original technology of the production of polycarbonate, concluded an agreement with two engineering firms. Millions of dollars plus great international prestige have already been earned from the joint sale of the technology and equipment. A line of those wishing to purchase this technology from Europe to the Far East has formed. If the research project had been sold (there has already been such experience), the earnings would have decrease to one-twentieth to one-fortieth.

Firms are also displaying an interest in academic research, but categorically refuse to finance it, at times explaining cynically: Your results will in any case be published.

Thus, is it worth turning, perhaps, to medium firms? They have a good "appetite" and do not have their own research centers. But it is necessary to find them. And here consulting firms, which have a permanent contingent of consumers, in a number of cases up to several thousand, are at your service.

Another means is appearance on the international market, the stepping up of the activity of the Litsenzintorg All-Union Association, the Vneshtekhnika All-Union Association, and intermediary cooperatives under the conditions of growing competition, and the improvement of the laws that regulate foreign trade activity in the area of science and technology. From the old-fashioned "hold on and do not let go," by levying a predatory tax of 85 percent and depriving the participants in developments of the deserved reward, it is necessary to switch quickly to international law norms.

What share of the jobs is it possible to finance in this way? A survey of staff members of western universities, which was conducted by us, yielded a very mixed picture—from 0 to 70 percent and more, everything depends on experience, contacts with industry, and prestige. On what can we count? What is the possible degree of integration in world scientific activity?

For the present, it appears, a low degree, on the average 3-5 percent of our developments arouse serious interest.

If we want to increase this share and to earn more, we will have to study the market and, perhaps, change themes.

Unfortunately, the trend of the overall reduction of the state budget and, consequently, the financing of scientific research is being clearly observed. Local soviets and enterprises are becoming the owners of assets. The difficult time, which is being experienced by practically all the enterprises of the country, has already adversely

affected the share of allocations for scientific developments, which sectorial scientific research institutes and the higher school have felt in full.

Incidentally, there is also the opposite trend. Strict ecological norms and the need to update the assortment and to attain the world level of quality will force enterprises to seek contacts with scientific institutions. However, the new way of life will require the radical reorganization of the entire system of scientific institutions.

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Scientist Notes Positive Aspects of 'Brain Drain'

917A0081A Moscow POISK in Russian No 1 (87),
3 Jan 91 p 3

[Interview with Corresponding Member of the USSR Academy of Sciences Garri Izraylevich Abelev, director of the laboratory of immunochemistry of the Scientific Research Institute of Carcinogenesis of the All-Union Oncological Scientific Center, by POISK correspondent Anna Malysheva under the rubric "Point of View"; date and place not given: "A Bitter Sip of Freedom"—first four paragraphs are POISK introduction]

[Text] "The 'brain drain,' unfortunately, is just as indisputable and sad a fact of our present reality as social instability or empty stores. We have become accustomed to it, we have resigned ourselves to the thought that we have nothing to oppose to it, and if we find out that somewhere, at some scientific institute BRAINS have appeared, we immediately sense an internal willingness to bid farewell to them forever, because 'what is to be done?!'"

Garri Abelev is a scientist of the older generation, a well-known immunologist, a corresponding member of the USSR Academy of Sciences, and the winner of the USSR State Prize and a number of international prizes. The readers of POISK are familiar with his reflections on the morality of a scientist (No 16, 1990). G. Abelev does not regard emigration as a natural solution of all the problems of young scientists, just as he did not regard it as a normal solution for himself even during the most difficult years of his own life and the life of his laboratory.

We are certain that his point of view will interest both those, who have firmly resolved to leave to work abroad, and those, who have not yet made a final decision.

POISK correspondent Anna Malysheva talks with Garri Abelev, director of the laboratory of immunochemistry of the Scientific Research Institute of Carcinogenesis of the All-Union Oncological Scientific Center.

[Malysheva] Garri Izraylevich, I know that you often use your influence and foreign contacts to organize international grants for young scientists and to give them an opportunity to do some work abroad. But you understand that for many of them this is, quite possibly, the last journey from the country....

[Abelev] Yes, of course, although in each specific case I would not want to think that way. But we simply need to attain the level of international science and to apply the most exacting international criteria to our scientific research. A system of communicating vessels, in case of which the level of world science can influence the level of our science, should as if be developed. International publications and, to an even greater extent, work contacts with leading scientific centers of the world are a necessary condition for this.

[Malysheva] When you assist the practical study of young scientists abroad, whose interests do you represent first of all: those of your institute? Of the homeland? Of world science?

[Abelev] One should not divide science among countries and especially institutes. Science is international, and in it not so much "where it was done" as WHAT was done and HOW is important. But here it should exist and develop in each country, and such a country as ours will not be able to exist at all without science and scientists....

[Malysheva] But then thousands of our scientists, as it turns out, are entirely able to exist without our country.

[Abelev] Of course, it is a great pity that this is so, but still one must not be too afraid of the fact that a significant portion of our science will move to the West. After all, in past years the equilibrium in the scientific contacts of the USSR with other countries was greatly disturbed. Sooner or latter equilibrium will be established.

Although, honestly speaking, I did not expect that work abroad—not temporary work, not practical studies, but permanent work, for many years or forever—would prove to be so appealing to our young scientists. I did not expect that many almost without regret would abandon the new opportunities which have been afforded here. We waited so long for these changes! Our generation, in essence, lived on the hope that the time would come, when we would be able to influence the structure of our science, its life and level, the nature of our entire society.... What happened in science and society after the "thaw" of the 1960's and until the middle of the 1980's was contrary to human nature, and it was clear that this cannot last forever. But we also could not dream that such global changes would occur so rapidly. We strove merely to create a certain community of spiritually close and intelligent people, who would be able to exist in a fitting manner within the sick society.

[Malysheva] The generation of younger scientists, it seems to me, perceives slightly differently the present situation. They see in it not so much extensive opportunities as annoying and interminable complications.

[Abelev] And it is a great pity. Without good young people all our attempts to change science and society are futile, and there is no one, for whom to engage in this.

And all the same it seems to me that a true scientist, if only owing to his duty to science and his civic duty, will not be able to ignore the opportunity, which has appeared for him, to influence actively and positively the structure of science and society in his country. I am convinced that a person, who consciously evades the solution of global problems at the place where he has been put by fate, is evading his own human and scientific duty. While all the real social and human problems are now here, in our country, and not in the States, which for the most part have already solved their problems.

Incidentally, everyone makes his own choice, while gaining something and sacrificing something. And during the times of stagnation we constantly chose between duty and well-being. Should one condemn or not condemn dissidents? Should one take part or not take part in the public trial of a person who has decided to emigrate? Should one push through to oneself an associate with "point five" or is it better "not to arise"? Such questions—questions of duty, honor, truth, and justice—constantly arose during those years. And those years, it must be said, did not exchange life for trifles, but taught us to distinguish the main thing from what is of minor importance. What is happening with us now can occur only once in a lifetime, moreover, not in any lifetime. We now have biblical times, when we can live on truly human passions, on truly human aspirations.

[Malysheva] Yes, all that is true. But on the other scale there is well-being....

[Abelev] Not only it. First of all there is the opportunity to realize oneself, which seems more easy. But here, too, everything is not so well-defined. American science, for example, lives mainly on grants. An application is submitted for one study or another, and assets are issued precisely for this work on a competitive basis. Not only equipment and reagents, but also associates themselves are paid for. However, only 15 percent of the applications are satisfied, and not because the other 85 percent are that poor, but because they do not come up to the most exacting demands.

As a result such keenly competitive relations among scientists, which, generally speaking, are not characteristic of the scientific community, are developing in the West, particularly in the United States. Scientists live on the sense of common interest and cooperation, which is based on it, but, having come under the conditions of tough competition, they have been forced to wreck this cooperation. They no longer hurry to share their successes, but, on the contrary, try to withhold them until publication and to derive from them as much as possible before divulgence.

The dependence on the holder of grants has increased sharply. When hiring scientists for one grant or another, he takes close care that they work only on this specific problem. In science the most valuable thing is freedom in the choice of the goals and means of research, the right to creativity, and independence. In science people do not work for hire. In science people work by reason of interest.

The type of scientist, which has formed in recent times in the West and in part in our country, is often called the "sports" type: well-trained, highly professional, capable, fast, technically highly developed, and inflexible in competition with colleagues.

In my opinion, this is not the best type. This is a developer, who works on already formulated problems and takes paths that have already been specified.

Freedom in general and freedom from the pressure of "productivity" in particular are needed in order to pose new problems.

Americans say: "Our young people have unlimited opportunities, but only one chance." The genuine researcher simply needs the right to make a mistake, the right to a second change, and the right to take a risk. And the "sports" type of researcher is just as incompatible with the nature of a real scientist as the stagnation period is with human nature.

While working in western laboratories, our young scientists will inevitably come to understand what enormous values these are—independence, the freedom of creativity, the stability of the situation, and what there is in our country, although not everywhere and by no means always in the best form. They will also come to the understanding that it is within their power to improve Soviet science so that stability would not mean conservatism and sluggishness, "the right to make a mistake" would not be identified with the lack of conscientiousness, while the absence of the pressure of "productivity" would not dictate a slack work pace.

The elements of the grant system, which is now also being introduced in our country, are in many respects a salvation for Soviet science, but (!) given the preservation of the stability of the situation and if only the minimum provision of research. In America, incidentally, the greatest value is a permanent job. In improving the organization of our science, we should take into account without fail that stability in combination with additional possibilities and the flexibility of the grant system can serve as a serious counterbalance to "the drain of the most valuable brains."

[Malysheva] But many Soviet scientists are working abroad under contract, that is, are not losing their "permanent job" here. In essence, this is the same "brain drain," although a temporary one. In your opinion, are any other types of contracts with foreign scientific institutes possible, but so that this would be more advantageous for our science?

[Abelev] Of course! First, we need to gain access to international grants, which previously were closed for us. These assets would make it possible to boost the level of our research and its supply. For many people this, undoubtedly, would serve as an adequate basis to stay and work in the country.

Moreover, foundations, which, quite possibly, would undertake to finance scientific developments in the Soviet Union, for example, through mixed firms and companies, exist in the West.

It is also time to think about establishing joint laboratories, where part of the work would be performed abroad and part, in our country. Nothing is so conducive to the increase of the quality of research and the approach of the international level as joint work. In foreign laboratories the most significant portion of the assets is spent

on the remuneration of the labor of scientific personnel. The most expensive thing is people and their skills. If, for example, the Soviet associates of a joint laboratory are paid by the Soviet side, even at higher rates, this will sharply increase the personnel capabilities of the western side and will sharply improve the provision of research for our side.

And, finally, a large number of scientific institutes, which were founded by prominent patrons, exist in various countries. As a rule, they are extranational and international board of directors supervise them. Why not also establish such institutes in our country?

But everything said makes sense only when social upheavals have not yet exceeded the bounds of civil war and have not developed into the total alienation of nations, which feeds mass emigration.

Problems in Evaluating, Certifying Scientific Personnel

917A0085A Moscow *PRIRODA* in Russian No 12, Dec 90 pp 71-73

[Article by Doctor of Chemical Sciences Z. V. Todres, the Institute of Elementoorganic Compounds imeni A.N. Nesmeyanov of the USSR Academy of Sciences, under the rubric "The Organization of Science" (Moscow): "Certify or Evaluate?"]

[Text] It is difficult, as is known, to learn democracy. Especially after studying for decades under the supervision of the authorities something completely different: to believe and repeat that your democracy is the most democratic in the world, and in this area it is not that one ought to learn—one ought especially not plunge into thought. I would like to write off some peculiarities of today's restructuring (and, apparently, democratization) of science to the inevitable costs of education and to the inertia of that, the domineering, democracy. For example, the fact that they consulted on the first steps of this restructuring with the very ones being restructured and democratized no more than during the times of the most democratic democracy in the world. But these steps (for example, the reorganization of the system of scientific positions and the certification of personnel, which is connected with it) directly or indirectly affects every science worker.

Now, after some time has passed, it would be a good thing to look at this process from a fresh angle, from the standpoint of gained experience. How is "personnel surgery," about which any "mean statistical" director of the era of stagnation dreamed for so many years, being used in science? Undoubtedly, today our science cannot get by without surgical steps, including painful steps? But the scalpel is a critical and rather dangerous instrument. I want very much that they use it skillfully and, what is the main thing, knowing exactly for what: Precisely what disease they intend to "cut" from the living, although sick, body of science and how. Has this condition been observed?

Let us begin with the fact that certification was not based on any set of criteria, which was formulated explicitly and was uniform for everyone. True, this, perhaps, is even for the better. It is difficult to propose a set of formal criteria that actually reflect the complex, diverse, and creative activity of a scientist. Many people even assert that it is impossible. But without this the calculation of the scores, the filling in of columns with daggers and dashes, and so forth will afford free play to the most diehard bureaucracy.

