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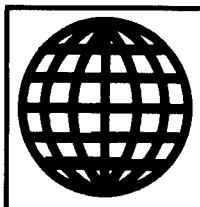

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JPRS Report

Science & Technology

USSR: Science & Technology Policy

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JPRS-UST-90-011 *15 October 1990*

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Decree, Commentary on Status of USSR Academy of Sciences

Gorbachev Decree

907A0336A Moscow SOVETSKAYA ROSSIYA in Russian 25 Aug 90 1st edition p 2

[Ukase of President of the Union of Soviet Socialist Republics M. Gorbachev of 23 August 1990 "On the Status of the USSR Academy of Sciences";]

[Text] The USSR Academy of Sciences is the largest scientific institution of the country. The best scientific forces, world-famous scientists, and talented young people are concentrated at its institutes and laboratories. By its work it determines the level of basic research in the country and is making a worthy contribution to the development of world science.

The profound changes occurring in the country require the creation of the conditions for free and fruitful scientific creativity and the extensive and unimpeded use of scientific knowledge in the spheres of engineering and technology, education and culture and in all areas of the creative activity of people. These tasks should be accomplished on the basis of the gradual democratization and decentralization of the system of management, the elimination of the state ownership of property, and the granting to institutes and laboratories of the USSR Academy of Sciences of extensive rights in the organization of their activity. At the same time, as world experience shows, the scale and effectiveness of basic research in many respects are governed by reliable and increasing material and financial support on the part of the state and by the implementation of steps that are conducive to the increase in society of the prestige of members of the academy and all scientists.

For the purposes of the creation of favorable conditions for the further development of basic science and the preservation and strengthening of the intellectual potential of Soviet society I resolve:

1. To establish that the USSR Academy of Sciences is an all-union self-managed organization. It operates on the basis of USSR laws and the charter of the academy without any intervention of state and other structures, independently ensuring the efficient work of institutes, laboratories, and other subdivisions in the area of basic scientific research and the training of scientific personnel.

2. To transfer the fixed capital and other state property, which at present is at the use of institutes, laboratories, enterprises, and organizations of the USSR Academy of Sciences, to its exclusive ownership, having specified the status of the latter in conformity with Articles 10 and 17 of the USSR Law "On Property in the USSR."

3. To retain henceforth the special-purpose state financing of basic scientific research of the USSR Academy of Sciences from the all-union state budget, bearing in mind that the results of this research are turned over free of charge by the USSR Academy of Sciences to the state, with the observance of copyright and invention law norms.

4. To establish that the USSR Academy of Sciences and its organizations and institutions should cooperate closely on a contractual basis with the academies of sciences of the union republic, striving by joint efforts for the increase of the overall level of basic research in the country.

To regard as one of the basic tasks of the USSR Academy of Sciences the organization of broad international ties by the establishment of joint scientific organizations and centers, the exchange of scientists, and the use of other forms of modern international scientific cooperation.

5. The USSR Council of Ministers is to adopt within a month a decree which ensures the implementation of this Ukase; in the decree to stipulate:

the list and the procedure and dates of the transfer of the state property, which is at the use of the USSR Academy of Sciences, to its exclusive ownership;

the procedure and dates of the formation of the all-union state-budget fund of basic research and the approval of the statute on it;

the increase of the state-budget allocations for the improvement of the material supply of scientific personnel of the system of the USSR Academy of Sciences, including the revision of the prevailing salaries and rates;

the granting to the USSR Academy of Sciences and its organizations of the right to form from their own assets special funds for the settlement of social questions;

the introduction at the USSR Academy of Sciences of the contract system of the offering of a job to associates, including scientists from abroad, with the granting of the right to establish independently the rates of the remuneration of labor for people, who work under contracts, as well as the sending of scientists of the USSR Academy of Sciences on a contractual basis to international scientific centers and foreign scientific organizations and laboratories.

[Signed] President of the Union of Soviet Socialist Republics M. Gorbachev

Moscow, the Kremlin. 23 August 1990

Need for Decree Explained

907A0336B Moscow IZVESTIYA in Russian 26 Aug 90 Morning edition p 1

[Article by K. Smirnov under the rubric "On the Themes of the Day": "The President Has Issued an Ukase. What Is Next?"]

[Text] The Ukase of USSR President M.S. Gorbachev "On the Status of the USSR Academy of Sciences" touches upon the painful points of science and its interrelations with society.

Why was it suddenly necessary to separate the academy from state structures? After all, back immediately after the revolution V.I. Lenin came out in favor of its independence and spoke out sharply against the attempts to transform the academy into "an association of proletarian scientists," which is obedient to the state. Precisely he supported the many years of work of the Academy of Sciences on the study of the resources and productive forces of Russia, which was undertaken on the initiative of V.I. Vernadskiy (on the reports on this work the supreme rulers of the empire placed resolutions like: "Who needs this?"). In response—a little known fact—not individual scientists or institutes, but the general assembly of the Academy of Sciences in the spring of 1918 voted in favor of cooperation with Soviet power.

This happened. But another thing also happened: the complete rejection of Lenin's approach to the interrelations of science and the state during the decades of Stalin's regime and in subsequent years. It is frightening to read the academic resolutions in support of the terror, with the curses meant for scientists, of whom mankind today is proud.

Incidentally, is it necessary to delve deeply into history for examples? I myself already in our times, the times of perestroyka, have heard with my own ears how in the presidium of the USSR Academy of Sciences the leaders of the academy have said with all but reverential trembling: "Instances have given us an assignment." As if there is in the country some higher instance in the field of science than the academy itself! As if bitter experience has not taught us what disasters happen, if one "brilliant" individual or an "indisputably correct" higher instance begins to decide the fates of genetics and cybernetics, literature and linguistics!

For fairness' sake let us remember: During any, even the most gloomy times our science highlighted from its ranks the heroes and martyrs of the resistance of arbitrary actions and dictation. Nikolay Vavilov, Petr Kapitsa, Nikolay Semenov, and Andrey Sakharov by their stands and actions saved the honor of domestic science.

Perestroyka and the democratization of Soviet society could not but concern science as well. Unfortunately, and IZVESTIYA has repeatedly written about this, the restructuring of the academy obviously lags behind the processes that are taking place beyond its walls.

The presidential decision, which frees the Academy of Sciences from the administrative command fetters and declares it an all-union self-managed organization, which operates on the basis of USSR laws and the charter of the academy, without any intervention of state and other structures, opens the way for acceleration.

Several years ago hotheads assured the state leadership that cost accounting in science is a panacea, which will save us from all troubles and will have the result that it is not scientists who will pursue manufacturers, imploring for the introduction of their developments, but vice versa: Industry will declare an all-union search for the latest technologies, plans, and designs. This did not happen. But then cost accounting in science struck a painful blow to basic research. Its level began to decline.

World experience testifies that quick breakthroughs into the world of new, high technologies do not happen without the active support of basic research on the part of the state and powerful public foundations. For it is clear that this research, as a rule, cannot provide an instant return. But in the end all the industrial revolutions of recent decades rest on precisely such a foundation. On whom did you and I rely when letting everything, which had been accumulated by our basic science, take a "cost accounting" course?

People may reply to me that, they say, in the Ukase of the President there are words concerning that fact that it is necessary to retain the special-purpose state financing of basic scientific research from the all-union state budget. Yes, formally it was always that way in our country. But if everything were in order, it probably would have to have been recorded in the Ukase: The USSR Council of Ministers within a month is to adopt a decree which provides "the procedure and dates of the formation of the all-union state-budget fund of basic research and the approval of the statute on it." The state allocates the money. But scientists themselves will be in charge of the fund and will decide its fate.

The division of the forms of property between the state and the Academy of Sciences, which is made by the Ukase and consolidates economically the independence of the latter, is extremely important. True, it is not clear: If the entire material and research base of the USSR Academy of Sciences, which is located mainly on the territory of the RSFSR, becomes the property of the union academy, on what base does the newborn Academy of Sciences of Russia intend to be founded?

In recent times a serious discussion of the "brain drain" from our country has been taking place in scientific auditoriums and in the press. I will recall the words of Professor M.D. Frank-Kamenetskiy, which have already been cited by IZVESTIYA: "The freedom to travel here and there is necessary and noteworthy, but if we do not take the next step, which will enable us to organize the supply of work in laboratories at the western level, science in our country will cease altogether. We will become a raw material appendage—in the sense that we have become it in deliveries of petroleum and gas. The lot of turning into a raw material appendage in the area of scientific brains will be in store for us. We will produce semimanufacturers and send them to the West, and only there will they begin to work and to create a product....

"This process is now approaching logical conclusion—everyone, who is capable of working, will work abroad, while here no one will any more."

The step, which is spoken about in the quotation cited above, is made by the new Ukase of the USSR President, although such words—"brain drain"—are not in it. Much in this new document is envisaged for the creation

of normal living conditions of Soviet scientists. But the natural question is: Will the increase of salaries and the offering of work under contracts be accompanied by the strengthening of the research base of the country? For the freedom of scientific creativity is safeguarded not only by personal well-being, but also by making available everything necessary for work such as laboratories and the latest instruments and devices.

