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***USSR: Science &
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Goals, Operations of S&T Parks Examined

917A0080A Moscow IZVESTIYA (Union edition)
in Russian 28 Jan 91 p 4

[Article by IZVESTIYA science commentator B. Konovalov:
"Parks of Science and Technology"]

[Text] The new is the long-forgotten old. A large number of scientific and technical towns for the solution of important problems have been established in our country since prewar times. Zhukovskiy, Obninsk, Zelenograd, Pushchino, and Troitsk appeared in the Moscow area. The Novosibirsk Academy Campus became the most famous one. The creation of an environment favorable for the development of science and the liberation of the intellectual potential were the main goal of these scientific towns.

As often happens, our initiative was taken up in the West and the East, was improved, and underwent extensive development in the form of technology parks, science parks, and entire technopolises like the famous Silicon Valley in the United States and Kitakyushu in Japan. Now this idea, which has been enriched by western experience, is returning like a "boomerang" to us. Under the conditions of the transition to a market technology parks can become the "rudimentary" structures of new science-intensive industries that are based on Soviet inventions.

Now more than 10 technology parks are being formed in various cities of our country. Each of them has its own peculiarities. But it is important to emphasize that all of them will be able to develop efficiently only under the conditions of a market economy, and our "transition period," of course, is leaving a definite mark on their birth and future development.

In the West technology parks appeared under the conditions of the saturation of the market with traditional commodities and the availability of idle production areas. Technology parks became kinds of "incubators," where new ideas were brought up to a form suitable for testing on the market, and, in case of success, turned into an industrial works. Some ideas "wilted," while some blossomed, giving birth to new powerful firms. The market of competition was replenished owing not only to work in the laboratories of major firms, but also to the success of individual inventors and scientists and small collectives.

Under our present conditions of a deficit economy, the 100-percent utilization of enterprises, and the lack of competition, objectively there is no need for the intensive development of technology parks, it is necessary to understand this. Otherwise we will return again to the notorious barrier of introduction, to endless discussions about what scientists have developed, but production is not taking....

It is necessary to say honestly that we need technology parks today not as an industry, but first of all as a school of market relations in the area of science and technology, as the preparation of the base of tomorrow.

"And without the enlistment of western capital and know-how in our country great success hardly awaits technology parks," First Deputy Chairman of the USSR State Committee for Science and Technology (GKNT) I.M. Bortnik and B.D. Antonyuk, economic adviser to the chairman of the USSR State Committee for Science and Technology, believe. "Therefore, at the initial stage of the establishment of such structures in the USSR, the form of joint enterprise is most effective. One of the first Soviet technology parks is now being formed in precisely this way at the Exhibition of National Economic Achievements. This will be a joint Soviet-Italian venture."

Initially the technology park requires considerable investments. At a normally equipped university in the West a workplace now costs \$60,000-70,000. In our country on the average it costs 12,000 rubles. Our scientific minds are "armed" far worse than in the West. At the technology park this should not be. Everyone, whose idea has received recognition and support, should receive advanced equipment, materials, and assets for its implementation and bringing up to testing on the market, that is, the making of a small series of an efficient product. While later in case of success the commercial path should begin on the basis of the collective that developed this innovation.

And here it is necessary to emphasize the main thing—the technology park at the Exhibition of National Economic Achievements is being established not simply for talented scientists and inventors, but for people, who are prepared to become entrepreneurs and to participate themselves in the introduction of their creations on the world and domestic markets. At the technology park they are abandoning our traditional arrangement, when the scientist-inventor is cut off from the fate of his creation. All the conditions not only for work, but also for the harvesting of the "commercial crop" from an invention, including personal rights to the product being developed, are being created for him.

And here it is difficult to overestimate the assistance of western partners. In case of the success of a product, which originated at the technology park, the inventor-entrepreneur himself or with the participation of shareholders and managers acquires the opportunity to set up a small enterprise for the domestic market. While for the world market they will select for him a partner firm for joint enterprise. Taking into account the state of our market, the manufacturing of the new product, most likely, will be organized abroad or at our plant, which will become a part of the joint venture. In any event our market will receive its share of the new product. But, as practical experience shows, in your country people buy a finished commodity with pleasure, it is only that no one wishes to organize the production of "someone else's" product.

Planning Official on USSR Academy of Sciences Budget Problems

917A0077A Moscow POISK in Russian No 51 (86),
21-27 Dec 90 p 3

[Interview with Aleksandr Ivanovich Konoshenko, chief of the Main Planning and Economic Administration of the USSR Academy of Sciences, by a POISK correspondent under the rubric "What Is Science To Be Like?"; date and place not given: "What the Coming Year..."—first two paragraphs are POISK introduction]

[Text] We have found ourselves on the threshold of a market, without visualizing at times all the consequences of the transition to a form of economics, which is new for us. And that is why it is extremely important already today to know how traditional budget structures will behave under these conditions. In particular, what awaits academic science.

At the request of a POISK correspondent Aleksandr Konoshenko, chief of the Main Planning and Economic Administration of the USSR Academy of Sciences, tells about this.

[POISK] First of all, Aleksandr Ivanovich, let us examine how things went at the Academy and institutes during the present, premarket year.

[Konoshenko] The present fiscal year was extremely tense for the Academy. The point is that literally until the last months we did not know whether we would receive the planned assets in full. Only in November did the government settle the question.

You can mention economic contracts. They, it is said, are capable of closing if only partially the budget gaps. But with the fulfillment of themes for outside organizations things here are also getting worse and worse.

First of all one of our largest financiers—"defense industry workers"—disappeared. The state considerably reduced the spending on their needs. And this is probably justified. But, in striving to preserve its own scientific potential, the military-industrial complex reduced the amounts that had been earmarked earlier for the support of our research on space, thermonuclear fusion, and so forth. That is, in the end the Academy suffered.

Another serious problem is the outflow of economic contracts to cooperatives, various kinds of introduction centers, and so forth. In a year they got 6 billion rubles [R] of such work. Hence, science did not count nearly the same amount in its plans.

[POISK] Is it possible to hope that during the coming year the situation will improve drastically?

[Konoshenko] Of course not. Perhaps, it will be aggravated even more. As you probably know, the financing of academic science in 1991 will be carried out from the USSR Basic Research Fund. It will consist of two parts.

The first—the constant part, which includes approximately two-thirds of the amount—is intended for the financing of operations on themes of institutes and scientific institutions. The second—the variable part—will be intended for the financing of individual applications of scientific themes and research, which have gotten through the competition and an independent expert evaluation.

The lion's share of the fund is assets of the state budget and, in addition, deductions from the profit and contributions of enterprises and organizations and donations of private people. We proposed that the amount of taxable profit be reduced by the amount of the payment to this fund. It would also not be taken into account in calculations of the maximum profitability.

The Council of the fund, to which leading scientists of the country and representatives of the academies of the Union and the republics, the higher school, and sectorial academies will belong, will manage it.

But let us return to money. The constant part of the fund, undoubtedly, interests you first of all. For it will determine to a significant degree the financial well-being of basic science. For the present it is too early to talk about its specific amounts. The draft of the budget of the Academy of Sciences has been drawn up and submitted for approval to the State Committee for Science and Technology. But the budget of the country was not approved in the parliament. The only thing I can say is: We anticipate receiving a slightly larger amount than in 1990.

And all the same we do not expect radical progress. Yes, a larger absolute figure is expected. But, as has already been calculated, with allowance made for inflation we will receive fewer assets for the development of science. For example, the mentioned increase of the wage. They did not specially allot us money for it for next year. What is more, it is alarming that thus far the matter with the tax on the increase of the consumption fund has not been settled. If financial organs take this year, 1990, as the base year in the system of comparison, the tax may eat up a large part of the assets that are being channeled next year into the financing of academic institutes. And so, the reduction of spending on equipment and materials is inevitable. That is, while retaining personnel, we inevitably lose the quality of scientific works.

So that, in spite of the apparent increase of budget financing, it is impossible, perhaps, to call the situation in the economy of the Academy sufficiently satisfactory.

[POISK] We are talking about the transition to a market. But its laws are strict. And if there is not enough money for everyone, hence, is it necessary to get rid of someone?

[Konoshenko] How do you visualize it? First, how is one to find out whom to get rid of? On what basis? The "citation index," which is being proposed today, is far from absolute. A scientist can be a most talented experimenter. More than one dissertation has been written on

the basis of his results. And at the institute they threaten him with respect. But he does not have publications. What, is he to be included in the ballast?

Second, a sufficiently effective mechanism of elimination does not exist. What is more, we had only to hint at a reduction of the number of personnel, when the trade union threw itself into the fight. There they believe that every member of the union should be equally protected against such misfortunes. Unfortunately, the stand "we will defend everyone" is having the result that the best, talented, able-bodied people remain unprotected. For precisely they lose most of all from unwarranted leveling. And science can lose precisely such people, if it will not provide them with a comparatively higher standard of living.

First of all, it is necessary to increase their wage. But the money spreads over the average collective....

Perhaps, the contract system will help here. It will enable institutes to settle the questions of the number of personnel, the elimination of the ballast, and the attachment of personnel.

[POISK] But here my turn has come to ask: How do you visualize this?

[Konoshenko] A semifinished contract system already exists. The Institute of State and Law, the State Committee for Science and Technology, and the State Committee for Labor and Social Problems took part in its development. Our administration is generalizing the proposals and will try to submit them for discussion by the public no later than January. But, I believe, it is possible and necessary to talk now about several elements.

Each institute specifies independently the features of the application of the contract system. However, in my opinion, there are two mandatory categories which should run through contracts. There is, first, all the young specialists who are newly hired at scientific institutions. If only because far from everyone is capable of engaging in creative activity. A contract is needed so that subsequently the institute management would not torment itself when getting rid of a "substandard" worker. The second group is people of retirement or preretirement age. This is necessary in order both to ensure the rotation of scientific forces and at the same time to retain leading scientists.

This system will make it possible in principle to increase the efficiency of scientific labor. And, of course, to differentiate the wage to an even greater degree. To see to it that the scientist would receive according to his contribution. For the difference in the creative return is disproportionate to the magnitude of the salary "spread."

[POISK] But who will be able to evaluate the correctness of the choice?

[Konoshenko] We believe that the director and the scientific council together with the scientific community of the institute will be able to.

And we are placing particular hope on the principle of glasnost. Every question, which is connected with contracts and personnel, should be brought to the attention of the collective. It is one thing if an unjust decision is made in the lobby, in secret. And it is an entirely different matter if you should announce it in front of hundreds, or else thousands of people.

So that the contract system will enable our institutes, in my opinion, to a significant degree to settle personnel and financial questions. Otherwise losses of scientific personnel and the destruction of the accumulated creative potential are inevitable.

[POISK] But there are also other ways. The commercialization of basic science is capable of yielding a considerable return. Might it be worth establishing innovation firms, which deduct a portion of the profit from the use of ideas of academic subdivisions for the needs of basic research?

[Konoshenko] I will recall that most often of all an entrepreneur in a market economy directs his attention to the rate of return. And only it controls his actions. Therefore, hardly anyone will agree to make any deductions without an apparent advantage. It is far more convenient to work for oneself.

[POISK] But then it is possible to block the channels of the obtaining of fruitful ideas from academic institutions, and the entrepreneur will have nothing, on which to do business.

[Konoshenko] Ideas are people. As long as a legal apparatus, which protects intellectual property, does not exist, all the attempts to block the sources of the obtaining of ideas are unpromising. Pay a person two-fold, threefold, fivefold more, and he will transfer to a different organization, no longer an academic one. Moreover, not "empty," but with valuable, fruitful ideas. Perhaps, not even his own, but ones seized from an adjacent desk.

Therefore, in speaking about the market and commercialization, it is necessary first of all to establish the effective legal protection of intellectual property. Incidentally, it is also possible to achieve something today.

Corresponding Member of the Siberian Department of the USSR Academy of Sciences V. Sidorov once said that he was very interested in the introduction of a contract system. And particularly not for leading scientists, but for young scientific associates and engineering and technical personnel. In every contract he intends to stipulate the conditions, in conformity with which in exchange for a higher wage an associate gives up work on the side.

This, of course, is not a panacea, rather it is a half-measure. But today, when we have found ourselves in an unprotected position, this, although a temporary one, is a solution.

[POISK] And do institutes have an opportunity to take part in commercial activity?

[Konoshenko] Of course. For example, it is possible to establish small enterprises. To operate only independently. With the enlistment of lawyers to conclude a founding agreement and accordingly to work out a charter, in which to set down the responsibility of the small enterprise to the founder and of the scientific research institute to the subsidiary. And from now on.

[POISK] But where is one to get entrepreneurs? There are, it seems, not that many of them in the system of the Academy of Sciences.

[Konoshenko] I believe that people, perhaps not leading lights of science, but with a good entrepreneurial flair, will be found at any institute. Here is an example.

What commercial product, it would seem, can mathematicians put out? However, a center for the development of high quality software materials was established at the Institute of Applied Mathematics of the USSR Academy of Sciences. And it is providing a good return. The young people are working with pleasure. And, note, they are fulfilling all the tasks in a first-class manner. The work is not detrimental to the institute. On the contrary, it is attaching people.

But the main thing is that one must not forget that glasnost is also needed here. Everyone at the institute should have the opportunity to find out: What is such a small enterprise doing and how? Whose developments and ideas are being used? Then there will be no misunderstandings.

[POISK] The real market is not for opportunists and dodgers. It is for those who know how and like to work. To work, of course, for money. This is indisputable.

Round Table Discusses 'Brain Drain'

917A0052A Kiev PRAVDA UKRAINY in Russian
7 Dec 90 p 2

[Article by T. Mayboroda under the rubric "Notes With Regard to": "The Brain Drain"—first paragraph is PRAVDA UKRAINY introduction]

[Text] This problem was recently discussed at one of the round tables, which were held in Kiev within the framework of an international symposium on scientology and scientific and technical forecasting.

According to preliminary data, today 3 million people are potentially ready to leave the USSR. These are people of different nationalities and occupations, from various strata of the population, and with a different level of education. Unfortunately, those fellow citizens of ours, whose departure from the country will entail a number of negative consequences for the development of society and its culture and science, constitute a considerable share of them. In just seven months of this year more than 230,000 people emigrated. If we do not stop and do not begin if only somehow to regulate this outflow, the losses may become irreplaceable.

Our country, of course, is not the only "brain donor" in the world. The migration of minds is of a truly global nature and this, first of all, is connected with the broad process of the integration of science and with its internationalization.

They say that the mass "brain drain" began for the first time at the end of World War II and was connected with the Manhattan Project, in the development of which scientists of various countries participated. During those years about 5,000 specialists left Germany alone for the United States. Since then the "brain" flows between countries have not decreased.

And today the United States of America along with Israel are the main centers of immigration attraction. Along with developing countries of the Asian continent and countries of the recent "socialist camp" such highly developed countries as Great Britain, Canada, the FRG, and France are also serving as suppliers of "brains." It is not surprising that, according to the testimony of statistics of the early 1970's, in only about two years the United States saved more than \$2 billion on the expenditures on the training of specialists. It is also asserted that one in three Nobel Prize laureates, who resides in the United States, is an immigrant.

Many people regard such a situation as unacceptable. French trade unions, for example, are raising insistently the question of the payment by Canada and the United States of the debt for specialists who migrated, on whose training and education French money was spent. It seems that there is a reason here.

However, in the situation, which has formed in the world economy, it should also be acknowledged that the process of the "brain drain" is of an entirely objective and, in part, already irreversible nature, although it still lends itself to adjustment.

Why do scientists leave one or another and, in particular, our country? As a rule, a set of factors, which often are exclusively individual, operates. And still two are most characteristic: the impossibility of self-realization and poor working and living conditions.

As to the USSR, for many years the intolerable decline of the prestige of the labor of a scientist and the inadequacy of its appreciation have been spoken about from various rostrums.

As one of the basic "stimuli" of the brain drain the round-table participants also named the information famine: The "electronic curtain," which separates us from world science, is so thick that items of scientific information are received even by the main library of the country—the Library imeni V.I. Lenin—at times with a delay of two-three years.

One also has to admit the sad fact that intellectual labor in our country has never properly become the property of the self. And here is eloquent confirmation of this: Every other inventor of the Ukraine does not receive the author's reward. Today in the republic more than 300 cases concerning the suit for nonpayment of the author's reward are at the stage of consideration. How many such suits have simply not been brought! And the notorious "ceiling" for such a reward: Even if you load the state treasury with money by an invention, all the same you will not get more than 20,000 rubles.

It seems that it is also time for us to take a close look at the grains of experience with regard to "the return of brains," which exist here and there. At one time Czechoslovakia suffered a large outflow of specialists. In 1948 about 250,000 people emigrated from it, ill reputed 1968 "carried away" just as many. The living conditions in the present-day CSFR are such that those who left are not striving to return to it. With the possible exception of those who have reached retirement age and have provided themselves for old age "in dollars." Such people, fortunately, are found: Nostalgia all the same is not an invention. These people, who have much practical scientific experience, are agreeing to work as instructors at higher educational institutions of the homeland that they once left. And it is not rejecting their assistance, but, on the contrary, is gladly accepting it.

A similar situation has formed, in the opinion of one of the speakers, in Latvia. There they are trying today to return what was lost, by relying on the assistance of the association "Latvia and Latvians in the World." They are electing as honorary members of the republic Academy of Sciences prominent scientists from among Latvian emigres. The strengthening of even such formal ties is considered promising. Within the framework of the activity of this association professional congresses

are being organized. For example, a congress of Latvian physicians from throughout the world has already been held in Riga. The same kind of congress of Latvian scientists is being prepared.

At the round-table meeting the following wish was also expressed: It is necessary to create the conditions for the extensive development of two-way "push-pull migration"—to attract well-known scientists of the West for two-five years of work under contract in our country and to afford our scientists the same opportunity to work abroad.

From the experience of the countries, which underwent a "brain drain"—such as Japan, Korea, and others—if follows that after a certain time, which has been spent in the accepting country, half of those who left are willing to return to their country, provided it has been able to raise itself a step higher in the level of its scientific and technical development. And this is also understandable, for the majority of foreigners in the same United States obtain no less prestigious a job than the one they could obtain upon returning home.

Domestic sociology for a long time did not touch upon the problem of the "brain drain." Now attempts are being made to fill this gap. In particular, the Institute of Sociology of the Ukrainian SSR Academy of Sciences is conducting such research. According to its observations, the outflow of representatives of the natural sciences from our republic is most significant, humanities scholars are more susceptible to "push-pull migration." Surveys of sociologists show that more than 75 percent of those who go abroad are disposed to returning, if the conditions in our country change for the better. But we should all the same change them.

It is impossible not to note that the present migration boom, which our country is experiencing, by no means is promoting the "prosperity" of those who go abroad. According to the data of the New York association "For New Americans," just among the 40,000 Soviet Jews, who came to the United States last year, there were 400 scientists with degrees and 6,000 engineers, and the absolute majority of them are still looking for a job in their specialty. Many have been forced to "change their profession" and now are driving taxis, are working as accountants, doormen, guards, dishwashers....

But even those, who have gotten a job in their specialty and have achieved the desired external comfort, often suffer from internal discomfort. However you look at it, we are all the children of our times. And the sense of patriotism is by no means far-fetched.

Many of us probably did not leave unnoticed the short TASS report that was published the other day in the central newspapers. At the Kremlin high awards of the homeland were presented to a group of scientists for a special contribution to the preservation and development of genetics and selection and the training of highly skilled scientific personnel. Among those given the awards are scientists of the older generation, who held out courageously in the struggle against Lysenkoism,

saved science from complete devastation, and ensured the transition to its revival and further development.

Here are their names: Academician of the USSR Academy of Sciences N.P. Dubinin; V.S. Kirpichnikov, scientific consultant of the Institute of Cytology of the USSR Academy of Sciences; Corresponding Member of the USSR Academy of Sciences I.A. Rapoport; Academician of the USSR Academy of Sciences V.A. Strunnikov; and A.A. Malinovskiy, now a retiree, but in the past an associate of the Scientific Research Institute of Systems Research of the USSR Academy of Sciences.

This report upset me personally. What sincere gratitude these people, who did not abandon the country and did not betray domestic science even during the hard days of "scientific obscurantism," deserve! Is this really not an example for imitation?

Draft on Status of USSR AS Institutes Completed

917A0049A Moscow POISK in Russian No 48 (83),
30 Nov-6 Dec 90 p 3

[Article by Yelizaveta Denisova: "They Should Not Waive 'The Principles....'"]

[Text] Thus, the job has been done. The work on the new draft of "The Basic Principles of the Organization and Activity of the Scientific Research Institute of the USSR Academy of Sciences" has been completed. The text lost a least a third of its weight, but became topical and is of interest not only for the leadership.

At last there are envisaged among the rights of the scientific associate: first, the right to work outside structural subdivisions. That is, an administrative official should not necessarily stand over a person who is writing, for example, a dictionary. Second, the right to an independent examination of his work. For example, one submitted for the competition for financing. And the third one is the very important right, which is connected with the preceding one, to submit a scientific work for publication without approval, which is indispensable today, in the form of the stamp of a chief. This is fundamental in case of the transition to a contract system. For the contract is an element of the market. And if a scientist does not have publications, he has no chances to declare himself. But then there will also be no contracts.

In short, the document turned out to be worthy and progressive, and its writers are not ashamed, as they themselves admitted, to affix their signatures to it. Kettledrums—it suc-ceed-ed!—are now blasting, it would seem, in their hearts. But then a familiar appeal was heard: "Colleagues! Do not forget: It is still necessary to see to it that the document would be accepted and approved with the participation of representatives of the scientific research institutes, and not only by the authority of some members of the Academy. Otherwise

all the efforts on the democratization of the life of scientific collectives will go to rack and ruin...."

Yes, Aleksey Zakharov, who said these words, is right. Such a danger does exist. He warned of it back at the round table in the office of Academician V. Kudryavtsev, when the flaws of the first draft were discussed in detail (see POISK, Nos 14, 18, 22, 25, 37, and 44, 1990). And at that time together with other envoys of public organizations from the Union of Scientists, the Club of Inventors of the Academy of Science and the Moscow Forum this scientific associate of the Institute of Oceanology was invited to be a member of the working group as an active participant of the new trade union movement. I remember that, having heard from the mouth of Vice President of the USSR Academy of Sciences V. Kudryavtsev this suggestion on cooperation, I thought: For the sake of appearances he is inviting people "from the plow" in order to quiet public opinion.

It turned out that it was nothing of the sort—they actually wanted to hear them out and to take into account the ideas about the principles of the organization and activity of scientific research institutes.