The "Hamburg assessment," which is traditional for science and is conducted among one's own people quite strictly, although not always entirely deliberately, is often opposed to the formalized evaluation of scientific personnel. There are also methods, which were developed in scientometry and sociology, of evaluating such an elusive substance as scientific authority: the analysis of citations, references in surveys, and direct evaluations given by colleagues (not with respect to an institution, but with respect to a narrow specialty!). Each of these methods suffers from one-sidedness and limitations, but their various combinations give in general a quite accurate picture of the hierarchy of prestige in one or another field of knowledge. Thus, did the organizers of certification attempt, perhaps, if only somehow to use these methods and to organize the gathering and processing of the corresponding data? The author of these lines—and owing to the range of duties he also has to take an interest in scientific organizational problems—does not know of such a practice.

Another hypothesis remains: The certification commissions were simply selected from the most authoritative representatives of the scientific community, whose evaluations reflect quite accurately and even form themselves the public opinion of their colleagues. And this being the case, there is simply no need for any additional evaluations, formal or informal. It would be possible to argue with such an approach, but there is no need for this: The Statute on Certification did not establish for the commission even the minimum "quorum" of highly skilled specialists in the specialization of the person being certified. Often authoritative scientists had to appear before a court of people with a lower scientific status.

In institutional commissions it would often be simply impossible to ensure the necessary quorum. Given the present differentiation of the sciences at one institute there simply cannot be a sufficient number of highly skilled specialists in a large number of fields of knowledge. Noninstitutional commissions, which are accountable not so much to any authorities whatsoever as to their own scientific community: for example, to all organic chemists, solid-state physicists, geneticists of the country, would be needed for this. And it is right here, apparently, that the trouble lies.

The author realizes that all his foregoing discussion will seem naive to a well-informed person. More precisely, its basic premise: That the careful and objective evaluation

of "who is who in science," the encouragement of worthy people, and the identification of unworthy people were the genuine (not simply proclaimed) goal of certification, that its proclaimed and real goals coincided. In actual fact the pursuit of "personnel policy" was the real (in contrast to the proclaimed) goal. But does personnel policy really not consist first of all in encouragement, in the selection of the most capable and productive people? A Martian or a scientometrist working at home, who knows about the procedures at a scientific institution only from the analysis of scientific publications, would be entirely capable of asking such a reasonable question: From the standpoint of our present science, both of these figures are, apparently, equally imaginary. But any other person clearly understands that the essence of "personnel policy" lies in something else, although he cannot always say just as clearly in precisely what it lies. Incidentally, to some extent he also knows this. For example, he understands that regardless of specific slogans this policy consists, first, in the fulfillment of the plans of the "authorities," be it the Central Committee, the Council of Ministers, the State Committee for Science and Technology, the Academy of Sciences, or any other instance, which is authorized to issue not too precisely worded directives without the least responsibility for the consequences; second, in the display of vigilance with respect to those who for some reason are not worthy of the trust of the "authorities." One must not, of course, farm out either one to the elemental forces of scientific democracy and to the chance occurrences of scientometric analysis.

But in specifically what did the essence of "personnel policy" during the present certification consist? The discussion of "vigilance" is a separate one, especially as this time its claims were quite moderate. But the designs were fairly transparent. In a historically short time to increase the effectiveness of our science, having freed a portion of the wage fund and having raised slightly the wage of those who remained, so that they would "feel" and would work better. Particularly in "urgent directions." The authorities reserved or reassigned to the board of directors the definition of "urgency."

It is clear that no interinstitutional (and even intra-institutional) commission, which has been put together on a subject basis, will worry either about the observance of the norms of "apportionment" or about the relatively uniform distribution of new positions among subdivisions. It will also not coordinate its ideas about the urgency of various directions with the views of the board of directors. The commission, which is formed by the board of directors itself, the party organization, and the trade union organization, which to a greater or lesser degree are accountable to the same authorities for the fulfillment of the same directives, is another matter. Here its loyalty is guaranteed. Here it is also possible to allow oneself the supreme display of democracy—the making of decisions by a secret vote of this commission.

But does all the evil, perhaps, also consist in the lack of democracy when forming the commissions and when

approving their decisions? Let the scientific council, which is elected by the scientific collective, form the commission, let this council or even the assembly of the collective hear the appeals! There were such calls. And it is possible to understand their authors. But let them, these authors, imagine for a minute that, say, the council of the labor collective of a textile factory obtained the powers to decide in what everyone is to dress and how much is to be paid for this. And after this let them display themselves in front of a mirror (or in front of the wage). Such an alternative to directive planning will hardly delight the most ardent supporter of production (or intrascientific) democracy.

The analogy is not as artificial as might seem. For the present in science there are no real cost accounting and no real competition for access to sources of financing, for the present the financing of the scientific institution (under whatever pretexts it is carried out) is based on strong-willed decisions, on the figures "from what has been achieved," and so forth—any broadening of the rights of the collective in the area of scientific and personnel policy will differ little from the offered example. In both cases the interests of the collective will have overwhelming superiority over the interests of business. But the image of the director as an individual exponent of "the interests of business" today also evokes skepticism—he, after all, is also not accountable in practice for the triumph of these interests. (It is a matter, of course, of accountability not to the authorities—we have already "gotten through" this—but to the consumer. In the case of applied research, it is accountability to the client, who, in turn, is accountable to the market. If this is basic research, it is accountability to the scientific community. Colleagues act as the consumer of the results of basic research, although a unique consumer. They pay off the authors of these results with a no less unique currency—recognition, as was shown by sociologists 50 years ago. While under the conditions of competition for access to sources of financing this unique currency can be "converted" into completely trivial rubles and dollars, rates and instruments.)

Basic science always was and should remain nonprofit. All the talk about the "cost recovery" of science is meaningless without its "self-marketability." How is one then to get to the development of science—after all, it is determined first of all by the logic of knowledge! It is also necessary to form tax policy in science more correctly. This pertains not only to scientific institutions, but also to enterprises that are proceeding to the practical use of scientific results. In these cases it is necessary to ease the press of taxes, and at times even to finance the laborious process that only in Russian is called introduction.

If the accountability to the consumer is real, the director (or the collective—this will no longer be so important, inasmuch as their interests coincide) himself will see to it that the merits of his associates are discussed by competent colleagues, as is happening today throughout the world.

Always, under all social formations, policy was "the concentrated expression of economics." Today we are forming the personnel policy of science "by way of preparation" for the changeover of scientific institutions to a new economic base. But to what extent this forming personnel policy will meet the demands of the economic base, which for the present is vague—we will look into these trifles later. We will have to—we will be carrying out perestroika.

Of course, it is very difficult to develop a mechanism of the accountability of science to the consumer and even simply to organize a competent examination. But it is easy to put together a commission made up of reliable people. But seeking here means that are a little simpler and a little cheaper and beginning "personnel surgery" without the necessary economic organizational mechanism are the same as, according to the well-known anecdote, seeking a key not where you lost it, but where it is lighter. And it is even worse: There is the chance of losing the latter.

A very simple example. Even today many healthy, efficiently working small collectives exist in our science. The allotment falls to them in approximately the same way as to the others: The certification system does not suggest any methods to distinguish such collectives from others, one must also not rely too much on the scientific taste of commissions. But meanwhile, whereas the allotment cannot hurt too much poor and even average collectives, for efficient, but small collectives it can prove to be disastrous. A scientologist and psychologist could tell the members of the certification commission that in any productively working scientific group a certain division of roles forms: the generator of ideas, the critic, the collector of facts—the erudite person, the scrupulous experimenter, and, finally, simply the diligent worker, who is no genius, but whom the given collective needs for routine work. The details of the role typologies differ among different authors, but the principle does not raise doubt: The role division is recorded in a large number of empirical studies, including domestic studies. And the collective is capable of working efficiently as long as a certain "assortment minimum" of roles is maintained in it, although its members themselves might not realize the "role distribution," and the commission is even less capable of doing this.

"Personnel surgery" will come into conflict with the role distribution even in its most mild version—if they do not dismiss the associate, but merely reduce his wage. After all, for the science worker such a loss is far more appreciable than for many other categories. The wage level here traditional reflects the status of a person, which in science was always one of the main stimuli—we have already mentioned that the community pays its members for their contribution to the development of science with recognition and status. And deformations of this "currency" are just as disastrous for the functioning

of science as the present deformations of the monetary system are for the functioning of the economy.

It is at least naive to expect that the certification commission will begin to consider such "subtle effects." It is possible to count on this only when the economic status of the collective and, hence, both the wage of the very people who certify and the status of those, who assigned this work to them, depend on the correctness of the decisions being made. Then the personnel policy of science will be able to become truly scientific. Then there will be a stimulus to use the methods of evaluating scientific institutions, microcollectives, and individual scientists, which for decades have been undergoing development throughout the world. Then assets will also be found for the establishment of scientometric and sociopsychological services and for the organization of the one-time and permanent examination of projects, applications, and results.

It is necessary to begin accumulating evaluation experience already today. For this it is necessary to set up small cost accounting groups made up of psychologists, sociologists, and scientologists. Scientific and scientific engineering societies could assume the role of "sponsors" of these groups: Today precisely they represent the scientific community not by departments, but by specialties.

It is merely necessary to clearly realize one circumstance: The independent scientometric and sociological analysis and the independent substantive scientific examination cannot serve directive management. If we intend to reserve for any instance whatever, including the Presidium of the USSR Academy of Sciences, the opportunity to monitor scientific activity closely, it is better not to take the trouble. Either the independent analysis "will eat up" the power of any instances, or these instances "will eat up" its independence and objectivity. Only full cost accounting for jobs, which are of commercial value, and the legislative strengthening of the mandatoriness of an extradepartmental examination, which relies as much as possible on the informal and semiformal mechanisms of science, for every "grant," every special-purpose subsidy, and every state order, which are paid for from the budget, can be a guarantee of the latter.

In science democracy consists not in the making of decisions by a majority of votes in case of a secret ballot—although at times this is also needed. It lies first of all in the direct dependence of the status of scientists, scientific institutions, and scientific directions on the evaluation of the entire scientific community, which forms spontaneously and is most democratic in its nature. Such democracy for more than one and a half centuries has constituted the basis, the natural medium of the development of basic science throughout the world. Wherever it was undermined, science degenerated. It is not necessary to invent this democracy. It is necessary to remember it.

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'Loopholes' in Draft Law on Inventions, Patents

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[Article by Candidate of Technical Sciences V. Ya. Yeremin, the USSR Ministry of Defense (Moscow): "New Loopholes Around Inventions"]

[Text] As a whole the draft of the Law on Invention is in keeping with the spirit of perestroika, and after its passage and putting into effect one should expect an increase of creative activity, particularly in the area of the introduction of inventions.

However, there are a number of inaccuracies, omissions, and "big holes," which will make it possible to derive additional profit by means of tax breaks, without the introduction of inventions.

Article 35 of the Law (the state stimulation of the use of inventions) should become the mainstay of the economic levers of the introduction of inventions.

The fact of the introduction of an invention in a product, which is being manufactured, is confirmed by the consumer, who agrees to pay a higher price for a product which, owing to the inventions incorporated in it, has added consumer properties. If the fact of introduction is confirmed by the ruble of the consumer, who is not interested in the overstatement of the price of this product, no one, except the producers themselves, can confirm the introduction of an invention in technology. For technological inventions have a slight effect on the consumer properties. Inventions, the introduction of which is difficult to monitor, can become a tempting enticement for the concealment of the increase of the profit (revenue) of enterprises from taxation, which was actually derived due to other sources.

For this it is sufficient, if one does not have one's own inventions, to conclude with the patentee a competent licensing agreement, in accordance with which in case of the introduction of this technological invention (read between the lines: in case of the increase of the profit) during each of the first five years the licensee transfers to the author or the licensor 15 percent of the profit that was supposedly derived from its introduction. If there is an increase of the profit, there is introduction, if there is no increase of the profit, there is no introduction. Everything is very simple.

In order to obtain a tax break and not to make deductions to centralized and reserve funds, it is sufficient for the superior organization to register officially in document form, perhaps, after the event, everything that is supposed to be in such cases. It will not be much trouble to calculate the necessary share of the economic impact. Everyone knows that the prevailing methods (for example, in construction Construction Norms 509) are

imperfect. With respect to the same introduced invention, after making several versions of the calculation, it is possible to obtain completely different amounts of the economic impact. If the profit is very large and one invention is not enough, it is possible in the same way to "introduce" several inventions. As a result the entire additional profit is exempt from the payment of the tax, the amount of which, including the payments to the superior organ, will exceed by many fold the amount of the payments of the reward to the authors of the inventions or the cost of the license. The enterprise for five years from every 1 million rubles [R] of the increase of revenue is able not to deduct for the budget a minimum of R300,000 (given a level of taxation of 45 percent) and not to deduct a minimum of R50,000 (five percent of the profit) for the centralized and reserve funds of the superior organization. During the first three years not less than 30 percent of such a profit (R300,000) can be used by the enterprise for the payment of incentives to the pseudo-contributors, moreover, this "live" (as they say among the people, "sausage") money is not included in the unified fund for the remuneration of labor (YeFOT) and is not taken into account, in accordance with the Law on Invention being discussed, in case of the standardized formation of this fund.