Everything then depends on whether we will create such conditions in practice. It is not enough, after all, to promulgate a good presidential Ukase. When something actually gets moving in the life of the academy, it will be possible to judge the power of influence from the rate of acceleration.

The Ukase of the President affords great opportunities for academic institutes. Now very much in the specification, supply and fulfillment of their own programs will at least depend on themselves. If this time it does not succeed, there will be no one to blame except oneself and the intrinsic inertia of stagnation. It is difficult to turn stiff structures and brains in the direction of drastically changing life.

It is possible by presidential Ukase to abolish the dependence of the academy on state instances. But how will you "abolish" this dependence in the consciousness of the many big and little chiefs at the Academy of Sciences itself, who with their mother's milk absorbed the principles of administrative grandeur? Here great hope is being placed in the young forces of science — in the coming election of new academicians and corresponding members, but also in those still quite young people, who are now heading for their first research results and first discoveries.

Laverov Interview on Decree

907A0336C Moscow POISK in Russian No 34 (69), 24-30 Aug 90 p 2

[Interview with Vice President of the USSR Academy of Sciences Academician Nikolay Laverov, chairman of the USSR State Committee for Science and Technology: "The Goal Is Stability"; date and place not given; first paragraph is POISK introduction]

[Text] At the request of the editorial board of POISK Vice President of the USSR Academy of Sciences Academician Nikolay Laverov, chairman of the USSR State Committee for Science and Technology, comments on the Ukase of the USSR President.

N. Laverov: The appearance of the Ukase, in my opinion, is due to the fact that under the conditions of the transition to a market it was necessary to define more precisely the status of the USSR Academy of Sciences. If you recall, during the election of USSR people's deputies the Academy acted as a public organization. But it is financed not by means of contributions of individual citizens or charitable foundations, but mainly from the state budget, and without the consent of the USSR Council of Ministers it cannot close or open a single institute. In order to avoid different interpretations, it is proposed to consider the Academy of Sciences to be an all-union self-managed organization. No other organization in the country has such a status. What is behind the new wording?

Henceforth the Academy has the right to regulate independently, without any intervention of state and other structures the activity of its institutes, laboratories, and specific scientists, who are engaged in basic scientific research. The new contractual system of the organization of labor at the Academy should play an enormous role in increasing their efficient work.

The fact that all the property of the institutes and enterprises, which belong to the system of the USSR Academy of Sciences, is being transferred to its exclusive ownership, also broadens substantially the prerogatives of the USSR Academy of Sciences. This step, I believe, is logical: The elimination of state property is occurring, while the expensive experimental complexes, which were built with the assets of all the results, cannot pass to any one of them merely because of territorial affiliation. Now no one has the right to interfere in property relations within the Academy.

It is also particularly necessary to speak about the fundamental changes in the procedure of financing the USSR Academy of Sciences. The formation of a state all-union state-budget fund of basic research is envisaged for the first time by the Ukase. The fund, which is managed by a council, will be an independent organization. We still have to discuss with the scientific community the principles and mechanism of the activity of the fund, the composition of its management, and the relationship with the USSR Academy of Sciences and the USSR State Committee for Science and Technology and to prepare a special decree of the USSR Council of Ministers.

It seems that the new fund—by analogy, for example, with the U.S. National Science Foundation—could successfully support so-called basic research, from which it is difficult to expect an instant return, but which is vitally necessary for scientific and technical progress as a whole. Apparently, the fund could keep a statewide register of the operations, which are performed both at academic institutes and at higher educational institutions, and accordingly also subsidize these operations. Then the all-union integration of science, about which so much is being said, would also appear....

I hope that the establishment of the fund will make it possible to consolidate the stable financing of science and the constant troubles due to the lack of assets for one or another scientific direction will end. And not a state bureaucratic organ, which is far from science, but an association of leading scientists will make the decisions on the amount of allocations for a specific job.

At the same time many collectives of the Academy can seek on a competitive basis additional financing within

the framework of state scientific and technical programs. Academic organizations also have the opportunity to work under contracts with enterprises.... In short, the steps on the improvement of the material status of scientists, which the USSR President commissioned the government of the country to elaborate, are acquiring a considerable financial base.

I am confident that the state of affairs in this area will improve. The conditions, which it is necessary to create for scientific personnel—and the sooner, the better—should not differ from those existing for researchers in the West. All this will have a beneficial effect on the activity of the Academy.

GKNT Studies Legislative Needs, Changes

907A0307A Moscow POISK in Russian No 23 (58), 8-14 Jun 90 p 5

[Article by First Deputy Chairman of the USSR State Committee for Science and Technology Ivan Bortnik and Aleksey Aleksandrov, chief of the legal department of the Administration of Affairs of the USSR State Committee for Science and Technology, under the rubric "Dialog With the Reader": "Laws for Newton"; first four paragraphs are POISK introduction]

[Text] "Progress should be supported legally. It is not only a collection of instructions, orders and circulars, but of the sum of the laws which have been passed at the state level.

"In our country for the present, let us face it, the priority of a direction is often determined by the penetrating power of one scientific school or another, and at times of its leader. In the area of the financing of basic research many scientific personnel do not feel protected and are forced annually to 'drum up' money for research. The participation of the public in the formation of state programs is not supported legally and economically in our country. I would like to know: To what new laws, which protect the scientist and stimulate creativity, can we look forward in the immediate future?

"[Signed] Aleksey Tarasov"

In the USSR State Committee for Science and Technology a new department, the goal of which is to give the scientific community a legislative base, has begun to operate. First Deputy Chairman of the USSR State Committee for Science and Technology Ivan Bortnik and Aleksey Aleksandrov, chief of the legal department of the Administration of Affairs of the USSR State Committee for Science and Technology, tell about what "scientific" laws we need first of all:

Let us begin with the fact that thus far we do not have a law on intellectual property, which is classic for the West. There is also no law on invention activity—for the present it exists only in a draft....

Today we are talking about the fact that the scientific and technical product should become a commodity. But its buying and selling are not regulated in our country! Hence, we have nowhere to escape from the draft law, which would confirm that this commodity can be someone's property, can be in circulation, and can be protected by the full force of legislation against encroachments.

In the "package" for it there is the draft of the law on the scientific research organization (activity). Here, as is evident, two versions are possible. It will begin either to regulate by means of certain rules scientific research activity itself or to regulate the work of scientists within the framework of the organizational forms existing today in science.

Let us go further. The future of science will probably require the combination of all conceivable forms of property—material and intellectual, private and state, union and foreign. Hence, a law on property and its forms, which does not forget science and enables scientists to establish small and large associations with diverse types of property, is needed—otherwise the talented and enterprising scientist risks finding himself in...the dock.

Today science also needs a law on contractual (or contract) scientific activity. The scientist under certain conditions should obtain the rights of a juridical person—that is, while working independently, he will receive the opportunity to dispose of equipment and materials, as well as to hire a staff of associates. Today this is impractical—having hired an assistant, the scientist working on his own becomes...an "exploiter." The new law, we hope, will allow the independent researcher to have a bank account and, therefore, to plan his work independently and to answer for its results. After all, it is well known that in the West small firms and inventors, who work on their own, at their own risk, at times score significant successes. Similar firms and researchers also have the right to exist in our country. In general the activity of small and medium firms in the majority of developed countries is governed by special laws.

Now about financing. The U.S. Congress begins the consideration of the budget (including questions of the financing of science) several years before the year of "reckoning." In our country this is done differently—a few months before it. Moreover, the formation of the plans of production, the construction of new capacities, and renovation anticipates the plans on science. But, according to the logic of things, it should be the other way round! Therefore, it seems to us, a law on state scientific and technical policy and its coordination with structural policy in the area of the economy are necessary.

Today in science there exists—poorly and wretchedly—a large number of promising directions, which are actually dragging out a destitute existence: they do not fall into the sphere of interests of existing scientific research institutes and design bureaus. For their protection we will have to pass a law on innovation activity, which

makes it possible to subsidize research that does not fit into the already existing structure of scientific institutions.

Why, you will ask, will the scientific institute not be able to undertake the development of an idea from scratch, if this promises significant revenue in the future? The point is that if, having spent the assets allocated by the state, the institute suffers a fiasco and the idea does not yield the "planned" fruits, major troubles can threaten the managers of the scientific collective. Who will voluntarily put his head into such a noose? While the innovation enterprise—according to the law—is venture enterprise. It will have the right to make a mistake, which is stipulated by the law. Someone, after all, should experiment in our science!

The innovation fund attached to the State Committee for Science and Technology, which was recently established, can also give support to individual inventors. Assume that someone has developed a new preparation, but cannot penetrate the bureaucratic "wall" and achieve its testing and introduction. The innovation fund will be able to pay for this work or to give other financial support. According to Soviet legislation, a bank can also open credit, but for a specific interest—and this scares the inventor off. Therefore, a special statute, which secures specific forms of the activity of the innovation fund, will be required.

The previously passed laws for the present are not designed for market interrelations. They support such a state system, in case of which all people should live identically. The market is slowly breaking us of such a form of the distribution of material goods and is forcing us to live according to different principles. When the researcher has the right to have more money for his work and, hence, goods and services, the more he gives society. The Department of Legal Support, which has been established under the USSR State Committee for Science and Technology and in which the most experienced lawyers and practicing scientists will be included, will deal with the development of the corresponding area of legislation and the specific preparation of the laws that are listed (and are not listed) above.