"Since that day in June the working group has gathered several times," relates Vladimir Pavlov of the Mathematics Institute imeni V.A. Steklov, a participant in it and a member of the board of the Union of Scientists. "The discussion was conducted in an exceptionally constructive manner. One's own ideas were voiced clearly, there were no shouts. In the group besides us, let us conditionally call ourselves the 'informals,' there are four specialists from the Institute of State and Law, three full members of the Academy, and the same number of associates of the presidium. If people do not agree with each other, the debates do not go, as usually, through two or three rounds, but stop—the different points of view are recorded. Vladimir Nikolayevich Kudryavtsev, it must be pointed out, is supervising the commission very skillfully and knows how to create a businesslike, intellectual atmosphere. That is why, I believe, there is also a result: We succeeded in registering in the document the opinion of the scientific community—it concerned first of all the role of the scientific council. Now, according to 'The Basic Principles,' at the scientific research institute

the scientific council has legislative power, while the director has only executive power.

"For example, the scientific council now approves the structure of the institute and internal financing by directions and determines the level of specialists and, accordingly, the remuneration of their labor. The concept 'manning table' was simply obliterated from the document. The administrative system in the form of the department and the presidium will no longer have a decisive influence on the life of the scientific research institute. But the right to elect the director has been left to the department as the manager of finances. True, it is possible to do this only with the consent of the collective—from among the candidates who were supported at the institute by a minimum of 50 percent of those who voted. Of course, this is a very big and resolute step in the direction of democratization.

"Previously the scientific council was actually a consultative body of the presidium, nothing more. Now the scientific council is an autonomous, independent body. A body of collective management, which is also recorded this way in the document. It is also elected by the collective, not appointed, as before, by the director. The opinion of the collective is also taken into account when approving the deputy director for administration and management. The director appoints him, but in consultation with the elected organization that represents the interests of the labor collective."

Such a document has originated for the first time in recent decades within the walls of the USSR Academy of Sciences. We hope that it will be adopted. It is still not clear where and when. But however this happens, the participation of representatives of the scientific community is required without fail. Did the working group record not for nothing in the chapter "The Rights of the Institute": "The institute elects its own representatives for congresses and conferences of scientific personnel and delegates scientists for participation in the work of the departments of the USSR Academy of Sciences and the general assembly of the USSR Academy of Sciences"?

Note: The working group has not been dissolved, it has begun the discussion of the Statute on the Department of the USSR Academy of Sciences.

USSR Academy of Sciences Creates Advanced Materials College

917A0060A Moscow POISK in Russian No 50 (85),
14-20 Dec 90 p 7

[Interview with Academician Yuriy Tretyakov, head of the Chair of Inorganic Chemistry of the Chemistry Faculty of Moscow State University and director-organizer of the Higher College of Materials Sciences attached to Moscow State University and the USSR Academy of Sciences, by a POISK correspondent under the rubric "The Convertible Diploma"; date and place not given: "The College Seeks Talented People!" and announcement of first enrollment—first two paragraphs are POISK introduction]

[Text] Next year the Higher College of Materials Sciences will open. The parents of the newborn baby are: the USSR Academy of Sciences and Moscow State University. The first enrollment is 24 people.

At the request of our correspondent Academician Yuriy Tretyakov, its director-organizer and head of the Chair of Inorganic Chemistry of the Chemistry Faculty of Moscow State University, tells about the college.

[Tretyakov] I would say that the establishment of the college is an attempt to go beyond several traditions of the Soviet higher school. The rigid system of faculties, which enslaves students. The rigid syllabuses, which are similar to table d'hôte dinners that are identical for everyone. You will agree, all this is slightly old-fashioned.

At Cornell University in America, for example, nearly 60 percent of the students change faculties during studies. And it is a matter here not only of the high degree of independence of American students. We often overlook one of the main reasons for the free transfer of students from faculty to faculty: We are not conscious of the abundance of interdisciplinary courses. In itself the transfer is not a goal, it is a means. The real goal lies in stimulating the interest of students in independent incursion into bordering fields of sciences. Americans have mastered well the lesson of our century: Discoveries are most often made at the meeting points of disciplines.

We treated this lesson quite frivolously. For example, at the Physics Faculty of Moscow State University to this day not a single hour of chemistry is given to students. Transferring from faculty to faculty is an entire event. In other words, our interdisciplinary relations and, consequently, interfaculty bridges are extremely weak. The desire to change the situation somehow and to pull ourselves up to the world level also led us to the idea of the Higher Collective of Materials Sciences.

We are proposing to incorporate in the basis of instruction the principle of "three levels of interpenetration."

The first level will unite Moscow State University and the USSR Academy of Sciences, inasmuch as the college is their common subdivision. The directors of leading

institutes and prominent educators will be members of the council of trustees. We hope that for our students the university lecture halls and academic laboratories will equally be their own.

At the second level the college will link faculties and chairs. Instruction will be conducted on the basis of the physics faculty and the chemistry faculty, as well as faculties of the humanities type. When we formulated the syllabuses, we conditionally broken them down into three blocks: The first is chemistry and the problems of the synthesis of materials; the second is physics, mathematics, and work on computers; the third block is the humanities block (economics, foreign languages, esthetics, psychology). We would like to train our graduates so that they would be competitive not only in their own fields of science, but also in the world of the market. More simply speaking, so that they would not only know, but would also know how and could.

Finally, the third level of interpenetration will unite domestic and foreign science. A number of foreign professors have consented to work as regular instructors. Among them is Professor Hagenmuller of France, an honorary academician of the USSR Academy of Sciences.

Of course, hardly any of the foreign colleagues has a command of Russian. Therefore, English will be for students of the college a mandatory subject from the first through the last year (first-year students, when beginning their studies, for three months will probably study only a language and mathematics).

It is anticipated that during the first two years our wards will receive more or less identical basic training. The next two years will be devoted to subjects, which to a certain degree are mandatory, but of a different scope. That is, for example, everyone will familiarize himself with colloidal chemistry, but someone of the students will believe that for him 10 hours for it will be sufficient, while someone by his own choice will study it for 200 hours.

During the last one and a half years the student himself will form the package of subjects and the amounts of their instruction. He will specialize in one of four directions: industrial design and the development of materials; the development of promising processes and technologies of producing materials; the development of methods of the diagnosis and analysis of materials and processes; economics and management. During this period every student will spend one semester in practical studies abroad.

The college will be creatively and administratively independent to not less a degree than the faculties of Moscow State University.

It will be difficult to get into the college. We are directing attention to the search for talented young people in all corners of the country. We hope that the Secondary School Graduate-91 Competition of the newspaper

POISK, in the organization of which we intend to take an active part, will help us in this.

Secondary School Graduate-91

The Higher College of Materials Sciences attached to Moscow State University and the USSR Academy of Sciences announces the first enrollment of students.

The college trains world-level specialists for the fulfillment of materials science programs at institutes of the USSR Academy of Sciences and in scientific research groups of foreign firms and joint ventures.

Instruction at the college will make it possible to receive basic training in the area of natural science disciplines and to acquire knowledge and skills in the area of management and marketing, fluency in foreign languages, and a general-purpose humanities education.

Over the course of 11 semesters, one of which is allotted for foreign practical studies, leading specialists will acquaint you with the latest achievements of modern science and technology in the area of the directed synthesis and diagnosis of materials of the future: ceramics, high-temperature superconductors, composites, and polymers. Participation in scientific research and work on the latest equipment, instruments, and computer systems will enable you to specialize in a field of materials science, which you have chosen.

Students of the college will receive an increased stipend, while graduates of the college will receive a diploma of graduation from Moscow State University.

A dormitory is being made available for the time of instruction to those from other cities.

You risk nothing, since enrollment in the first year is being carried out in accordance with the results of correspondence competition and a resident spring session. The correspondence round includes assignments on chemistry, physics, and mathematics, which will be sent to all candidates in January 1991. The resident round is examinations in the same subjects.

For participation in the correspondence round we ask that you send an application in arbitrary form with the indication of your detailed home address and concise information about yourself no later than 5 January to the address: 119899, GSP-3, Moscow, V-234, Lenin Hills, Moscow State University, the Chemistry Faculty, the Higher College of Materials Sciences.

It is proposed to conduct an additional enrollment of secondary school graduates for participation in the resident round among the participants in the Secondary School Graduate-91 Competition that is being conducted by the newspaper POISK. The assignments of the correspondence round of the Secondary School Graduate-91 Competition will be published in POISK in January 1991.

Telephone inquiries: 939-34-90 (from 1100 to 1600).

Doctoral Dissertation Process Criticized

917A0073A Moscow INZHENER in Russian No 11,
Nov 90 p 10

[Article by A. Yezhov, head of a department of the TsNIIIEUS of the USSR State Construction Committee and people's deputy of the Moscow City Soviet, under the rubric "We Continue the Discussion": "Certification Is 'Not for Publication'"—first paragraph is INZHENER introduction]

[Text] Our journal has already turned repeatedly to the problem of improving the certification of scientific personnel (see TEKHNICA I NAUKA, No 11, 1988, the article "What One Is To Be"; No 6, 1990, the article "Is the Dissertation Writer Rejoicing?"). In this issue A. Yezhov, head of a department of the TsNIIIEUS of the USSR State Construction Committee and people's deputy of the Moscow City Soviet, continues the theme.

Expert councils, which consist, as a rule, of 25 doctors of science and examine dissertations on the average in 12 specialties, are preparing the materials for the presidium of the Higher Certification Commission on the content of doctoral dissertations. Here in principle with regard to an overwhelming number of dissertations it is impossible to ensure a scientific quorum of specialists and, consequently, a qualified examination, which is responsible for the pretentiousness and uselessness of this unit.

Democracy "a la Higher Certification Commission" is no less pretentious. Is it really not clear that before adopting a negative conclusion, the expert council is obliged to invite to its meetings not only the candidate, but also representatives of the specialized council and the lead organization and official opponents, to familiarize them with its arguments, to listen to the counterarguments and after this to make a decision, having objectively reflected in the corresponding documents the opinions of the sides. However, in the new version of the Statute, as in the one previously in effect, these important questions were turned over "to the discretion of the expert councils and staff of the Higher Certification Commission."

The Statute, which was previously in effect, and its new version are twin brothers who protect the authoritarian administrative bureaucratic system of certification. Legally they are lame in both legs. Thus, scientific criteria of the evaluation of the level of dissertations are completely lacking. Whoever has power is also right! The range of specialties is large, while passports of specialties within directions (economic sciences, historical sciences, and others) have not been developed. Hence, the rejection of dissertations "for the lack of conformity of specialties" can be carried out subjectively. The Statute does not stipulate any responsibility of the staff and the members of the expert council for violations, red tape, prejudice, and departure from the law.

Much in the Statute is worded vaguely, much is placed under the complete control of the Higher Certification

Commission. For example, how many students is it necessary to have to obtain the title of professor? How many publications is it necessary to have? It is unclear. Points 19 and 43 of the new Statute, in which the illegitimacy of using the material of someone else (what kind?) without a reference to the author and the source is spoken about, are not consistent with the Russian Soviet Federated Socialist Republic (RSFSR) Civil Code (the section "The Copyright"), the All-Union Copyright Agency, and prevailing regulations of the publication of scientific works.... And much, much more.

The candidate is absolutely defenseless before the bureaucratic machinery of the Higher Certification Commission. They can insult, humiliate, and slander him and organize persecution. Legal and control organs are helpless when it is a question of the protection of the legal rights of the candidate and his honor and dignity. But then the bureaucrats from science as before live carefree, having barricaded themselves with documents and patrons. There is nothing similar in any country of the world.

The certification system, which was adopted in our country, opened the door to degrees, titles, and, through them, to high positions, power, and money to many people, who have nothing in common with science and do not deserve these benefits. At the end of last year two Statutes: one for simple mortals, which contains 68 points, and the other for the elite, which contains 69 points, were newly adopted by a decree of the USSR Council of Ministers for making easier the obtaining of academic degrees and scientific titles from "the back door," just as before. In the additional, 69th point it is "modestly" recorded: "The individual features of the application of this Statute are specified by the presidium and collegium of the USSR Higher Certification Commission and the collegium of the USSR State Committee for Public Education in conformity with their competence." But so that the reader would not be left with doubts about the modesty of this note, on one side it is written in bold type: "Not for publication." And this is at the height of glasnost!

Whom are we deceiving? Ourselves?

The academic degrees of doctor of sciences should be awarded publicly and collectively by scientist-specialists in case of public defenses of dissertations. But there are needed for this the radical and immediate restructuring of the certification system, its democratization, and the transfer of the right of the deciding and final vote in the awarding of academic degree to scientist-specialists without administrative bureaucratic control over them, which comes from the times of Stalin's personality cult and took firm root during the period of stagnation.

In this connection the basic directions of the restructuring of the certification system in general form are the following.

1. The conferment of the academic titles of professor in a specialty and senior scientific associate for sectorial

scientific research institutes should be transferred to the USSR Academy of Sciences, by analogy with the transfer of the right of the conferment of the academic titles of professor and docent for a chair to the system of the Committee for Public Education.

2. The awarding of academic degrees should also be transferred from the system of the USSR Council of Ministers to the system of the USSR Academy of Sciences.

3. Material additions to the wage for academic degrees should be abolished.

4. The final decision on the awarding of academic degrees should belong to scientist-specialists in the theme of the dissertation as a result of a public defense. The following day (if not immediately) after the defense the diploma of a doctor and candidate of sciences should be given to the scientist, who publicly defended a dissertation, on behalf of the institutions, at which the council operates.

5. The procedure of defense and the requirements should be differentiated by directions: science, technology, medicine, pedagogy.

6. A switch should be made from the defense of dissertations as such to the defense of report-abstracts (on the order to two printer's sheets long), which contain the basic points of published works that are of scientific novelty and of theoretical and practical interest.

7. Criteria, which make it possible to give a reliable appraisal of the contribution of the candidate to science, should be elaborated for the directions of sciences.

8. For the technology, medicine, and pedagogy directions it is advisable to introduce a one-stage certification system, of which the practical services of the candidate should become the basic criterion.

9. The administrative and material (in some cases, criminal) liability of the members of the specialized councils for the quality of certification should be increased significantly.

10. The specialized councils should be formed on an interdepartmental basis from among the scientists, who have been elected for this purpose by the labor collectives at the place of work. The memberships of the councils should be completely replaced once every two years. The chairman of the council and the scientific secretary are elected by the council members by secret ballot and should be reelected before the date of the review of the council.

11. In place of the present bureaucratic command USSR Higher Certification Commission it is expedient to establish a commission of 10-15 people, which will follow the observance of legal norms when dissertations are defended.

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Academician Moiseyev Comments on Computer Game 'Tetris' Scandal

917A0057A Moscow POISK in Russian No 50 (85),
14-20 Dec 90 p 3

[Article by Academician Nikita Moiseyev under the rubric "We Continue the Discussion": "Who Is Robbing Whom? Additional Information for Reflection on Administrative Computer Games"—first four paragraphs are POISK introduction]

[Text] Once, at the very beginning of what is called perestroyka, Aleksey Pazhitnov, a programmer of the Computer Center of the USSR Academy of Sciences in Moscow, whom until then no one knew, devised a quite simple computer game. And after a few years it suddenly turned out that the entire world—both the enlightened and the not entirely enlightened world—was playing it enthusiastically. If Pazhitnov lived in the West, he would be a millionaire. But he happened to be born and to reside in Moscow, and, therefore, he received practically nothing—a few thousand rubles as a bonus. The Computer Center of the USSR Academy of Sciences became a millionaire—it earned on the game, which is called "Tetris," several million not at all rubles, but dollars. And the management of the Computer Center signed contracts with various foreign firms for the dissemination of "Tetris," since in accordance with Soviet laws Pazhitnov did not have the right to this. One of the associates of the editorial board also wrote precisely about this the report entitled "The Story About Lost Millions," while other associates printed the article. This occurred in No 40 during the second year of October of this year. While a week after this Academician Nikita Moiseyev, who at the beginning of that remote time of perestroyka, in 1985, was deputy director of the Computer Center of the USSR Academy of Sciences, called the editorial office. "I want to write a response to your article about Pazhitnov!" he said.

"That is, a refutation?" we began to worry.

"No," he reassured us. "A supplement."

And he wrote it. While we are publishing it.

The case described in the article "The Story About Lost Millions," so it seems to me, gives grounds for the discussion of far more important problems than the fate of a specific computer game and its author, although this is also a topical question.

First of all: The impression is created that the Computer Center, at which Aleksey Pazhitnov worked, simply fleeced the programmer, having signed for him a series of contracts for the distribution and sale of the game "Tetris." It may seem to the reader that the Computer Center is very nearly a robber who plundered the millionaire who never was. Nevertheless, this is not so. Imagine for a minute that the Computer Center had not signed these contracts. What would have happened? Nothing! There would not have been the contracts.

According to Soviet laws, which are in effect to this day, a programmer does not have any rights to a program written by him, and especially to a computer game. Thus, if the Computer Center of the USSR Academy of Sciences and the Elorg Foreign Trade Association had not taken part in this matter, the name of Aleksey Pazhitnov and his game to this day would be unknown in the United States and Western Europe. Yes, all the payments for "Tetris," which were received from foreign firms, wound up in the accounts of the Computer Center and Elorg. But it would not have happened otherwise! No one would have received anything at all: The state and the Computer Center would not have received foreign currency and Aleksey Pazhitnov would not have received a bonus. But in addition to the bonus, which is also of no small importance, Aleksey Pazhitnov became famous throughout the world. If there had not been the first contracts, which the author of the article qualifies as predatory, it is still unknown with what success Pazhitnov's new versions of "Tetris" and other original games would be sold at the Paragraf Joint Venture, where he now works. In this situation it is necessary merely to advocate the quickest passage in the USSR of a law on author's rights to intellectual property, which I am doing. It will solve many burning problems that face far from Pazhitnov alone. Many of them, but far from all of them.

While working at the Computer Center of the USSR Academy of Sciences, Aleksey Pazhitnov rotated between several laboratories. The associates of the Computer Center, under whose supervision he worked, now unanimously describe him as a quite interesting programmer, who treated his work duties honestly. I, who did not run into Pazhitnov, think that all these years he mainly engaged at the Computer Center in what was to his liking—the invention of computer games. But is this good or bad? Here it is necessary to dot all the "i's."

They hire an associate at a research institute for the performance of a specific job. If he does not perform it, they have the right to show him the door. In this case the programmer should have written specific programs. He engaged during the lion's share of the time in the writing of completely different, perhaps, more interesting ones, but different ones. Yes, the Computer Center earned much money on his game. But the Computer Center is not a commercial enterprise!. Nevertheless Pazhitnov worked precisely on our computers—at that time he did not have his own. What would you order us to do?

At self-respecting private firms and scientific institutes of the West this question is settled simply—all the output, which has been produced on the computer pool of this organization, belongs indivisibly to it. In our country this field of activity—programming—is in no way described by the law. In the USSR a certain (and quite significant) portion of what is done on institute computers goes "on the side"—the associates often earn a little extra as holders of more than one job at various joint ventures and cooperatives. Moreover, very often these jobs "on the side" use developments, which were made precisely at the institute, in this case at the

Computer Center. Owing to this some programmers earn in a month sums that exceed by three-to fourfold the wage of professors and even academicians.

It is under these conditions that I am also hearing talk about the author's rights in programming and about the right to dispose oneself of the fruits of one's own labor! But an associate is hired at an institute for an entirely specific job. It, undoubtedly, is the property of the institute. Any publishing, not to mention the sale of the rights to the use of programs, cannot be done without the permission of the management of the institute. But work as you wish and do what you think fit on your own computer! But in order to settle the question completely, it is necessary to introduce a contract system at our scientific institutions. The first contract is for a period of not more than three years. During this time every associate should complete a specific amount of work (which is not at all always independent work—he can be an assistant). After the expiration of the contract a new specific contract can be concluded with him. If it is not concluded, the associate is automatically dismissed.

With the increase of his skills the term of the contract can be increased to five years, moreover, this should concern all the associates of the institute, including the managers. After a long-term contract, if all its terms are fulfilled, a person becomes a permanent associate of the institute.

Any small thing, which precludes what happened with Pazhitnov and "Tetris," should be stipulated in the contract. Of course, freedom of inquiry should be granted to any young and other person. In principle, had such a system existed, we could have freed Aleksey Pazhitnov at one time from routine, having given him the opportunity to work on the computers of the institute on electronic games and having stipulated in the contract the specific amounts, which go to Pazhitnov and the Computer Center in case of the sale of a game on the software market of the West. But we do not have it and for the present it is not foreseen. Hence, for the present we are not insured against the fact that a new computer genius will not harbor malice toward our own Computer Center....

New Patent Law Inadequate Defense Against Foreign Exploitation

917A0072A Moscow IZOBRETATEL I
RATSIONALIZATOR in Russian No 11,
Nov 90 pp 40-43

[Article by Candidate of Physical Mathematical Sciences A. Kiselev under the rubric "The Law: Interpretations and Appraisals": "Invention and the Nomenclature. The Patent Confirms Not the Prestige, But the Right of the Author to the Commodity Developed by Him"—first two paragraphs are IZOBRETATEL I RATSIONALIZATOR introduction]

[Text] According to official data, the Soviet Union receives for its inventions (patents and licenses) about one percent of the received currency. This is less than in the state of Luxembourg. But our patent department—the Committee for Inventions and Discoveries—issues a fourth of the protective documents (patents and inventor's certificates), which are issued in the world. These two figures are sufficient to confirm that the cause of scientific and technical progress in the country has been wrecked significantly more than agriculture.

An old concept, which is unacceptable for the times of perestroika and in principle does not differ from the concept of the existing law, which in its development went through 1931, 1959, and 1974, moving away each time both from the patent legislation of Russia and from the ideas of Lenin's 1919 decree, was made the basis for the new draft of the law on invention.

The basis of the proposed Law, just as the existing one, was stated briefly by N.V. Gogol in the dispute of Bobchinskiy and Dobchinskiy—which of them was the first to say "Eh!" All the categories of our Laws are present in this dispute: **novelty** (precisely who said it first), a **technical solution** (precisely what was said, about what information was given), substantial differences or **unobviousness** (precisely "Eh!" and not "Oho!" was said), the importance of what was done, a **positive impact** for one's associates. And, of course, there is a **judge**. Incidentally, the introduction of a proposal is **separate** from those making the proposal, they take a trivial part in this introduction.

But mankind needed the institution of the protection of inventions not at all for the protection of the prestige of the author-inventor of new information. It emerged from the needs of society to protect the author's ownership of the commodity developed by him, for labor and certain assets were spent on the development of this commodity. Precisely the commodity is the basis for any system of patent law, in any country, except ours.