For the sake of this it is worth thinking a moment about how to evade the Law legally, not by violating it, but by looking for omissions, "holes" in it.

It is practically impossible to prove and demonstrate that not that technological invention was introduced, or it was introduced not in that volume or not in that composition.

For example, at a mine the ore body is being working in accordance with an existing plan. Annually at the mine they fulfill the plan of measures on the increase of production efficiency, in which it is outlined to obtain an additional profit (an increase of revenue) of, assume, R1 million. Of course, the management of the mine ponders how to obtain a tax break. And here an idea appears: Could they not use some invention in the technology of working the ore body? If you rummage well in the patent library, several more or less suitable inventions regarding methods of working, which given the appropriate elaboration of documents it is possible to "introduce" in production, will always be found. After the ore body has been bored and blasted, it is possible to verify the fact of the use of one method or another only from documents, and in their drawing up, as V.I. Lenin stressed, we are all great experts. As a result of quite simple calculations the needed economic impact can be confirmed and a "legal" tax break can be obtained. It is possible to reckon that R350,000 are in the "pocket" of the mine: the difference between the amount of the tax breaks (R450,000—45 percent of R1 million—to the budget and a minimum of R50,000—five percent of R1 million—to the centralized funds) and the reward paid to the author—R150,000—or the amount paid to the patentee. The mine can use a part of this amount,

R300,000, for paying incentives to the pseudo-contributors, especially as this "live" money is not included in the unified fund for the remuneration of labor and is not taken into account in case of the standardized formation of the fund for the remuneration of labor.

It is similarly possible to introduce inventions regarding methods of the driving of tunnels, the sinking of shafts, and everywhere that after the completion of operations it is practically impossible to refute the fact of introduction.

For the monitoring of the actual use of inventions it will be necessary to maintain at superior organizations an enormous staff of skilled specialist-patent experts, of whom the Institute of State Patent Examination has been experiencing an acute shortage for a long time.

One would like to know, why adopt in a law such provisions, which create in advance the prerequisite for its legal unpunishable violation?

It would be possible to supplement Article 35 with Point 8 of the following content:

"8. In case of the conclusion of a licensing agreement for the use of inventions that are hard to monitor, for example, technological inventions and so forth, the enterprise-licensee is obliged within five days from the start of preparation for introduction to notify the financial inspectorate (or another similar organization of the USSR Ministry of Finance), which is obliged, with the enlistment of specialist-experts of the appropriate type, to verify the truth of the actual use of the invention.

"Without the confirmation by the financial inspectorate of the fact of the use of an invention the effect of Point 2 of Article 35 of this law is suspended.

"Similar actions are taken in case of the use by the enterprise-patentee of an invention that is hard to monitor in its own production."

In other words, in order to obtain a tax break in accordance with Points 1-2 of Article 35 and breaks on the remuneration of labor in accordance with Point 3 of Article 35, it is necessary in the five-day period after the start of the introduction of an invention to show the fact of its use to the financial (tax) inspectorate of the USSR Ministry of Finance.

Otherwise in Points 1-2 of Article 35 it should be stipulated that the tax break does not apply to inventions that are hard to monitor (for example, technological inventions).

From the draft of the law it follows that the assets for the payment of the rewards to the authors of inventions and to the people, who contributed to introduction, are allocated from the profit, which was derived from the use of the invention and is channeled into the fund for the stimulation of invention activity. The time of the payment of the reward to the author is not stipulated in

the draft of the Law on Invention and, it must be assumed, it is made within the effect of the patent, that is, over the course of 20 years from the moment of the submission of the application for an invention to the State Committee for Inventions and Discoveries attached to the USSR State Committee for Science and Technology.

From the draft of the law it also follows that the assets, which are left at the disposal of enterprises due to tax breaks, are spent on the increase of the technical level of production, the social development of labor collectives, and the stimulation of invention activity: Rewards are paid to the authors of inventions and to the people, who contributed to its development and use.

Inasmuch as the profit, which has been derived from the use of an invention, is not taxed for five years, while the author's reward is paid over the course of 20 years, uncertainty arises: Will the enterprise pay the rewards to the authors of inventions during the second and subsequent five-year periods from the profit before or after settlement with the state and with the superior organization?

The Supreme Soviet has established a tax rate equal to 45 percent, then due to the tax break the enterprise will have (hypothetical amounts of the economic impact are cited):

given a share of the profit of R1,000, which was derived from the use of the invention during the first year—R450;

given a share of R1,500 during the second year—R675;

given a share of R2,000 during the third year—R900;

given a share of R3,000 during the fourth year—R1,350;

given a share of R3,000 during the fifth year—R1,350.

In all in five years owing to the tax break the enterprise will derive additional revenue (without the discount) in the amount of R4,725.

During this time the enterprise will pay the author a reward in the amount of at least R1,575.

Given subsequent use over the next 10 years and an annual revenue of R3,000 the enterprise will pay the author a reward of R4,500, which nearly comes to the amount of the obtained tax break—R4,725.

From the cited example it is possible to conclude that the author's reward should be subtracted from the economic impact, and then the profit should be determined, regardless of the effect of the tax break. The enterprise pays the author of the invention (the licensor) from the amount of the derived economic impact, and then determines the amount of the profit (revenue) from the introduced invention, including the amount that is exempt from taxes during the first five years. Then there will be no contradiction. The profit (which is tax-free

during the first five years, but then taxable) is automatically reduced by the amount of the author's reward or the amounts of the annual payments to the patentee. In other words, the "net" profit less the author's reward should be determined.

Further, from the draft of the Law it follows that any enterprise, which has introduced an invention, including an enterprise that has acquired a license, and has derived a profit from its use, should pay rewards to the authors of the inventions. It is logical that in this case the licensor would pay the author's reward, while the expenditures on the acquisition of a license would be subtracted from the share of the economic impact when calculating the share of the profit (revenue).

At first glance it might seem that the incorporated idea stimulates the search for and introduction of new technical solutions. The desire to receive constantly privileges on payments to the budget and to the superior organization induces enterprises every three-five years to introduce newer and newer inventions.

However, in life everything will be different. An invention is regarded as introduced, if all the features, which are included in the general part and the distinguishing part of the formula of the invention, have been used.

If the formula has been written in a legally competent manner (and the law should not be oriented toward legally incompetent formulas of an invention), the next new invention is based most often of all on a prototype, on a previous technical solution. It is impossible to introduce a new invention without the use of features of the prototype. This means that, after introducing a new invention, the enterprise will continue to pay the authors or the licensor and to make deductions to the budget and to the superior organization—from the share of the economic impact during the second through fourth five-year periods. Tax privileges and privileges on payments to the superior organization apply only to the share of the profit, which is derived from the use of a new invention during the first five years.

Thus, the envisaged procedure of the payment of the author's reward and license payments from the profit will not promote the acceleration of scientific and technical program and, even on the contrary, may prove to be a hindrance of it. The enterprise during the second through fourth five-year periods in accordance with the draft of the Law will receive not more than 35 percent of the profit, and if the amounts of the license payments (author's rewards) are subtracted when determining the share of the economic impact as direct expenditures, half of the profit, or 42.5 percent of the economic impact, will go to the revenue of the enterprise. The enterprise will receive as revenue 20 percent more than according to the draft of the Law. This is in case of a cost of the license of 15 percent. If the license payments exceed 30 percent, according to the proposed version the enterprise will receive 35 percent of the share of the economic impact; in accordance with the draft of the Law the enterprise,

starting with the second five-year period, will receive as revenue not more than 20 percent of the economic impact, which is two-thirds as much as according to the proposal.

In case of the receipt of only 20 percent of the economic impact enterprises will not have the desire to strive for the introduction of inventions. At the same time it is possible to recommend to enterprises not to conclude licensing agreements for a period of more than five years.

From the draft of the Law it is unclear who monitors the use of a patent only with the consent of the patentee. It turns out that the patentee, having paid his hard-earned money for the protection of his patent, does not know specifically who protects his rights against violators, that is, who does not allow the use of an invention without the consent of the patentee. Is it the state?

The fee is collected by the state. Specifically who in the state? Apparently, the State Committee for Inventions and Discoveries attached to the USSR State Committee for Science and Technology, which in accordance with the law accepts applications for inventions for consideration, conducts an examination with regard to them, and within its competence monitors the observance of legislation on invention activity. A question arises: What does "within its competence" mean? Is the monitoring of the state of the use of patents without the consent of the patentee within its competence? It is unclear.

The patentee is granted the right to prohibit the use of an invention in cases that are at variance with this Law. In what way will the patentee be able to do this? It is incomprehensible!

It seems that the patentee should busy himself with this. But how and by what forces will it be possible to do this given our universal secrecy? Why then pay the state a patent fee for the protection of a patent, if the patentee himself should catch the violators of his rights?

Inventors or the enterprise-patentee after the patenting of the first invention should turn into detectives, who in accordance with the content of the patent could find who is using it without the consent of the "owner." The Law also enables the licensee to do this.

The patentee in the person of an inventor working on his own will never find the violators of his rights to the patent. It remains to surrender the invention to the mercy of those who will introduce it. Then how will the patent differ from the inventor's certificate? And why make an unnecessary fuss about the fine word patent?

It is possible to hope that Article 35 will begin to work. Then enterprises, in order not to pay the tax from the share of the economic impact, which is formed from the use of an invention, and not to deduct a share for the superior organization, will begin to report voluntarily to the State Committee for Statistics information on the volumes of introduction and the obtained impact.

But for this it is necessary over the entire term of effect of the licensing agreement to subtract the annual amounts of the license payments (author's rewards) from the amount of the economic impact, and after this only to determine the profit (revenue); to reduce the percentage of the payment of the author's reward to five percent, at most 10 percent, which in turn will make it possible to reduce the cost of the licensing agreement; the increase the level of taxation to 50-55 percent, in order not to pay the tax for five years, then it will actually be profitable to announce (to report to the State Committee for Statistics) the introduction of inventions.

Moreover, it is necessary to assign the functions of the monitoring of the use of inventions to a special service

attached to the State Committee for Inventions and Discoveries. This service should be a cost accounting service and should exist by the recovery from the violators of a patent of the illegally derived profit. Or the functions of the monitoring of the use of inventions only with the consent of the patentee should be assigned to the All-Union Society of Inventors and Efficiency Experts. The All-Union Society of Inventors and Efficiency Experts in this case should operate only on a cost accounting basis by means of the profit that is confiscated from the violators of the rights of patentees.

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Japanese Firms Accused of Stealing Soviet Software

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[Article by V. Gorshenin and L. Kokhanova under the rubric "The Market Does Not Tolerate Simpletons": "A Poaching License"—first paragraph is PRAVDA introduction]

[Text] It all began in a tempting way. In February of last year the USSR State Committee for Public Education jointly with the Japanese firms ASCII Corporation and Shinyei Kaisha Company, Ltd., announced the holding of the All-Union Competition for the Best Program for Personal Computers.

From the file of PRAVDA: ASCII Corporation is the largest Japanese firm for the development of computer software.

Shinyei Kaisha Company, Ltd., has been cooperating with the USSR since 1984. It won five years ago the competition among foreign firms for the delivery of computers to Soviet schools and pedagogical institutes.

It was easy for the three authoritative founders to attract the attention of participants to the competition—they promised large monetary awards and prizes. The State Committee for Public Education allocated for this fine cause 20,000 rubles [R], while the Japanese firms allocated even more—week-long trips to the Land of the Rising Sun, professional and game computers, color televisions and videotape recorders, monetary awards of \$1,000-3,000.

What specialist would refuse to test his strength? The organizing committee of the All-Union Competition is international and, hence, protectionism is excluded in it! Moreover, it firmly guarantees the protection of copyrights. Three entire base organizations for the holding of the competition were specified by an order of the USSR State Committee for Public Education. Everything, it would seem, was provided for.

But this self-confidence in their professionalism also let the Soviet administrators down. Hajime Kato, the Shinyei Kaisha representative in the USSR, had long harbored a grudge for them. In order to unleash it at the very start of the competition. He knew how to do this—it is necessary to turn to newspapers and in advertisements to add another two addresses, to which the future competitors could write. That is what he did—he turned to the newspapers and added them. The newspapers, including PRAVDA, gave in to the assurances of Kato of the legality of such advertising. At that time another two base organizations—the educational production center of computer technology of Oktyabrskiy Rayon of the capital and the Information Science and Children Center of the city of Novosibirsk—were born.