Laverov on Adapting Science To Market Economy

907A0337A Moscow IZVESTIYA in Russian 17 Sep 90 Morning edition p 2

[Interview with Academician Nikolay Pavlovich Laverov, chairman of the USSR State Committee for Science and Technology and deputy chairman of the USSR Council of Ministers, by IZVESTIYA science commentator B. Konovalov: "The Path of Science Through the Market. A Conversation With Chairman of the USSR State Committee for Science and Technology Academician N. P. Laverov"; date and place not given; first paragraph is IZVESTIYA introduction; last paragraph is IZVESTIYA conclusion]

[Text] The discussion of programs of the transition of the country to a market economy is now under way. How will market relations affect the status of our science and technology? The editorial board of IZVESTIYA decided to ascertain the government point of view on this problem and turned to Deputy Chairman of the USSR Council of Ministers N.P. Laverov, who is in charge of the state committee that is responsible for state policy in the area of science and technology.

IZVESTIYA: Nikolay Pavlovich, the collapse of the administrative command system also led to the elimination of the centralized funds for the development of science and technology of ministries and departments. Will this not have a catastrophic effect on the financing of scientific and technical progress in the country?

N.P. Laverov: Yes, the centralized funds for the development of science and technology of ministries and departments came in 1990 to more than 4 billion rubles (with the exception of defense sectors). Their elimination is a quite serious blow to scientific and technical progress, this has already led to the sharp reduction of the financing of long-range and exploratory research work of a sectorial and intersectorial nature. It is clear that this trend will intensify until market competition makes enterprises strictly dependent on the consumer.

IZVESTIYA: What way out of the formed situation does the USSR State Committee for Science and Technology propose?

N.P. Laverov: We believe that when changing over to a market economy it is necessary, on the one hand, to increase state support for the development of priority scientific and technical directions and long-range basic research. In particular, of the USSR Academy of Sciences, which has become a nongovernmental organization, and, on the other, to use more completely the possibilities of multiple sources of financing. Now the Innovation Fund, which was established by the union government, is already operating under the USSR State Committee for Science and Technology. We have also proposed that enterprises, which introduce advanced technologies, would enjoy preferential taxation.

But the formation of a full-fledged market of scientific and technical products seems to be the main thing. For this it is necessary to carry out the elimination of state control over sectorial science, to implement a set of antimonopoly measures, and to untie completely the hands of scientists who work in applied directions. This process, in essence, has already begun. On the basis of the program of the demonopolization of science alternative small innovation structures—centers of scientific and technical creativity of youth, scientific and technical cooperatives, cost accounting centers, and collectives attached to the All-Union Society of Inventors and Efficiency Experts and the USSR Union of Scientific and Engineering Societies—are being actively developed and the first small venture firms have been established. They have already begun to influence the market of scientific and technical products, which is being formed. Last year the volume of scientific and technical developments, which were sold by them, came to 4.7 billion rubles, while this year not less than 6 billion rubles are expected.

The contract prices for scientific and technical products, cost accounting, and competition made it possible to strengthen in 1990 the social orientation of scientific and technical progress and to include defense scientific research institutes and design bureaus in this sphere. The number of developments of this level, which are being assimilated, is increasing this year by not less than one and one-half fold and will increase by not less than twofold in 1991.

For the improvement of the social, economic, and legal protection of scientific collectives, scientists, and specialists it was decided to establish the Nauka Investment-Insurance Society. It should not only stimulate long-range research and development, but also compensate the participants in the work for damage in the form of an "indemnity."

In conformity with the prepared draft of the USSR Law "On Invention in the USSR" the changeover to the patent form of the protection of inventions is planned and several steps on the increase of the economic interest of enterprises in the use of inventions and on the increase of the prestige of the inventor and the protection of his rights are envisaged.

At the same time the mechanism of the implementation of the preferential taxation of enterprises, which actively assimilate scientific and technical achievements, thus far has not been legalized. As a temporary measure for the transition period the government should give the State Committee for Science and Technology and the Ministry of Finance the right to establish tax credits on the profit, which is used for the financing of science and the assimilation of scientific and technical developments.

IZVESTIYA: But these issues should be settled legislatively....

N.P. Laverov: Certainly. The drawing up of a draft of the USSR law on state science and technology policy is now being completed. It is also necessary to pass a law on the

protection of the right of scientific intellectual property. At the same time USSR laws on the patent court, production prototypes, and trademarks and other laws, which form the organizational legal basis in the area of industrial property, should be passed at the fall session of the USSR Supreme Soviet.

Laws on the scientific research organization and the status of the scientific worker are also necessary. For the practical development of a contractual system of the organization of research and development, which is aimed at the increase of the effectiveness of the labor of every scientist and specialist and the increase of his responsibility, is starting already in October 1990. According to forecasts, during 1991-1992 a decrease of the number of personnel, who are employed at large scientific research institutes and design bureaus, is expected for various reasons. It is obvious that a large portion of them will be able to find work at small enterprises, cooperatives, and centers of scientific and technical creativity of youth. However, the questions of the social protection of scientists should be settled legislatively.

IZVESTIYA: And what problems is the formation of the new Union Treaty raising for the development of science. Will this not lead to the loss of a unified science and technology policy in our country?

N.P. Laverov: In the Union Treaty, which is being drafted, we have proposed to differentiate the spheres of activity of the republics and the Union. The union republics, in our opinion, should settle independently all questions of the scientific development and scientific and technical development of their republic (region) with the exception of those which are voluntarily referred by them to union organs of management. They could successfully formulate and implement measures on the pursuit of an effective republic policy in the area of science and culture, particularly in the humanities, which are connected with national history, ethnography, language, literature, and the organization of effective research in accordance with republic scientific and technical programs, and promote the assimilation of new technologies that are promising for the republic.

All-union scientific and technical priorities and programs should be formed and formulated jointly by union and republic state organs of administration.

The strengthening of the scientific and technical potential also presumes the further integration of academic and VUZ [higher educational institution] science in the interests of both science itself and higher education. For this it is necessary to provide for the establishment in the country of a network of scientific educational centers on the basis of academic institutions and leading higher educational institutions for the training of highly skilled specialists. Their access to advanced experimental equipment should be ensured.

IZVESTIYA: A "brain drain" from our country is now emerging. What does the State Committee for Science and Technology intend to do in order to avert this phenomenon, which is extremely undesirable for the country?

N.P. Laverov: You will not help the matter with bans. The migration of scientists is an ordinary matter in the western world. While we intend to begin the process of integrating domestic science in the world scientific community, particularly in the area of global scientific problems and the development of high technologies. The appropriate economic and legal base will be created for this. In this connection the establishment at large scientific and educational centers of the country of science and technology parks, technopolises, as well as joint scientific research laboratories, institutes, centers, and other scientific collectives is especially promising.

The task facing us is to afford all our talented people the opportunity to earn well and to live befittingly in their own homeland. Now, unfortunately, the prestige of a scientist in the country and of an engineer is declining, and this greatly disturbs the scientific community. We do not have ready-made formulas of the solution of this problem, which it would be possible implement even now, with allowance made for the overall situation in the country. The USSR Council of Ministers is preparing a special decree on this question.

It is a pity, of course, that the government thus far has not formulated a clear concept of the combating of the coming "brain drain." But this is just one of the large number of problems that are now arising on the path of the development of our science and technology. It seems that in the program of the transition to market relations, which should be adopted by the USSR Supreme Soviet, serious attention should be devoted to these problems.

No Change in Wages for Scientists in Basic Research

907A0325A Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 6 (92), Jun 90 pp 86-91

[Article by Doctor of Economic Sciences D. N. Karpukhin and Candidate of Economic Sciences L. S. Rzhanitsyna, the Institute of Economics of the USSR Academy of Sciences (Moscow): "The Wage in Science"]

[Text] The decrease of the pace of economic growth is occurring against the background of the sharp increase of the wage and income of a large portion of the population. Having forgotten about competition for the boosting of output and the increase of efficiency, sectors are competing to see who will raise the level of the wage of their personnel higher.

Only basic science is retaining the 30-year-old wage level. In 1957 salaries were increased sharply for doctors and candidates of sciences and three categories of scientific research institutions and higher educational institutions were established. The director of a laboratory,

division, sector, and department, when having the degree of doctor of sciences, could receive 400, 450, and 500 rubles in conformity with the category of the institute (a candidate of sciences in this position could receive 300, 350, and 400 rubles), a senior scientific associate and doctor of sciences could receive 350, 370, and 400 rubles (a candidate of sciences—250, 280, and 300 rubles), and a junior scientific associate and candidate of sciences could receive 175, 180, and 200 rubles. This was a high wage for that time, inasmuch as the average wage in the national economy came to less than 80 rubles. The prestige of the labor of scientists and the influx of young people into science, especially into the area of basic research, were ensured by the terms of remuneration.

In recent years the situation has changed radically. Whereas in 1950 the average wage in the sector "science and scientific service" was nearly 1.5-fold higher than for the national economy, in 1989 it exceeded the wage in industry only negligibly and was less than in construction.