The departure from the commodity as an object of protection in USSR Patent Law is not a chance misunderstanding. This is a thoroughly thought out action of barrack socialism in a series of measures, which are aimed at the separation of the worker (the peasant or the inventor) from the end product of his labor (the crop or

the developed new commodity product). The result of this separation is absolutely identical: The country, which exported grain, is now buying it; the basic export product is petroleum, raw materials, and timber. Of course, both the low level of the innovations, which are liable to protection, and the extremely low level of the people making decisions, which concern scientific and technical progress, have an effect. After all, one does not need a great flight of imagination to buy abroad toothpaste, laundry detergent, milk packaging lines, and a license for Pepsi Cola, which we need terribly.

The separation of the inventor from the invention both in the existing Law and in the proposed Draft was easily accomplished—not the commodity, but something, which has specific criteria and points, became the essence of protection. Perestroika will not result from the fact that in the Law and the Draft these criteria and points differ slightly. And it is a matter not of good or bad criteria, but of the fact that the necessity of the existence of a group of people, who decide whether these criteria are observed in the proposal of an inventor, what the significance of the different criteria is, whether there are enough documents for the substantiation of the coefficients for remuneration, whether arithmetic mistakes were made in the calculations according to their anti-economic formulas, and what the score is in the socialist competition on the number of submitted applications, is maintained only in case of the existence of the system of criteria, coefficients, and points. And this entire mass of people deals not with pieces of iron, but with pieces of paper, while at best not preventing the pieces of iron from being converted into commodities. In the Draft as compared with the prevailing Law the proposal to let both the Soviet government and the specially established institution of patent courts have a piece of the inventor's pie is essentially new. The intention of all of them, as is clearly formulated in the Draft, is "to establish," "to envisage," "to represent," "to organize," "to render," "to head."

The essence of the Draft remained unchanged—to protect the administrative bureaucratic system. But the essence of perestroika is to do away with this system, so that the Draft is unacceptable precisely in essence!

Unobvious Examples of Obvious Stupidity

Let us examine a number of examples that show to what losses the disregard of the commodity in the invention leads. All the examples are true and only here and there have been slightly exaggerated for clarity.

Example 1. In conformity with the existing Law and the proposed Draft proposals, which satisfy specific technical criteria, are protected.

But several years ago an application for an invention, in which precisely commodity characteristics were the main thing, was examined. The foreign applicant requested a patent for an item, a portion of which was made of round wire. In complete conformity with the Law the applicant was turned down (they would also

turn him down in conformity with the Draft). But it was a mistake: If you issue a patent, we would receive the fee in currency. If we would not use the item, we would not pay the author anything, but the fee would come in. If we would use it, the fee would also come in, but we would also not pay anything, for it is very easy to get around such a patent, after all, in practice there is no round wire, there is always some ellipticity. In general, we did not derive an advantage, the foreigner also did not (for him the advantage consisted in the advertisement of the holder of a Soviet patent).

Example 2. In conformity with the Draft **unobvious solutions are protected. It is clear that a school graduate and a professor understand "obviousness" in different ways. But there is also the completely unobvious.**

I will quote from the response of an applicant to a decision of the All-Union Scientific Research Institute of State Patent Examination: "Inasmuch as segregation is the additivity of foreshortening, while the process of production is latent, the image on the screen will be raster dispersed." It is impossible to understand such nonsense in case of any technical education. Thus, the Draft does not exclude the possibility of protecting nonsense, if you manipulate pieces of paper well, keep the State Expert Commission busy, force the Enterprise "to organize work on the invention," and include in the matter of "the protection of the invention" additional administrative staff.

Example 3. The Draft protects technical solutions that have novelty, unobviousness, and the possibility of production applicability.

But not simply commodity proposals, but such proposals, which it is in no way possible to protect, come under such a set of criteria. For example, it is categorically impossible to protect a landing strip for foreign aircraft, which is distinguished by the fact that it has been made on Red Square of Moscow (one of the "coauthors" is Hero of the Soviet Union Marshal S.L. Sokolov). The technical possibility of such an "invention" does not raise doubts, and the novelty is obvious, for there was nothing similar from Yuriy Vladimirovich (Dolgorukiy) to Yuriy Vladimirovich (Andropov). Mikhail Sergeyevich was sparing of reward. Ivan Vasilyevich would have impaled the authors, Petr Alekseyevich would have taken a personal part in the ceremony at the Place of Execution, in the past century they would have led the authors with honor through a formation of gauntlets, and in this century the anger of Georgiy Konstantinovich would not have escaped the authors. But what is to be done? Inventors are far from always paid according to their deserts.

Example 4. The existing Law and the new Draft protect technical solutions, that is, the author should prove that the invention has specific technical attributes, which are also recorded in the formula of the invention, which is, thus, a source of information.

I will cite the content of one of the applications, having changed beyond recognition the technical sense, but having retained the form: "A method of manufacturing television tubes, which is distinguished by the fact that, for the purpose of increasing their durability to infinity, they stamp the anodes from nickel of the Norilsk Combine, while they fire the glass with pulses lasting two and a half-four minutes at a temperature of 360 to 365 degrees until the completion of gas evolution." A potential foreign user of such a patent will say openly: "Well done, fellows: You found the opportunity simply to manufacture good tubes! And still—you fools—you showed the main production secret free of charge! I will replace the Norilsk nickel with nickel that is also good, say, from the Norton firm, and by this will outdo the Muscovites." Such an opportunity "to make fools of the Russian men" is incorporated both in the existing Law and in the new Draft, inasmuch as not the commodity, but technical information about it was the basis for protection.

Foreign patent legislation does not allow such idiocy. When analyzing foreign patent literature, you very often come across a strange thing: A Dutch firm holds a patent in Norway, France, and Spain, but not in its own country, not in the United States, and not in our country; the inventor refuses to let a curious journalist know the composition of an invented plastic for an artificial heart; the Japanese patent for a television picture tube shamelessly repeats the essence of a Soviet inventor's certificate, but a picture tube intended for the same task in an electronic instrument with the poetic name "traveling wave tube"; an Italian patent protects a material based on an alloy of two elements with a content of one of them in the amount of one to 99 percent; in late 1944, that is, during the fierce battles in Ardennes, the Patent Department of Germany issued a patent to a U.S. citizen for a part for radio tubes. But—no strange things!—the Japanese simply stole the idea, the additive in the alloy should be in the form of an intermetallic compound, and this was concealed in the text of 18 points of the formula of the invention; the inventor of the plastic also does not conceal the fact that on the hearts the firm hopes to derive profits of millions, while the doctor from Radio Corporation in the 1950's published a number of articles on electronics, that is, he...was not taken to court.

Foreign patent law also promotes commodity, but not numerical scientific and technical progress, because it is based on yellow filthy lucre, while the prestige of an inventor, his political character, and participation in socialist competition are based on the fine factors of our patent legislation. Apparently, these fine factors are immaterial for economics, of which patent law is one of the tools.

Example 5. It is envisaged by the draft to introduce the system of deferred examination, that is, to publish the submitted application, having corrected in it only grammatical errors, before the examination, which is conducted in accordance with all patent regulations.

To conduct the final examination after someone, who wants to introduce what has been published and, accordingly, to cheat the applicant out of the proper reward, appears. Such a system is based on the fact that the main thing in scientific and technical progress is information about the essence of the invention, that the manufacturers of products lack merely ingenious ideas, and they are prepared to pay immediately for such ideas. An examination, thus, is not needed, and it is intended merely to confirm by it the fact of the noncoincidence at sight of the declared device and a known device.

Having worked on the State Expert Commission for more than 15 years, I could count on my fingers the applications, in which one would not have to drag out the meaning of what was proposed, the formulas of which would not require correction, and the declared impact would not require confirmation. The role of skilled patent examination specialists in the protection of an invention is large, and it does not make sense to ignore it for the sake of gratifying the vanity of some authors. The deferred examination is not an achievement, but thoughtlessness, for obvious production secrets, like the above-described mode of firing, can go past protection and can be gotten around when setting the price for the commodity. In any case, if an engineer is unable to get around 99 out of 100 applications in his specialty, which are suggested by the system of deferred examination, he must find a place among the inspectors or givers of instructions, but not the creators.

Example 6. In the Draft it is proposed to introduce a new authority—the Patent Court, the duties of which include among others the examination of disputes of authors with the expert commission and of authors with each other, the rewards, and the forced confiscation of a patent from an obstinate inventor. Now the dispute of an author with the expert commission (with or without the understanding of each other, in a gentlemanly manner or hand to hand) is a dispute among specialists. But is the Patent Court, which consists of laymen in the field of technology in question and is forced to enlist specialists, really not an inferior version of the already existing Control Council? Disputes about authorship are, on the one hand, a most delicate area, which one must not enter in boots, and, on the other hand, fighting in a ditch with shovels. Not patent experts, but psychologists or specialists in criminal law should settle such disputes. As for disputes about the reward, it (the reward) is always not quite enough, even for those who know that they are receiving it undeservedly. While the possibility of the confiscation of a patent from the author (which, incidentally, is present in the existing legislation!) is also a conflict with the opportunity of the author to receive a particularly large reward, if such an opportunity appears; after all, you will not take anything from the applicant from Chita, who last year proposed an “electronic perpetual motion machine.”

The establishment of the correctness of the determination of the profit, which has been derived by an enterprise from an invention, and the permitting of the author

of a patent to prohibit his own enterprise to make the product should become one of the directions of the work of the Patent Courts. Such wordings are lack practicability and are idle. I will have to relate a true story. I and my colleagues proposed a new material for a crucial part of an electronic instrument, which was used in landing equipment of the Venus descent module. Without our material the equipment would have been different, larger in overall size, and heavier. For the invention, on the development of which the authors spent several years, the coefficients of single-unit production predetermined for us a reward that is less than a month's wage of the administrator of a cooperative lavatory. But if the Draft turns into the Law, then, of course, I will be able under the threat of disrupting the landing of the equipment on Mars to demand a little large reward than a lavatory attendant and the improvement of housing conditions. Of course!

Example 7. The Draft, just as the existing Law, separates the process of invention and the process of introduction.

This separation is based on the inculcated, hammered in, widespread opinion that what is the inventor's, that is, to create, is for the inventor, while others, specialists, for example, in specialized introduction cooperatives, should carry out introduction. Both the Draft and the Law work for the idea of the chosen nature of the inventor and for the necessity of expanding this chosen nature among the masses. Cases, when somewhere they invented something, but certain bureaucrats dragged out the issuing of a protective document, while other vile creatures did not want to introduce it, have been repeatedly cited in the press.

In such publications technical progress is completely reduced to subjective factors: Someone is working creatively, while someone is interfering, therefore, they say, licenses have to be bought from far from leading firms, although there are heaps of our own inventions. But sober voices are also encountered: If we introduce everything that is protected and has not been introduced, we will mortally disorganize the economy in two years. While in foreign publications it is pointed out that it does not make sense to make a patent search and to invent, if the anticipated profit from the introduction of an innovation will be less than a certain amount, for example, \$100,000. In case of a smaller profit it is easier to accomplish the task on the basis of well-known knowledge. Thus, it is necessary to protect by patent not everything in succession, but only what people will buy. And a commodity, which is of a little better quality and is a little cheaper, is preferable to the consumer.

The separation of the process of invention and introduction is necessary only for the group of people who manage invention. Having a low creative potential and primitive economic knowledge, they can understand something only at the level of a very trivial thing. Therefore, they need the slogan “the mass character of invention,” they need the gross output of inventions regardless of their quality, they need maneuvering in

coefficients and points, they need a Law with economic words, but without an economic content.

Example 8. Both in the existing Law and in the Draft the inventor has the right to ask that the invention be named after himself.

An explorer has the right to name a discovery after his wife (Yevgeniya Korzhenevskaya Peak) or his own, insignificant, but his own chief (Mount Everest), while an inventor has the right only to ask. Such wording is needed only so that those people, whom it is necessary to ask, would have the right to exist and they would give or not give their gracious permission. It is possible to show, to what such a "trifle" leads, with the example of a drug, which was protected several years ago by an inventor's certificate and was sold in drugstores of Tbilisi in accordance with formulas of the author. The author personally prepared the drug. The author decided temporarily not to reveal the method of mixing the components, until the name of the developer had been officially given to the drug. But SOMEONE objected. In short, now this drug is not available, since the author, unfortunately, died, having waited in vain.

The fight for a name is an infrequent event in patent affairs. Far more often you encounter interesting people and brilliant individuals, who, however, are indecently modest and have grown accustomed to being humiliated and tormented. Recently an application from Orel for a method of checking items, which makes it possible to reject defective products and at the same time also potentially unreliable products, that is, to avert major troubles due to the possible breakdown of equipment, was considered. The author of the splendid technical solution—an eagle!—agreed with the saving of 15 rubles [R] a year, which was reckoned for him, with the idiotic corrections of the formula of the invention by semiliterate patent experts, and with the inclusion in the list of coauthors of an official from the ministry and, in general, behaved like a chicken before being put in a kettle. Laws, which humiliate Man, make me furious. The proposed Law is aimed against Man.

It is possible to multiply such examples, but from the cited ones it is clear that it is necessary to protect not a technical solution, not the novelty of an idea, and not the prestige of the author—the cornerstones of the power of those who "manage," "organize," and so on. It is necessary to protect the commodity! But the powers that be fear precisely this, for, if one puts scientific and technical progress of the country (and invention, in particular) on a commodity economy footing, it will become clear that there is no need for people who "manage," "organize," "head," and others.

Good Old Trivialities

The essence of perestroyka is to get away from the administrative command system, therefore, it is necessary as a whole to reject both the existing Law and the Draft which patches it up slightly. The trivial switching to the patent law of any country: weighed English patent

law, pedantic German patent law, overly clever American patent law, insolent Japanese patent law, disorderly French patent law, Hungarian patent law, which is seeking its own paths..., will promote perestroyka. Even a simple loan translation of the patent legislation of any country will be more useful than the legislation that now exists or is proposed by the Draft.

But, comrades, there is another means. Its ideas were outlined in the 1919 Decree that was signed by V.I. Lenin. The ideas were formulated by obviously talented engineers and economists. At that time, after all, neither the Luginy fitter, the people's academician, the Great Uzbek writer, nor oblast leaders had launched out yet. In Lenin's Decree there are no specific instructions to the Arkhangelsk Oblast Committee on how to persecute the Arkhangelsk peasant, therefore, the compilers of the Draft, who know how to think only within the limits of what is permitted, did not see anything useful for themselves in the Decree.

The subsequent presentation is an attempt to read the Decree as applied to the present. A different reading, apparently, is also possible, but the basis of the new legislation, which solves the problems of perestroyka, can also come from Lenin's Decree.

The essence of the Decree is the establishment of direct commercial relations between the inventor, who has proposed a useful commodity, and the state in the person of the Committee for Inventions. The recognition of a useful invention as the property of the state can be the result of such relations. The compilers of the Decree, an economic document, by the utility of an invention meant obviously not the technical utility and not the social utility, but obviously the economic, commodity utility. Thus, the basic purpose of the Committee is to determine such utility and to settle the question of the presence of commodity criteria in the proposal of the applicant, and not the novelty of the proposal—whether at some time ground bones or stuffing made from skins had been added to Ukrainian homemade salami or to foreign salami.

The basic question of the existing Law and the Draft being proposed to us: What is an "invention"? was not even examined in the Decree, since from common sense it is clear that an invention is the creative resolution by the inventor of a technical contradiction when developing an object that is intended to become a commodity. So that only the author himself settles the question of whether there is an invention in the proposal—whether the barrier of human ignorance was overcome or a textbook on the strength of materials was used. But it is difficult and, at times, impossible for the inventor to answer the question of whether the developed object is a commodity, inasmuch as different, by no means technical knowledge (for example, the scarcity of source raw materials, the business conditions on the market of items) is needed for this. Therefore, in the Decree an invention is recognized as national property, but it is not the proposal that is recognized as an invention.

In Lenin's Decree nothing is said about the repeal of the old patent law (which suited Lomonosov, Popov, and Tsiolkovskiy), consequently, an invention, which for some reason has not been recognized as national property, is governed by the categories of the old law, that is, a patent can be issued to the applicant, let him merely pay the fee, while if he wants to organize production, say, in a cooperative, by all means!

The understanding of the importance of the inventor's certificate in Lenin's Decree differs in principle from its understanding in current legislation. The inventor's certificate according to the Decree is merely a reference concerning the fact that the invention has been declared national property, that it has been bought from the inventor, and the state can do with it as it wishes—whether to organize production in Dagestan or in Poland, to sell it as is to Greece, or to hold it back until there is a good price on the market.

In the existing Law and in the Draft much space is devoted to questions of the reward—the amount, the procedure of crediting, monitoring, deductions, and so on—with some nuances of distinctions. In the Decree only the necessity of a reward is spoken about and nothing is said about its monetary expression and about the manning table of the collective which makes the decision on the reward. The reward to the inventor of a new method of mining coal, which is distinguished by a changed order of the performance of operations in the mine, appears to be entirely in the spirit of Lenin's Decree. It is possible to formulate in precisely this way the proposal of Aleksey Grigoryevich Stakhanov. Among the other points of the reward I personally like very much the granting to the innovator of two seats—for him and his wife—at all the concerts and performances at the city theater. Imagine how fine it would be to enter the box of innovators at the Theater imeni Ye. Vakhtangov and to know that it is possible to get tickets there only upon presentation of the card of an inventor!

The following procedure of examining applications in the Committee for Inventions would not contradict Lenin's Decree. A commodity is declared. The form of the declaration is any one that suits the applicant: only the formula of the invention on a quarter of a sheet of paper or with a complete analysis of the technical solutions of the proposed commodity and the known commodities, with a theoretical substantiation, with drawings, process sheets, and check sheets, with specimens of the items. All these materials do not leave the Committee and are necessary (insofar as their author-applicant considers them necessary) for the formulation in the Committee of a response to questions that pertain to the characteristics of the commodity. It is clear that for a decision one should request the services of the most qualified specialists in the Union in the specific theme of the application (an engineer, the organizer of the production of similar commodities, an economist, while if the application concerns, say, commodities for Sweden, a specialist of this country from the Ministry of Foreign Affairs). In the Union there is nothing above such

specialists, so that their decision is simultaneously the final one. But inasmuch as it is necessary to pay for skill, and well, it is necessary, of course, to collect a fee from the applicant. The collective of specialists should answer the following questions: Is it possible in general to produce the proposed commodity (or is this a perpetual motion machine); if it is, who needs such a commodity—in Ryazan or Sweden; in what quantity; what can the price of the new commodity be; where is it possible to organize production—in an existing section of a small candle plant or is it necessary for this to build a complex of plants; within what time; how much money will be spent on introduction; will the commodity have time to become obsolete during introduction; and, as a result, will the amount of the profit exceed the amount of expenditures? If 10 years will be needed to introduce it, while the derived profit will come to 15 ruble, it is inadvisable to declare the proposal state property and it is necessary to give the applicant a firm handshake.

As an engineer I can assert that it is possible to predict entirely the technical characteristics of a commodity for 15 years (the term of effect of a patent in the majority of countries). Economists also agree with the possibility of predicting the commodity characteristics for 15 years ahead. With the increase of the time of the forecast the probability of an error increases, but long terms of commodities are also not needed owing to their obsolescence.

It is clear that it is preferable for the author to submit as much information accessible to him for the settlement of the commodity question in his favor. It is clear that after a quite objective estimate of the profit it is possible to pay the author the sum of the reward, say, according to the minimum estimate of the profit, having made supplementary payment, say, five years after introduction. In accordance with the source materials of the application, which has undergone such approval, the patent experts can also formulate without the author (but it is better with him) the object of the invention, having avoided known ones and having hidden the secrets deep, so that the formula will be not so much information as an advertisement of the commodity and a guarantee that the commodity is available, and if a potential buyer of the commodity (or the patent!) shows up and wants to know precisely its technical essence, then—by all means!—turn to the authors or the manufacturing enterprise through the guarantor of the commodity—the Committee.

Thus, it is possible to settle all the questions of the production of invention-commodities—introduction, the right, the reward—quickly, efficiently, in a skillful manner, without correspondence, disputes, courts, and humiliations of the innovator. And as for prestige, it is determined by no means by the number of inventor's certificates. Einstein and Tsiolkovskiy are well known not for patents, although they did have them. I do not remember whether Korolev had inventor's certificates; Tupolev did not have them. Scientific and technical literature, conferences and symposiums of specialists,

and, of course, completed developments: aircraft—Tupolev, buildings—Travkin, electronic instruments—Zusmanovskiy, a bridge—Paton, an ointment—Vishnevskiy, the heart operation—Bredikis, petroleum finds—Salmanov..., exist for the confirmation of technical prestige.

The Result

There is perestroyka on our street, but the published Draft is at variance with perestroyka. A new Draft, based on new principles, the principles of perestroyka, is needed.

The ideas of a commodity should become the basis of the formulation of the New Draft. The ideas of Lenin's 1919 Decree can be used as the underlying ideas of the formulation.

The formulation of the New Draft should be assigned to competent specialists, first of all economists, but ones who have shown without fail their dedication to perestroyka.

Those who participated in the compiling of the Draft now being discussed are categorically not to be included in the collective as people who have shown their complete inability or reluctance to think in terms of perestroyka.

Inventors, yet not simply technical people, but people with a philosophical mentality, should act as participants in the formulation or if only consultants to the elaborators.

The collective of elaborators should be known personally. So that the people would know whom to trust and whom to call to account.

I believe that for the collective of like-minded people, who are not linked by the need to put the former meaning into new words, two-three, at most four months will be enough to formulate a new Draft of the USSR Law on Invention and to submit it to the Supreme Soviet.

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GKNT Efforts To Market Soviet Science Described

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[Article by IZVESTIYA science commentator B. Kononov: "Intellect Is a Scarce Commodity. How Soviet Developments Appear on the World Market"]

[Text] During the era of the great "empty rhetoric" the shoots of affairs, which with time promise to change our life radically, nevertheless are also beginning to appear. It is gratifying that we have finally realized: The most valuable capital of the country is not only petroleum, lumber, and other raw materials, but also its mighty scientific and technical potential. For a long time we took pride in the fact that we had the largest army of scientists in the world, while bashfully failing to mention its inefficient use. And now during the difficult times for the country the mining of this truly golden and, what is the main thing, renewable resource of the country is being stepped up.

Now a larger and larger number of scientific and technical collectives, feeling the shortage of assets in the country, are trying to appear on the world market. But, perhaps, the most noteworthy thing is that the USSR State Committee for Science and Technology (GKNT) has actively joined in this process and has already elaborated a large number of strategic decisions, which may become highways to the world market.

In the opinion of I.M. Bortnik, first deputy chairman of the USSR State Committee for Science and Technology, in our country the share of science-intensive products in exports for the present is intolerably low. And it is necessary to change this situation as quickly as possible. Today we will tell about one of the roads, which can be regarded as a model of the standard solution of this problem.