The blow to the Soviet side was timed right. The USSR State Committee for Public Education was able to come

to its senses only toward the end of April. At that time the chairman of the organizing committee also demanded from Hajime Kato the materials received by the Japanese owing to the deception. Mr. Kato promised: "They will be turned over." And disappeared.

Although he is gone, on 8 May he would have time before his disappearance to drop in at a meeting of the organizing committee in the State Committee for Public Education in order to sign a protocol. There both parties would come to the agreement to allow 221 of the programs received by the base organizations to participate in the competition. It is after this that he would disappear. Probably forever....

In the course of several long months the chairman of the organizing committee managed to send him more than one letter. Without result. In the middle of November Hajime Kato would warn: "The organizing committee will be forced to announce officially the termination of the agreement on the conducting of the Soviet-Japanese joint competition." Shinyei Kaisha also did not give a damn for this. Only then would the State Committee for Public Education finally understand: It had been cheated. Therefore, the last letter would have the tone of a note:

"The organizing committee of the All-Union Software Competition informs you that it does not consider it advisable to participate in the presentation on 5 December 1990 of awards to the participation in the competition that was organized by your firm and the ASCII firm.

"The latter is due to the fact that we did not have the opportunity to familiarize ourselves with several hundred programs, which were sent to Japan by the educational production center of Oktyabrskiy Rayon of Moscow and the Novosibirsk Information Science and Children Center without the consent of the organizing committee, which is a violation of the mutual understanding on the holding of the All-Union Competition.

"Mr. Kato, in connection with the stated circumstances we ask you to consider that the people, who submitted software to the organizing committee for consideration, are the participants in the All-Union Competition. The people rewarded by you are not participants in the All-Union Competition...."

Alas, a response to this also did not follow. Only in response to a telephone call did Hajime Kato consider it possible for himself to say: You should trust us.

And the USSR State Committee for Public Education took offense. It did not work out for it to use the programs "for the purpose of improving the educational process and scientific activity of educational institutions." Embarrassment surfaced. Yes, in such cases the most cunning person wins. The Japanese firms ASCII and Shinyei Kaisha are celebrating their poaching catch. According to the estimates of one of the staff members of the State Committee for Public Education, more than

800 programs came to the addresses of the centers that were advertised in the newspapers by the Japanese! This is nearly fourfold more....

The competition began as usual. The partners had faith in each other: Relations between our countries became a little warmer. But.... In the Soviet Union there is no law on the protection of intellectual property. Such a concept as "a commercial secret" has also not been defined. And we do not intend to spend billions on saving the intellectual potential of the country. All this has also become a reason for international theft. Like, incidentally, the overstated, in our opinion, decency of foreign partners.

Everyone in the world, except us, knows: Our programmers are rich in creative ideas. It is only that there is no place to implement them. The Japanese also took advantage of this.

A scandal should have broken loose long ago. But—hark, it is quiet all around. Will someone make a fuss because of several hundred programs? What for? In the Soviet Union there are loads of them.

And, therefore, take, gentlemen foreigners, our intellect for nothing! We do not need it. Will it, perhaps, be useful to you? Hurry, the license for the poaching of intellect in the USSR is still open....

Committee Initiates Exchanges With Expatriate Soviet Scientists

917A0094 Moscow INZHENER in Russian No 12, Dec 90 pp 4-5

[Article by Academician Yu. Gulyayev, director of the USSR Academy of Sciences Institute of Radioengineering and Electronics and USSR people's deputy, as recorded by N. Ilinskaya, under the rubric "In the Union of Scientific and Engineering Societies of the USSR": "No, They Didn't Become Foreigners"; first paragraph is source introduction]

[Text] The International Commission on Ties With Former Countrymen has begun operation in the Union of Scientific and Engineering Societies (USES) of the USSR. Explaining the commission's work is one of the committee leaders, Academician Yu. Gulyayev, director of the USSR Academy of Sciences Institute of Radioengineering and Electronics and a USSR people's deputy.

The USES commission was assembled primarily to establish ties with scientists and engineers who had left the country at one time or other. We have nostatistical data whatsoever that would enable us to determine how many of them there are. It is simpler for me to speak only of those of my profession—physicists. I know of what happened to many of them, and I have stayed in contact with some. Working at the American firm Bell Telephone is R. Kazarinov, a specialist of world renown in the field of semiconductors. A former scientific associated of our institute, Professor A. Kaplan, is a current

department head at Johns Hopkins University in Baltimore. He is an acknowledged authority in the field of optoelectronics. At the University [of California], Berkeley, we met with Dr. A. Khachatryan, whose books are well known among specialists in the field of the physics of metals. The former Leningrad physics and technology specialist, M. Shur, is now a professor at the University of Minnesota in Minneapolis. Those scientists left so that they could have an opportunity to do research in the newest fields of physics.

We found it interesting to meet with second-, even third-generation Russian emigrants. For example, A. Malozemov, the head of a department in a company known throughout the world—IBM—not only speaks Russian marvelously, but also considers Russia his homeland. A. Maradulin, a physicist well known in American and the son of a Belorussian emigrant, holds the traditions of Russian culture sacred.

Of course, that's far from a complete list of the first-class physicists whom I know personally. I could add to it many names of outstanding mathematicians, geneticists, chemists, biologists, economists, and representatives of the engineering professions. Apparently, they number thousands upon thousands. Unfortunately, that number is growing.

But we don't intend to sever our relations with the representatives of the scientific-technical intelligentsia who are deciding to work abroad. We are interested in continuing our collaboration with them.

Unlike other organizations that have cultural ties with Russians abroad, we have focused our attention only on scientists and engineering-and-technical personnel. They represent a clearly defined, but broad stratum of people. We are striving to set up a multilateral cooperation with them. We want to create an international club, hold joint conferences and symposia, and publish monographs. We are suggesting informal contact during vacations.

I must say that in the meeting with the former countrymen, none of them has offended my patriotic sensibilities. I reiterate, this is important today for mutual understanding: many of the emigrants continue to consider Russia, or the Ukraine, or Lithuania, or Armenia their homeland. We shouldn't forget that some of those who left voiced their disagreement not with socialism itself, but with the form in which it existed when they left. And it wasn't the Homeland that forced many of our countrymen to seek refuge and understanding in foreign lands. They are aware of that. In August, the president of the USSR repealed ukases that had taken away USSR citizenship from a number of individuals now living abroad. And now, particularly manifest in the country is the effort to participate as much as one can in the transformations that are under way.

For example, former countrymen who are now professors at George Washington University in the United States have proposed that 20 young Soviet specialists and graduate students be sent there for two years of

training and work. No sooner had the make-up of the group been approved at the presidium of the board of the Union of Scientific and Engineering Societies of the USSR than representatives of the university flew to Moscow to personally meet and talk with the entrants, and they left satisfied with the level of professional skills of the youth. In September, the group of Soviet specialists left for the United States.

There are other proposals for cooperation, too. Professor A. Kaplan is inviting one or two graduate students to study at Johns Hopkins University. Similar proposals have been made by professors at other learning institutions.

By the way, most of the emigrants in the various countries, having by now acquired solid positions, are extremely active in helping other former countrymen acquire professions, improve their skills, and set up business ties. A great deal of attention is being devoted to that mission in Oxford, for example, by the well-known Hungarian physicist, Solimar. Thanks to the care taken by their countrymen, nearly 20,000 Chinese students study in the United States every year. Many young people from various countries in Europe and from the United States, Australia, and countries of Asia are training and gaining experience in science centers throughout the world. We, however, actually extinguished that practice. We will revive it.

The autumn session of the USSR Supreme Soviet reviewed the Law on Entry into the USSR and Exit From the Country. In accordance with that, Soviet citizens are

given the opportunity not only to travel to various countries, but also to work in them.

As a USSR people's deputy, I intend to do what I can to see to it that the efforts of the public in the expansion and reinforcement of business ties with former countrymen gain government support. Many of those people have high positions and authority in scientific, technical, and social circles. Who, if not them, could be a mouthpiece for the humanitarian strivings of our state and could help millions of people abroad to believe in the sincerity of our intentions and our new politics and in the inventiveness of our new thinking? Experience shows that personal contact, informal ties, and national diplomacy sometimes are much more effective than other, official meetings and demarches.

Why not, for example, use the help of our countrymen to create abroad joint laboratories, joint ventures, and joint institutes and temporary creative groups for solving specific problems. Such forms of contact improve the skills and the outlook of our specialists and acquaint them with advances technologies, entrepreneurship, and the functioning of real market economics.

We also intend to enlist foreign scientists in the appraisal and realization of our own projects. The forms of cooperation can vary widely. The International Commission of the Union of Scientific and Engineering Societies of the USSR anticipates from Soviet scientists, as well as their foreign colleagues, specific proposals and ideas. History cannot change, but we ourselves must change, so as not to constrain the creative individual either today or in the future.

Azerbaijan Examines Need For Changes in Republic Science Policy

917A0093 Baku BAKINSKIY RABOCHIY in Russian
1 Feb 91 p 1

[Article picked up from AZERINFORM news agency, with no by-line: "Even Science Needs A Law: The Concept of Scientific-Technical Progress Is Discussed"]

[Text] What will things be like for the science of our republic in the new economic conditions and with further strengthening of the sovereignty of Azerbaijan? How will science evolve, and what must it do to dramatically increase the effectiveness of research? What should be done to protect the intellectual capacity and to realize the scientific potential of the Azerbaijan people?

Those questions were the focus of scientists and specialists of the national economy who had gathered in the Azerbaijan Academy of Sciences to discuss the draft of the "Concept of Scientific-Technical Progress in the Transition of the Azerbaijan SSR to a Market Economy." Gosplan and the Azerbaijan Academy of Sciences held the meeting in compliance with the "Law on Economic Independence" and as a government program involving transition to market principles.

The role of basic and applied research is burgeoning in the transition to new management principles. And it is difficult to overestimate the value on that path of a unique compass of development for science—the concept of scientific-technical progress. And although its draft is ready, life, as the participants in the discussion in the Academy of Sciences noted, makes more and more corrections in it virtually everyday.

The addresses of the president and vice president of the Azerbaijan Academy of Science, academicians E. Yu. Salayev and N. A. Guliyev, and those of other leading scientists from academy and sectorial scientific institutions, of science organizers, and of specialists noted that the foundation of scientific-technical policy should undoubtedly be the law adopted by the Supreme Soviet of the republic that makes it mandatory to establish both the republic's priorities in the development of science and technology and the responsibilities of the higher organs of state authority of Azerbaijan in implementing them. In the opinion of the discussion's participants, the policy should contain the procedures for determining and affirming the principle directions and appropriate programs of scientific-technical progress in the republic—primarily in the areas of ecology, energy conservation, computerization, social and spiritual development, and arrangement of priorities of basic research.

There was vigorous discussion of problems involving the organization of a market for scientific-technical information and developments; the establishment of innovation funds for supporting and developing basic and exploratory research; economic-management and legal aspects of work done by cost-accounting sector institutes; and issues associated with reduced taxation of scientific

research, especially in high-priority areas. Effecting the principles of economic independence and the market mechanism also requires improvement of the status of the republic's scientific-technical programs and programs involving international cooperation.

The need was emphasized for the solution of the problem involving the protection under law afforded to scientists, as well as for the development of a mechanism guaranteeing the protection of science in general in the transition to market relations.

Above all, the scientists feel, the scientific-technical potential of Azerbaijan must be accurately evaluated, because, as it was asserted in a figure of speech at the meeting, that is the very beginning from which we should begin as we determine the future path of the development of science and as we affirm the concept of scientific-technical progress. And that potential is rather large: in operation in the republic are 125 science facilities and organizations; 17 institutions of higher education; 60 drafting, design, and engineering organizations; and 45 independent experimental bases and experimental enterprises, shops, and works, as well as industrial plant laboratories and other science subunits. The rates of development of science in recent years have been rather high, but the parameters of both extensive and intensive development of Azerbaijan science are below the all-Union figures, which in turn are far below the world standards. In all probability, we need estimates and indices that are different from those used before to describe scientific-technical progress. In the opinion of the discussion's participants, statistical organs should base their work on the very same objective criteria that are currently used in world practice.

It is suggested that, in reworking the principles underlying the organization of science in Azerbaijan, functions be clearly distributed between the center and the republic, which henceforth is assuming complete responsibility for solving the problems associated with the development of scientific-technical progress within its borders and for determining the methods for financing scientific research. The presidium and the departments of the Academy of Sciences will now release funds not to institutes, but to high-priority programs that will pay a guaranteed return to society and that will serve the further economic and spiritual development of the Azerbaijan people. Material support is planned for research projects that promise a large impact. Small enterprises will grow, as will joint ventures with foreign firms, other ventures that combine science and production, and the acceleration of the transfer of research achievements to the national economy. A great deal of attention will be focused on the training of the science corps—5-7 percent of the best higher educational institution (VUZ) graduates should go into the major sciences every year.