The implementation of the decree "On the Improvement of the Remuneration of Scientific Personnel, Designers, and Process Engineers of Industry," which was adopted in 1985, did not contribute to the real increase of the wage in the sphere of science. A number of innovations were envisaged by the decree: Five positions for scientific personnel (chief scientific associate, lead scientific associate, senior scientific associate, scientific associate, junior scientific associate), a supplementary payment (up to 50 percent of the salary) for the performance of the most difficult and crucial jobs with allowance made for the personal contribution, the amount of assets, which are envisaged in the estimates of scientific institutions for the payment of bonuses to personnel, was increased to 6 percent of the wage fund. But under the conditions of a stable wage fund the directors of institutes are approaching election to the position of chief scientific associates with great caution. At the Institute of Economics of the USSR Academy of Sciences only four people have this position. Three of them are corresponding members of the USSR Academy of Sciences. For the same reasons only a negligible number of scientific associates of academic institutes receive an increment in the amount of 50 percent. As for the bonus, in the system of the Academy of Sciences it cannot play a substantial role for the majority of associates, if only owing to such a negligible percent of the wage. Thus, under the conditions of the sharp increase of income in all sectors of the national economy, and now also in the apparatus of state and public organizations, the level of the wage and the prestige of the labor of scientific personnel are decreasing relatively.

In recent years a disproportion has formed in the remuneration of the labor of personnel of the USSR Academy of Sciences and sectorial science.

The average wage at scientific research institutions as a whole came in 1987 to 240 rubles a month and in 1989 to 306 rubles a month. The increase is 28 percent. In the system of the USSR Academy of Sciences in 1988 it was equal to 227 rubles and in 1989 to 262 rubles. The increase of 15 percent (1989—preliminary estimates).

In 1989 in civilian industrial ministries the increase of the average monthly wage at sectorial scientific research institutes was from 34 to 63 percent with 15 percent at the union academy. For example, in the Ministry of the Chemical Industry the wages of scientific personnel in 1988 were at the level of 205 rubles a month and were 10 percent less than academic wages, while in 1989 they had already reached 304 rubles, that is, they were 16 percent higher. The situation is similar at institutes of the Ministry of Light Industry, where the wage increased from 219 rubles to 346 rubles, and at institutes of the Ministry of the Electrical Equipment Industry, where it increased from 226 rubles to 320 rubles. There is a similar observation everywhere, but the record belongs to design organizations.

Thus, in industry the average wage came in 1987 to 222 rubles and in 1989 (for nine months) to 261.2 rubles (the increase is 18 percent), in construction and installation work—respectively 259 and 357 rubles (the increase is 19 percent), in science and scientific service—217.4 and 300 rubles (the increase is 38 percent), while at design and surveying organizations—210.4 and 384.7 rubles. The increase is 83 percent!

Such trends in the remuneration of the labor of scientific personnel cannot contribute to the attraction of good personnel to basic science. Moreover, the significant increase of the wage at sectorial scientific research institutes is not being accompanied by the corresponding increase of the effectiveness of their developments. Let us also note that cost accounting in the absence of a market of scientific ideas and scientific services (where the amount of the expenditures and the impact is objectively determined) is of a formal nature and is consolidating the monopoly position of scientific research institutes in sectors, enabling them to dictate their own terms to enterprises. According to the data of the State Committee for Science and Technology and the USSR Ministry of Finance, in 1988 the prices for design and surveying work increased by 34-36 percent, but the quality of design documentation did not improve.

The wage in academic science is substantially less than at higher educational institutions. In 1988 instructors received through their basic activity 282.5 rubles a month and through economic contractual jobs 278 rubles, which is incomparable to the situation at academic institutes, although there are no fewer doctors and candidates of sciences there. With the introduction in December 1989 of new conditions of remuneration at higher educational institutions the gap increased even more. The salary of a docent who is a candidate of sciences with 15 years of science teaching work will come to 350-400 rubles, while a senior scientific associate of an academic institute regardless of the length of service has 250-350 rubles. The salary of a professor of a higher

educational institution with 15 years of service is 500-550 rubles, a worker of the same category at the Academy of Sciences, that is, a lead scientific associate who is a doctor of sciences receives 350-400 rubles, while a chief scientific associate receives 360-450 rubles. But these positions, as was noted, a quite rare.

The disparity in the remuneration of managerial scientific personnel is especially great: The maximum salary of the head of a chair, if he is a professor and doctor of sciences, comes to 550-600 rubles. At a scientific research institute the head of a department, who is a doctor of sciences, can receive a maximum of 500 rubles. But if the head of a chair does not have the academic degree of doctor of sciences, then it is 500-550 rubles (at a scientific research institute it is 400 rubles), and so on. It is also important to note that at scientific research institutions the length of service is not taken into account, while for higher educational institutions it is one of the basic indicators when establishing the salary. All this runs counter to traditions and the point of the organization of the remuneration of labor in sectors, which are similar in the content of labor, and contributes to the outflow of skilled personnel from science to higher educational institutions, which as a result hampers the attraction of talented, creative young people to scientific activity.

When you read these decrees on the remuneration of the labor of associates of scientific research institutes and higher educational institutions, you wonder how such an inconsistency could have been brought about. Either casual people, who understand hardly anything, are doing this or they are specially introducing as much confusion as possible in the organization of remuneration. The very fact of the separate adoption of decrees on the remuneration of personnel of sectors, which are related in the nature of activity and the content of labor, is illegitimate. Why in one case is it a question of the quite significant increase of salaries and in the other is it a question of an ephemeral increase? Why are directly opposite principles of the remuneration of labor being established? It appears that what it was necessary to envisage for scientific research institutes was envisaged for higher educational institutions, and vice versa.

At institutes of the USSR Academy of Sciences the main person is the doctor of sciences. As a rule, precisely they are the leaders of scientific directions. But the decree, which was adopted in 1985, discredits mainly doctors of sciences. Whereas for candidates of sciences, who hold scientific managerial positions, the salary "bracket" was broadened by the increase of the maximum part, while the salary with a length of service of less than five years was taken as the minimum salary, for a doctor of sciences the opposite was done—the "bracket" was shifted downward, and the salary, which corresponds to a length of service of more than 10 years, was taken as the maximum salary.

At the higher educational institution it was done differently—in addition to the previously existing three levels of salaries subject to the length of science teaching work a fourth one (more than 15 years) was introduced. The head of a chair, who is a professor and a doctor of sciences, will receive with the maximum length of service 550-600 rubles a month, while one who does not have the degree of doctor of sciences will receive 500-550 rubles. But it is well known that docents, instructors, and assistant instructors bear the largest teaching load. Many of them, of course, do not have a length of service even of more than 10 years and, consequently, in practice will not receive any wage raise. For a docent who is a candidate of sciences with a length of service of up to five years the salary is 250 rubles a month (just as before), with a length of service of five to 10 years it is 250-300 rubles a month (it was 280 rubles), for a senior instructor with a length of service of five to 10 years it is 250-280 rubles a month. But if both have been working at a higher educational institution for more than 15 years, even if they have not defended a doctoral dissertation, for this they will receive salaries that significantly exceed the salaries of personnel of approximately the same categories at a scientific research institute.

It is also possible to group with the inexplicable, in my opinion, steps the increase of pensions, which is being introduced, for professors and docents of higher educational institutions to 220 and 160 rubles a month, respectively. A doctor of sciences from a scientific institute in case of any position will receive a pension of not more than 160 rubles a month, a senior scientific associate will receive a pension on a common basis, that is, not more than 132 rubles.

Against the background of the outlined situation the decree "On the Improvement of the Remuneration of the Labor of Personnel of the Staff of Organs of State Administration," which was adopted in the best traditions of the "stagnation" times—quietly and secretly—causes bewilderment. According to this decree the minister of a union ministry and the chairmen of central economic organs receive 1,000 rubles a month, their deputies receive 800 rubles a month each. The managerial personnel and specialists of all levels were also not offended: The chief of an administration and department receives 600-650 rubles (let us recall that the head of a department of an academic institute, who is a doctor of sciences, receives not more than 500 rubles, one who is a candidate of sciences receives not more than 400 rubles), a chief specialist receives 500-660 rubles, a lead specialist receives up to 500 rubles, a specialist of category I receives 300-400 rubles, a specialist of category II receives 200-300 rubles, the salary of a beginning specialist is up to 200 rubles, and even the salary of the secretaries of executives is up to 250 rubles. Here it is permitted to establish wage increments of up to 50 percent and to pay bonuses on the basis of the wage fund of 2 months. Moreover, additional assets are being allocated for material assistance, the combining of occupations is permitted. And all this is against the background of the curtailment of the rights, duties, and functions of the staff and the development of democracy

and self-management. It is necessary to add to all these expenses the analogous increase of the salary of party personnel, although they are attempting to explain it by the abolition of special privileges, which should be offset by money.

It is necessary, perhaps, to raise the wage. But now, in such an acute economic situation for the country, it is necessary to select for raises the categories of personnel, on which scientific and technical progress and our technological, economic, and social future depend. The need has arisen to set up the independent public examination of all economic and social projects, in much the same way as the public ecological examination, which is gaining strength.