Now the world electronics market is experiencing another boom—so-called neurocomputers have appeared on the scene. Whereas an ordinary computer is a powerful "calculator," a neurocomputer is an electronic "recognizer." Their purpose is the recognition of various patterns, diagrams, and speech. To some extent the principles, which man and animals use, are applied here. Of course, this is far from "artificial intelligence," but it is the next step toward its development. And now an enormous sales market is already emerging for neurocomputers. Let us cite just one example—it is necessary to "open" by voice the entry door to a house or garage. The neurocomputer, which has been taught to recognize the voices of your family, will do this willingly, but the doors will be closed for strangers. This can be an only "guard," but it can also be additional obstruction. A slight stretch of the imagination will suggest to you an enormous field of activity of electronics of this sort.

Having seen that a neurocomputer boom was beginning, the USSR State Committee for Science and Technology began to study how matters stood in the USSR. It turned out that

the greatest successes had been scored at the Moscow Institute of Radio Engineering, Electronics, and Automation in the department of neurobionics and neurocomputing, which Candidate of Biological Sciences Ye.G. Litvinov heads. The assets necessary for the successful completion of the work were allocated. And in a record time for the USSR—in just one year—this collective developed the first Soviet neurocomputer. Of course, this became possible only because the work was not begun from the ground floor, the developers already had behind them the 10 years of experience of preceding research. But the fact remains a fact: Only a year passed from the drawing up of the state order for the neurocomputer to its appearance.

The next step is important. They immediately began to display the new item at international exhibitions. It turned out that as a whole the Soviet neurocomputer is no better than world models, but it does have several new things which in themselves are of great value.

From a scientific and technical standpoint for the USSR it was important to have good neurocomputers, while from a business standpoint only these new items could sell on the world market. And at that time the plan of realization, which it is possible to call "the pursuit of two birds," was put into effect. But in contrast to the well-known proverb here they succeeded all the same in catching the two "birds."

In the USSR a small enterprise headed by Ye.G. Litvinov was organized for the purpose of developing and producing various types of neurocomputers. While for the sale of Soviet "know-how," such as, for example, associative memory, they helped to find an established Italian firm and to organize the Neuroma Joint Venture.

As a result we can offer the world market not just know-how or a license, as was mainly the case until now, but a commercial commodity. The dollar profit is being used for purchases in the West of the components that are necessary so that the Soviet market would also get neurocomputers that are not inferior to world models. In our specific case, and, perhaps, also in the majority of cases, comparatively small expenditures are needed to ensure the high quality of the entire final item.

But the primary advantage lies in the liberation of scientists and engineers. Whereas previously they could only hope for favors from domestic suppliers, now they work as they do in the West—through catalogs they can order all the best that is on the world market. While this also is already opening up for them the possibility of genuine competition with the West. Russia has plenty of "brains," and there is confidence that under such conditions, if they are duplicated extensively enough, we will be able to eliminate our lag in electronics behind developed countries.

We have cited only one example of when a state management organ is acting as an active and effective intermediary, but there are already many such cases. Moreover, they are gradually developing into a system. A computerized data bank on the latest developments has been established in the USSR State Committee for Science and Technology. Exhibitions have begun to be organized in the USSR and abroad for the sounding of the market. And whereas previously the work proceeded mainly in the direction of trade in licenses, now the intermediary is striving to select foreign partners for Soviet authors, in order to use western commercial experience for the rapid organization of the production and sale of a finished product, which is immeasurably more profitable.

It is noteworthy that along with retail trade in specific innovations now wholesale trade has also been organized. For this we enlisted our old business partners—the Finns. The Finnish Sitra National Foundation for Research and Development—a state organization—for a year studied specially Soviet offerings of innovations and came to the conclusion that the potential is very great. Finland itself is not capable of assimilating it, but it is very tempting to act as an intermediary on the world market.

On the initiative of the Sitra Foundation and the USSR State Committee for Science and Technology a mixed Soviet-Finnish association, SITRANS Ltd., was established. (This is an abbreviation of the English name “transfer of Soviet technological innovations.”) The International Scientific and Technical Activity Joint-Stock Company, the Scientific and Technical Progress Association of Business Cooperation With Western Countries, the Moscow Joint-Stock Innovation Bank, and the Science-Service Association of Foreign Economic Cooperation also acted as founders on the Soviet side. The Finns enjoy the confidence of western partners and are acting not only as intermediaries, but also kinds of guarantors. While for the Finns in turn the USSR State Committee for Science and Technology is serving as the guarantor of the reliability of the Soviet partners who are being recommended on the markets of Europe and Asia.

“In your country,” M. Andersson, vice president of the SITRA Foundation, told me, “they are very afraid of the ‘brain drain.’ Our enterprise will help to ease the urgency of the situation. In accordance with the contracts, which are concluded with firms, Soviet scientists and engineers will receive a good reward and advanced equipment. We will try to enlist world venture capital, and in Europe alone it comes to about \$40 billion, in the development of promising Soviet research efforts.”

“Each of the sides,” Deputy Chairman of the USSR State Committee for Science and Technology V.V. Yezhkov adds, “will work in accordance with the laws of its own country, and this will make it possible to avoid many ‘hidden rocks.’ Our goal is not one-time contracts, but the creation of an atmosphere of most favorable treatment for the promotion of Soviet scientific and

technical achievements to western markets. In our country about 200,000 applications for an invention are submitted annually. About half of them are recognized as inventions. But a negligible share is introduced. Our industry, which operates under the conditions of a shortage of all and everything, for the present is not accepting innovations. But they become obsolete very quickly and after a few years are practically worthless. It is simply wasteful to lose our knowledge, therefore, we are making every effort to sell it on the world market....”

Let us add to this that joint organizations, which are based on advanced Soviet technologies under the conditions of the market that is arising in our country, will be able to serve as nuclei of the establishment of alternative enterprises and to become a real economic base for the appearance of antimonopoly legislation. For over 70 years we traded only in raw materials and in practice did not participate in the world economy. If we now begin, at last, to use our intellectual potential for commerce and the establishment of new science-intensive industries, there is hope that we will be able to join the world community.

Marchuk Indicates Greatly Increased S&T Cooperation With India

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[Article by Dmitriy Gvozdev under the rubric “We Are Discovering India” (Delhi-Moscow): “The Sensation at the Holiday Inn”—first paragraph is POISK introduction]

[Text] A wave of exclamations of surprise rolled through the conference hall of the Delhi five-star Holiday Inn hotel: Had Academician Marchuk not made a slip of the tongue? But the president of the USSR Academy of Sciences calmly continued his statement at the third session of the Soviet-Indian Council for the Implementation and Coordination of the Comprehensive Long-Term Program of Scientific and Technical Cooperation Between the USSR and India. Just what in his speech rocked the orderly course of the scientific “summit,” at which nearly 100 leading scientists and organizers of science from both countries had gathered? Just one word became the sensation of the first day of the meeting. More precisely, a figure. Guriy Marchuk stated that the optimum level, in his opinion, of the annual exchange of scientists and specialists is a THOUSAND people from each of the sides. And it would be possible to achieve this number, of course, given the maintenance of the current trends, literally in a few years.

One thousand! A week of daily airplane trips. Some people on a 10-day “short-term stay,” and some people for half a year. Are each of the sides able to and can each one afford from year to year to send to each other the equivalent of the staff of an entire scientific research institute?

Let us try to gain an understanding, having provided ourselves with other figures, as well as facts. To start with, what is scientific India today? The staff members of the Indian Department for Science and Technology kindly responded to the request of the POISK correspondent, who was included on the Soviet delegation, and helped me to supplement my knowledge. A pile of splendidly published statistical yearbooks, prospectuses, and booklets, in which there are literally all and everything about Indian science, was presented to me.

Thus, the key figure is the spending on research and development. During 1988-1989 it increased as compared with 1986-1987 by 17.9 percent and amounts now to 37.7 billion rupees a year, that is, \$2.1 billion. This is one percent of the gross national product (10 years ago it was only 0.62 percent). In India there are 1,300 scientific institutes, their research personnel number 268,000 people. There are 169 universities and 6,900 colleges, at which nearly 4 million students (two percent of the population) are studying. And another thing: Annually in the country 3,800 people receive the degree of doctor of sciences.

As we see, the country is not simply increasing its scientific and technical potential, it is doing this rapidly, while showing concern at the same time for the forge of personnel—the higher school.

This is according to statistics. And here is what eyewitnesses say. I give the floor to Soviet delegation member Oleg Roman, general director of the Belorussian Scientific Production Association of Powder Metallurgy and corresponding member of the Belorussian SSR Academy of Sciences:

"During 1967-1969 I was invited as a visiting professor to the Indian Technological Institute, which is located in the city of Kharagpur, which is in the eastern part of the country. This is an analog of our polytechnical institutes. It is noteworthy that it was built on the site of a former political prison, where independence fighters were kept, as a kind of memorial that affirms the development of the new India. Our country gave some assistance in the building of the institute. My task was not only to instruct students, but also to organize there are powder metallurgy laboratory. Of course, those two years were just the beginning. Today a large materials science center operates in Kharagpur.

"Observing this country for nearly a quarter century, I can say that the present India is, of course, not a 'developing' country, as is customary to call it. This is a well-developed country, although, of course, not everywhere and not in everything. Its scientific institutions are splendidly equipped with instruments, the best of those that are available today in the world. I also visited a number of completely computerized enterprises that produce high-quality science-intensive products. These are plants of the 21st century, plant-robots. Moreover, Indian specialists themselves designed them. Yes, the latest achievements of world science are being used in

India. But it is also carrying out itself a number of first-class scientific developments—in both basic and applied fields."

I am also prepared by personal impressions of the Indian capital to confirm the correctness of the words of Professor Roman. For example, by the beholding of rooms packed with computers of the largest Indian newspaper, THE TIMES OF INDIA. Incidentally, the computerization of this country is a separate conversation, we will return to it in one of the next issues of POISK. Let us note that in the present economic and technological market of India its cooperation with capitalist countries played not the last role. For example, in nuclear power engineering. Or the same space. On 12 June of this year the Indian INSAT-1D satellite was launched—this time by an American rocket. Up-to-date Japanese-designed, but domestically produced passenger cars, jeeps, and minibuses with the Maruti firm label scurry through the streets of Delhi.

All this, however, does not mean that cooperation with our country has receded for industry, as they say, into the background. Metallurgical combines, which were built with our assistance, are duly supplying industry, the flight of research cosmonaut Rakesh Sharma is still fresh in memory.... And on and on.... In this sphere a certain "old-fashionedness" was felt, we somehow were stepping out of pace toward high technologies, life required different forms and methods of interaction.

And they were found. M. Gorbachev and R. Gandhi signed in Moscow three years ago the longest-term program of cooperation, the course of the implementation of which was discussed in July of last year in Kishinev and in November of this year in Delhi.

The joint program is a fundamentally new word in the scientific and technical ties of both countries. You visualize this by leafing through the 250-page folio that was jointly published specially for the Delhi meeting. The specific breakdown of the program—the names and addresses of the coordinators and performers, the deadlines, financing, the immediate and long-range goals—is given in it. As it stands, for each of the 79 major projects, in which tens of Soviet and Indian institutes are "bound up" with each other.

The contents of these pages literally "came to life" in the reports of the session participants—the coordinators of such directions as biotechnology and immunology, materials science, laser technology, catalysis, computers and electronics, chemistry, mathematics, theoretical and applied mechanics, the earth sciences, ecology. And this is far from the entire list.

I realize that the enthusiasm with regard to the organizational aspects may evoke the distrust of some readers: Many examples, when, as they say, "everything looked good on paper," are known.

Indeed, three years are, in the statistical mean, the half-life of a good applied development before its complete moral decrepitude. What is happening on the approaches to practice?

"I can cite several examples, when it is possible to expect results in the immediate future," Academician Marchuk said in responding to this question. "In March-April of next year the completion of the first section of a factory for the production of polio vaccines not far from Delhi is anticipated. At first 10 million doses of vaccines will be produced, while in two-three years 100 million doses will be produced. This will make it possible to completely meet the needs of India. On our part both specialists of the USSR Ministry of Health and scientists of academic institutes participated in this work.

"At the Baba Atomic Research Center in Bombay powerful and small accelerators were developed jointly with scientists of the Siberian Department of the USSR Academy of Sciences. They make it possible to obtain electron beams and synchrotron radiation, which are suitable for technological purposes. While these are effective methods of preserving food products, the obtaining of new materials, and other practical use. At our meeting it was said that it is time to establish a joint venture for the mass production of such devices.

"New catalysts for the synthesis of ethylene oxide were developed. One series of works was completed in our country, another was completed in India. And as a result prospects of developing a fundamentally new industrial technology, which does not have analogs in the world, for the obtaining of this most important product were afforded.

"The Center of Powder Metallurgy was organized and is being actively built in Hyderabad (the southern part of India). This will be our first joint venture of the scientific type on Indian territory. On the Soviet part Belorussian specialists are playing the leading role here, but scientists from other republics are also participating.

"It must be said that this experiment, when a joint venture for the production of science-intensive products is being built for the first time not in our country, but abroad, is of fundamental importance for us. Given the successful implementation of the project in the area of powder metallurgy we will expand the sphere of this activity. We hope that with respect to the majority of programs joint ventures will be established in the future, and we will divide the revenue in proportion to the contribution of each of the parties.

"I would like to emphasize that the program, within the framework of which we are working, is not aid of the Soviet Union to India, but equal work of scientists of the two countries on a mutually advantageous and fair basis...."

Thus, the chain runs from medicine to the preservation of the crop. Of course, the pace is stirring. But will the

outlines of future joint ventures not be too vague for our situation, when every minute counts?

I had a conversation on this theme not only with the president of the USSR Academy of Sciences, but also with many members of the Soviet delegation. I was also interested in the opinion of Indian scientists. I succeeded in gathering, for example, the following information. Talks on the organization in our country of the production of a number of drugs, which have shown themselves to advantage and are produced today in India, were actively—and not unsuccessfully—conducted during the days of the work of the session. Moreover, the joint development of methods of combating various forms of hepatitis is no less urgent for us than for our southern neighbor. The production of facsimile machines in accordance with Indian technology is also planned. The joint development of parts for the automotive industry (clutch and brake systems) has been advanced well. The main idea (on the Soviet part) was as follows: Cooperation with India is equal in both basic and applied areas. While the Indians unanimously praised our research. And they spoke in a far more reserved manner about the technical level of enterprises. So that one should examine in the real context their willingness to agree with us to production cooperation.

I am intentionally not touching now upon the most interesting projects in the area of meteorology, environmental protection, astronomy, laser technology, high-temperature superconductivity.... All these, just as the information science mentioned above, are themes for separate articles. In the level and scale of scientific and technical cooperation India is coming to be among the first three countries, with which we are cooperating on a permanent basis. Therefore, POISK considers it necessary to cover regularly the course of the implementation of the joint program.

What is the reason for its confident start? Not last of all, it seems, is the closeness of the structures of the management of science (we will not look now into the question of how optimal they are for each of the countries). Namely: The share of state allocations for research and development (including the assets being released by firms of the state sector) comes in India to 82.8 percent! However, in recent times private firms have also been displaying greater and greater interest in this sphere. And for us the key terms are market, the elimination of state control....

How is one to preserve the "green wave" on the two-way street?

And again the Holiday Inn conference hall tactfully, but clearly "began to buzz with excitement." In concluding his statement, Academician Marchuk announced two new proposals of the Soviet delegation. "The first: to found state and private funds for the support of programs on the development of high technologies, from which it is difficult to expect a quick return. The second: to take in our countries special steps for the fulfillment of

the long-term program. Namely: to introduce additional privileges with regard to the investment complex and the taxation of the enterprises that are engaged in its implementation. That is, to create in fact for the implementation of the scientific results of the program conditions that are equivalent to those that exist in free enterprise zones."

Who could have thought that the Soviet side would pose the question in precisely this way, contrary to the stereotypical notions of the "traditionalism" of our economic thinking and the "ossification" of our approaches? The impression formed that for the Indian representatives such a turn was a surprise. In any case, during the first day of the meeting no direct responses to our proposals were heard on their part.

But from behind the scenes discussions one could see that the speech of Academician Marchuk had made an impression.

Of course, the governments of both countries have to make the final decision on these questions, which affect statewide interests. But much also depends on whether scientists themselves will succeed in taking a concerted stand. On completion of the forum I was interested in the opinion of Prof. C.N.R. Rao, cochairman of the joint Council on the Indian side, with regard to the proposals of Academician Marchuk. Incidentally, the name of this scientist, the director of the Indian Institute of Science in Bangalore, is well known in our country. At one time he was president of the International Union of Pure and Applied Chemistry. While recently the translation of the book of C.N.R. Rao, "New Directions in Solid-State Chemistry," was published in Novosibirsk under the editorship of Academician F. Kuznetsov.

Here is what Professor Rao said:

"The Soviet side came forth with very good proposals, and we, of course, will consider them. The Indian Government has already now set aside a certain sum of money for the implementation of joint projects. In a year we will meet again and will discuss these questions, including financial questions, in detail. As for the sending of specialists.... In the last three years—it is hard to believe this—we increased the scale of such exchanges by several fold. Today 400 scientists from each side annually go to each other. So that everything is possible...."

We also talked with Prof. Vasant Govariker, secretary of the department of science and technology of the government of India (a post equivalent to the rank of minister). Mr. Govariker, incidentally, is being very considerate

toward the plans of the establishment of joint ventures, in his statement at the session he listed five promising areas for these forms of cooperation.

"It seems to me that the most important achievement of the last three years," he said, "is the fact that for the first time such a large number of scientists from both sides began to work together and to get down, as they say, to specifics. Because until the scientists got to know each other sufficiently well and got an idea of the working conditions of their colleagues and their strong, as well as weak points, it would have been premature to talk about the establishment of joint ventures. Yes, several of the directions, which have been included in the comprehensive program, could become material for joint production activity both in India and in the Soviet Union. It would also be possible to enlist our private entrepreneurs in this. But when we begin to use the standards of the market economy, such questions as, for example, the possibility of exporting the profit acquire vital importance. For the entrepreneur, perhaps, will have to take out a loan from someone, he has to make various investments and should be certain that he will derive enough of a profit. In short, it is necessary to create an adequate economic mechanism. This is a topic of discussion with the Soviet colleagues. It is necessary to note that much has happened in these three years. And now we are prepared to advance farther."

It is worth heeding the opinion of Doctor Govariker. The Indian side is actually treating seriously the questions of the commercialization of science and the search for means of increasing the economic impact of the programs of cooperation. Moreover, this is finding understanding at the highest level. While telling about the meeting with the prime minister of the Republic of India, Academician Marchuk noted that Mr. Chandra Shekhar not only supported the entire long-term program as the basis for scientific and technical cooperation between our countries, but also endorsed the idea of enlisting private firms in the implementation of the program.

And another sensational report was heard under the arches of the Holiday Inn. The president of the USSR Academy of Sciences to the applause of those present made public a telegram from the Embassy of India in the USSR concerning the fact that Prof. Oleg Roman, with whom we are already acquainted, had been awarded the international Jawaharlal Nehru Prize. This political figure, as is known, came out in favor of the utmost development of friendship between India and the Soviet Union. Today in the development of the friendly relations of our two peoples the role of scientists is also becoming more and more noticeable.

Official Formation Concepts for RSFSR Academy of Sciences

917A0053A Moscow POISK in Russian No 50 (85),
14-20 Dec 90 p 1

[Article: "What Is the Russian Academy of Sciences To Be Like?"—first paragraph is POISK introduction]

[Text] The Committee for Science and Public Education of the Russian Soviet Federated Socialist Republic (RSFSR) Supreme Soviet is submitting for discussion the concept of the formation and the organization of the activity of the Russian Academy of Sciences.

1. The Academy of Sciences is a self-managed state-public organization (association) of domestic and foreign scientists (members of the academy). The Academy of Sciences is formed on the basis of principles that have been approved by the RSFSR Supreme Soviet. It operates on the basis of RSFSR law and its own charter, which is adopted by the general assembly of the academy.

2. The Academy of Sciences is called upon to promote the formation and development of basic and applied research in priority directions in the area of the humanities and the natural and technical sciences, the creation of the conditions for free and fruitful scientific creativity and international scientific cooperation, the efficient use of scientific knowledge in all areas of creative activity, the dissemination of scientific knowledge, and the protection of intellectual property.

The Academy of Sciences draws up recommendations on the strategy of the development of the republic and its regions and on the priority financing of prevailing scientific programs and projects, substantiates before the government of the republic the necessity of the formulation and the amounts of financing of new programs of basic and applied research, organizes and conducts the examination of the most important scientific programs and projects of economic activity on the territory of the republic, and advises the Supreme Soviet and government of the Russian Federation on problems of science, technology, and education.

The Academy of Sciences participates in the formulation of the strategy of the training of scientific personnel and gives all-round support to young scientists.

The Academy of Sciences on the instructions of the Supreme Soviet and the government of the RSFSR performs representative functions in international organizations.

3. The Academy of Sciences is formed on the basis of two types of organizational structures: regional departments headed by presidents of the departments and councils for directions of sciences headed by chairmen.

4. The Academy of Sciences is a nonprofit organization and does not have within it scientific research subdivisions or educational institutions. It implements its scientific policy by the formulation of scientific programs and projects, which are fulfilled by higher educational institutions and scientific research organizations.

5. The financing of the maintenance of the staff of the Academy of Sciences and its regional departments, publishing activity, educational activity, and other types of activity, which are provided for by the charter, is carried out by the RSFSR government from the state budget.

Public funds can be placed at the disposal of the Russian Academy of Sciences and its departments.

6. Membership in the Russian Academy of Sciences is recognition of the scientific achievements of a scientist. Material remuneration for membership in the Russian Academy of Sciences is not made.

The number of members of the academy is limited. The maximum age of nomination as members of the Academy of Sciences is specified by the charter. After reaching a specific age the members of the Russian Academy of Sciences are converted to or are elected honorary members of the academy.

7. The president and the governing bodies of the Russian Academy of Sciences and its regional departments are elected. The election procedure is specified by the charter and should provide for the continuity and replaceability of their staffs.

8. The Academy of Sciences and its regional departments have the status of a legal entity

9. The election of members of the Russian Academy of Sciences is conducted by the general assembly of scientists of the regional departments in accordance with the quotas, which are established by the general assembly of the Russian Academy of Sciences, from among the scientists who work in the given region. The election results are confirmed by the general assembly of the Russian Academy of Sciences.

Foreign scientists are elected members of the academy at its general assemblies.

The procedure of the election of the initial membership of the Russian Academy of Sciences is drawn up by the committee for the organization of the Russian Academy of Sciences. The staff of the organizing committee is formed by a group of authoritative scientists jointly with the Committee for Science and Public Education of the RSFSR Supreme Soviet and is approved by the Supreme Soviet.