Based on the remarks and suggestions that were made, it was recommended that the document under discussion

be considered one of the component parts of the program for the transition of the republic's economy to a market economy.

The secretary of the Central Committee of the Communist Party of Azerbaijan, F. G. Muradaliyev, spoke at the meeting.

Z. A. Samed-zade, the head of the Socioeconomic Department of the Central Committee of the Communist Party of Azerbaijan took part in the work of the meeting.

Problems of UkSSR Academy of Sciences Outlined

917A0063A Kiev RADYANSKA UKRAYINA
in Ukrainian 5 Dec 90 p 3

[Article by Academician, AN USSR [UkSSR Academy of Sciences], K. Sytnik under rubrics "Tree of Knowledge" and "Point of View" - first paragraph is RADYANSKA UKRAYINA introduction]

[Text] About the only thing that does not yield itself to inflation in our overpoliticized times is the society's intellectual stock - knowledge, ideas and discoveries born in laboratories, at institutes and in lucid minds. This is the capital the society has all reasons to pin its hopes on. This is why, opening a new rubric, we invite to it anyone who is lured by search for truth in any field of knowledge. We invite people who have linked their lives to scientific search, all those we call creators of progress.

Nowadays one can observe increased society's attention to science. This is only natural - science as a whole, and especially social sciences (philosophy, history, study of art and literature, economics, politology, ethics, aesthetics, linguistics and jurisprudence) form the foundation of any practical, material and spiritual activity and development of society and man. This is why a State's policy should be based on creating favorable conditions for the progress of all fields of science. Anywhere in the world people understand this, and countries such as the USA, Japan, Germany, England and many others spend much more money for science development than the Soviet Union, let alone Union Republics. And developed countries assign priorities to basic directions - mathematics, physics, chemistry, biology, geology and social sciences. Neither medicine, nor agronomy, electric welding or any other applied or branch science cannot be developing successfully and consistently without a proper state of basic science. Our country has not been able to ensure proper development of new directions of scientific research. Disproportions in the country's scientific potential were allowed to happen, and the actual practice of business activity has not called for acceleration of S&T progress. Lysenkoism, persecution of scientists in cybernetics, voluntarism of directive decisions have led to a fall in the prestige of science and the social status and prestige of scientists. Out of the total amount of funds the State allocates to the development of science in the country only 12 percent is allocated to academic

and higher educational institution (VUZ) science, although the most highly qualified personnel work at academia and universities. At the same time, almost 80 percent of all funds are allocated to branch science.

It is very unfortunate that at the Republic's Academy the last decade has also been marked by gradual reduction in the pace of development of basic research, by stagnation and in some places even by retreat. The entire atmosphere of scientific search has changed to worse, and negative phenomena such as cupidity, plagiarism and pseudoauthorship have become more frequent. The young have considerably lost their taste for science, and due to isolation of the majority of academic institutions laboratories from their foreign counterparts they are lagging behind the world level. For instance, the Academy does not have a balanced and reliable strategy for developing biology institutions, and so-called directive bodies have been quietly watching this and have been (and still are) reducing their "wild activity" in the field of science to creating sound effects by establishing ever newer Republican applied programs.

Nobody here is really interested in scientists' living conditions. The President of the country has already issued a decree to increase State budget allocations for improving financial support of scientific associates of the USSR Academy of Sciences. The government of Estonia has adopted a decision to approximately double salaries of scientific associates of academic institutions. Only in the Ukraine one had been waiting for a long time and then the Academy Presidium adopted a decision that will result in large staff cuts and unemployment among the very scientists who work on basic problems of natural sciences.

But finally timid knocking of perestroika has been heard at our door - new drafts of the AN USSR Bylaws and other important documents has been prepared. And what is new in these documents?

The very first article of the Bylaws draft states that the UkSSR Academy of Sciences is guided in its activities by decisions of the UkSSR Council of Ministers and USSR and UkSSR laws. I think that in a state governed by law both public and State institutions must abide by the law. But when it comes to government's right to interfere into activities of an independent public organization, which the Academy must be, I disagree. The only "dependence" of the Academy on the State is that it has or should have special-purpose financing of basic scientific research from the Republic's budget. It is my opinion that this must be done by the Republic's Supreme Soviet - when it approves annual budgets of the economic development of the Ukraine, it must specify as a separate item budget allocations for the Academy as a clearly and firmly established percentage of the GNP. The Academy will hand over the results of its research to the Ukrainian State free of charge (while keeping intact copyright and invention law norms), and due to the development of

basic science the State will always have a dependable basis for enrichment and be able to allocate even larger funds.

I also think that Bylaws sections dealing with financial support must state clearly that Academy's funds for conducting and developing basic research are formed from allocations from the State budget. There should be a separate statement to the effect that academic institutions can also have additional funds generated from their cost-accounting activity, voluntary contributions and other receipts coming from various Republican and international organizations.

One other thing. I have been saying this many times and repeat again that restructuring, democratization and renewal of the Academy will only happen when the General Assembly will assume full power. The proposed Bylaws draft, like the current Bylaws, only proclaims the supreme power of the General Assembly, but in reality, when one carefully studies the entire text, it becomes obvious that full power remains in the hands of the Academy Presidium. Apparently, it would be expedient for problems such as determining principal research directions of Academy's institutions; reviewing and adopting independent assessments of processes of economic, social and spiritual development of the society and ecological condition of land and water areas; formation of scientific councils, societies and associations; and formation, reorganization and liquidation of scientific research institutions and other organizations that are part of Academy's structure to be the General Assembly's prerogative.

I have touched upon an important subject and would like to stress it. The thing is that the current practice of activities of the Academy's steering body when virtually everything is decided mainly by the President and its staff, has resulted in indifference on the part of members of the scientific community and in the habit of non-interference into its life. People have reconciled themselves to the existing status and do not want to raise their voices for revolutionary, radical and progressive changes in all spheres of scientific and science organization activities. Is it really our fate to keep being indifferent?

As far as the Academy structure is concerned, the Bylaws must provide for the creation of permanent committees (commissions or councils - I would not quibble over the name). Being permanent bodies, they will perform professional examination of proposals coming in from institutions, come up with their own initiatives, propose for General Assembly's consideration measures that would be ahead of the regular course of events, and prepare forecasts. A small (three to four people) staff of consultants and clerical workers will be helping committee members in their day-to-day work.

Of course, the entire scientific life of the Academy takes place at its institutes and institutions, and as a rule they

are managed by their scientific councils and management. They do not need to be managed from above. But integrated, interdisciplinary, interbranch and global problems of modern natural and social sciences and problems of organization and economics of science must be discussed and in a sense decided at the Academy's General Assembly and in its committees. An executive body of the General Assembly, consisting of committee heads, the President, two Vice Presidents, Chief Scientific Secretary and Administrator of Affairs of the Academy, should be created. The democratization of Academy's life also requires that managers of scientific institutions who are not members of the Academy take part in General Assembly proceedings as voting members on problems pertaining to their institutions.

A Bylaws provision of dividing members of the Academy into Academicians and Corresponding Members also merits one's attention. I think nobody (not even Academicians!..) can explain the difference between outstanding scientific works and works of paramount scientific importance (I have to advise the readers that the former enrich science with works of paramount importance, while the latter enrich it with outstanding works) [per original]. At the Academy it is not uncommon that it takes a Corresponding Member as little as two years to become an Academician. Apparently, during this short time outstanding works evolve into paramount ones... or maybe paramount works are urgently created in two years.... I am for the Academy to consist of Academicians and Foreign and Honorary Members. I think the Bylaws should also state that other men and women of culture and arts who have made exceptional contributions to the development of literature, arts and architecture can also be elected Academicians.

I am sure it is also necessary to carefully and comprehensively discuss a number of other provisions that regulate Academy's work. In particular, one should discuss a provision for a real, i.e. unlimited, independence of scientific research institutes, which so far has only been declared, because, as the draft states, they "conduct their activities under scientific and methodological guidance of respective Departments of the USSR Academy of Sciences", rather than under the guidance of the Institute's scientific council, as should be the case.

I shall dwell specifically on the problem of election of Academy members. I am convinced that the existing practice is both imperfect and unsatisfactory. The draft Bylaws phrases like "election campaign" and "Candidates of AN USSR Academician and Corresponding Member nominees are widely discussed in scientific collectives and at enterprises (!), institutions and organizations, with the use of mass media" seem to sound democratically. But we are talking elections of Academy Members picked from a body of particular specialists for a particular announced vacancy (mechanics, plant physiology etc.), who cannot be evaluated objectively by any collective other than a collective, or, to be more precise, a meeting of a relatively small group of 10 to 15

specialists who are as particular as the nominee. Therefore, I am proposing the following election procedure. Instead of the Bylaws article that proclaims elections on a democratic basis (this basis has been cited above), include an article stating that commissions of experts consisting of up to 15 Doctors of Sciences (in the respective specialty) are formed for preliminary evaluation and selection of Academy Member nominees by a secret ballot. The elections must be conducted at the

General Assembly of the Academy after the expert commission proposals have been discussed in Academy's specialized committees.

I could keep talking about desirable structural changes to the draft that would help improve it, but I hope that those Academicians who are not indifferent, as well as interested readers, will themselves analyze faults and bottlenecks of the proposed document.

Political Aspects of Elections to USSR Academy of Sciences

917A0079A Moscow *LITERATURNAYA GAZETA*
in Russian 9 Jan 91 p 6

[Article by Oleg Moroz under the rubric "The World of Man. Science": "The Games Around Olympus"—first paragraph is *LITERATURNAYA GAZETA* introduction]

[Text] The regular election to the USSR Academy of Sciences was held in December of last year. Its result is 45 new academicians and 136 corresponding members. What is the real, not ostentatious, role of the academy in our current perestroika life?

As always, before the election to the Academy of Sciences there are calls to the editorial office. A typical one is: They are giving a certain NN a boost for academician; several years ago they removed him ignominiously as director of an institute (he organized picnics with launches and helicopters, in general was caught stealing), for some time grew quiet, later found ways to an influential person, gave something as a present (for an anniversary celebration a rifle costing 2,000 rubles [R]), and now five minutes to the hour he is an academician. Incidentally, the caller is also a member of the academy. He is, so to speak, worried about the purity of the ranks and asks not to admit him, to help, and to expose him.

In general this time—election time—is a restless time. There were about 2,000 candidates in this election. In some specialties the competition exceeded 40 people per place—not one higher educational institution during the enrollment period dreamt such a thing. That is why the moms and dads of future academicians (who are still alive) were uneasy.

A naive uninformed person might think that, without wasting hours, the electors—that is, those who have already had the good fortune to become an academician or corresponding member—scrupulously evaluate and compare the scientific achievements of the candidate-entrants and elect the very, very most worthy. This, of course, is an excessively idealized notion. Nearly always the entrant and his crew simply fight for votes, moreover, often in the most primitive manner—by coaxing, persuasion, promises, the organization of refreshments and drinks (if, of course, the person being coaxed does not have gastritis). Various groups during this time come to an agreement with each other on reciprocal voting: If you support so-and-so, we will support so-and-so....

The directors of prominent academic institutes have the most chances of all to be elected. Here there is no need to go to particular pains, this is our brother. The academy in large share consists of administrators or former administrators. Scientific services, of course, are of some importance, but of far from primary importance. Often they, on the contrary, hinder promotion to academician. Those, who have already become an academician, do not wish to have next to them a more gifted, talented,

scientifically significant person, who would unfavorably emphasize them. With the aging of academicians and the inevitable decline of their intellectual and scientific potential the measuring rod is also lowered.

Many truly worthy scientists thus were never elected to the academy. Recall if only M. Bakhtin, A. Losev.... In other cases, gritting their teeth, they elect a person according to scientific criteria after endless delays only when he acquires recognition throughout the world and the further ignoring of him becomes simply indecent. A vivid recent example is mathematician I. Gelfand.

In the last election among the other more than worthy people (it would take too long to list them) they left Vyach. Vs. Ivanov and Yu. Lotman beyond the doorstep of the academy. Neither scientific talents nor popularity among the intelligentsia helped them.

It has already been said more than once that the election procedure is a quite strange one. First the corresponding department votes (only academicians vote for academicians, they do not let corresponding members come near the election). And what happens? In the country, let us assume, there are hundreds of geneticists, but just nine aged figures of science, of whom only two are geneticists and the rest are biologists, zoologists, botanists, ecologists..., are trusted to elect a single one of them as an academician. Then the election at the general assembly of the academy follows. This is the second stage. Here it is entirely a game "in the dark": Philosophers vote for physicists, physicists vote for philosophers and historians....