RSFSR Academy of Sciences Encounters Financing Problems

907A0338A Moscow IZVESTIYA in Russian 14 Sep 90 Morning edition p 1

[Article by S. Leskov under the rubric "On Themes of the Day": "An Order 'From Above' or an Initiative 'From Below'"]

[Text] I would hardly err from the truth if I were to say that the idea of establishing the Russian Academy of Sciences, which emerged one and one-half years ago, was perceived by the majority of scientists, to put it mildly, skeptically. Conjectures that in such a way bureaucrats from science are preparing for themselves a new sinecure, were expressed. But time passed, many problems, which are specific for Russia, became more acute, no one solved them, and the voices of pessimists died away. After the proclamation of the sovereignty of Russia the necessity of establishing its own authoritative scientific headquarters no longer rouses anyone's objections.

What is holding things up? Modern science is not only financing, but also an expensive material base and skilled personnel. You will not get all this out of the air. While the fact that 95 percent of all the scientific research institutes of the USSR Academy of Sciences are on the territory of the RSFSR [Russian Soviet Federated Socialist Republic], serves merely as poor consolation. It, of course, will not voluntarily give up its institutions. Moreover, by the recent Ukase of the USSR President, all the property of the union academy was transferred to its full and undivided ownership. Obviously, the Russian Academy, which has not yet been born, will not have to live in luxury—you will not advance modern science far without a material base and by only an idea.

But the decision on the establishment of the RSFSR Academy of Sciences was made at the first session of the RSFSR Supreme Soviet. At the present session the Committee for Science and Education jointly with the RSFSR State Committee for Science and the Higher School need to submit to the Russian Government the concept of the republic Academy of Sciences. Strictly speaking, the work on this concept was begun even earlier. The RSFSR Council of Ministers of the former membership set up a special commission under the leadership of Vice Presidents of the USSR Academy of Sciences V. Koptyug and G. Mesyats, chairmen of the Siberian and Ural Departments of the USSR Academy of Sciences. Whoever pays the money, orders the music. It is not surprising that the proposed concept satisfied the requirements of the administrative command system perfectly. In accordance with the draft about 200 members of the USSR Academy of Sciences became members of the Academy of Sciences of Russia, and these "squared" academicians would appear before the RSFSR Government as some private consultants. It is more than likely that the Russian branch of the union academy, which was born in the lap of the union academy that has been gravely ill for a long time, would not begin to bear fruit vigorously and the academic sores would be inherited. During the summer debates many RSFSR people's deputies sharply criticized this concept, while B.N. Yeltsin at a meeting with scientists of the Far Eastern Department of the USSR Academy of Sciences stated his opinion in plain terms: For the present the formation of the Russian Academy of Sciences does not hold out particular prospects for Russian scientific thought.

For the modification of the concept in August it was proposed to include 50 members of the USSR Academy of Sciences, as well as I. Polozkov, V. Chikin, and Yu. Bondarev on the scientific coordinating council of the Russian Academy. The follow-up discussion of the concept in the RSFSR Supreme Soviet, which took place several days ago, showed: The changes are negligible, in the draft, which was brought into being by the will of the administrative system, bureaucratic trends triumph.

Where is one to look for alternatives? The most surprising thing is that the Academy of Sciences of Russia is already living and operating. Its constituent congress, which united three academies that were established a little earlier—the academies of technological, natural, and agricultural sciences—was held in Moscow on 31 August. Nobel Prize laureate and Academician of the USSR Academy of Sciences A. Prokhorov was elected president of the united presidium of Russian academies, such authorities as G. Flerov, V. Osiko, and S. Kapitsa are on the presidium. In each of the three small academies there are now about 50 scientists, moreover, during the election the functional principle, which is unshakable at the USSR Academy of Sciences, was violated—not directors, but authors of new discoveries and new directions ran for election. It suddenly turned out that only a few of the full members of the USSR Academy of Sciences can satisfy these requirements. Incidentally, this is not distressing for everyone: After all, at the new academy they do not pay any money for a title.

But the primary thing is the principles that were incorporated in the charter of the newly established Russian

Academy of Sciences. Having been left without a material base, it will operate on a contract basis, which is recognized throughout the world, concluding contracts with small mobile laboratories and individual scientists. In the concept of the academy that was born on an initiative "from below" there are the demands not to allow the transfer to it of departments and scientific centers of the union academy in their established form and not to establish new institutes after the pattern of former institutes, the intention to combat any monopoly with respect to fields of science, as well as the merging of the process of instruction at higher educational institutions with scientific research activity. The fundamental proposals of the community at large on the transformation of science found reflection in this list. The USSR Academy of Sciences remained deaf to them, and it is natural that now the initiative is slipping from its hands.

Can science during the present difficult times help society? The authors of the first, "official" concept propose first to specify the budget of Russian science, then to consider specific plans. The authors of the second, "unofficial" concept take a different route. They considered a program of "500 days" and indicated stage by stage the real possibilities of science. Among the proposals are the establishment of telephone service at farms by means of satellite communications, biotechnological projects in agriculture, the conservation of fresh waters, the introduction of lasers in medicine, and participation in the fight against crime.

But the Academy of Sciences of Russia does not have seed capital. For the conclusion of contracts, no matter how promising they are, the reborn academy needs financing. The competition of different concepts is good, but to delay the decision is to be left with nothing. After all, the drawing up of the budget for next year is on the agenda of the session of the RSFSR Supreme Soviet. It is necessary to choose one of the two proposed concepts of the Russian Academy of Sciences. If it is possible to specify the most promising policy in science, the results will not be slow in showing, and not only in Russia. Many will follow its good example. But then it is difficult to turn ossified structures toward the demands of life.

Institute Director on Halting 'Brain Drain'

907A0331A Moscow PRAVITELSTVENNYY VESTNIK in Russian No 32 (58), Aug 90 p 9

[Article by Corresponding Member of the USSR Academy of Sciences Yevgeniy Davidovich Sverdlov, director of the Institute of Molecular Genetics of the USSR Academy of Sciences, under the rubric "The Response": "A Bare Island Will Not Yield Fruits"; passages in boldface as published; first paragraph is PRAVITELSTVENNYY VESTNIK introduction]

[Text] "We, a group of young scientists (eight people) of one of the scientific institutes of the USSR Academy of Sciences, offer you our services in the gathering of berries. Our norm is 20 kilograms a day. Report the terms, on which the firm is willing to hire us for seasonal work." Is other evidence of the unenviable status of our researchers needed? Is it worth being surprised that nearly any of them, having received from abroad an invitation to do some work at a normal laboratory, agree almost without hesitation? The problem of the "brain drain" is becoming more and more acute—the responses to the article of Ye. Kolesnikova, "The Hunt for an Idea" (PRAVITELSTVENNYY VESTNIK , No 21), testify to this.

When the conversation turns to the brain drain, I become anxious and hurt. And afraid for our future, because this "drain" is the beginning of the end. So it seems to me, and God grant that I am wrong.

In order to understand the essence of the phenomenon, it is necessary first of all to cast aside the stereotypes about the life and work of scientists, particularly young scientists, which have formed in mass consciousness. On movie screens there is sheer plenty—in rooms filled with incomprehensible instruments elegant and self-confident people bandy paradoxes and fence with wisecracks. But what is it like in reality?

I see Rando Allikmets, a fellow from Estonia, sleeping in my seminar. "What is the matter, Rando?" "Yevgeniy Davidovich, I get up at 4 AM, I work as a janitor." I understand—you will not live on his wage. Meanwhile, he leaves work at 11 PM—at the earliest. And our 40-year-old scientist looks like a 65-year-old American scientist. The lads are getting worn out, without having had time to reach maturity.

They live on a piece of bread with rotten sausage, or else the Holy Ghost—there is no time. On vacation, on days off, they read foreign journals and books, write articles, dream, and think about work. They are giving rise to the future of mankind. But this future is visible only to trained minds. They are the basis of the development of society, but they understand this only in civilized society. But under the conditions of our "socialism" they are outcasts. On paydays they give them several tens of rubles each—precisely for patches for the torn jeans, which papa and mama bought, since now this is even fashionable. At home there is a sick little boy—fruit and fresh air are needed, in the apartment the faucets leak, the wallpaper is peeling, the floors have cracked, there are drafts from the windows.

I myself have no time to deal with this, but there is no money to hire a skilled craftsman. But after school I studied another 10 years (five years at the university, two years as a trainee, three years as a graduate student). A candidate of sciences, for colleagues abroad an established scientist, but here a former classmate, who graduated from a vocational and technical school, receives twofold more and jokes openly on meeting: "Did you seem to be smart in school?"

The one joy is work. But there is also trouble here: There is not this, there is not that. Today you go to a kolkhoz, tomorrow you go to a construction project, the day after tomorrow you go to the people's voluntary patrol.

And suddenly there is an invitation: "Dear Doctor! I have become acquainted with your works and find them very interesting. I invite you to my laboratory for two years. Unfortunately, initially I can offer you a wage of only $18,500 a year.... Sincerely yours, Professor...."