Koptyug Interviewed on Status of RSFSR Academy of Sciences

917A0053B Moscow SOVETSKAYA ROSSIYA
in Russian 26 Dec 90 p 3

[Interview with Academician V.A. Koptyug under the rubric "What the Russian Academy of Sciences Is To Be Like"; date and place not given: "From the Ground Floor. An Interview With Academician V.A. Koptyug"—first three paragraphs are SOVETSKAYA ROSSIYA introduction]

[Text] Almost a year ago, on 24 January 1990, our newspaper published an interview with Academician V.A. Koptyug on the concept of the formation of the Academy of Sciences of the Russian Federation, which was drafted on the instructions of the Commission for Science and Technology of the Russian Soviet Federated Socialist Republic (RSFSR) Supreme Soviet of the preceding convocation by a large group of scientists on the basis of the generalization of the results of the extensive discussion of this question in scientific circles and in the press.

Relying on the concept that was approved by the commission, the Presidium of the Supreme Soviet of Russia adopted the Ukase "On the Establishment of the Academy of Sciences of the Russian Federation," while the decree of the RSFSR Council of Ministers "On the Formation of the RSFSR Academy of Sciences," which commissioned the established Constituent Committee to begin the work on the organization of the academy, appeared on 13 March.

A few days ago "The Basic Principles of the Formation and the Organization of the Activity of the Russian Academy of Sciences," which the Committee for Science and Public Education of the RSFSR Supreme Soviet of the new convocation is submitting for consideration by the Supreme Soviet, were published. The editorial board of the newspaper addressed to Academician V.A. Koptyug, who headed the Constituent Committee, the request to comment on these principles.

[SOVETSKAYA ROSSIYA] First of all we would like to find out what happened during the period from March to December and what was responsible for the need to revise the previously approved concept of the establishment of the Russian Academy of Sciences.

[Koptyug] The Constituent Committee, of which representatives of scientific research and VUZ organizations of the 11 economic regions of the RSFSR became members, was organized immediately after the adoption by the RSFSR Council of Ministers of the decree on the organization of the RSFSR Academy of Sciences. The committee began the work on the establishment in these regions of regional scientific coordinating councils, which should have become the supporting structures of the organizational actions of the scientific community on the drafting of the charter and other regulatory documents, on the preparation of the

constituent assembly, and on the formulation of the scientific programs and scientific and technical programs of the future academy.

This work, which evoked much enthusiasm in the regions, was halted in July by the session of the RSFSR Supreme Soviet of the new convocation, which commissioned the Committee for Science and Public Education jointly with the Committee for Legislation and the RSFSR Council of Ministers to draft a new concept of the establishment and activity of the Academy of Sciences of the Russian Federation. The results of the five months of work of the committee have now also been published in ROSSIYSKAYA GAZETA.

[SOVETSKAYA ROSSIYA] And still, to what was such a decision of the people's deputies, which held up the establishment of such an important structure for Russia, due?

[Koptyug] Initially I explained it by the entirely natural desire of the RSFSR people's deputies to examine this important and complex issue in detail. But later, with allowance made for the discussions that took place after the making of the indicated decision, I concluded that the unique position of a number of deputies, which it is possible to convey with the words: "Everything that was done before us was done obviously poorly," played a decisive role. This position is giving rise to difficulties not only with respect to the question under consideration.

[SOVETSKAYA ROSSIYA] Is a connection between the new concept and the previously approved documents visible?

[Koptyug] With regard to a number of important items continuity undoubtedly exists. Both concepts proceed from the fact that when establishing the Russian Academy of Sciences one must not destroy the existing USSR Academy of Sciences (its reorganization is a separate issue). At the same time the barriers between the various spheres of science should be destroyed, and the close cooperation of operating academic collectives and VUZ science should be ensured first of all. The concepts also coincide in the orientation toward the creation of the conditions for the equal development of science in all the regions of the Russian Federation and in much else.

But there are also fundamental differences. The main one of them concerns the question of the essence of the RSFSR Academy of Sciences. In the previous concept it was proposed that the academy being established, by relying on the republic scientific research fund, would take upon itself the formulation of scientific programs and scientific and technical programs in the interests of the RSFSR, the holding of competitions of projects, and, accordingly, responsibility for the level of the obtained results and their use. In the new concept, in conformity with the comments of V.P. Shorin, chairman of the Committee for Science and Public Education, the role of

"the most authoritative consultation and recommendation council in the republic" attached to the government and the Supreme Soviet of the RSFSR is being assigned to the academy. The advisability of the existence of such analytical forecasting, consultative, and recommendation councils attached to state organs of legislative and executive power does not raise doubt. It is only unclear why such a council is to be called the Academy of Sciences.

[SOVETSKAYA ROSSIYA] I would like to make more precise your position on this matter. In the published "Basic Principles" the following is said: "It (the RSFSR Academy of Sciences) implements its scientific policy by the formulation of scientific programs and projects, which are fulfilled by higher educational institutions and scientific research organizations." In the preceding concept the same thing was proposed. To what do you object?

[Koptiug] I completely agree with the cited principle. However, in the preceding concept, as I have already pointed out, it was proposed that the formulation of programs and projects relies on the republic scientific research fund, which is distributed on a competitive basis by commissions of the Academy itself, which is monitored by the supervisory council of the fund, on which representatives of both the scientific community and state organs have been included. In contrast to this "The Basic Principles" propose, as follows from the published explanations, a different thing: Argumentation is left to the academy, the government makes the decision. This is a fundamentally different situation.

It is necessary to understand clearly that not the organ, which formulates programs, but the one, which decides what to finance and what not to finance, actually determines science policy. During the years of perestroika, it would seem, it was realized that the version, when state organs actually dictate science policy, while representatives of the scientific community if necessary can be used either as a cover for decisions that interest the powers that be or as "scapegoats" for blunders, leads to the repression and enslavement of science. Nevertheless this version, which was discussed by the public, is suddenly beginning to appear in the new concept of the establishment of the Russian Academy of Sciences.

The state, no doubt, should keep watch over the effectiveness of the use of the assets being allocated for science. Its organs specify the priority problems of national economic and socioeconomic development, to the solution of which science should make its own contribution, and regulate the necessary redistribution of the forces of the scientific community by the attachment of a portion of the assets of the fund to republic scientific and technical goal programs that are approved by the government. If the government takes upon itself the distribution of all assets, moreover, down to the institute, the pursuit of science policy by the Academy of Sciences becomes an empty phrase.

I catch myself thinking that, perhaps, I misunderstood something in "The Basic Principles." But in the comments on them with regard to the distribution of assets it is directly noted: "Depending on the complexity these decisions will be made at different levels: the simplest ones by a specific official, more complex ones by a collective organ; the Presidium of the Council of Ministers...."

About what rights and accordingly about what responsibility of the RSFSR Academy of Sciences in the implementation of science policy is it possible to speak in this case?

The fact that in the materials on the concept of the development of science in Russia, which were published in the newspaper RADIKAL (No 3, November 1990) and were prepared by the RSFSR State Committee for Science and the Higher School, mention of the RSFSR Academy of Sciences is absent altogether, also serves as an answer to this question. It seems that they also do not intend to take it seriously.

[SOVETSKAYA ROSSIYA] Let us nevertheless assume that the scientific community will agree with the role of a consultative and deliberative organ, which is in store for the RSFSR Academy of Sciences. In what time, in your opinion, can its formation be accomplished?

[Koptiug] I do not think that this can happen quickly. "The Basic Principles" are very terse, and, therefore, many questions, which require discussion with the scientific community, are arising. I will indicate one of them—How will the initial composition of the academy be formed? The question is very crucial and difficult. There is no answer to it in the published materials.

After "The Basic Principles" have been discussed and approved by the RSFSR Supreme Soviet, answers to the mentioned question and many others have to be given and work in the regions has to be started again. As a result, on the order of a year will be lost on the revision of the preceding concept, moreover, for the present fundamentally new steps forward, which would justify this delay, are not visible in the new version of the concept. But a year in our times is too long a period.

During the past period on the initiative "from below" a whole "range" of Russian academies—of the natural sciences, the technological sciences, the agricultural sciences, and so on—were established, each on the basis of its own principles and with its own specific status. Attempts are being made to unite these special-purpose academies with the proclamation of the establishment of the Russian Academy of Sciences.

Unfortunately, lost time cannot be returned. The initiative has been lost by the RSFSR Supreme Soviet, speed has been lost. The beginning of next year promises to be very difficult. The scientific community of the Russian Federation will think not so much about new structures and formations as about how to survive the difficult times and how to break through to some sources of

financing or others. I am afraid that under these conditions the problem of establishing the Academy of Sciences of the Russian Federation in its substantive part will begin to recede into the background. I will be happy if I make a mistake in my forecast.

**Discussion at LiSSR AS General Meeting
Summarized**

917A0074A Vilnius EKHO LITVY in Russian
15 Dec 90 p 3

[Statement of the General Assembly of the Lithuanian Academy of Sciences of 4 December 1990]

[Text] The General Assembly of the Lithuanian Academy of Sciences, having discussed the tasks and the prospects of the development of science, declares:

1. In recent times the unfounded attacks on the Academy of Sciences with the aim to belittle its services and role and to separate its longstanding activity from the most important economic and cultural interests of the region and from the great goals of the restoration of the state system of Lithuania have increased in frequency. It should be recalled that for ages the most prominent representatives of the Lithuanian intelligentsia and the founders of the Lithuanian Scientific Society (J. Basanavicius, J. Sliupas, and others) cherished the idea of establishing the Academy of Sciences. The most enlightened part of the intelligentsia strove to implement this idea in practice in independent Lithuania. Although the academy was established under the difficult conditions of political repressions, at it creative scientific thought was always alive, the ideas of the restoration of the sovereignty and state independence of Lithuania were not forgotten. In recent years at the Academy of Sciences with the support of the creative intelligentsia the initiatives of Sajudis, the movement of the "Greens," and other democratic movements ripened, the draft of the Constitution of Lithuania, the concept of economic reform, and documents of the succession of the state system were prepared.

In different years a number of prominent figures of Lithuania, who were dismissed from higher schools for their political convictions, found refuge at the Academy of Sciences.

At the academy at present internal reorganization is being carried out, the preparation of a new charter has been completed, and it has been approved. The academy has become independent of the USSR Academy of Sciences. Agreements on cooperation with the academies of sciences of Great Britain and Sweden have already been signed, agreements on cooperation with the academies of the United States, Norway, and other countries of Western Europe have been prepared. This demonstrates the international recognition of the Lithuanian Academy of Sciences. Its scientific collectives have concentrated efforts on the study of the history, language, culture, and economic and social development of

Lithuania, as well as on the formulation of the basic directions of science and the solution of urgent problems of the life of the republic.

2. The fact that in the preparation of laws and solutions of important economic, cultural, legal, and other problems of the republic the Academy of Sciences is not being enlisted for a scientific examination and its knowledge and competence are not being used, disturbs us.

3. The Lithuanian scientific community linked great hopes with the organization of new state and public scientific institutions, hoping that they would serve the unification and coordination of creative forces. Unfortunately, with their emergence group interests began to appear more and more. The aspiration to firmly reestablish the command system of the management and financing of science is being realized by the finding of new structural forms. The financing for culture and science is being reduced. Some activists of the Union of Scientists are attempting to usurp the management of science and are using for mercenary purposes their influence on the Supreme Council of the Lithuanian Republic and on the department of science and schools attached to the government of the Lithuanian Republic. Here and there voices, which are calling for the transformation of the Academy of Sciences into a "club" of well-known scientists, for its isolation from scientific research institutes, and for the restriction of its influence on basic research in the republic, are being heard. The idea of turning the conducting of scientific research over to higher schools is also being spread. We are speaking out in favor of the integration of the higher school and the Academy of Sciences, but it should be natural and not due to the destruction of the Academy of Sciences.

The General Assembly of the Academy of Sciences can decide best of all what the Academy of Sciences should be like.

The Lithuanian Academy of Sciences will strive to unite the scientific forces of the republic for the solution of the most important problems of culture, language, and the economy, as well as social progress, to rely on world scientific practice, and to unite institutes for the conducting of basic research and will show itself to be a reliable expert when settling urgent questions in the life of the republic.

Well-known scientists of the world have repeatedly noted that the functioning of the Academy of Sciences is an important factor of the state system of the republic. Instances of the persecution of the Academy of Sciences are unknown to the history of science.

Given the overall tense situation in the republic the Lithuanian Academy of Sciences should remain a reliable factor of the stability of the scientific, cultural, and social values of Lithuania.

RSFSR Official on Republic S&T Funding

917A0050A Moscow POISK in Russian No 48 (83),
30 Nov-6 Dec 90 pp 4-5

[Interview with First Deputy Chairman of the RSFSR State Committee for Science and the Higher School Aleksandr Tikhonov by Yelizaveta Ponarina under the rubric "What Is Science To Be Like?"; date and place not given: "First It Is Necessary To Survive"—first two paragraphs are POISK introduction]

[Text] There is nothing worse than to be convinced by one's own fact that the writer Vladimir Orlov, who observed: "The more interesting events are for the historian, the sadder they are for the contemporary," was right.

Who else but scientists were the first to raise their voice in defense of the market and to begin developing the concept of the transition to it? Who else but scientists will be the first, it seems, to incur losses on this path? While reproaching the present authorities with the fact that even during the lean 1920's the country allocated considerable assets for science, we are forgetting that it allocated them by the administrative command, cursed method.... Such approaches have been ordered for the market. What is one to do? Ask the President, perhaps, to promulgate another ukase?

[Tikhonov] Alas, it will not help, First Deputy Chairman of the Russian Soviet Federated Socialist Republic (RSFSR) State Committee for Science and the Higher School Aleksandr Tikhonov gave a laugh after hearing these words. Science is not to hide any more from life behind anyone's back. It is necessary to learn to live like all people—under real circumstances. More precisely, it is necessary to adapt to them in order not simply to preserve, but to increase the scientific and technical potential of the republic. We attempted to indicate how it is possible to do this in the concept "Science," which we are proposing to the scientific community for discussion.

The document is short and for the present quite raw. It has been sent to the scientific centers and higher educational institutions of Russia for an expert opinion. The range of the first responses is broad: from three lines of indifferent agreement to several pages of scrupulous analysis and severe criticism. The committee says "thank you" for the latter and especially for the suggestions first of all to Leningrad University, the North Caucasus Scientific Center, the rectors of Krasnoyarsk and Moscow higher educational institutions, instructors from Voronezh....

Nevertheless, now the broader public discussion of this draft is required. Today POISK is opening it.

[Ponarina] Here, perhaps, are the key words: "The carrying out of the restructuring of the system of management in the direction of decentralization, democratization, and demonopolization." What is behind them?

[Tikhonov] In our opinion, these are the three whales, by which the transition to a market is being supported. Conversion and the elimination of the centralized funds for scientific and technical progress in ministries and departments drastically reduced the revenues of many institutes and higher educational institutions. Now it is necessary either to win money for research in a competition or to earn it, having concluded a contract with a specific client. Soon not signs, but business qualities and original ideas will be valued, that is, not the structural unit—the institute, but the creative unit—the researcher—is coming to the forefront.

[Ponarina] But earlier the institute also received assets for the development of some themes, programs....

[Tikhonov] Yes, often they selected the performer by the corresponding name of the institute, while they determined the amount by multiplying the average wage and the number of units in the manning table. That is why we are leaning toward the rejection of the formation of numerous large monster institutes. Not the masses, but individuals develop science. People who are capable of advancing an idea, of finding and uniting like-minded people, and of obtaining financing in open honest competition. Of course, such a talented person needs social protection, therefore, the transition to a contract system of the organization of scientific work is envisaged. This is also present in the concept.

[Ponarina] But for the present this is far from life. The contract requires legal support, but we do not even have the concept "intellectual property."

[Tikhonov] We will. The work on the preparation of a package of legislative acts, without which it is impossible to give scientific and technical progress a qualitatively new level—"On the Status of the Science Worker," "On Intellectual and Industrial Property," the statute "On the New Mechanism of the Financing of State Budget Scientific Research Work, Projects, and Programs"... —is designated by a separate chapter in the concept.

[Ponarina] The last one requires explanation. What is being changed in principle? And for the sake of what?

[Tikhonov] Do the stands at the Exhibition of National Economic Achievements not exasperate you? How many interesting things have been thought up, how exquisitely they have been executed, but in life there is no trace of them. Why? Because we are investing assets for the most part in the production of...prototypes.

If you take the total amount that the country spends on science, basic research eats up only seven-10 percent of it, experimental design work eats up 55 percent, while not more than 35 percent is used for the duplication and dissemination of new equipment and technology. The developed powers, with a high level of supply, give 14-15 percent for basic exploratory work and 35 percent for experimental design work, while all 55 percent is used for duplication. And this is yielding results.

We intend to do the same. Moreover, we plan to conduct basic work mainly through budget allocations and to disseminate innovations primarily through nonbudgetary sources. Applied research on medicine, culture, education, defense, informatization, communications, ecology...might constitute an exception.

[Ponarina] This is like pictures from the future, but in reality during the first days of January scientists will come to the cashier's offices and...

[Tikhonov] And will receive the money due to them. Because for the present we have maintained state support of scientific activity at the level of the passing year. During 1992-1993 we hope even to increase it by a third, moreover, to obtain financing in constant fractions of the national income of the republic. Approximately 10 percent should be spent on science. We are not certain that we will receive that much, but are insisting on a stable "scientific percent."

[Ponarina] Let us assume that your suggestions will be adopted. But where are the guarantees that you will divide the money among scientific collectives and scientists more successfully than those who engaged in this earlier?

[Tikhonov] The guarantees lie only in the fact that we do not intend to divide anything. This is not our job. *Our goal is the direct opposite: in the next three years to establish such a system in the State Committee for Science and the Higher School of Russia, under which neither we nor those who come after us will ever be able to reach the levers of the distribution of assets and the manipulation of scientific institutions.* For the sake of this we are now forming under the committee an independent body—the Council for Science. For we actually do not have that many assets. Therefore, it is necessary to invest them sensibly. First of all, it is necessary to channel them into the solution of important problems of an intersectorial nature, which are urgent for all of Russia, as well as the Union. Therefore, we also decided to formulate priority scientific programs.

[Ponarina] The approach—the goal program approach—is not new. It was approved by the State Committee for Science and Technology. And, in the opinion of many scientists, it showed itself to be ineffective. But in the State Committee for Science and Technology there are 620 specialists, while in the RSFSR State Committee for Science and the Higher School there are a tenth as many of them. Are you not overestimating your capabilities?

[Tikhonov] We will invite to select directions scientists of the encyclopedic type, 19-21 people, so that under the committee they would organize an independent consultative body, the same Council for Science. Each of them will have under him his own expert groups. Moreover, ones that work for decent pay and bear legal and moral responsibility for the conscientiousness of recommendations.

Relying on the activity of these experts, the Council for Science will compile a list of priority programs and will turn it over with an application for financing to the special republic Science Fund of Russia. This fund should be, of course, connected with the all-union fund for the financing of basic research.

[Ponarina] But who will manage it? In the Ukase of the USSR President on the status of the Academy it is stated that in the country the Union Council of Ministers will. This disturbs many scientists. Does the Council of Ministers of Russia also not want to seize the reins of government of basic science? After all, whoever pays also....

[Tikhonov] We are incorporating in the concept the idea of the independence of the fund from structures of power, including from ourselves. We believe that the fund should be accountable only to the RSFSR Supreme Soviet.

[Ponarina] They say that you will finance only those programs that will yield an considerable impact in half a year. Will such early fruits be of much use?

[Tikhonov] The programs "Ecology and Nature Conservation of Russia," "The Peoples of Russia: Revival and Development," and "The Informatization of Russia" are on the list of proposed programs. Is it really possible to cope if only with one of them in six months? But then "Small-Tonnage Science-Intensive Products for Sectors of the National Economy" should, apparently, have a short time of implementation. First, because the people have become tired of living as in the Middle Ages. *One of the postulates of the concept is the establishment in the country of a new technological structure and the turn of the national economy toward the meetings of the needs of the Soviet people. Such a country as ours must not go about the world wearing a cap.* We must earn ourselves a decent living, if only for socks with linings and children's food.

For example, it is now necessary to deal in earnest with the problem of the informatization of the republic. Otherwise we will simply forget how to understand what the world is doing and about what the world is talking. But it is possible to accomplish this task only by having the appropriate materials and hardware. Silicon, for example, is needed for the development of small-scale power engineering. You will not save up enough foreign currency for it. But we have a good deal of silicon in waste products and in the dumps of several enterprises, which produced plutonium by the industrial method. Previously no one even took an interest in these invaluable dumps, they even did not enter them on maps. But now the Ministry of Industry of Russia is making a cadaster of such hand-made "deposits." A technology of their processing exists. Is this program to drag on for a five-year period? Do we really not feel sorry for ourselves and our children?

Here we will try to spare no money. At least about 30 percent of the assets received from the state budget will

be used for intersectorial programs (and there will be about threefold more than usual for each one)! Only the creative collective, which proposes the most original solution and wins the competition, can, I repeat, receive these assets.

[Ponarina] And what about the losers? Is their place among the unemployed?

[Tikhonov] Why? Having incorporated in the concept the principle of the decentralization, demonopolization, and democratization of management, we understood that this means first of all a multiplicity of sources of financing. Whoever believes in his own idea and is not afraid of taking a risk, can apply for "traveling expenses" for his matter to innovation banks. We intend to establish an entire network of similar banks throughout Russia. For a specific interest rate there it will be possible to get a loan and to organize a scientific and technical cooperative, a cost accounting collective, a center of scientific and technical creativity of youth, a small enterprise. The committee is inclined to support all these new organizations, creating favorable conditions, up to tax credits, for their formation. Moreover, not only for themselves, but also for their sponsors.

[Ponarina] In your concept there is another fundamental feature—on the active use of the market as a tool of the elimination of state control over and the demonopolization of science. What is incorporated in the concept "the privatization of science-intensive small-tonnage works, the partial privatization of scientific research institutes"?

[Tikhonov] Let me explain with an example from life. The other day a professor from Barnaul was in our committee. He took from his case three little cardboard boxes with construction tiles made of...seed hulls, sawdust, and brick dust, of which there are not heaps, but soil layers at combines. By adding to the garbage and waste phenol-free components (the professor is a specialist in them), he obtained an excellent material. Of course, it is necessary to help him set up a science-intensive works, perhaps, even a private one. And it will become easier for all of us to breathe, and he will realize himself not only as a scientist, but also as an entrepreneur.

And what about in medicine? Can there really not be a private laboratory for the preventive treatment of an allergy or infertility? Of course, we are not proposing to privatize the synchrotron. But why is it necessary at the start to yell "im-pos-si-ble!"? People are already coming, they have ideas, critical analyses and documents have been prepared. It is necessary to support them, then, perhaps, the prestige of the science worker will also increase.