For what is the title of academician so enticing? For much. For several decades our propaganda with all its might exaggerated its importance and praised it to the skies, so that in the end the bearer of this title appeared before common eyes as such a scientific celestial being, who had grasped through uncommon intelligence nearly all the mysteries of the world and is capable of pronouncing a final irrefutable judgment, consider, with regard to anything.

At one time for the Soviet philistine the word "academician" meant, perhaps, even more than "Nobel Prize laureate" (the more so as the influence of Nobel Prizes was belittled in every way—these, they say, are political games).

The person who winds up an academician automatically becomes a "prominent" scientist (so it is recorded in the charter of the Academy of Sciences, in "Bolshaya sovetskaya entsiklopediya" [The Great Soviet Encyclopedia], and so on). Who does not want to be considered prominent? He begins to influence directly and indirectly the distribution of money, staff units, instruments, and equipment and the specification of scientific themes. The same person, who is not yet the director of something or the head of something, acquires the direct possibility to become him.

Of course, the lifetime grant of 500 re [rubles (colloquial)] (although the weight of these "re" in recent times has lessened greatly), the possibility of the easier obtaining of an apartment and a dacha, and medical and other special service are attractive.

In reality do we have that many prominent people? For there are generally accepted criteria—international prizes and the citation index, the informal "Hamburg assessment," and much else.... We are far from the first places in prizes, in citation, and in universal recognition.

It is considered that the principles of the organization of the academy and the great (in many respects artificial) authority of the "immortals" enabled it to preserve relative independence during the uncontrollable onslaught of power of the partocracy and to save islets of reason and science in the flood of obscurantism. Perhaps, this is so, but, I would ask, were those islets large? The office of academician did not protect against either oppressions or arrests. Let us recall N. Vavilov, L. Shtern, and, in our times, A. Sakharov. The academy, for all its ostensible independence, was unable to withstand the plague of Lysenkoism.

Very well, in the end by hook or by crook we settled accounts with Lysenkoism in biology, at least in principle, theoretically. But to this day a boundless unplowed field, the virgin soil of the same Lysenkoism in a completely different aspect remains before us. For earlier than biology, during the memorable 1930's ideology with laughter established a grip on the so-called social sciences and, cajoling with a gnarled club, drove them along a winding general line. This diabolical gallop continued until recently, the hoofbeats are just beginning to die away and lather is just beginning to roll off the horse's sides.

How many Dudintsevs and "White Clothes" will be needed to describe in details the dramas and tragedies, which were played through over six decades along the course of this senseless race! For they have not yet been named aloud by ordinary, not belletristic language.

The principle of the self-election and self-reproduction of academicians proved to be very convenient for the maintenance of the continuity and stability of ideas (to put it bluntly, dogmas). As Comrade Stalin appointed the first academicians for the philosophy department, so up to now they, "who do not go against principles," were also reproduced from election to election.

Petr Nikolayevich Fedoseyev, the longstanding curator of all our social sciences, also came from these ranks. The small, grayish, but unusually energetic man is a true soldier of the party. He and the likes of him (it is impossible here not to mention another soldier—M. Suslov) did everything so that several generations of our fellow citizens would never learn anything about philosophy, except that in the world there is a single, correct-super-correct, scientific-superscientific philosophy. The other splashes of philosophical thought are the fruit of misunderstanding and a result of the activity of young

ignoramuses who have been blinded by class. Or of insidious ideological adversaries.

I will never forget the feeling of awkwardness, which I experienced at international philosophical congresses, when foreign philosophers attempted this way and that, sincerely, but always unsuccessfully to break through the scab of our (and our friends') programmed Marxist-Leninist maxims (there and then both Petr Nikolayevich and the "comrades from the Central Committee" always fussed when coordinating combat operations on the philosophical and ideological repulse of foreign intrigues). One would like to know: Why then participate in congresses, if we stop up our ears with cotton? We always attempted to win adherents to different beliefs over to our side. After returning, we reported through the chief on the successes.

When you go through the works of P. Fedoseyev, the feeling is that you are hearing a continuous drum roll—under backs with scholarly titles they brought together the entire collection of propaganda cliches, which year after year were driven into the brains of the older generation (young people, fortunately, not longer found this).

"Marxist-Leninist philosophy is a truly scientific philosophy. The policy of the communist parties...is incompatible with another other philosophy."

"Marxism-Leninism is the theoretical foundation, by relying on which the communist parties of all countries are waging the struggle for the victory of communism."

"The new social system, the socialist economic system, is growing and is becoming stronger irrepressibly, while newer and newer countries are defecting from the old, capitalist system, changing over to the path of socialist development" (the learned man must have second sight).

"The Communist Party is aiming the efforts of the working people at the building of a communist society, equipping them with the scientifically substantiated prospect of the gradual transition from socialism to communism."

And all this is philosophy. All these are quotations from a book under the signature stamp "The USSR Academy of Sciences. The Institute of Philosophy."

I remember that in the 1970's, already near the end of his life, one of the academician-philosophers once said to me either still in earnest or already in a bitter sarcastic manner: "We do not have philosophical science—we have a philosophical front."

During my years of work on LITERATURNAYA GAZETA I attempted more than once to take a dig at the pitiful state of our social sciences, but every time the authorities silenced me: "Do not stick your nose in there. The social sciences are a matter of the party. Deal with the natural sciences." (True, in the recent times of perestroika they, on the contrary, have begun to demand

that this theme be dealt with, but now I no longer want to: It is boring, it is uninteresting, everything is clear to everyone.)

We go farther through the list of the academy's Philosophy and Law Department. V. Afanasyev, recent editor of PRAVDA, author of the textbook "Osnovy filosofskikh znaniy" [The Fundamentals of Philosophical Knowledge], which has been reprinted such a number of times as only the very founders of the wisest of philosophies can look forward to in our country. In addition to the explanation of its fundamentals, V. Afanasyev theorized much in the area of the substantiation of the very administrative command system, which is now falling with a crash, and went to pains to give it a modern, cyberneticized appearance:

"The Communist Party is at the head of this system. Precisely the party carries out in the end the scientific supervision of the entire system of state and public organizations—soviets, economic organs, trade unions, Komsomol, creative, sports, defense, and so on.... Precisely through the system of state and nonstate organizations the party is linked with the masses, who in the end are the main element of any system within the framework of socialist society, the main subject and object of management."

After all, what a well-balanced, thoroughly thought-out system, a real IBM computer: Above is the CPSU; then there are all sorts of organizations, state and public; while at the very bottom are the little people, the masses, the primary elements of management. If you just push the button, everything will be okay. It is nevertheless strange that this system did not work. It is none other than the intrigues of world imperialism and domestic enemies.

Another member of the department is A. Yegorov. Among other things he is a specialist in esthetics. At one time he castigated cubism, impressionism, expressionism, and other modernism, all these Monets, Manets, Pissarros, Picassos, as "the corruption of art, which is due to capitalism's entry into the period of imperialism." Of course, he praised to the skies the only correct socialist realism: "The critics of socialist realism come and go, while socialist realism remains and grows strong." (Where is it now, this socialist realism?)

Freud, Fromm, Jung, Kierkegaard, Heidegger, Jaspers, and, of course, Kafka, Joyce, even such writers, who are acceptable from the standpoint of our ideological innocence, as Tennessee Williams or Eugene O'Neill got it from Academician A. Yegorov: "The goal of all this is to corrupt man, to paralyze his will to resist the dark forces of the reaction, and to turn him into an obedient of imperialist aggression."

It would have been strange if Salvador Dali had missed the optical aiming gaze of the academician.

"...It is quite clear that the ideological basis of surrealism is antidemocratism, the cult of blind faith, of the subconscious. Not without reason...did such retrogrades as S. Dali, Tanguy, P. Chelishchev, and their like become associated with surrealism." And the already familiar, universal verdict: "Surrealism is clear evidence of the disintegration and corruption of bourgeois culture in the age of imperialism."

They simply lived: on the one hand, the bright sun of socialism and communism and, on the other, the impenetrable darkness of capitalism and imperialist. The academician has only to move his sensitive nose (for that he is also an academician!) and it immediately becomes clear into what heap to pile what: the operetta and cheerful songs of Dunayevskiy here, jazz and boogie-woogie there.

The History Department. Academician M. Kim is one of the few fellow citizens of ours, who had the honor, it can be said, of examining in detail our bright future—communism:

"Communism is not only a high standard of material life, but also an abundance of spiritual goods" (an innovation of the academician: Previously it was believed that under communism there would be not only an abundance of material goods, but also a high standard of spiritual life).

"The principle 'from each according to his ability, to each according to his need' will also apply, of course, to spiritual life. Everyone will receive on an equal basis cultural goods according to his need. It goes without saying that everyone will also participate to the full extent of his powers and abilities in the production of these goods" (what an ingenious interpretation of the famous principle!).

"The workers of communist society will have enough free time (they will devote three-four hours a day to production)...."

"The intelligentsia as a special stratum of society will cease to exist. All people will become intellectual...."

"They correctly call the boarding school the prototype of the school of the communist future."

The founders, as is known, were wary of elaborating the future radiant society. Academician M. Kim overcome this prejudice of theirs, or, in his words, "outdated survival."

Tell me, what does history have to do with it? Well, of course, before Marxism-Leninism history, as is known, did not exist, there was prehistory. Why study it? It would be better for us to set immediately to work on communism and history.

With time, true, it became clear that the brightly colored magical future is a fata morgana: No matter how much progress you make, it does not get closer. At that time academician-historians began to beslobber in their works

such concepts as "developed" socialism, after "real" socialism (when it had become clear that socialism in our country is not that developed, and most likely is not at all socialism). They invented the formula "the Soviet people are a new historical community" (*homo sovieticus*, consequently)....

Our social sciences approached the start of perestroika fully armed with innovative ideas and unusual discoveries. Academician Yu. Kukushkin, for example, proved like two times two that the soviets can exist only under the wise supervision of the CPSU (they, he said, hatched out into the world in 1905 only owing to the revolutionary zeal of the Bolsheviks). Academician V. Vinogradov demonstrated the vital advantages of the total nationalization of everything that it is possible to nationalize....

And that is that. But you now say that the soviets should be separate and independent of all kinds of parties. That with nationalization we went to far in an untalented way and it is necessary to quickly roll it back.

As is known, no one understood the deficiency of excessive nationalization to such an extent as Margaret Thatcher. This lady proved to be wiser than all our men—revolutionaries, Marxists, the founders, academicians, and true Leninists—taken together. This is whom I would elect to the London Royal Society.

Among the academicians is recent high party executive B. Ponomarev. It is easy to get an idea of his creativity from the table of contents of his "Izbrannoye" [Selections]: "Lenin Is Our Banner!", "The Working Class Is the Leading Force in the Struggle for Peace, Democracy, and Socialism," "Proletarian Internationalism Is the Revolutionary Banner of Our Age," "The Building of Communism in the USSR Is the Great International Task of the Soviet People," and "By the Leninist Course to Communism."

And here as some works that did not have the honor of being included among the selections: "The Trotskiyite-Zinoviev Gang Is Direct Agents of Fascism," "The Right Socialists Are Agents of the American Aggressors"....

"I do not want to indiscriminately rate negatively all academicians—at the Academy of Sciences there are still enough authoritative scientists, but, unfortunately, they are no longer what counts there." This is the opinion of our reader V. Rylov, a senior scientific associate of the Special Astrophysical Observatory (Stavropol Kray).

I do not know who counts there and who does not, it is hard to say, in different departments it is different, but it is also a fact that the share of such "science" at the academy is very significant.

Or take economists. The works of L. Abalkin, for example. From then you learn what a nasty thing—private property—is, what inconceivable obstacles it creates for the economy of those countries where it

exists, and how awfully lucky the socialist countries are that in them public property reigns undividedly. After all, not a pure ideologist, who was destined to write that way, but a scientist, whose duty ostensibly is to rub his eyes and to look at things objectively, writes this.

L. Abalkin is numbered among precisely those people who always regarded as an indispensable attribute of socialism precisely public property. Now they are disowning this: How? Where? When? There was no such thing! But here it is, printed in black and white.

They also frightened people with the market: "The dominating role of the market...over production is conceivable only in an economy that is based on private property and production anarchy." Tut-tut, how strange! This is also L. Abalkin.

From him, too: "The socialist economy is a system of the highest production efficiency.... Public property contains unlimited possibilities of the increase of production efficiency." Where is it, this highest efficiency? For some reason it is not visible.

Among our economists there are more able and less able ones, but as a whole it must be said honestly: Our economic science proved to be completely unprepared to help the country switch to a market, for long years it trimmed its sails to a wind that was blowing in the direct opposite direction. And this is one of the reasons why today we are sticking our nose in here, like blind kittens.