And he will go. Not so much for the money as for the social recognition, of which money is a gauge. "There" he will not have to be on the job a loader, a dishwasher, and, finally, a cleaning woman. There you are a scientist, a figure. He will go for two years and will stay forever—as a professor of the University of Chicago, the University of California, New York University.

But how will they treat his departure in our country? In different ways. But of the entire range of opinions I would like to dwell in a little more detail on two positions.

I am the director of the Institute of Molecular Genetics of the USSR Academy of Sciences and at the same time the head of a laboratory. I am talking about this because the director and the head of a laboratory sense differently the effects of the exodus of brains. Here are illustrations. Candidate of Sciences Sergey Mirkin, head of a sector, left the laboratory of Professor M. Frank Kamenetskiy for the United States for three months. The time was then extended for another three months. And then several days ago I, the director, received at letter-...from Professor Sergey Mirkin of the Genetics Department of the University of Chicago, who had concluded a contract for several years. It grieves me, but for me, the director, this is not a tragedy.

But Candidate of Sciences Sergey Arsenyan, a senior scientific associate, left my laboratory for Sweden for six months. Not that long ago he sent by telex a request to extend the business trip for another year. The matter most likely will not end with this. Sergey developed means of the diagnosis and prevention of AIDS [Acquired Immune Deficiency Syndrome]. I am mentioning this so that it would be clear what we are losing. His departure was a crushing blow for the laboratory.

While several days ago Sergey Gryaznov, a very good chemist, came to me and said that he was being invited to the United States. Another blow to the laboratory. I am certain that it is not the last one. And here I have completely different feelings. Each of them for me is not simply a good research and a good fellow. These are my hands, these are an extension of my head, these are the fate of my thoughts and ideas, in other words, my "alter ego." Their departure is my personal tragedy.

There is a difference in the arguments of the highest scientific managerial sphere (directors, chairmen of councils, presidents) and the executives of the basic unit of our science—the heads of laboratories. And this is a fundamental difference. Of my two "egos" one should pay more attention to the head of a laboratory.

What is to be done so that talented, promising scientists—they will not call them, after all, people without talent—would not leave the country? I understand that my thoughts may seem controversial. So hear me out, be unbiased, and let us argue!

It is necessary to increase by five-to-tenfold the wage of scientific associates of the highest skill. Even in this case we will fall short of the world standard of the "valuation of brains" by a factor of about two or three. But at least we will underscore the priority of their work for the development of society and will create the opportunity to live fairly well, although worse than a sanitary engineering plumber, a dentist, a woman hairdresser, and representatives of other "lucrative" occupations.

It is necessary to build at scientific research institutes comfortable hotels, where foreign scientists could be accommodated for long periods. Then if only the semblance of equality: we to them and they to us, will appear.

It is necessary to allocate the necessary foreign exchange assets for the modernization of our institutes, if only the leading ones, which have won prestige in world science. This, in turn, will contribute to the attraction of foreign specialists and will hold back ours. Foreign currency is also needed so that we could send our specialists abroad for a long time **at our expense** and, consequently, **in accordance with our programs,** and not at their expense and, hence, in accordance with their programs.

It is necessary to change drastically the system of the supply of institutes, having given them the opportunity to buy instruments and reagents directly from firms, bypassing the large number of bureaucratic stages. Then we will be able to obtain in two weeks what they now deliver to us in two years.

It is necessary, it is necessary, it is necessary. This refrain is probably already evoking in the reader irritation and a sacramental question: But where is one to get the assets? I will answer honestly—I do not know and, besides, this is not my concern. In turn, I know well that if we squander our intellectual potential, we will remain forever a poor country. Science is unified, and its achievements, which have appeared in one state, become universal achievements. In the end they also reach you and me. Computers, drugs of a new generation, biosensors, video systems. But for money, for the same foreign currency.

The practical fruits of science are reaped first by the peoples, who do not drive it into a blind alley. Who understand that every scientist is a ticket of a lottery without losers. A prize is guaranteed, only its amount is unclear in advance: perhaps, it is millions, but it also might be trillions. We are arguing from the standpoint of today, do not know how to get a glimpse of the future, and, what is the main thing, are forgetting that the miser pays twice.

I am saying all this in the hypostasis of the head of a laboratory. As the director I can say: Oh, come on, it is not necessary to exaggerate. Everything is not that bad. Of course, they are going, but not everyone is, nothing terrible is happening. Do not believe me, the director. A tragedy is occurring. Our future is in its death agony.

USSR Academy of Sciences Announces Vacancies

907A0334A Moscow IZVESTIYA in Russian 2 Sep 90 Morning edition p 2

[Article: "From the USSR Academy of Sciences"]

[Text] The USSR Academy of Sciences, in conformity with Sections 21 and 22 of its charter, hereby gives notice of the available vacancies of full members (academicians) and corresponding members of the USSR Academy of Sciences in the following departments and specialties:

Departments of the USSR Academy of Sciences, specialties	**Number of vacancies**	
	full members (academicians)	corresponding members of the USSR Academy of Sciences
Mathematics Department		
Mathematics	2	5
General Physics and Astronomy Department		
Physics	2	-
Theoretical physics	-	3
Experimental physics	-	6
Astronomy	-	3
Nuclear Physics Department		
Nuclear physics	3	4
Physical Technical Problems of Power Engineering Department		
Power engineering	2	1

Departments of the USSR Academy of Sciences, specialties	Number of vacancies	
	full members (academicians)	corresponding members of the USSR Academy of Sciences
Electrical engineering, including electrophysics	-	1
Problems of Machine Building, Mechanics, and Control Processes Department		
Mechanics	-	2
Mechanics and control processes	1	-
Machine building	1	1
Control processes	-	1
Transportation	-	2
Machine building, including technical diagnostics	-	1
Information Science, Computer Technology, and Automation Department		
Information science	1	2
Computer technology	-	1
Automation, including scientific instrument making	2	1
Computer-aided design systems in machine building	-	2
Element base of computer technology, including molecular electronics and biotechnical systems	-	1
General and Technical Chemistry Department		
Chemistry	2	-
High-molecular compounds	-	3
Organic chemistry	-	4
Technical chemistry	-	5
Physical chemistry	-	6
Physical Chemistry and Technology of Inorganic Materials Department		
Physical chemistry and technology of inorganic materials	1	2
Construction materials	-	2
Inorganic chemistry	-	1
Chemistry and technology of ultrapure substances	-	1
Metallurgy	-	1
Biochemistry, Biophysics, and Chemistry of Physiologically Active Compounds Department		
Biochemistry	1	2
Bioorganic chemistry, physiologically active substances	-	1

Departments of the USSR Academy of Sciences, specialties	Number of vacancies	
	full members (academicians)	corresponding members of the USSR Academy of Sciences
Molecular biology	-	2
Microbiology, virology	-	1
Cell biology	-	2
Biophysics	-	1
Physiology Department		
Physiology of man and animals	-	3
General Biology Department		
Ecology	1	1
Developmental biology	1	-
Botany	-	1
Genetics	-	1
Forest science	-	1
Evolutionary morphology	-	1
Ecology of the sea	-	1
Geology, Geophysics, Geochemistry, and Mining Sciences Department		
Metallogeny	1	-
Stratigraphy	-	1
Geology, tectonics	-	1
Seismology	-	1
Geochemistry, space chemistry	-	1
Petrology	-	1
Petrography, ore deposits	-	1
Working of petroleum and gas deposits	-	1
Hydrogeology	-	1
Mineral dressing	-	1
Comprehensive development of mineral resources	-	1
Geology, petrology	-	1
Mining sciences	-	1
Oceanology, Atmospheric Physics, and Geography Department		
Geography	1	2
Oceanology	1	2
Atmospheric physics	-	1
History Department		
History of the USSR	2	3
World history	2	3
Philosophy and Law Department		
Philosophy, sociology	2	1

Departments of the USSR Academy of Sciences, specialties	Number of vacancies	
	full members (academicians)	corresponding members of the USSR Academy of Sciences
Law	1	1
Psychology	-	1
Economics Department		
Economics	2	3
Problems of World Economics and International Relations Department		
World economics and international relations	3	4
Literature and Language Department		
Literary studies	1	2
Linguistics	2	2
Theory of culture and art criticism	1	-
Far Eastern Department		
History, archeology	1	-
Molecular immunology	-	1
Oceanology	-	1
Stratigraphy	-	1
Zoology, hydrobiology	-	1
Plant physiology, biotechnology	-	1
Mineralogy	-	1
Geology of ore deposits	-	1
Mechanics	-	1
Economics	-	1
Siberian Department		
Mathematics	1	1
Experimental physics	-	1
Nuclear physics	-	1
Power engineering	-	1
Mechanics	1	1
Machine building, control processes	-	1
Computer technology, automation	-	1
Element base	-	1
Information science	-	1
Chemistry	1	1
Bioorganic chemistry	-	1
Biology	-	1
Biophysics	1	-
Genetics	1	-
Petrology, mining	1	-
Geography, hydrology	1	-
Petroleum and gas geology	-	1
Geochemistry, hydrogeochemistry	-	1
Mining	-	1
Atmospheric physics	-	1
Regional economics	1	-
Literary studies	-	1
Ural Department		
Mathematics	-	1
Machine building	-	1
Scientific instrument making	-	1
Control processes	2	-
Technical chemistry	-	2
Physical chemistry	-	1
Physical chemistry and technology of inorganic materials	-	1
Metal science	-	1
Immunology	-	1
Plant ecology	-	1
Physiology	1	-
History of the USSR	-	1
Law	1	-

In conformity with Section 16 of the charter of the USSR Academy of Sciences, scientists, who have enriched science with works of fundamental scientific importance, are elected full members (academicians) of the USSR Academy of Sciences.