[Ponarina] Perhaps, it will increase, provided by that time the best people of science do not succeed in packing their suitcases. I do not know about scientists, but the phrase in the concept, where the foreign exchange cost recovery of international scientific and technical ties is

declared, alarms me. Does this not mean that, by transferring to institutes and higher educational institutions the right to expand international contacts, you are saying: "And you pay for everything yourselves!"? Where will people get foreign currency?

[Tikhonov] First, they will earn it. Second, they will develop business ties in all directions, particularly by using popular diplomacy. When a scientist from a foreign center arrives, we believe that it is better in the present situation to lodge him in the family of the science worker who will later go abroad for practical studies. Scientists themselves will more likely provide a colleague with an acceptable level of comfort than our hotel services.... Is it strange? Yes, but, while we are poor, it is better that way than not at all.

And there is another matter—the idea of establishing the philanthropic fund "Science of Russia" is recorded in the concept. We would like to channel its assets into the support of young scientists during this transition period. For the market will weigh most heavily of all on them.

[Ponarina] You say that the concept is at the stage of discussion. Is it a long time to the start of implementation, for approximately what period is it intended?

[Tikhonov] The concept is at the stage of modification. The Council for Science is being formed, proposals on taxes, which would promote the rapid introduction of the results of scientific activity, have been turned over to the commission of the Supreme Soviet. *Our people are working actively on the drafts of laws, by means of which there is the hope of establishing a rule-of-law state that respects intellectuals.* The All-Russian Conference of Representatives of the Scientific Community and the Higher School, at which we would like to discuss the concept in detail and to adopt it in final form for putting into effect, is being held in the middle of December.

As a whole it is intended for approximately one and one-half years. This, of course, is not the deadline for correcting the situation in science.

But this is the time, during which, as Deputy Chairman of the RSFSR Council of Ministers Nikolay Malyshev noted, we need to find if only the bottom. The bottom of the hole, into which we are sliding. To find it in order to push off and to begin to get ourselves out.

Newly Formed Latvian Council on Science Described

917A0051A Riga NAUKA I MY in Russian No 12,
Dec 90 pp 6-7

[Article by E. Gudriniece, chairman of the commission for elections to the Latvian Council on Science, and interview with Academician Elmars Grens, chairman of the Latvian Council on Science, responsible secretary of the board of the Union of Scientists of Latvia, and

director of the Institute of Molecular Biology, by A. Kluinis; date and place not given: "The Latvian Council on Science"]

[Text] **Composition** (E. Gudriniece)

The Statute on the Latvian Council on Science (LSN) was approved by Decision No 44 of the Latvian Republic Council of Ministers of 3 July 1990. It was specified: The council was formed in order to democratize the management of science and to promote the increase of the effectiveness of scientific work.

At the basis of the activity of the Latvian Council on Science is the comprehensive examination of individual scientific studies and projects of scientific research programs, as well as the skilled evaluation of the results and effectiveness of the activity of scientific institutions; the 13 expert commissions have been given the right to enlist in their work specialists not only from Latvia, but also from other countries.

The most important function of the Latvian Council on Science is to generalize and evaluate the proposals of scientific institutions and higher educational institutions, individual scientists and groups of scientists with respect to the main directions of the development of Latvian science, as well as the possibilities of the state financing of the proposed scientific research.

The Latvian Council on Science will engage in the distribution of the released budget assets among individual fields of science and for specific programs, as well as the monitoring of the use of budget allocations. In cases of the useless spending of assets the council has been given the right to discontinue financing.

There are 28 people on the Latvian Council on Science. Of them 13 were elected from among the expert commissions. Leading scientific centers of the republic—the Latvian Academy of Sciences, the Union of Scientists of Latvia, the Latvian University, Riga Technical University, the Latvian Agricultural Academy together with agricultural scientific research institutes, the Latvian Medical Academy with medical scientific research institutes, and the Riga Institute of Civil Aviation Engineers—delegated the remainder.

The composition of the expert commissions is (in parentheses are the chairman, the deputy chairman (chairmen), the representative to the Latvian Council on Science): information science (I. Bilinskis, J. Barzdins and I. Tomsons, I. Bilinskis); mechanics, machine building, and power engineering (V. Tamus, A. Skudra, A. Grundulis); physics, mathematics, and astronomy (A. Silins, A. Buikis and K. Svarts, A. Silins); chemistry (E. Sukevics, I. Meirovics, J. Freimanis); the scientific principles of technology—materials, chemical, pharmaceutical, wood (M. Kalnins, O. Kukurs, T. Millers); biology, ecology, geography, and geology (R. Kondratovics, P. Cimmins, G. Andrusaitis); molecular biology, microbiology, biotechnology (E. Grens, V. Berzins, M. Beckers); medical sciences (V. Rudzite, V. Klusa, I. Lazovskis);

agricultural sciences (M. Belickis, J. Lavielis, E. Lacgalvis); history and the history of culture (J. Graudonis, V. Pavulans, J. Stradins); linguistics, literary studies, art criticism (G. Bibers, J. Baldunciks, A. Klotins); philosophy, sociology, psychology, pedagogy (M. Kule, D. Meiksane, P. Lakis); economic and juridical sciences (J. Janovs, T. Jundzis, J. Porietis).

There are included as individual members of the Latvian Council on Science: A. Bluger (the Latvian Medical Academy), J. Ekmanis (the Academy of Sciences), E. Grens (the Union of Scientists of Latvia), I. Gronskis (the Latvian Agricultural Academy), V. Hausmanis (the Academy of Sciences), I. Knets (Riga Technical University), E. Lavendels (Riga Technical University), J. Lielpeteris (the Academy of Sciences), M. Lidaka (the Academy of Sciences), V. Panasenkov (the Riga Institute of Civil Aviation Engineers), I. Ronis (the Academy of Sciences), J. Vaivads (the Academy of Sciences), U. Viesturs (the Academy of Sciences), J. Zakis (the Latvian University), and E. Ikaunieks (the Council of Ministers).

Academician Elmars Grens, secretary of the board of the Union of Scientists of Latvia, was appointed chairman of the Latvian Council on Science.

Strategy

The events of recent years convince us that the types of human actions and relations, which have taken root in real life, can also remain unchanged in case of a change of formal structures on the scale of not only individual organizations, but also all of society as a whole. The "designing" of new social relations and their shaping into new organizations will lead to the desired goal only if we study the secret strings of the mechanism of the old relations. Several opinions on the administrative bureaucratic system in Latvian science, on the possibilities of breaking up this system, and on the prospects of the development of our science were expressed this year in the journal *NAUKA I MY* (No 1). In the middle of 1990 the Government of the Latvian Republic adopted a decision, which changed radically the former procedure of organizing and financing science. This decision in many respects was based on the concept that was developed by the Union of Scientists of Latvia. That is why we asked Elmars Grens, chairman of the Latvian Council on Science, responsible secretary of the board of the Union of Scientists of Latvia, and director of the recently established Institute of Molecular Biology, to tell about the situation, in which Latvian science is greeting 1991.

[Grens] Beginning next year we will dispose of the budget assets that are allocated for the needs of Latvian science. For their distribution among specific themes it was necessary to establish the most objective and authoritative organ that is capable of deciding, of which scientific themes to support the elaboration, whether an adequate scientific potential, level, and traditions exist, to which of the scientists it is possible to entrust one risky theme or another, what research today is being conducted merely owing to inertia and it does not make

sense to finance them from the budget of science (which does not rule out the possibility of other sources). Plants and other manufacturing institutions can also invest in science, the conclusion of contracts is possible. Precisely such assets constitute up to 40 percent of the annual budget of some institutes.

In the present situation the expert commissions, which were democratically elected and began their work on 1 October (the deadline for the submission of applications for themes of scientific developments to the Council on Science expired on precisely this date), will have a difficult time, for it is necessary to start from scratch and in the shortest time to give their evaluation of all the received applications. Later, in case of normal work, they will have to examine approximately a third of the present number of applications. Therefore, now we cannot carefully examine all the announced themes: For the present we will, perhaps, finance a portion of the research only for a year, by issuing something like credit. Next year we will be able to examine these works with the maximum care and to make qualified decisions on them.

The work of the experts will be paid for—this will increase the degree of responsibility. We will analyze the work of the experts also in order to eliminate the superficiality of evaluations and potential collusion.

Time will tell what we will be like, but today it seems to me that people, who in reality want—and are not pretending that they want—to reform Latvian science, have gotten onto the expert commissions and the staff of the Council on Science. Our clear resolve to finance not institutes, but themes, putting the assets at the disposal of their supervisors, testifies to this.

However, we will not forget that institutes are not simply a conglomerate of scientists, but a structure, which one must not destroy, having thrown the financing of themes to the will of the waves and having handed them over to the power of uncertainty. Institutes have expensive equipment, which is needed for the elaboration of many themes, and a special infrastructure for the support of scientific research, and this is an element of not only service, but also scientific labor. However, the financing of institutes (infrastructures) should be dependent on the amount of financing of competitive jobs, therefore, according to our ideas, the supervisors themselves of themes together with the leadership of the institutes and the scientific councils will decide what portion of the amounts, which are being allocated for the financing of themes, will be transferred to the central funds of institutes. State assets will be received by the institutes, as before, each institute has its own account at the bank, but the director will not dispose of them as freely as was done before. We will finance individual scientists and work groups, which are engaged in the study of certain themes. The supervisors of these groups, and not the director of the institute, will be responsible for the use of the assets and the obtained result. Monthly or quarterly accounting reports will provide rapid financial information.

[Kluinis] Having become the owners of the fixed capital of production, the supervisors of jobs will be obliged to sell the results of their labor. Is this possible? Are we ready for this?

[Grens] The Latvian Council on Science will not engage in this now. It is necessary to pass a republic law on intellectual property. At present they are engaged in solving this problem. Until now the institute was the actual owner of scientific results.

[Kluinis] Is it really not the one who financed it, that is, Moscow?

[Grens] Formally the institute all the same was—if there was not a contract that provided for the transfer of the results of labor to the ownership of the client. In case of budget financing there are no such stipulations, but the result in one way or another gets to whoever finances the job, since there is often nowhere to put it. The republic, perhaps, was also interested in the use of one scientific result or another, but in practice.... This is in general a very complicated question—to what extent our production is ready to accept a scientific product and even to pay for this. Until now the situation was often as follows: The scientist introduces his own development, but the producer alienates him—he has his own problems and his own plan. Now it is the other way round—the producer as if should seek the scientist in order to produce something that it is possible to sell. But this is fine in word only. In practice far from everything, which a scientist offers, is in such a state to be bought and introduced. Our industry for its most part is so backward that nothing of what goes beyond the most trivial (and is far from science) suits it, to say nothing of the acquisition of foreign technology or ideas, about which—in contrast to homegrown ones—no one dares to say anything bad. Such is reality. Moreover, the scientist will be able to sell the results of his research only when the law on intellectual property makes it possible to do this without restrictions, as well as without the deductions, which reduce to naught the interest of the scientist in the results of his labor.

In Latvia it is necessary to establish various funds of manufacturing organizations, the boards of which would settle freely questions of sectorial financing, without linking this with the development of specific machines or technologies. Here a high scientific potential, which is no longer basic science and is not yet design and engineering, is often needed. The state usually does not finance this intermediate stage. But by means of tax legislation it is seeing to it that it is advantageous for firms, in order to get into another group of tax payers, to deduct millions for science (including culture and education).

[Kluinis] In this way state enterprises are avoiding the functions of the distributor of assets. But with what will

the Latvian Academy of Sciences—as an enterprise, for which the distribution of assets was all but the basic task—now deal?

[Grens] Indeed, a vacuum has now formed in the functions of the Academy of Sciences, and some people are recommending even to eliminate the Academy of Sciences, having transformed it into a public organization and having transferred the institutes to higher educational institutions and plants. Perhaps, with time that will happen. The newly formed Institute of Molecular Biology is the first one that will be able to belong, if it is possible to express oneself that way, simultaneously to both the Academy of Sciences and the Latvian University. Owing to this science at the chairs will step to a new rung and the most capable undergraduates will be drawn into scientific work.

[Kluinis] But how is one to see to it that highly skilled scientists, who work mainly at institutes, come to lecture halls?

[Grens] Today there are no longer restrictions which do not allow scientists to work as instructors and to be at their institutes the supervisor of course and graduation projects.

[Kluinis] In such a case it will be more difficult for deans and heads of chairs to carry out the supervision and monitoring of educational work, while some of the instructors will have to leave their chairs.

[Grens] Yes, I know that some people perceive, let us say, unequivocally our joining in the educational process at the biology faculty of the university. But what will the merging of the higher school with the Academy of Sciences provide in case of the elimination of the latter? If we had powerful VUZ science and the same Academy of Sciences, their merging would strengthen science even more and would improve the instruction of undergraduates. For the present this does not exist—the chairs for their most part are weak, and I even do not know whether they are striving for science. If the Academy of Sciences is eliminated, problems with the basic sciences might arise, for it is supporting them for the time being. And, moreover, the Academy of Sciences could concentrate the entire infrastructure of scientific service—libraries, the organization of scientific conferences of firms (having given the appropriate powers to the House of Sciences in Lielupa), the acquisition of firm scientific equipment, and others. Thus the Academy of Sciences can unite all the institutes.

[Kluinis] What are the advantages of the Academy of Sciences in supporting the level of scientific jobs, if expert commissions of the Latvian Council on Science are already at work?

[Grens] The tasks of the expert commissions are quite narrow, and they do not work every day. Today the Academy of Sciences is still a kind of “ministry of science,” it forces its departments—the institutes—to work. In reality the institutes themselves should ensure a

sufficiently high level of scientific developments, while the Academy of Sciences, in turn, should be concerned about the prestige of basic research. In order to achieve this, the Academy of Sciences should win for itself high prestige in society, having included in its membership the most well-known scientists and by using its own authority and the authority of its five representatives on the Council on Science. If the academicians of the Academy of Sciences and its departments and presidium achieve this, they can have a very substantial influence on the development of science in Latvia.

[Kluinis] If the Academy of Sciences is gradually transformed into a public organization, how will it differ from the Union of Scientists?

[Grens] This question requires an extensive response, perhaps, we will postpone it to another time. However, suspecting its context, I want to say the following. When the Union of Scientists of Latvia was formed, it did not have anything expect people longing for work. And look what they have achieved in not a full two years, although no one demanded anything of us. We ourselves demanded. If the academy waits until they come to it for advice, it will wait for anyone in vain. But if the Academy of Sciences displays activity, this will influence appreciably the science policy of the country. And if the transformation of our “ministry of science” into an authoritative association of scientists is not to someone’s liking, this is his own tragedy.

And, finally, I would like to touch upon another question, which I have occasion to hear at times and which I also ask myself. In establishing the Council of Scientists of Latvia and transferring to it the broadest powers, are we not replacing one autocratic system with another one, hiding ourselves behind the mask of democratization? Yes, this question is quite pertinent.

We ourselves through democratic elections formed the sectorial expert commissions—they have the decisive say in determining the fate of future scientific developments. None of the sectors, including the main scientific institutes, was passed over when forming the Union of Scientists itself, which was also established as a whole in accordance with democratic principles.

The future will show to what degree this democratically formed organ of the management of science will conform to our initial ideas. In my opinion, the old maxim that society has the kind of government that it deserves, can once more prove correct.

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Reforms Fail To Improve Science in Georgian SSR

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[Interview with Doctor of Biological Sciences Nodar Mitagvariya, deputy director for scientific work of the Institute of Physiology of the Academy of Sciences of Georgia, by ZARYA VOSTOKA correspondent Kevevai Amiredzhibi under the rubric "The Scientist and Society"; date and place not given: "Directives Are Not For Science"—first paragraph is ZARYA VOSTOKA introduction]

[Text] A scientific research institute needs, at the least, two conditions in order to hold high the measuring rod of scientific authority: massive financing and strong scientific personnel. Are they being observed? The interview of a ZARYA VOSTOKA correspondent with Doctor of Biological Sciences Nodar Mitagvariya, deputy director for scientific work of the Institute of Physiology of the Academy of Sciences of Georgia, is about this and other problems of science.

[Amiredzhibi] Quite recently full cost accounting and self-financing were named among the fundamental steps that are supposedly capable of reviving the activity of scientific subdivisions and placing it on a sound financial basis. But this did not happen. What are the reasons?

[Mitagvariya] The fallaciousness of the approach itself, particularly when it is a question of basic research. Bureaucrats from science "designed," at first glance, a well-balanced, but "ethereal" system, having made the state order the cornerstone of scientific subdivisions. Much was said about the opportunities being afforded to allocate assets for the performance of basic operations, the development of fundamentally new technologies, advanced equipment, and so on. However, reality is such that there was no need to expect a substantial breakthrough in this direction. The work of scientific research institutes in recent years was financed particularly stingily, the instrument and experimental bases became very obsolete. In short, the obstructions on the path of scientific and technical progress proved to be so massive that it did not seem possible to clear them by pure administration by mere decree and "cosmetic" steps. The "lower strata," incidentally, noted this: Having descended to the level of scientific production associations, sectorial institutes, and others, it was possible to become a witness of anything but high spirits. In nearly every scientific collective they were certain that self-financing, administration by mere decree, and work under contracts will hardly yield the benefits which the "upper strata" promised and that it will be very difficult to find stably a sufficient number of clients for developments. Scientists also do not entertain illusions with regard, for example, to the distribution of assets. At any governmental level it was constantly repeated that they should be distributed on a competitive basis of projects. And, indeed, for the second year now, it would seem, if not all, then a portion of the assets being released for research are being

received on the basis of the examination of projects. In reality the very same people, who managed our science during the times of stagnation, are making the decisions, and they do not intend at all to give up either the privileges or the power.

[Amiredzhibi] In recent years the concept "program financing," when assets are allocated for a specific scientific and technical program, has come into extensive use. What does the institute, which is the participant in a program, get from this?

[Mitagvariya] There are union scientific and technical programs, there are republic ones. The latter were not financed at all and were of a formal nature. As to the union ones, they give the scientific subdivision hardly anything. Here is an example from the life of our institute, which, I believe, does not need separate presentation: Here there are an authoritative physiology school and a high level of research. All this enabled us to participate in union programs on physiology and biology under the code name "Thinking," "Signal," and others. The institute completed its part of the research, but this year no longer received assets for subsequent research in accordance with the program. Why? We do not know. Moreover, we do not know how the part of the research, which we completed, will "blend" with the overall context of the program. Then, one would like to know, for what are we working? Might researchers be doing work, which on the whole is useless and which no one needs? But this is not so. As we see, chaos and confusion are also characteristic of major projects....

The assets being allocated for science, including basic science, are decreasing. For the institute, in the work of which the experiment is in the forefront, this is a genuine disaster. We, for example, constantly need the latest instruments, advanced equipment, and a large number of reagents, but all this is unavailable. Those of the associates, who go abroad, bring something with them, the same, by the way, reagents, and gradually use them during work, supplying themselves and their "team" for several years. But this, you will agree, is not the solution.

[Amiredzhibi] But will academic scientific research institutes be able to earn currency for themselves?

[Mitagvariya] Of course, they will. But on one condition—they will have to give up the main thing: basic science, and to switch to the service of western firms. What will this give? Perhaps, several tens, even hundreds of thousands of dollars. Here we will lose the entire scientific reserve and will lag in basic research by a decade, and this, perhaps, will be a most appreciable blow to science, particularly physiological science, in which we now hold the foremost positions in the world.

It is another matter that currency for scientific research institutes of any type is necessary. Does it make sense, perhaps, to establish at the same basic institutes special divisions, which will be able to work on orders of major foreign firms, thereby earning currency and "fattening" the entire institute with it? However, how will basic

scientists perceive the assignment to work as "Negroes on plantations"—for, in essence, after two-three years of such work many of them can take leave with the hope of developing something serious in basic science. As we see, for the present there are more questions than answers. Another, and the most effective, means is the sale for currency of a scientific idea, if it, of course, is worthwhile. But we will still have to study in earnest the art of selling an "intellectual commodity." In order to appear with valuable scientific ideas on the intellectual market, it is necessary to organize their, roughly speaking, assembly line production, small, but very mobile scientific collectives, which are capable of elaborating any complex scientific and technical problem, are needed for this.

[Amiredzhibi] On what bases is it best to form such collectives and, in general, what are the criteria of the evaluation of the labor of a scientist "here" and "there"?

[Mitagvariya] "Here" first of all there is the number of published works. That is why so-called scientific publications, in which there is no or almost no scientific innovation, flow in a stream. In the West there is a different system: A computer provides the basic evaluation of the professional level of a scientist, by generalizing all the data about him. The number of references to one or another scientific work of his is taken into account, how these references are used and by whom is taken into consideration. Here it is clear that other researchers will not use a mediocre work at all—this is where the objective criterion is. They look least of all at the number of scientific publications. The main thing, I repeat, is their scientific value. Then all the information goes to special authoritative commissions. Their opinion, in essence, is also decisive in case of the hiring, for example, of a young scientist at a large laboratory, a scientific center, or a firm. A form of what is called an "interview" is used: The commission asks some, even trivial, questions, and the scientist answers them. But before this he presents a scientific paper, the value of which is determined by international experts, rather, the paper is sent to authoritative foreign specialists. Incidentally, I have more than once had occasion to act as such an expert. Then the data on the scientist are sent to various scientific subdivisions, and he merely has to wait for a call to a new job. The question is settled very quickly—within one-two weeks. Having obtained a job, the researcher has everything: complete creative freedom, all the good things of life.

[Amiredzhibi] The most valuable qualities of a researcher are the independence of thinking, initiative, and individuality. Do the conditions for their development exist at our scientific research institutes?

[Mitagvariya] It is told that Rutherford, for example, gave encouragement when his young colleagues were working on obviously unpromising scientific ideas, although these efforts cost his laboratory a pretty penny. But then, Rutherford explained in such cases, the young scientist has his own problem, and even if the work comes to nothing, it will teach him to think independently and will lead to another

problem, which will be of experimental importance. We, honestly speaking, do not have such opportunities. Finances are limited, the conditions for work, to put it mildly, leave much to be desired, and all scientific work proceeds strictly according to plan. All this is also forcing us to proclaim more than to engage in the fostering of the real researcher.

It is also necessary to change fundamentally the system of VUZ instruction and to increase first of all the level of scientific competence of VUZ instructors. I will again cite an example from the history of science: Well-known mathematician Stokes, while formulating problems for his students, derived a theorem, which became fundamental and was subsequently the basis for the famous equations of Maxwell. As we see, intensive scientific activity should be an indispensable condition of the work of a VUZ instructor. But here this condition for the most part is not being observed, but later on we are amazed at why students do not have authorities among instructors and why the matter of identifying truly talented young people has been poorly organized at the higher school. Recently someone tried to convince me that very talented VUZ graduates are concentrated in student design bureaus, and the service record of triumphs of leading higher educational institutions of the republic in all-union student competitions, conferences, and others was cited as an argument for this. I do not presume to dispute these assertions, I will simply note that the quantity of students, who have been "put to use" at design bureaus, for the present is not turning into quality. Only a few score important successes, the others do not leave any noticeable mark in the scientific life of the higher educational institution.