For long years Academician A. Nikonov has been making efforts on behalf of the increase of the efficiency of agriculture. Kolkhoz and sovkhoz agriculture, naturally. At one time he lashed out at Chayanov (now he praises him), cursed the theory of the working peasant farm, and justified the impoverishment of the peasants:

"The impossibility of the preservation of peasant small-scale commodity production was obvious for both economic and political considerations: First, it...could not deliver much commodity production and, second, it served as a breeding ground for the raising of capitalist elements."

The peasant, just look, could not deliver much output. But kolkhozes and sovkhozes could. It is a matter here, of course, not of output, but of "socialism":

"It is well known that it is impossible to build a socialist society with the preservation in the countryside of the small-scale commodity farm."

For the sake of socialism they are prepared to starve whomever you like.

Somehow we have forgotten that such a well-known figure as Vadim Andreyevich Medvedev is also, after all, not only an ideologist and politician, but an economist as well. True, in economics he is only a correspondist member. In his works he also built developed socialism. I want to understand what all the same that actually is.

"Developed socialism," we read from V. Medvedev, "is the fundamental unity of interconnected systems—economic, social, political, and spiritual-ideological—each of which has its own structure and performs mutually complementary functions in the life and development of socialist society."

Did you understand anything, dear reader? No? I also did not. But then it is impossible not to feel that it was twisted in very scholarly way. (Do you remember what Zoya Fedorova says in the movie "The Marriage" regarding Chekovian subjects: "They want to show their erudition, that is why they talk about the incomprehensible"?)

So, what is next?

"At the stage of developed socialism the distinction between the working class and the peasantry, the city and the countryside...can be completely eliminated."

This is already a familiar, dear thing. They got through. This distinction came easy to them! As if in the States some Texas farmer or cowboy suffers so because he is not like a Chicago steel worker or auto mechanic, because he has not yet completely blended with him externally and internally.

"As to the substantial distinctions between physical and mental labor, significantly more fundamental material and technical prerequisites will be required to overcome them...."

Now it is at last clear what developed socialism is: It is possible under it to put an end to those distinctions, but for the present it is a bit early to put an end to these. The intelligentsia as a stratum at this stage, thank God, will be preserved.

Of course, all these achievements of academicians and corresponding members in our days are easy prey for criticism. I do not have at all the desire to avail myself of this ease (otherwise it would be possible to quote the works of thinkers ad infinitum). My only goal is to show how ruinous the principle of the raising of people for life to the celestial scientific Olympus is. The times are changing. Not simple the times, but ages. They are changing more rapidly than the most courageous imagination could visualize. And what is the result? Whoever was raised, it can be said, before our era, remains at the helm, runs the show, and decides science (and other) policy up to the present as well. For here is in what one of the main defects of our academic system lies.

Not only we have an academy of sciences, here we are not exceedingly original. Similar academies also exist abroad. But here, however, there is a small difference, nothing much, a small trifle: In no country does the academy of sciences play the role of the supreme organ of the management of science, the role of a ministry of science, as in our country. These are simply honorary scientific societies. They, it is true, participate in the distribution of some funds, their members conduct their

own research, act as government advisers, carry out examination, reviewing, and so on, but these academies, of course, do not have under their command such a huge number of gigantic institutes, laboratories, and observatories as our academy does.

"Practically nowhere in the world is there an academy of sciences as a bureaucratic organ of the management of 'large-scale' science, to which a large number of scientific institutions are subordinate. Where these institutes should be transferred—to large higher educational institutions, to sectors, but perhaps they should be combined into interbranch complexes—this is the question that we will all the same have to settle sometime, and the sooner we settle it, the better" (reader O. Figovskiy, candidate of technical sciences, Moscow).

Where it is better to transfer institutes—it is possible to talk about this afterward. Now one thing is obvious: It is impossible to combine the principle of an honorary society (with lifetime membership) and the principle of the efficient management of science, which is at a modern level. These are completely different principles. Here it is like this: either one or the other. It is necessary in the end to understand what we want from these moss-covered academic buildings.

Our science urgently requires radical reform. In exactly the same way as the country requires agrarian reform, military reform, and so on. It is already clear to everyone: In case of agrarian reform, there is no getting away from it, it is necessary to dance to the tune of the peasant, to the tune of his vital, immediate interests. In science the very worker, who feeds everyone and produces, is the scientist, the production unit is the laboratory. Here it is necessary to do everything so that it would be easy for him to live and work, and to subordinate everything to this main interest, and not to the interests of the bureaucracy with and without academic titles, which sits over this level.

Unfortunately, recent decisions on the Academy of Sciences run in the direct opposite direction—the academy is being separated almost completely from the state and is becoming a detached house from it. Here, of course, the power of the honorable old men, who in conformity with the academy charter constitute the academy, although in general usage there is often implied by this word a different thing—all the academic institutes and laboratories with their numerous personnel—is increasing.

Incidentally, it could not be otherwise—would the academy lobby in the Presidential Council really act to the detriment of its interests?

Thus far it has been a question of the "big" academy. Numerous "little" ones: medical, agricultural, pedagogical..., were modeled in its image and likeness. There was even an artillery academy, but it has departed this life. Accordingly, "these little ones" are of even less use (first and foremost in the sense of management efficiency) than the "big" one. There are academies in nearly all the

union republics. They were established not out of considerations of genuine scientific necessity, but mainly to demonstrate the unprecedented flourishing of national cultures (just like the unions of writers, artists, composers, and so on). Now they have realized that in the largest republic—Russia—there is no academy. Tut-tut! How can it be? They are establishing it quickly. So that everything would be as it is among the people. It would be wiser (and cheaper) “among the people” to eliminate these structures in order to make everyone equal. But since this is not within our power (the republics now are all sovereign), I would venture to make a business proposition: to limit the Russian academy staff to two units—the president and a watchman. There will be another symbol of Russian statehood, and that will do. More is not required.

The opinion has already been repeatedly expressed that in our country universities should become the real centers of basic science, social science, the humanities, as in the majority of developed countries. This would make it possible to merge science and education tightly. Students would acquire the opportunity from a young age to be in an atmosphere of real, and not ersatz creativity and to associate with real scientists, and not “lecturers,” who babble stale truths. As for science, fresh blood from the most talented, most capable young people would constantly flow into it. The university science instructor elite, in contrast to the academic science instructor elite, is not so stagnant-immobile, if only because it is not in the role of an elite that is irremovable for life.

Of course, under our conditions far from every university, even in the future, will be able to play the role of such a scientific center. In the United States several leading universities are also distinguished—first of all the University of California, the University of Chicago, Columbia University, Harvard University, Princeton University, as well as California Institute of Technology and Massachusetts Institute of Technology. Time is required to form in our country such seats of science and education, but it is necessary, apparently, to aim the gradual evolution of our science education system in this direction.

No evolution, of course, will occur, if the system of the financing of basic scientific research is not changed. The system of contracts and grants, which determine the financial injections for specific scientists for specific jobs on the recommendation of truly authoritative (and not only titled) specialists in the given field, should play a greater and greater role here. It is time to cut off the unstoppable flow of budget money to all institutes and to all laboratories, which at one time were opened by someone for some task and which in practice it is already impossible to close or if only to reorient toward another goal.

It is probably worthwhile to shift the laboratories and institutes, which are gravitating more toward specific

research, to an applied footing, to make them governmental, or to turn them over to private firms (will such very likely appear soon in our country?).

In short—I will say once more—it is time to finish playing these dragged out Olympic games, the games around the scientific Olympus, which are substituting real management for real science.

Soviet S&T Citations 1973-1988

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Dec 90 pp 74-77

[Article by Candidate of Technical Sciences V.A. Markusova, the All-Union Institute of Scientific and Technical Information (Moscow), and P. Pesavento, the Institute for Scientific Information (Philadelphia), under the rubric “The Organization of Science”: “How Soviet Works of 1973-1988 Were Cited”]

[Text] *PRIRODA* has repeatedly turned to the analysis of the data of SCIENCE CITATION INDEX, which is published by the Institute for Scientific Information of the United States.¹ Let us recall that 670,000 bibliographical descriptions of articles and about 9.6 million references, which are contained in 3,300 scientific journals, are annually incorporated in this index. This study is based on a database, in which 4.5 million articles, which were cited in 1973-1988, were included (let us note that about 3.8 million works of this period were not cited).

In the science department of the institute under the supervision of G. Small, a well-known specialist in information science, work is being performed on the study of the contribution of different countries, including the USSR, to world science. In late 1989 a program, which made it possible to identify the most frequently cited articles of Soviet authors, which were published during the period 1971-1988, was completed (articles cited not less than 50 times during this period were included in the data file). The affiliation of an author with the USSR was determined from the place of work, which was cited in the article. This led to several inaccuracies. For example, the absence in this list of one of the highly cited articles of L.D. Faddeyev caused surprise. It turned out that one of the universities of Italy, where it was completed, was indicated in the journal that published it (the permanent place of work—the USSR Academy of Sciences—was mentioned in a footnote).

Thus, 892 Soviet works were included in the list of the most cited articles during 1973-1988. By fields of knowledge they were broken down in the following manner: physics and astronomy—47 percent; the life sciences (including biochemistry)—27 percent; chemistry—18 percent; mathematics—5 percent; geology and geophysics—1 percent; the engineering sciences and electronics—1 percent; others—1 percent.

These articles were published in 239 journals, moreover, only 17.7 percent were published in journals that are published in the USSR. A list of these publications is cited in Table 1. Eight of the 10 are journals that are connected with a wide range of physics problems. More than 90 percent of the highly cited articles were published in them. The value of the impact factor—an indicator of the information significance of the scientific journal²—is indicated in the right-hand column of the

table. The data, which are published by the Institute for Scientific Information of the United States in another index—JOURNAL CITATION REPORTS—testify that Soviet journals have a lower impact factor than foreign journals. Nevertheless, it should be pointed out that the first three of the Soviet journals indicated in the list invariably stand out clearly among the others with respect to this indicator. Although, of course, it is impossible not to take into account that the traditions of citation in different fields of knowledge are distinct.

Table 1. Soviet Journals, in Which the Most Frequently Cited Articles Were Published (1973-1988)

Nos.	Name of Journal	Number of Articles	Impact Factor		
			1978	1982	1988
1.	USPECHI FIZICHESKIKH NAUK	48	1.174	1.814	2.207
2.	ZHURNAL EKSPERIMENTALNOY I TEORETICHESKOY FIZIKI	38	1.202	1.017	1.261
3.	PISMA V ZHURNAL EKSPERIMENTALNOY I TEORETICHESKOY FIZIKI	33	0.547	0.439	1.504
4.	DOKLADY AKADEMII NAUK SSSR	11.	0.445	0.419	0.326
5.	USPEKHI KHIMII	11	1.118	1.090	—
6.	FIZIKA POLUPROVODNIKOV	10	—	0.520	0.363
7.	KRISTALLOGRAFIYA	4	0.514	0.337	0.467
8.	ASTROFIZICHESKIY ZHURNAL	1	not processed in SCIENCE CITATION INDEX		
9.	GENETIKA	1	0.467	0.433	0.398
10.	IZVESTIYA AKADEMII NAUK SSSR, SERIYA FIZICHESKAYA	1	0.298	0.132	0.340
Total Number of Articles		158			

The analysis of the 50 most cited articles showed that 35 of them are articles on physics and 13 are studies in the field of molecular genetics and biochemistry. Of the 20 most cited articles 16 pertain to physics, here six of them belong to A.M. Polyakov. This name appeared for the first time in the pages of CURRENT CONTENTS (one of the most popular information publications in the world of science, which is also published by the Institute for Scientific Information of the United States) in 1977 in the list of the 20 most cited Soviet works that were published in 1975-1976, when the author was 30 years old. Last year he received an invitation to hold for two years the Feynman Chair at Massachusetts Institute of Technology.

The list of the authors of the 20 most cited works and information on the citation frequency of these works

during 1973-1988 are cited in Table 2. (Only one of them, the article of A.M. Polyakov "Particle Spectra in Quantum Field Theory," was published in a Soviet journal—PISMA V ZHURNAL EKSPERIMENTALNOY I TEORETICHESKOY FIZIKI, which is translated into English.) The data of the American Institute for Scientific Information make it possible to indicate for the majority of the authors the total number of articles, which were published by them during this time, and the total number of references to these articles (the two right-hand columns). We stress that it is a matter of articles, therefore, a number of extremely highly cited Soviet scientists, who are the authors of world-famous books, for example, Ya.B. Zeldovich and L.M. Brekhovskikh, were not included in this list.