In conformity with Section 17 of the charter of the USSR Academy of Sciences, scientists, who have enriched science with outstanding scientific works, are elected corresponding members of the USSR Academy of Sciences.

The main duty of the full member and corresponding member of the USSR Academy of Sciences, according to Section 32 of the charter of the USSR Academy of Sciences, is to enrich science with new achievements and discoveries by personally performed scientific research, by the organization of the collective elaboration of leading scientific problems, and by the scientific supervision of this elaboration.

Full members and corresponding members of the USSR Academy of Sciences actively promote the introduction of the achievements of science in the national economy and their use in cultural development and perform work

on the training and the improvement of the skills of scientific personnel; are obliged to fulfill assignments of the presidium of the USSR Academy of Sciences and the corresponding department, as well as to participate in the work of the general assembly of the Academy of Sciences and the general assembly of the corresponding department.

The election of candidate full members and corresponding members of the USSR Academy of Sciences for work at the regional departments of the USSR Academy of Sciences is conducted in accordance with general procedure at the general assemblies of the departments in the corresponding specialty for the vacancies, which are specially envisaged for the regional departments, from among the people, who work in the given region or have been invited by the regional department, and with allowance made for the recommendation of the regional department of the USSR Academy of Sciences.

The right to nominate candidate full members and corresponding members of the USSR Academy of Sciences in the specialties indicated in the publication is granted to full members and corresponding members of the academies of sciences, to scientific institutions and higher educational institutions, and to state and public organizations. In case of the recommendation of candidates by scientific institutions, higher educational institutions, and state and public organizations, the nomination is made at the meetings of academic and scientific and technical councils, collegiums, or presidiums by secret ballot by a simple majority of votes.

The representation for candidate full members and corresponding members of the USSR Academy of Sciences with the corresponding justification and with the attachment of the necessary documents is reported in writing to the USSR Academy of Sciences within one month from the date of publication (Section 23 of the charter).

It is necessary to attach to the representation for candidate full members (academicians) and corresponding members of the USSR Academy of Sciences the following documents (in duplicate): the representation (decision) of the council and state and public organizations with the results of the secret ballot or a letter with the corresponding justification in case of the nomination of a candidate by full members and corresponding members of the academies of sciences, the autobiography, the personal personnel registration certificate, the list of scientific works (form No 3.3), copies of the diploma on graduation from a higher educational institution and the diploma of a doctor of sciences and of the certificate of a professor, the reference on scientific and public activity from the basic place of work, and three copies of a 4.5- by 6-centimeter photograph.

The indicated materials are to be sent to the address: 117901, GSP-1, Moscow, V-71, Leninskiy Prospekt, 14, the USSR Academy of Sciences.

[Signed] President of the USSR Academy of Sciences Academician G. Marchuk

Chief Scientific Secretary of the Presidium the USSR Academy of Sciences Academician I. Makarov

USSR AS Starts New, 'Elite' College for Chemists

907A0335A Moscow POISK in Russian No 24 (69), 24-30 Aug 90 pp 1, 5

[Article by Svetlana Kirillova under the rubric "The Convertible Diploma": "How Do You Do, College!"; first paragraph is POISK introduction]

[Text] On 1 September the Higher Chemical College of the USSR Academy of Sciences begins its first academic year.

The idea had been floating about. The gap between the appeals to train high-class researchers and the reality of our heavy, slow-turning vehicle of education had become too obvious. It is impossible, after all, to duplicate world-level specialists in enormous batches in accordance with syllabuses that are identical for Moscow, Kazan, and Saratov. "Let us train a small group of researchers, but increase the educational standard substantially," the organizers of the college decided.

Several years ago, having learned that such a group was being made up of school children of yesterday, many fanciers of justice would probably have been outraged: "But why precisely them? What are they, special?"

But they are in reality special, these 30 kids. A commission, on which Academicians Oleg Nefedov and Nikolay Plate and several doctors of sciences worked, took two days to select them. The first year of the Higher Chemical College was made up of those, who had to their credit not less than 19 of the 20 possible points when enrolling in the Moscow Chemical Technology Institute, of winners of the All-Union Competition in Chemistry, and, moreover, of those, who had independent scientific research works.

The last one is very important: After the completion of studies scientific research institutes of the USSR Academy of Sciences await the graduates of the college, and each one should participate in the work without the probationary period that is mandatory for others. The fact that the student practical studies will be take place in laboratories of academic institutes will probably also make the task easier: it will be possible to choose a place of work and to work at "one's own" institute, which after the completion of studies will pay 15,000 rubles for you. Today the future expenditures on the training of students of the college are estimated at such an amount: It is not much, but it is also not a little, if you do not want him, do not take him, others will jump at him. But why decline? The Academy of Sciences is carrying out the educational methods supervision of the college.

During training a mandatory year of practical study at leading foreign centers of chemical education is planned. Accordingly the syllabuses have already been drawn up: In them there are fewer engineering subjects, for example, there are no drawing and strength of materials, after the passing of which, as student folklore says, it is possible to get married. But then intensive instruction in two foreign languages is planned, the history of European philosophical thought, the laws of world history, the psychology of scientific creativity, the economics and organization of science...have been introduced. Weekly two-hour scientific miniconferences, at which students will become familiar with the latest achievements of science, which have not yet been recorded in textbooks and educational manuals, are planned as a necessary part of the educational process.

But where, one would like to know, is one to get such a number of instructors? After all, according to prevailing norms, only 4 staff instructors are authorized for the 30 students of the most elite higher educational institutions that there is. The council of the college, which draws up the syllabuses independently, is recruiting instructors from scientific research institutes. The Academy of Sciences pays for their work. In spite of the fact that, once again in accordance with the norms in effect today, the time spent teaching is not taken into account for those enlisted "on the side," several leading scientists have consented to teach at the college.

The new higher educational institution has already presented one of the most striking syllabuses in recent years, but thus far, true, has not been able to find its own, purely geographic "place in the sun." For the present the college exists at the base of the Moscow Chemical Technology Institute with the rights of an autonomous faculty, that is, a faculty that is not subordinate to the academic council of the higher educational institution.

Thus, the new higher educational institution is beginning its first academic year within the hospitable walls of the Moscow Chemical Technology Institute. Of course, a certain private mansion not far away, which it is necessary to repair and rebuild, has been promised to the college. One's eye involuntarily falls on the walls of the Higher Party School, which is located next door: But what if at some time they were to serve basic science?

True, there are already quite many claimants to them....

State Committee for Inventions Reports Declining Indicators

907A0328A Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 7, Jul 90 p 24

[Article: "1989 Is Six Percent Worse Than 1988"]

[Text] The Collegium of the State Committee for Inventions and Discoveries attached to the USSR State Committee for Science and Technology and the Presidium of the Central Council of the All-Union Society of Inventors and Efficiency Experts have summed up the results of the All-Union Socialist Competition of Inventors and Efficiency Experts of Union and Autonomous Republics, Krays, and Oblasts in 1989. It was noted that in 1989 an economic impact of about 8 billion rubles, which is six percent lower than the 1988 level, was obtained from the introduction of inventions and efficiency proposals. The largest decrease occurred in the Estonian SSR (44.6 percent), the Armenian SSR (42.8 percent), the Azerbaijan SSR (26.8 percent), and the Georgian SSR (19.5 percent). Several regions did not submit at all the final materials on the review.

Having examined the materials, which were submitted by the commission of the All-Union Socialist Competition of Inventors and Efficiency Experts for the Maximum Contribution to the Acceleration of Scientific and Technical Progress of Union and Autonomous Republics, Krays, and Oblasts, the Collegium of the State Committee for Inventions and Discoveries attached to the USSR State Committee for Science and Technology and the Presidium of the Central Council of the All-Union Society of Inventors and Efficiency Experts awarded first place with the presentation of challenge red banners and certificates of the State Committee for Inventions and Discoveries and the Central Council of the All-Union Society of Inventors and Efficiency Experts to: the Tajik SSR, Belgorod Oblast, Bryansk Oblast, Vinnitsa Oblast, Karaganda Oblast, the Karakalpak ASSR, Kirovograd Oblast, Lipetsk Oblast, Novosibirsk Oblast, Pskov Oblast, Stavropol Kray (including the Karachayevo-Cherkess Autonomous Oblast), Kherson Oblast, and Cherkassy Oblast.

Trouble Predicted for GKNT's Machine Building Program

907A0326A Moscow IZVESTIYA in Russian 15 Aug 90 Morning edition p 2

[Article by IZVESTIYA science commentator B. Konovalov: "An Order for the Future. The USSR State Committee for Science and Technology Has Approved the State Scientific and Technical Program 'Technologies, Machines, and Works of the Future'"]

[Text] Many troubles of our economy are due to the low level of production. And not by chance, perhaps, were the largest industrial investments during this five-year plan planned for the machine building complex. It is also not by chance that the first of the State Scientific and Technical Programs (GNTP's), which were approved by the USSR State Committee for Science and Technology, is also aimed at the development of new technologies, equipment, and machines first of all in the machine building complex, which governs the level of domestic industry. It is clear to everyone that you will not provide all plants with foreign deliveries, even if you completely sell off the natural resources of the country.