Time is needed in order to turn everything around. But precisely it is lacking. And I would not be surprised that, when the borders are finally opened, the most capable young people will rush to the West in search of a better life. The results of a survey recently conducted among young people of the country, according to which about 80 percent of those surveyed are prepared to leave for a job and of them 16 percent may remain there forever, also convince me of this. All this cannot but cause alarm.

The low, purely symbolic remuneration of scientific labor, the destitute conditions of the existence of the scientist and his family, the lack of rights—after everything that has been said what kind of creative work is it possible to require of a researcher? But what in general is required of him? Who can now specify clearly the range of duties of one science worker or another, for example, a chief scientific specialist, a lead scientific specialist, and so on? Such a structure creates duplication in work and excessively inflated staffs at scientific research institutes. I remember that on my arrival in the United States I was quite surprised by the small number of permanent staff members at laboratories—a scientist, a laboratory assistant, several students, and the rest are technical

personnel. In all not more than 10-15 people. While the productivity from the work is very high. Everyone does his own job there. While in our country it often reaches the point that a doctor of sciences has to wash flasks and measuring glasses.

Radical reforms are necessary in order for science to develop and for the scientist to feel like a truly free, creative individual. It will be necessary, obviously, to begin with the "top floor." For example, the Academy of Sciences is a coordinating organ, but its activity reduces more to the distribution of finances. And as long as the Academy of Sciences remains a department at the level of, so to speak, a ministry, one must not expect appreciable changes in the scientific sphere.

Regional S&T Center Created in Kutaisi, Georgia

917A0054A Tbilisi ZARYA VOSTOKA in Russian
5 Dec 90 p 2

[Interview with Corresponding Member of the Academy of Sciences of Georgia Robert Adamiya, director of the Kutaisi Scientific Center of the Academy of Sciences of Georgia, by ZARYA VOSTOKA correspondent Vakhtang Kiknadze under the rubric "The Achievements of Science and Technology for All Sectors"; date and place not given: "Making Up for Lost Time"—first paragraph is ZARYA VOSTOKA introduction]

[Text] A regional scientific center of the Academy of Sciences of the republic is operating in Kutaisi. This will give a new impetus to the socioeconomic and cultural development of the region of Western Georgia. In connection with this a ZARYA VOSTOKA correspondent talks with Corresponding Member of the Academy of Sciences of Georgia Robert Adamiya, director of the Kutaisi Scientific Center.

[Kiknadze] Tell me, please, what prerequisites governed the establishment of the regional scientific center in Kutaisi?

[Adamiya] First of all, Kutaisi is a city with rich scientific and cultural traditions. Suffice it to recall the names of many authoritative scientists, writers, and figures of culture and art of the republic—natives of Kutaisi who in the end moved to the capital of Georgia so that there would be more opportunities for their scientific activity. And this point of view was dictated by objective reasons and first of all by the fact that in Kutaisi even now there is a weak material and technical base for scientific research. Until now there was not one independent scientific research institute here, while in Tbilisi about 40 institutes subordinate to the Academy of Sciences alone are operating. It is also inexcusable, it seems, that the second largest industrial center of the republic, which Kutaisi is and the share of which in machine building comes to 26 percent of the total volume, does not have a research institute for these problems. However, as they say, better late than never. I am thoroughly convinced that the establishment here of an independent scientific

center, which is manned mainly by promising young specialists—graduates of Kutaisi Polytechnical Institute and Kutaisi State University, as well as scientific personnel, who today for the most part work outside Kutaisi and wish to return to their native city, will afford, at last, an opportunity to perform productive scientific activity, to set up in the future specialized councils for the defense of dissertations, and to establish extensive scientific ties with authoritative foreign scientific centers. I, incidentally, was recently the first to be elected a member of the scientific council of the Italian international scientific center of mechanics specialists, to which leading scientists of the indicated field from many advanced countries of the work are invited for the purpose of the regular examination of current problems of mechanics and control processes. Participation in its work, undoubtedly, will give us an opportunity to establish close international scientific and business contacts in the sphere of mechanics and machine building.

[Kiknadze] What is the scientific potential in Kutaisi today?

[Adamiya] It is possible to regard as the reference point of the origin of academic science in Kutaisi 1976, when by a decree of the Council of Ministers laboratory-groups of material science, machine science, the use of vibration technology in the mining industry, the chemical processing of barite raw materials and educational psychology and so on were established in this region on the basis of various institutes belonging to the Academy of Sciences of Georgia. At the initial stage the work of the indicated subdivisions was not free of serious shortcomings. The reason is the isolation of the laboratories and groups and the lack of a united administrative leadership. In 1984, after my move to Kutaisi, the establishment on the basis of the indicated subdivisions of the Kutaisi Complex Scientific Center of the Institute of Metallurgy of the republic Academy of Sciences became possible. In essence the basis for the intensive development of academic science appeared. As a result at the center the number of scientific associates increased by two and a half fold, its material and technical base improved, contacts were established with leading scientific institutions and organizations of the country. The results of scientific output: Six monographs and hundreds of scientific articles were published, several republic and all-union conferences were organized, and 12 associates defended candidate dissertations. At present of the 60 scientific associates of the center 28 are working on candidate dissertations, while eight are working on doctoral dissertations, two of which are already ready for defense.

As we see, basic research accounts for the basic burden of the activity of the laboratory-groups of the scientific center, applied development is aimed at the solution of the problems of large works and the improvement and enhancement of the technical and economic indicators of important sectors of the national economy of the republic.

[Kiknadze] Not only specialists, who are natives of Kutaisi and at one time left the republic, but, first of all, higher educational institutions of the city are displaying the willingness to cooperate with the regional scientific center. What prospects for contacts are coming to light here?

[Adamiya] Most reassuring ones. On the basis of the laboratory of materials science of the Kutaisi Scientific Center a chair-enterprise of machines and technology of the founding and plastic working of metals was established and is operating successfully at Kutaisi Polytechnical Institute. Our center has quite powerful production and laboratory bases at Kutaisi motor vehicle and tractor plants, which are being used productively in the matter of training highly professional specialists. The regional scientific center will become an even more powerful base of higher educational institutions. Close contacts will also become useful on the level of new creative initiatives. For example, new highly efficient technologies of the obtaining of artificial marble and polymer composites, the conversion of dried fruits into extracts, the saving of fuel for diesel engines, as well as the casting and molding of metals have been developed here. Their introduction in production on a series scale is possible in case of the pooling of the creative efforts of specialists of the center and Kutaisi Polytechnical Institute. According to preliminary estimates this will provide a profit at the minimum of about 8 million rubles [R], including R1 million in foreign currency. Thus, the opportunity will appear to solve favorably the problem of not only the self-financing of our institutions, but also their supply with imported equipment, computer hardware, and others.

Cooperation with Kutaisi State University also holds out great prospects. It is envisaged to staff the laboratories of humanities fields of our scientific center mainly with its professors, instructors, and so on.

[Kiknadze] In what basic directions will the activity of the regional scientific center be developed?

[Adamiya] First, in the direction of the solution of optimization problems with allowance made for dynamics when designing heavy machines. The second is the theoretical direction, which is connected with joint thermodynamic and aerodynamic studies of continuous flow gases in narrow nonuniform passages. The practical aspects of the problem include the improvement of the KAS-4540 tandem trailer truck. It is a matter of questions of fuel economy and the improvement of ecological indicators. The third direction involves the study of the "man-machine" system. In short, the scientific directions, which have already been successfully developed here, will be continued.

Along the lines of equipment the prospects are connected with the motor vehicle works, the tractor plant, the electrical machinery plant, and the plant of industrial rubber items. In the future the center should ensure the scientific research substantiation of the operations of these works and the plants related to them.

In the field of the humanities in the research work of the scientific center it is necessary to devote special attention to the study of the basic questions of the history of Georgia. In particular, attention will be concentrated on the study of the history of cities and villages of Western Georgia. The work of the group, which exists today in Kutaisi, of the Center of Archeological Research of the Academy of Sciences of Georgia has to be intensified even more, in particular, exploration, archeological excavations of layers of various periods, the restoration and conservation of the found material, and so forth should become more effective.

Studies of aspects of psychology, including questions of general and educational psychology, particularly the problems of training and education, the establishment of the levels of mental development of school-age children, and so on, seem important for the Kutaisi region. A group for the study of the problems of economics, the main task of which will be the scientific elaboration of the prospect of the economic development of Kutaisi, also has to be established at our center. It is necessary that the problems of language and literature, particularly the study of questions of the folklore and dialectology of Western Georgia, would find development here, at the scientific center.

I personally do not doubt that several independent institutes of the Academy of Sciences of Georgia for fields of technology and the humanities will be formed on the basis of the established scientific center. These scientific subdivisions will make it possible to create the conditions for the keeping of talented young specialists in the region and the formation of young scientists.

[Kiknadze] Over many decades we have become accustomed to the fact that nearly every useful undertaking is accompanied by certain difficulties. What problems does the scientific center have, which are already hindering its work?

[Adamiya] There are a large number of problems. In the first place, this is the insufficiently powerful material and technical base. The work of the scientific center is being hindered significantly by the lack of its own computer center. It is very important to provide our scientific, administrative, and managerial personnel with the necessary space. And although a vacant, at first glance rather good building has already been turned over to the scientific center, it does not, unfortunately, meet its needs.

In the republic, undoubtedly, the revival of activity in the area of the management of scientific and technical progress is anticipated. Evidence of this is the establishment of the new Ministry of Science, Technology, and Long-Range Planning, which is important for all scientific and technical work and which, working in tandem with the Academy of Sciences, will not lay aside the solution of the problem of intensifying scientific research in those regions of the republic, where there are all the conditions so that science could be developed successfully.

Scientist Notes 'Doubtful' Future of Armenian Science

917A0055A Yerevan GOLOS ARMENII in Russian
6 Dec 90 p 3

[Interview with Corresponding Member of the Academy of Sciences of Armenia Konstantin Grigoryevich Karagezyan, director of the Institute of Experimental Biology of the Academy of Sciences of Armenia, by GOLOS ARMENII correspondent V. Chalabov under the rubric "Science and the Market"; date and place not given: "Is It Easy To Be a Scientist?"—first paragraph is GOLOS ARMENII introduction]

[Text] Everyone is talking about perestroika. However, the outlines of the imposing changes, which are anticipated by our society, are not yet visible. This particularly concerns industry, agriculture, science, and many other aspects of complicated life. Perestroika thus far has not affected academic, sectorial, and VUZ science. But many problems and tight knots, which were tied over the decades, have accumulated here. V. Chalabov, a correspondent of the newspaper GOLOS ARMENII, talks about this with Corresponding Member of the Academy of Sciences of Armenia K.G. Karagezyan, director of the Institute of Experimental Biology of the Academy of Sciences of Armenia.

[Chalabov] Konstantin Grigoryevich, how do you visualize today the development of science? What prerequisites are the most important ones?

[Karagezyan] As a scientist I will venture to note that the flourishing of the scientific potential of the republic is one of the most important prerequisites of its development. Armenia was always renowned for it at various stages of the many thousands of years of its history. And now, when the task of the maximum stimulation of the political, social, and cultural character of the republic is being posed, one cannot do without the primary stimulus of the formation of science.

The process of scientific research of all directions at a modern world level should probably become one of the priority tasks of the newly established parliament and government of Armenia and the organizers and immediate motive forces of scientific thought. The realization of the noted aspirations is possible only in case of the immediate establishment of a base for the materialization of high-level scientific research. The time has come to put an end to the demagogic slogans about advanced Soviet science. How is it possible to be in the front lines of scientific progress given the distressing social level of our scientific personnel? I recently had occasion to be in Hungary as a participant in a prestigious international congress. I was ashamed to name in private conversations with Hungarian and other foreign colleagues the figure 550—that is, the amount of the wage received by the director of an academic scientific research institute. In Hungarian forints this comes to approximately 10,000 forints, that is, about one-fourth as much as a professor in this country receives. And what is one to say with

respect to the enormous army of scientific associates, beginning with junior scientific associates and ending with heads of laboratories, the amount of whose wage ranges from 140 to 400 rubles?

With such money it is almost a utopia to dream about good scientific work, especially on the eve of the transition to a free market economy. After all, science will be faced with rapidly developing curtailment and the migration of minds abroad, as well as to various cooperatives and firms and to any other nonspecialized, but well-subsidizing organizations. The ripening uncertainty about tomorrow among scientific associates has become a real danger. For the resolute prevention of such a situation it seems exceptionally important to me in the most limited time to take resolute steps on the emancipation of science, its most complete decentralization, the strengthening of the scientific and technical base of research centers, institutes, and laboratories, and the rigorous introduction of a grant (competitive) system of the formulation of themes with respect to the most urgent research at the level of specialized councils (for example, an interdepartmental council for physical chemical biology and biotechnology, which operates under the presidium of the Academy of Sciences of Armenia and the republic Council of Ministers).

The right to form scientific collectives (laboratories, departments) of like-minded people should be assigned utterly and completely to the leaders of these scientific subdivisions. All the responsibility for fulfillment and the bringing of the end result up to implementation should be placed on the scientific supervisor of the program. Thus, a recognized collective of performers, which will bear responsibility to itself both on the level of the efficient fulfillment of its obligations, which it is customary to call labor discipline, and in the sense of their high-quality and timely completion, is created. Here the need for the time board checking of the appearance at and departure from work and the use of a number of other Cerebean methods, which belittle the dignity of a creative worker, will be lost.

The account of the results on the fulfillment of grant themes should be discussed at an exceptionally competent level, that is, at the level of the above-noted councils, which operate in the case of academic institutions at the level of the presidium of the Academy of Sciences and in the case of nonacademic institutions under the appropriate departments. Precisely these councils are also called upon to evaluate the theoretical and applied importance of the performed research and, on the other hand, to determine the advisability of the further conducting of research and the degree of its financing. The final decision of the councils is submitted to the republic Council of Ministers with the object of financial support in both domestic and foreign currency. However, if the question of the maximum stimulation of basic research

is touched upon, the problem of the quickest introduction of the results of the work in applied sectors of the national economy is also a logical development of such a statement of the question.

[Chalabov] What is the situation with the introduction of the achievements of scientific research in various sectors of the national economy? What is interfering with the timely "sale" of scientific results?

[Karagezyan] In this section of our activity we are constantly confronted with artificially created obstacles in the matter of the recognition of their value and admissibility to mass production or testing. In the last variant the question concerns numerous proposals which come from scientific research institutions of Armenia in the area of the use of the developments of Armenian scientists (of course, in an outlying area), for example, with respect to some drugs or others in a clinic. Such attempts receive a successful resolution at best five-seven years after the receipt of the "go-ahead" from the pharmacology committee of the USSR Ministry of Health. One would like to know why such centralization of questions at the level of Moscow is needed, when the problems can be solved in our republic with the establishment here of our own pharmacology committee or pharmacology commission? Having received in a significantly short time a response to a proposed research effort, even one that proceeds within the Republic of Armenia, we can, by bypassing bureaucratic authorities, go independently to various interested foreign firms and commercial organizations. Thereby we can promote the introduction in the shortest time of our theoretical developments in the corresponding applied sectors. It is also necessary to settle in a similar manner the question of the establishment in our republic of a committee for inventions and discoveries, as well as a higher certification commission attached to the Council of Ministers of the Republic of Armenia. What was noted above in combination with steps on the increase of the skills of scientific collectives will be a substantial stimulus for free contact with interested domestic and foreign institutions. This in the end will serve the effective "sale" of scientific results and the support of one of the stages of self-financing.

[Chalabov] What can you say with regard to the question of the organization of science? Who should work in science?

[Karagezyan] We often have to agree with the reproach with respect to the tenure in science of people who are far from it. Indeed, the existing system of the organization of labor discipline in many respects promotes the appearance at times of ugly distortions of this fundamentally important factor. However, the arrival of the ministers of science at a truly creative creation should be accomplished by the use of the measures listed above,

which, on the one hand, will lead to the complete unfettering of scientific associates and, thus, to the abolition, as was noted above, of coercive methods of forced labor and, on the other, will create the real prerequisites for the "natural" selection of them according to the principles of inclination and lofty personal qualities and merits, which are necessary for people who devote themselves to science. Otherwise the elimination of people, who do not meet these demands on scientific associates, will occur, and then they may prove to be far more useful in other spheres of labor activity. The most complete equality of the directors of scientific institutions and the people, who deal with questions of the scientific organizational type in their subdivisions, is necessary for the real materialization of these aspirations. But they are also called upon to bear the most complete responsibility for the increase of the scientific potential of the institution and the removal from it of casual people with the giving to them of the most complete immunity from the interference of various public organizations (party, Komsomol, and trade union organs), which supposedly guard the interests of the workers. This is understandable, but one must not stand up for the personal interests of associates who are qualified as ballast for the given scientific institution. On the contrary, given the full observation of the norms of objectivity, benevolence, and morality, without any intrigues, which offend human dignity, it is necessary by joint efforts to make these people aware of their incompatibility with the specialty chosen by them, of their vegetating position in society, and of the need to find their own place in it. Another urgent measure, which is called upon to advance scientific and technical progress, which should be the cornerstone of the question being discussed at the level of government authorities, as well as the departments that are responsible for the implementation of scientific organizational measures on the quickest increase of the scientific research potential, is the strengthening of the technical base of research institutes by the acquisition of imported equipment abroad. For this it is necessary to seek potential sources of foreign currency, which, of course, is a quite complex, but, apparently, surmountable problem. For one must not use foreign exchange difficulties as an excuse, as was done several years ago by the leadership of the USSR Academy of Sciences with appeals to switch to domestic equipment. One should think about the versions and means of acquiring and earning foreign exchange assets, which, in our opinion, is a task of foremost importance. The situation with the remuneration of the labor of scientific personnel, which was mentioned above, is also no less catastrophic. It seems to us that on the threshold of the impending trouble owing to the most complete devaluation of the Soviet ruble and the inexorable functioning of the canons of a free market economy, it is necessary all at once to quadruple or, at any rate, to triple the wage paid to scientific personnel. To guarantee their labor and everyday life.

Bureaucracy Blamed for Soviet Failure To Win Nobel Prizes

917A0075A Moscow IZVESTIYA (Union edition)
in Russian 4 Jan 91 p 3

[Article by Candidate of Geological Mineralogical Sciences Abram Moiseyevich Blokh: "And Again Among the Nobel Prize Laureates There Are No Soviet Scientists. Why?"]

[Text] [Boxed item: Abram Moiseyevich Blokh, 63, is a candidate of geological mineralogical sciences and the author of many scientific monographs. For six years he worked in geological prospecting expeditions and since 1957 has worked in science. He spoke on the raised problem on the Central Television program "The Obvious—the Incredible."]

The last time the king shook the hand of a Soviet scientist was in 1978: This was P.L. Kapitsa. The first time was in 1956, when N.N. Semenov became a winner. In all during this interval of time Soviet science, "the most advanced in the world," as they tried just recently to convince us, received six Nobel Prizes. Four in physics, one each in chemistry and economics, and not one in medicine. Both Russian laureates of the prize in medicine, I.P. Pavlov and I.I. Mechnikov, became its holders long before October.

To the six Nobel Prizes of scientists of the Soviet Union during the same period there are 119 prizes, which scientists from universities and firms of the United States received or shared with foreign colleagues. Since 1952 there has not been a year when an American scientist did not become a Nobel Prize laureate if only in one of its divisions.

The lag of the USSR behind other advanced countries is also large. Although in the number of academicians "we are ahead of the entire planet."

If you group with countrymen everyone who was born within the borders of Russia or the Soviet Union, it is necessary to increase the number of "our" prizes in science by seven—more than twofold.

Does anyone in Priluki in the Ukraine know about their fellow countryman, Selman Waksman, the developer of streptomycin, the first antituberculosis antibiotic, which saved from premature death millions of people, including, it must be assumed, in his home town?

A prominent scientist of the present, Belgian citizen Ilya Prigogine, who in 1977 became a Nobel Prize laureate for his fundamental contribution to the thermodynamics of nonequilibrium processes, was born in Moscow in the family of a chemical engineer, a graduate of the Moscow Higher Technical School. In 1922, as the scientist mentioned tactfully in his autobiography, the family left the homeland, "not having adjusted to the change of regime." The yearbook of the Nobel Foundation with the materials devoted to Prigogine did not get away with this

phrase. Only a year ago at our libraries did they release it from custody in the special depository.

Kharkov native Samuil [Simon] Kuznets and St. Petersburg native Wassily Leontief, future Nobel Prize laureates in economics, emigrated as adults.

The fate of Roald Hoffman, the 1981 Nobel Prize laureate in chemistry, is dramatic. He was born in 1937 in the western Ukrainian town of Zlochev, which at that time was on the territory of Poland. After the war his parents considered it best to move to the United States.

There is an even larger number of Nobel Prize laureates among the children of emigrants from Russia, who were born in their new homeland. There are 12 of them. Among them is French citizen Andre Lwoff, son of a political emigrant and grandnephew of prominent Russian artist V.A. Serov; his future mother is in "Girl Illuminated by the Sun," a famous picture from the Tretyakov Museum. American Sheldon Glashow, who was awarded with colleagues the Nobel Prize in physics for an epoch-making step toward the development of a unified field theory, the unfulfilled dream of the great Einstein, is the son of natives of Bobruysk. The parents of Herbert Brown, on his father's side a Brovarnik and winner of the prize in chemistry, emigrated to England from Zhitomir....

Why do Nobel Prizes so dislike us? We will not touch upon the humiliatingly poor supply of Soviet science with advanced equipment, especially as at leading scientific institutions it was at times at an entirely tolerable level, and, moreover, much in large-scale science is decided first of all "on the tip of the pen," by the play of the independent trained mind. We will also divert our attention from the consequences of many years of isolation of Soviet scientists from the world community, although, in particular, the sad fact of the loss of the highest scientific award by domestic scientists G.S. Landsberg and L.I. Mandelshtam, who discovered the effect of the combinational scattering of a light beam in a crystal earlier than Indian physicist C. Raman, who received the Nobel Prize in 1930 for it, is connected precisely with them.

It is necessary to regard as the main reason the traditional lack of freedom of Soviet science and the suffocating dictation of the bureaucracy. Only in our country should a scientist, when advancing a scientific problem, which is close to his inner inclinations, fill out in the program of work the column "Anticipated Results," which is absurd for common sense. Absurd because, while meeting the needs of official thinking, it absolutely does not take into account the specifics of scientific creativity and the unpredictability of its final product. As a result the scientist is forced to adapt himself to "plans" that are drawn up somewhere, while stifling that to which he is drawn.