Table 2. The Authors of the 20 Most Frequently Cited Soviet Articles (1973-1988)

Nos.	Authors ¹	Number of References to the Most Highly Cited Article	Total Number of Articles of Each Author During the Entire Period	Total Number of References to Each Author During the Entire Period
1.	M.A. Shifman	839	101	4,268
	A.I. Vaynshteyn		34	2,987
	V.I. Zakharov		129	4,401
2.	N.I. Shakura	730	14	916
	R.A. Syunyayev		35	1,887
3.	A.M. Polyakov	682	20	3,980
4.	A.M. Polyakov	677		
5.	M.A. Shifman	615		
	A.I. Vaynshteyn			
	V.I. Zakharov			
6.	B.V. Chirikov	533	22	799
7.	A.D. Linde	503	58	2,777
8.	A.M. Polyakov	437		
9.	A.A. Belavin	417	18	1,114
	A.M. Polyakov			
	A.B. Zamolodchikov		33	1,295
10.	B.L. Altshuler		35	1,761
	A.G. Aronov		54	1,449
	P.A. Li	399	3	778
11.	V.A. Matveyev	394	38	551
	R.M. Miradyan		4	451
	A.N. Tavkhelidze		12	647
12.	A.M. Polyakov	337		
13.	P.L. Privalov	369	61	1,590
	N.N. Khechina		8	498
14.	R.G. Gerr	366	11	402
	A.I. Yanovskiy		26	512
	Yu.T. Struchkov		253	1,878
15.	B.L. Altshuler	359	38	1,123
	D. Khmel'nitskiy		55	1,475
	A.I. Larkin		55	1,475
	P.A. Li			
16.	A.I. Varshavskiy	337	10	429
	V.V. Bakayev		18	52
	G.B. Georgiyev		123	3,140
17.	A.M. Polyakov	336		
18.	A.D. Linde	331		

Table 2. The Authors of the 20 Most Frequently Cited Soviet Articles (1973-1988) (Continued)

Nos.	Authors ¹	Number of References to the Most Highly Cited Article	Total Number of Articles of Each Author During the Entire Period	Total Number of References to Each Author During the Entire Period
19.	Yu.A. Ovchinnikov	324	232	4,082
	N.G. Abdulayev		27	997
	M.Yu. Feygina		23	924
	A.V. Kiselev		182	1,763
	N.A. Lobanov		4	449
20.	V.I. Ivanov	304	107	1,159
	L.Ye. Minchenkov		15	539
	A.K. Shchelkina		8	485
	A.I. Poletayev		2	306

1. In case of the repetition of names different articles are meant.

Summary information on the 50 most cited Soviet scientists (of them 22 are physicists, 17 are chemists, and 11 are biochemists) is put together in Table 3.

Table 3. The 50 Most Cited Soviet Scientists (1973-1988)

Nos.	Authors	Total Number		Number of References to Articles and Books in 1988
		articles	references	
1.	V.S. Letokhov	270	4,575	248
2.	V.I. Zakharov	129	4,401	14
3.	M.A. Shifman	101	4,268	303
4.	A.I. Vaynshteyn	78	4,181	64
5.	Yu.A. Ovchinnikov	232	4,082	286
6.	A.M. Polyakov	20	3,980	576
7.	N.K. Kochetkov	329	3,326	241
8.	M.G. Voronkov	624	3,290	263
9.	A.M. Prokhorov	490	3,177	52
10.	G.P. Georgiyev	123	3,140	51
11.	A.D. Linde	53	2,777	329
12.	V.V. Korshak	617	2,626	252
13.	I.V. Berezin	220	2,432	110
14.	A.N. Pudovik	548	2,389	116
15.	N.S. Zefirov	253	2,188	210
16.	V.N. Smirnov	190	2,179	20
17.	A.N. Nesmeyanov	226	1,997	375
18.	P.G. Kostyuk	55	1,924	247
19.	E. Lippmaa	72	1,887	102
20.	V.P. Skulachev	86	1,883	123
21.	Yu.T. Struchkov	253	1,878	24
22.	R.A. Syunyayev	35	1,877	87
23.	K. Martinek (CSFR) ¹	118	1,842	208
24.	A.V. Kiselev	182	1,763	178
25.	B.L. Altshuler	35	1,761	393

Table 3. The 50 Most Cited Soviet Scientists (1973-1988) (Continued)

Nos.	Authors	Total Number		Number of References to Articles and Books in 1988
		articles	references	
26.	O.A. Reutov	206	1,733	48
27.	Ya.B. Zeldovich	63	1,732	952
28.	L.D. Bergelson	176	1,708	64
29.	Ye.S. Fradkin	76	1,652	388
30.	V.A. Kabanov	224	1,622	51
31.	A.S. Shashkov	171	1,597	38
32.	P.L. Privalov	61	1,590	218
33.	N.G. Basov	199	1,544	316
34.	V.T. Ivanov	90	1,478	23
35.	N.V. Belov	409	1,475	45
36.	A.I. Larkin	55	1,475	236
37.	V.A. Novikov	56	1,463	62
38.	G.A. Razuvayev	211	1,454	85
39.	A.G. Aronov	54	1,449	45
40.	V.I. Spitsyn	293	1,397	96
41.	B.I. Shklovskiy	51	1,347	131
42.	V.N. Tsvetkov	143	1,367	185
43.	A.A. Bayev	77	1,338	14
44.	V.I. Goldanskiy	136	1,309	167
45.	A.B. Zamolodchikov	33	1,295	188
46.	A.A. Petrov	283	1,280	47
47.	M. Magi	40	1,251	21
48.	N.A. Plate	131	1,220	108
49.	F.V. Bunkin	137	1,197	121
50.	Ye.V. Shiryak	40	1,196	232

1. The author worked many years in the Soviet Union.

The high citation frequency correlates well with the high academic title of the authors—29 of them are full members and corresponding members of the USSR Academy of Sciences. Let us note that the authors cited in the list differ sharply from each other in the number of published articles. For example, V.S. Letokhov, first in the number of references, published 270 works (4,575 references), while A.M. Polyakov, sixth on the list, published 20 works (3,980 references). In connection with this it should be emphasized that it is necessary to use such information cautiously, and, as E. Garfield repeatedly stressed, the final say rests with experts in the given field.

The dissimilar transliteration of the surnames of some scientists (the same article could be cited in different transliterations of the surnames) caused some difficulties when working with this data file. For example, the surnames of Ya.B. Zeldovich and V.I. Goldanskiy were encountered in three versions.

In the last column of Table 3 the information for 1988 alone is cited (as usual, it is given with respect to the first author). Here the citation frequency of all works, including books, is taken into account. In connection with this the "correlation of forces" changes, Ya.B. Zeldovich has the highest citation frequency of the 50 scientists during 1988, although on the list he is in 27th place. The situation with L.D. Landau, who in 1988 was cited about 2,000 times (but he, of course, was not included among the "champions" in the citation of articles), is similar.

A work of Garfield, in which the cities, where the 100 most cited Soviet scientists work, were indicated, was recently published: 71 in Moscow, four each in Novosibirsk, Leningrad, and Pushchino-on-Oka, three each in Kiev and Tallinn, and so on. Even a chart with the cities, the residents of which in 1989 published not less than 250 scientific articles, was inserted (in 1989 articles from 127 Soviet journals were included in the

database of the American Institute for Scientific Information). The cities were broken down by the number of published articles in the following manner:

1. Moscow	14,044
2. Leningrad	3,414
3. Kiev	3,106
4. Novosibirsk	1,265
5. Minsk	995
6. Kharkov	884
7. Sverdlovsk	678
8. Tomsk	491
9. Irkutsk	429
10. Tashkent	420
11. Donetsk	413
12. Chernogolovka	409
13. Kazan	374
14. Lvov	346
15. Gorkiy	327
16. Odessa	326
17. Rostov-on-Don	325
18. Vladivostok	321
19. Pushchino-on-Oka	316
20. Tbilisi	292
21. Dubna	289
22. Riga	274
23. Baku	263
24. Ufa	261
25. Yerevan	255

As we see, in this list Moscow greatly leads all the other cities. Such a powerful scientific center as Novosibirsk yields one-third as many articles as Kiev. It is noteworthy that the scientists, who work in Sverdlovsk, where there were no journals that are processed by the Institute for Scientific Information of the United States, in the number of articles lead by a factor of two the researchers who work in Vladivostok (the journal BIOLOGIYA MORYA, which is published in Vladivostok, found reflection in the base of used data).

The work on compiling charts of co-citation frequency, or clusters, has already been told about in PRIRODA

(No 1, 1990). Each cluster is a block of highly cited articles, which are closely interconnected by co-citation. The contribution of a country to the scientific field, which the cluster describes, is evaluated by the number of references to authors from one or another country.

In 1989 the results of studies of the world information flow in accordance with the database of the same institute, which were conducted by Hungarian specialists under the supervision of A. Schubert, were published. In accordance with these results, the share of publications of the USSR in the world information flow came to 7.3 percent, while the share of references came to 1.63 percent. Publications on physics make up 11.3 percent of the world flow, while the share of references make up 3.55 percent. This made it possible to assume that even in those fields of knowledge, where our scientists hold priority positions, the share of Soviet publications within the clusters should not exceed 15 percent. However, many scientific directions, which are represented primarily or even entirely by Soviet publications, were found in the clusters of scientific literature for 1983 and 1988.

Is this good or bad? Bibliometric indexes do not contain answers to such questions, but do make it possible to pose them, and this is already a considerable part of the work. It makes sense for organizers of science and specialist-experts to investigate whether we have come across urgent directions, in which we have indisputable advantages, or, on the contrary, we are spending money on research that does not interest anyone in the world. The following explanation, for example, is also possible. These works belong to directions, the peak of which abroad has passed, while the basic studies have become such an integral part of the world thesaurus of knowledge that they are no longer cited (Garfield directed attention long ago to the possibility of such "oblivion").

In 1983 the number of clusters, which consist primarily or entirely of Soviet publications, came to 101 (86 of them consist only of Soviet works). They were broken down by fields of knowledge in the following manner: physics—41, the life sciences—17, chemistry—28, mathematics—8, the earth sciences—7.

Starting in 1977 the section "Classics of Citation," in which there are printed the comments of the most cited authors, who tell how their studies were conducted and why, in their opinion, they are actively cited, appeared in the weekly issues of the publication CURRENT CONTENTS.

Table 4. Soviet Authors in "Classics of Citation"

Nos.	Authors	Year of Publication	Year of Appearance of Work and Language of Publication	Number of References
1.	D.N. Zubarev	1981	1960, Russian	1,615
2.	L.M. Brekhovskikh	1983	1960, English	1,420
3.	V.I. Goldanskiy	1983	1964, English	275
4.	V.I. Goldanskiy	1986	1968, English	170

Table 4. Soviet Authors in "Classics of Citation" (Continued)

Nos.	Authors	Year of Publication	Year of Appearance of Work and Language of Publication	Number of References
5.	A.S. Spirin	1986	1958, Russian	760
6.	A.S. Davydov	1986	1958, English	490
	G.F. Filippov			
7.	G.P. Georgiyev	1986	1963, English	260
	O.P. Samarina			
	M.I. Lern			
	M.N. Smirnov			
	A.N. Severtsov			
8.	V.Ye. Vaskovskiy	1985	1968, English	280
	Ye.Ya. Kostetskiy			
9.	A.A. Abrikosov	1985	1957, Russian and English	1,075
10.	B.V. Deryagin	1987	1941, English	490
	L.D. Landau			
11.	M.F. Vuks	1985	1966, Russian and English	185
12.	G.I. Abelev	1987	1971, English	222
13.	Yu.M. Vasilyev	1988	1970, English	180
	I.M. Gelfand			
	O.Yu. Ivanova			
	S.G. Komm			
	L.V. Olshevskaya			
14.	Yu.S. Tatarinov	1988	1964, Russian and English	255
15.	V.I. Ivanov	1989	1973, English	310
	L.Ye. Minchenkova			
	A.K. Shchelkina			
	A.I. Poletayev			
16.	A.M. Zhabotinskiy	1989	1964, Russian and English	205
17.	Yu.I. Feldshteyn	1980	1967, English	120
	G.V. Starkov			

In all about 3,000 comments have been published, of them 17 are comments of Soviet scientists. As is evident from Table 4, the majority of them published their works in foreign scientific journals, which once again testifies to the advantages of initial publication in English. In connection with this it is necessary to welcome the appearance of the Soviet English-language journal BIO-MEDICAL SCIENCE, which is being published jointly by the USSR Academy of Sciences and the Royal Society of Chemistry of Great Britain and the first issue of which appeared in April of this year. Soon another two similar academic journals—on chemistry and power engineering—will begin to be published.

Footnotes

1. See V.A. Markusova, "The Citation Index to the Aid of the Distribution of Grants," PRIRODA, No 1, 1990, pp 3-5.

2. The impact factor of a journal is determined by dividing two numbers: The dividend is the number of references during one year or another to articles, which were published in this journal during the preceding two years, while the divisor is the number of articles that were published by the journal during the same two years.

3. E. Garfield, "The Russians Are Coming," Parts 1, 2, CURRENT CONTENTS, No 24, 1990, pp 3-17; No 25, 1990, pp 3-17.

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