The postwar history of Germany made it possible to organize a pure experiment in the area of the effectiveness of freedom and the lack of freedom in scientific

creativity. The FRG, taking advantage in its research of the broad scope of scientific choice, received 17 Nobel Prizes, while the GDR, where in the management of science, as in much else, our command methods were copied, did not receive any. What is effective for large-scale sports, in which the GDR scored impressive successes, is not suitable for large-scale science.

The second reason is the system of the certification of scientific personnel, which exists in our country. Its foundation was laid in the 1930's with the best intentions. But, as is known, the road to hell is paved with precisely these intentions, particularly in a totalitarian society. The priority of scientific councils in the reinforcement of the ranks of the scientific elite of the country was gradually usurped by an exclusively bureaucratic superstructure—the Higher Certification Commission—up to their complete capitulation under the 1974 Brezhnev reform, after which the activity of the control organs of the Higher Certification Commission—the expert councils—for a long time was evaluated by the number of rejected dissertations, like the activity of the militia was evaluated by the number of uncovered crimes.

By forming the expert councils out of prominent specialists of today, that is, out of the bearers of available knowledge and firmly established scientific notions, the Higher Certification Commission is objectively erecting a barrier not only to hack work, but also to fundamentally fresh views. Moreover, for the latter the "obstacles" of the Higher Certification Commission are most unassailable—who of the strong of the world feels like causing himself much harm, like agreeing with his own error in knowledge....

Let us recall that, in the words of P. Langevin, for a long time only 12 people in the world understood the theory of relativity, then it will have to be stated sadly that this outstanding achievement of thought would not have any chance to give its creator an academic degree and to set out on a wide scientific path.

Science is the flesh and blood of society, in a sick society there cannot be healthy science. For decades it experienced the oppressive patronage of ignorant ideologists and vigilant members of the professional cadre. The thin layer of dynamic intellectuals, who constituted the world fame of domestic science, was destroyed, defamed, intimidated, and cast out abroad. Not only by the satraps of the inhuman regime, but also by the zeal of its intellectualized lackeys. In the breeding ground of scientific institutions opportunists and careerists felt more and more free, the dictation of mediocrities acquired more and more often the traits of completeness. At the main headquarters of science the share of functionaries increased with every year. At times not one independently working scientist was seen among the newly elected members of the Academy of Sciences. The academic badge turned into indispensable accessory of the lapel of the director's jacket or the uniform of a high-ranking official.

The same figures continue to run the show on Olympus. Academic institutes in the area of conservatism could

compete on equal terms with army institutes. The fateful changes taking place in the country have practically not affected the highest echelons of the management of science.

Thus far nothing has also changed in certification policy, if you do not count the minor puttying of the decayed facade and the regularly repeated promises of radical democratic reforms. The maxim "first defend your dissertation, then prove what is yours" continues to remain in force. Accordingly society continues to stimulate the squandering by a talented person of the young years, which are most fruitful for scientific creativity, on individual trivialities. While he wastes years on banal dissertations about the Volga that flows into the Caspian Sea, for which our good for nothing certification system, which mass produces mediocrity, is first of all intended, the cordoned off person of his own age is erecting the building of his own future Nobel triumph.

The difficult times of perestroika lie ahead of Soviet science. What we have destroyed without a moment's hesitation, in a single hour, we will have to take decades to restore. First of all the potential of scientific intellectualism, without which there is nothing to do in the community of world science. The Nobel Prizes in science will take a liking to us in the same way that they like and will like many times more the descendants of Russians, who were disconnected by cruel fate from the paternal hearth, only when we become an integral part of this community. Our people ought not borrow genius....

Central Asian, Kazakh Officials Protest Underground Nuclear Tests

917A0076A Moscow POISK in Russian No 50 (85),
14-20 Dec 90 p 8

[Article by POISK correspondent Svetlana Krymova under the rubric "Details for POISK" (Alma-Ata): "The Specter of the Nuclear Testing Ground Again Roams the Land of Kazakhstan"]

[Text] A rumor about the redeployment to Turkmenia of the Semipalatinsk Nuclear Testing Ground instantaneously spread through the republic this summer, forcing its inhabitants to be quite worried. It was asserted that the testing ground would be located in an uninhabited region northeast of Kushka and that the redeployment of military equipment had already begun.

L. Guliyev, deputy chief of staff of Civil Defense of the Turkmen SSR, had to refute such information through the mass media. Here he was certain: "Events of this sort could not but be coordinated with our service."

Yu. Mogilevets, deputy chairman of the republic Council of Ministers, also did not have doubts in this regard. He stated with all responsibility that the question of the location in Turkmenistan of the nuclear testing ground had not been considered and added:

"But even it is were to arise, one would not get by, I am certain, without its extensive discussion with the population."

The inhabitants of Turkmenia at that time seemed to calm down. However, the specter of the Semipalatinsk Testing Ground appeared once again, this time in Uzbekistan. The rumor went around that the military intended to transfer it to the region of Uchkuduk. The people did not believe the local authorities, who were trying to refute this information. Meanwhile the rumors spread. In order to dispel the doubts, Colonel General I. Furzhenko, commander of troops of the Turkestan Military District, in November had to give an official response, with the enlistment of "heavy artillery." "The rumors with regard to the transfer of the Semipalatinsk Nuclear Testing Range to the Kyzylkum Desert were checked out at the General Staff of the USSR Armed Forces," he reported. "There is no confirmation of them. The question of a transfer was not raised and is not being raised." Further the commander stressed the necessity of "putting a stop to the unhealthy rumors, which create uncertainty as to the future and are aimed at the aggravation of relations between the army and the people."

How do we usually treat rumors of this sort? Some people believe them, some do not, some people relate them to acquaintances, some "make a mental note" of them. And everyone waits for "official word." The mass media have even introduced special rubrics—"According to Rumors and in Essence"—in which they allow officials and specialists speak. But their "aim" is most often the following: It is necessary to refute or at least to neutralize the rumors in order to calm the people. But the events of recent days in Kazakhstan, I believe, will force many people to adopt a different approach to the analysis of the rumors and to treat more critically the reports of officials, however high-ranking they are, which are lulling people into a false sense of security.

Confirmations?...

On the first day of December from a report of the AZIYA-PRESS Agency Kazakhs learned that 20 years ago the establishment of another nuclear testing ground had been planned on the Ustyurt Plateau on Mangyshlak Peninsula, 230 km northeast of the city of Shevchenko. Under the conditions of heightened secrecy specialists drilled holes, delivered nuclear charges there, and prepared the explosions. And although the testing ground itself did not come into being for various reasons, all the same during 1969-1970 **three experimental underground explosions** were conducted here. In its day there were, of course, no reports about this. But it is possible not to have doubt—there were rumors (incidentally, as there probably were their refuters). Only two decades later is it turning out that they had a real basis. There is now working in Yeraliyevskiy Rayon a commission of the Mangistau Oblast Soviet Executive Committee, which

should determine the level of radiation in these places and ascertain what the consequences of the tests on Mangyshlak Peninsula are.

Kazakhs had not had time to come to their senses from this report, when there was more "news." The report of Deputy Nigmat Zhotabayev at the second session of the republic Supreme Soviet concerning the fact that the Semipalatinsk Testing Ground would begin to operate once again at full capacity produced the effect of an exploded bomb. Let us recall: The testing ground has been silent for more than a year now. On behalf of a group of deputies Zhotabayev made an inquiry to the government of the Kazakh SSR. It was stated in it:

"According to unofficial information, USSR President Comrade M.S. Gorbachev signed a decision of the USSR Defense Council on the continuation of nuclear tests at the Semipalatinsk Nuclear Testing Ground until 1 January 1993....

"If this is actually so, the action of the President of the country conflicts with the sovereignty of the Kazakh SSR and violates the will and interests of the peoples of Kazakhstan."

This report caused a hail of questions and a storm of emotions. They demanded that the deputy name the source of the information. He refused, saying only that he absolutely trusts it.

I called the headquarters of the Nevada-Semipalatinsk movement. If no one else, its staff members would know first of all about this "unofficial official" information. But there, too, they did not know. Bakhytzhon Adilov, an adviser—it turns out that there is such a position in the movement—told me that the data that interest me are not available at the headquarters, that it is necessary to wait for official word, and added in a stern voice that it would be better for me not to use unverified data. Hanging up the telephone, I felt like "a spreader of rumors."

Oh, how the parliament of the Kazakh SSR, Deputy Zhotabayev, and I personally would like the information not to be confirmed! But the official response, which was received by the secretariat of the session and was signed by E. Gukasov, first deputy chairman of the republic Council of Ministers, sounded like a bolt from the blue. It was stated in it:

"During the discussion in Moscow of the draft of the decree of the USSR Council of Ministers 'On Measures Connected With the Conducting of Underground Nuclear Tests'... Comrade V.A. Bukatov, deputy chairman of the state commission of the USSR Council of Ministers for military-industrial affairs, read the decision of the Defense Council attached to the USSR President on the halting of tests at the Semipalatinsk Testing Ground as of January 1993. Moreover, during 1991-1992 it is envisaged to carry out in all 18 underground explosions with an energy yield of 20 to 30 kilotons."

Moreover, in the response it was noted that the official documents on this question are not available in the republic Council of Ministers.

Here, granny, is a fine how do you do! It turns out that the public fought in vain, it exerted in vain titanic efforts to shut the Semipalatinsk Testing Ground. The Defense Council opened it again! And, as if nothing happened, it is once again planning explosions there. So that only rumors about the redeployment of the testing ground circulated. It is itself remaining in the same place—as they say, it has “stuck” to the Kazakh land for two more long years. While later God knows what will happen. Perhaps they will once more make a decision.... And you will not have an “extensive discussion with the population,” you will not have embarrassment with regard to the “uncertainty as to the future” of the people, who live side by side with the nuclear monster, nor uneasiness over “the aggravation of relations between the army and the people.” The specter of the testing ground again threatens to become a reality for the inhabitants of the long-suffering region. Incidentally, just as all the other seven (!) Kazakh testing grounds, at which the military-industrial complex is testing various types of weapons of mass destruction. More than **18 million hectares** of land have been alienated for them by the military department in Kazakhstan.

I do not know how the deputies of the republic Supreme Soviet will swallow this “pill,” if their desperate, protesting decree on this question is not taken into account. It is hard to say how actively the USSR Supreme Soviet, which just recently got hold of another “pill”—the new land pill—will react to the complete disregard of public opinion on the part of the military. I do know one thing: Even specialists, before refuting rumors, must once more recall the precept: “People, be on your guard!”

Osipyan, Frolov Comment on USSR Academy of Sciences Elections

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[Interview with Vice Presidents of the USSR Academy of Sciences Academicians Vladimir Kudryavtsev, Yuriy Osipyan, and Konstantin Frolov by POISK correspondent Yelizaveta Ponarina under the rubric “The View From the Hall”; date and place not given: “With Reinforcement!”—first paragraph is POISK introduction]

[Text] The election to the USSR Academy of Sciences is over. Our correspondent, Yelizaveta Ponarina, addressed to three vice presidents of the USSR Academy of Sciences the request to comment on this event and to tell how this election differed from previous ones....

Academician Vladimir Kudryavtsev

More exacting demands than usual on the scientific and human merits of the candidates were the difference. But both regularities and chance occurrences appeared in the election results. For example, Corresponding Member

Aleksandr Spirkin was not approved as an academician. They reproached him with views on parapsychology and extrasensory perception, which are far from science. But then at the assembly they did not say a word against Corresponding Member Gennadiy Yagodin, but they rejected him. In my opinion, owing to the position he holds.

Or the defeat of four economists.... The dissatisfaction with the state of affairs in the country was carried over to the scientists, although none of them has anything to do with the food crisis. Many claims were also expressed against social scientists. Here I would infer the unsatisfactory state of affairs in science....

As a whole, in my opinion, the system of the reinforcement of the Academy of Sciences is sufficiently objective. It is necessary to improve it first of all starting with the preliminary procedure of selecting candidates. It is necessary to begin the discussion not one and a half months in advance, but half a year in advance. It would not hurt to hold a general assembly, for example, on the state of the work of economists and on questions of philosophy, so that the mutual understanding among scientists of different types would be greater and so that people would know each other better.

Academician Yuriy Osipyan

I believe that the election this time was absolutely free and independent of power structures. No one from party organs was even present. Vitaliy Ginzburg pointed out this freedom in his statement. And here Academician Kirill Kondratyev stood up and declared that for him the elections had always been free. Who is right? Very likely, Kondratyev. There was no pressure on everyone individually, but there was the reservation of vacancies for executives of scientific and technical organizations. Moreover, if they did not elect the corresponding chief engineering to this vacancy, the seat vanished. Special vacancies for the presidents of the academies of sciences of the union republics had also been used in practice. Now there was no longer such a thing. I believe that precisely for this reason there were lots of candidates for the specialty “Mechanics.” The absence of a quota for the military-industrial complex increased the competition here.

Academician Konstantin Frolov

In my opinion, the strongest people won. Although there were critical moments. For example, there were many claims against economists. The representatives of the natural sciences in this respect, in my opinion, correctly observed that economics cannot be isolated. It is necessary to conduct joint research with ecologists, natural scientists, and people working in the field of the technical sciences, in order to evaluate more precisely the essence of proposals and their both economic and technical-economic prospect. And all the same the election was exceptionally democratic, with the discussion of the

candidates at the level of scientific councils with the enlistment of the scientific community at large.

With regard to the state of affairs in the Problems of Machine Building Department. The basic strategy is the development of scientific centers in outlying regions. Large scientific centers and affiliates of the Institute of Machine Science are being established. In particular, during the election a vacancy was allotted for the Saratov Scientific Center. However, none of the people from Saratov was able to stand up to the competition, and Prof. A. Gusenkov, who, understanding the problems of the department, then and there submitted an application with the request to be transferred to Saratov, become a corresponding member.

And another thing. It is sad that the syndrome of Chernobyl fear appeared at the level of the Academy—they did not elect as members of the Academy people connected with atomic power engineering. But the disaster that occurred does not mean that we no longer need nuclear plants. The Academy of Sciences should free itself of such everyday emotional conservatism in thinking and acts and should learn to think independently, that is, responsibly.

Economist Lakhtin on Market Economy, Scientific Growth

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Second Edition p 3

[Article by G. Lakhtin, doctor of economic sciences: "Is the Shore Visible? Science Under Market Conditions"]

[Text] In the disputes unfolding on the prospects of a market economy, the future of sciences holds an overly small place; it does not figure at all in the programs being discussed by the parliaments. Yet, after all, only recently it was verified at all levels that science and the technical progress generated by it are the main engines of economic and social development, our greatest hope. What will happen to it? To what extent will destatification affect it? Having pushed away from state shores, where will it go: to cooperative, joint-stock, private, or maybe some other shore? If the market is regulated, will the state regulation (to a certain extent) of scientific and technical activity still be preserved?

Right now, in a period of growing difficulties, conversion to a market seems like a panacea to many: "Start a market here, and let the market settle our disputes." In this regard, we forget that the new economic system will not be built on an empty site, that the gigantic existing system, whose inertia is tremendous, must squeeze into this system. Many forces and inevitable losses are required to overcome it. Science is no exception: Its situation will change with respect to changes in society on the whole.

A mass destatification will occur in the first stage. Overthrowing the activity of the central departments and sectorial ministries will mean not only a loss of vertical ties, but also the disappearance of most horizontal ties, because these

were also arranged according to planned, administrative procedures. Hence a great economic freedom, bordering on economic permissiveness, which will contribute to barter, to interest in some partners, and to indifference toward others. As a consequence of numerous errors, a reduction in production volumes will appear, intensifying the shortages. Under these conditions, any producer of goods will feel like a monopolist, having the opportunity to dictate prices. No matter how progressive he may be at heart, economic necessity forces him to make a profit through the shameless inflation of prices, and on the other hand, to reject technical innovation as a less profitable allocation of capital.

These tendencies to the greatest degree affect highly science-intensive sectors, where output is created through the very complex cooperation of participants: if one intermediary breaks down, the whole chain idles in place. The electronics industry is in a somewhat more difficult position than, for instance, breweries.

All this does not greatly affect academic science, financed out of the state budget, but hard times will begin for sectorial science. The greater the need for material production, the less that for science. If there is a demand for technical innovation, it will be predominantly for petty development work contributing to the survival of enterprises. Financing from centralized ministerial funds will disappear. The loss of their state master will force scientific research organizations and their collectives to find themselves a new one.

A number of variants are possible here. Cooperative forms of scientific and technical activity will develop. Narrowly specialized collectives, forming for one large development project, will acquire independent status. A big, multi-profile institute may simply collapse, and several small companies, developing and producing new experimental production, may spring up from its wreckage. Or an institute might be preserved, but will be transferred into the collective's hands on lease principles. The conversion of institutes into a structure of companies, united into a scientific and technical center, is likely in highly science-intensive sectors. In less science-intensive sectors, independent institutes are possible, existing on the permanent dues from the enterprises which it serves (as though "going shares"). However, all this assumes sufficient orders.

At the initial stage there will hardly be such a sufficiency. The reduced need for research results will entail a loss of scientific potential, primarily cadres. A market will appear for scientific labor, filled with the associates of collapsed institutes or those who simply have not found uses for themselves in the remaining institutes. Apparently, the lack of attention to science in the programs for converting to a market can be explained as the start of this stage.

After a certain time, we will begin to overcome the slump. In the second stage, a sharp need to eliminate shortages will lead to the development of production in breadth and, consequently, to the establishment of horizontal ties. The monopoly of the producer will weaken and his opportunities to dictate prices will decrease. The participation of foreign capital will intensify, and will be linked to a access to foreign markets, which will force us to pull ourselves up to world standards. This in turn will start requiring the renovation of equipment and technology. However, saturation of demand will still be the closest goal. Increased profit will be achieved not so much by raising prices, as by expanding production, by increasing the mass of output and thus income as well.

At this stage, the needs for applied, industrial science (now no longer called sectorial) will grow. The demand will increase for developments which expand production capabilities, but even more—for work making it possible to pull technology and production up to world standards. Work to transfer Western technology to our country will take on important significance. This will entail a growth in the commodity producers' demand for "their own" science. Scientific research subdivisions and centers within the structure of companies, production associations, and so forth will be developed predominantly. Self-managing commodity producers will need not only support (as in the first stage), but also the transformation of production.

Finally, we assume, a third stage will begin in which quantitative growth will start yielding to qualitative development. Saturation of the domestic market will also signify the appearance of competition, forcing the search for and application of innovations. The first task will be to achieve competitiveness. The dictat of the consumer will take the upper hand. Scientific and technical development will become a source of profit growth: a ruble invested in the renovation of production will give a greater income, than the same ruble invested in expansion on the former technical base.

Only then will scientific and technical progress become a basic factor in social and economic development. Applied science will take heart. Instead of petty development work of an evolutionary nature, big programs leading to the creation of new generations of equipment will move to the forefront. Scientific potential will be restored and reinforced. Science itself will be transformed. The demand for its production and the more abundant financing will give impetus to the development of new organizational forms. Free scientific research organizations will appear, created according to a programmatic, and not sectorial principle. The first technopolises will spring up.

This is no prediction, drafted according to some scientific methodology, but simply a logical scheme dictated by ordinary concepts: "It could hardly be otherwise." However, one thing is certain: A difficult path awaits science in our country. In the coming years its main task will be to survive, to preserve its cadres, anticipatory work, and continuity. Only the state has the strength to fulfill this task. It is called

on to express not only the mercenary interests of individual groups or strata of society (ready to put science to the ax), but the interests of society on the whole, and not just immediate, but long-term. This does not mean feeding all who were left without work without a return. Evidently, a strict selection must occur. However, everything that might benefit society in the future should be kept. The state will be forced fully or partially to finance promising development work, as well as to offer material support to collectives and scientists who are in a difficult position. The creation of anticipatory scientific work should continue.

Here it is appropriate to recall how the young Soviet state, in the extremely severe years of the civil war, took steps to preserve scientific forces and not only supported scientists with academic rations, but also developed science: several dozen scientific research institutes were created.

Furthermore, in the second stage, besides supporting the developer, it will be necessary to interest the commodity producer in technical progress. Once again, only the state is capable of this (to which foreign experience attests) through the use of economic levers: tax privileges and penalties.

In the final stage the state's participation in managing scientific and technical development will, apparently, be preserved, but the stresses will be shifted. Science will gradually strengthen. There will be less need for the support of individual links. The state will regulate the overall mechanism for implementing scientific and technical progress, singling out especially priority directions, as well as contribute to the generation and mastery of new ideas which may contradict today's concepts, but promise revolutionary changes in the future.

With the contemporary scale and branching of economic ties, partial improvements in production are intertwined into a general network. The progress of automobile building depends on the appearance of improved components, from polymers and alloys to electronic devices. However, of course, the automobile industry will not start financing the progress of metallurgy. The overall dependence on separate achievements makes regulation on the part of the state inevitable.

Hence, it follows that the destatification of science cannot occur to the same extent and in the same forms as in material production. The essence of destatification is seen as the independence of scientific organizations with regard to the content of their activity, as freedom in choosing the directions of their efforts. The other side, providing science with everything necessary for successful activity, to a significant extent remains the concern of the state.

This includes more than financing. The training of scientific cadres is a state-wide task, if only because far from everyone is cut out to be a scientist, yet talented

people are our most important nationwide property. Moreover, realizing their own value, they are inclined to seek out better places to live and work. The "brain drain" to wealthy countries is acquiring the nature of a general calamity, and coordinated measures at the state level are necessary in order to prevent or even reduce it.

Another state-wide function is to create and develop a unified scientific and technical information system, unified due to the very nature of an information "commodity," which should be open to everyone and should find its consumer via this system. This involves a state-wide patent policy, called on to protect and support the achievements of creative thought, as well as simultaneously to attract the latest technical achievements from abroad into the country. At the same time, the state should be concerned about restricting the export abroad of domestic inventions which might, due to their more rapid assimilation "over there," increase the competitiveness gap for our goods.

Finally, there is also the function of informing the authorities and society about the state of science in the country, about how it looks against the world background. The legislator wants to know what he is voting for when approving the budget; the taxpayer has the right to know how the money taken from him is spent. For this, we need not the emotional speeches of individual scientists, but objective statistics and an impartial analysis of the situation with resource support for science, with its results, with the use of its achievements, etc. Who can do this, if not a state agency in charge of science and technology?

Thus, we should not hope that science, cast into the waves of market elements, will start swimming happily over to where it is needed. On the contrary, during conversion to a market economy the role of the state in managing science grows significantly: It must preserve our scientific forces and create conditions such that scientific and technical progress really will become the leader of social development.