The program consists of three basic directions: "Technologies of the Future," "Machines of New Generations," and "Computerized Integrated Manufacturing Systems." They were formed from 107 projects of already existing specific clients. It is necessary to stress that in contrast to past times these projects withstood tough competitive selection. At the beginning of the selection marathon 1,025 projects were submitted for the competition. In practice only one out of 10 competitive projects were included in the State Program, after discussion in the scientific council and the conclusion of the expert group.

Among the projects it is necessary to note plants of the future, much has already been said about them, while now it has come to specific projects. Thus, a completely automated manufacturing system based on computers, which are used throughout the technological chain, is being developed at the Moscow Krasnyy proletariy Machine Tool Building Plant, the Tver Die Plant imeni 1 Maya, and several other enterprises. A decisive step is being taken from "insular" automation, which did not yield a large impact, to complete automation, which ensures the flexibility of production.

An informal collective of developers of many organizations, who are capable even of participating in the international competition, which was announced by Japan for an automatic plant with a projected cost of about 1 billion dollars, has formed in this direction.

Scientists, designers, industry executives, and experts were invited to the meeting of the Collegium of the USSR State Committee for Science and Technology, which was held under the chairmanship of Academician N.P. Laverov, the director of this department. On this program, which remains open for projects of other national economic complexes, it is proposed to develop a mechanism of the management of state scientific and technical programs. Although the comprehensive discussion did not reveal opponents, it showed that there are still many unsolved problems.

Vice President of the USSR Academy of Sciences Academician K.V. Frolov, in particular, stressed that a technical and economic analysis of specific projects is lacking. We know what we should invest in them, but do not know how much we will receive and in what time. With such a poor economic analysis, in his opinion, the program will not be approved in the USSR Supreme Soviet.

As a whole the cost of the program, which should be accomplished by the year 2000, for the current five-year plan is estimated at approximately 1.3 billion rubles. Of them about 500 million rubles are from the state budget, while 800 million rubles are the assets of enterprises and ministries. But now ministries practically do not have centralized funds, while enterprises are still too weak to shoulder already today the quite heavy burden of scientific and technical progress. Budget assets, which pass through the USSR State Committee for Science and Technology, as a rule, due to bureaucratic procedure are received only in the second half of the year, therefore, all the speakers unanimously insisted on switching to two-year planning in order to ensure the financing of operations during the first quarters as well.

The establishment of a special bank, which could extend credit for science-intensive and expensive new developments, which are capable of causing revolutionary changes in the national economy, is becoming vitally important. It is clear that the enterprises, which are shouldering the burden of financing new machines and technologies, which are important for the country, should enjoy preferential taxation, otherwise we will remain forever at the present "cave" level of production. But all these problems for the present have not yet been solved.

But assume that even the financing of a project has been fully provided. How is it to be implemented under the conditions of the forming market economy, when the principle "a commodity for a commodity" rules? Scientists have neither meat nor scarce imported consumer goods. Who will provide material and technical supply for the priority programs? It is clear, it seems, that since they are state programs, hence, the State Committee for Material and Technical Supply will. But for the present the inclusion of state scientific and technical programs in the state order remains a purely "paper action." It is obvious that without the actual solution of this problem the state scientific and technical programs are also doomed to failure.

The fact that the program is being approved, but for the present there is no supervisor of it, causes bewilderment. I.S. Silayev, who has become head of the RSFSR Government, will hardly be able now to head this program.

Thus, although the program has been approved as a whole, but precisely as a scientific and technical program, on the economic and organizational levels it still has to be seriously modified. And, of course, first of all by the USSR State Committee for Science and Technology, for which the formulation and the management of the implementation of 15 priority state programs have now become the main concern.

Independent 'Concerns' Needed To Promote Technology Transfer

907A0330A Moscow NEDELYA in Russian No 33, 13 Aug 90 p 6

[Interview with Vladimir Ivanovich Rybak, general director of the Vneshtekhnika All-Union Cost Accounting Foreign Trade Association, by B. Pavlov: "The Concern of Intellectuals, Which Will Save Our Scientific and Technical Ideas"; date and place not given; first two paragraphs are NEDELYA introduction]

[Text] In our homeland there were always more than enough innovators, inventors, and trailblazing scientists. Another thing, however, is also indisputable: Their discoveries, inventions, and innovations for the most part were never properly appreciated in our country. Managers, who were always driven by the state plan, brushed them aside, all kinds of legal and departmental obstacles, as well as the fact that scientific and technical ideas and developments were offered to foreigners, as they say, in bare form: not backed by technologies and the experience of introduction and use (know-how), prevented the "intellectual commodity" from being sold sensibly.

In recent years things seem to have gotten moving, but as a whole the situation has improved negligibly. The basic reasons are the continuing lack of interest of state enterprises in the active introduction of innovations and the inadequate capacities and isolation of new organizations and enterprises, which are working in the scientific and technical sphere and the foreign trade sphere. The concern being formed these days on the basis of the Vneshtekhnika All-Union Cost Accounting Foreign Trade Association, I want to believe, will be free of all these shortcomings. Vladimir Rybak, general director of Vneshtekhnika, tells about it.

NEDELYA: Vladimir Ivanovich, our economy concerns for the present are still a new and, therefore, fashionable phenomenon. Examples, when former main administrations and even entire ministries have been renamed, concerns or associations of enterprises already exist. The sign is changed, but the managers with their style and methods of work remain as before. Your association is a state association and is subordinate to the State Committee for Science and Technology. Pardon me, but the question is not unfounded: Will not the concern being established prove to be the old structure with a new sign?

V.I. Rybak: I know well the examples, about which you are speaking. But they do not have anything to do with Vneshtekhnika and the future concern. Yes, the association is subordinate to the State Committee, but this subordination cannot be and will not be extended administratively to the concern. The relations between them will be formed on a contractual basis. The concern is an independent structure, otherwise it would not be worth establishing it. I will say more: All the members of the concern will also remain economically, legally, and financially independent. By no means do we intend to erect over it some managerial superstructure. This will be a quite small apparatus, the task of which is not to manage and not to give commands, but to serve the members.

NEDELYA: What is the general, main goal of the establishment of the concern?

V.I. Rybak: There are two primary tasks. The first is to improve in the shortest time with respect to all indicators the export and import of the latest scientific and technical developments, technologies, and know-how. The second is to promote the organization of the production of science-intensive products, first of all within the framework of the implementation of state scientific and technical programs.

Concerning export and import. Of the truly enormous number of all kinds of inventions and innovations, which are being registered, we succeed in selling abroad an infinitesimal portion, simply a pitiful number. Here it is possible, of course, to cite an objective reason that actually exists: It is prohibited to sell many innovations abroad before their introduction in the Soviet Union, but in the Union only a handful of the thousands are being introduced, our monster plants are no longer coping. It turns out that neither they nor people are succeeding.

But the second reason is even more regrettable. Because of it we either cannot sell at all what it is permitted to sell or sell it for next to nothing. In the West firms for a long time now have been accustomed to selling or buying developments together with the corresponding technologies, equipment, know-how, and at times materials as well. If all of this did not exist, they would reject even a perpetual motion machine. Because time is money. To pay, and then to develop themselves the technology and to design and produce the equipment—this does not suit them. And it is correct, if you consider it.... As a result we mainly deal in licenses, without any technical supply, and, thus, clear next to nothing.

NEDELYA: Is it really impossible to find in our country enterprises which would undertake such supply? For then the price would increase significantly and they would receive their share of the foreign exchange profit....

V.I. Rybak: It is now possible to interest enterprises with foreign currency. Previously nearly all of it was withdraw for the state budget, and no one wanted to exert himself to earn it. The main thing is to bring together and unite the necessary enterprises and institutes, which are different in type and specialization. But they, as a rule, work in different departments and their hands are tied by the state plan.... In short, before the appearance of independent enterprises it was no use even dreaming about the implementation of this idea.

The gaining by Vneshtekhnika of its own experience of establishing joint ventures with foreign partners preceded the idea of the concern. Today we have 12 such ventures, moreover, seven of them are already operating

actively and have given a good account of themselves on both the domestic and the foreign market.

NEDELYA: In what do they specialize? And what is the geography of the western cofounders?

V.I. Rybak: The geography is quite broad: the United States, Great Britain, France, Finland, the FRG, Yugoslavia, Hungary, the Czech and Slovak Federal Republic, even Liechtenstein. The specialization is also diverse. It is the production of computers and machining centers for machine building, the output of telecommunications equipment, construction, the rendering of all kinds of consultation services.... In establishing these ventures, we tried to see to it that their activity would be connected as closely as possible with new equipment, new materials, technologies.

NEDELYA: Will the concern now also consist of them?

V.I. Rybak: Yes, but not only them. Several small enterprises have expressed the desire to join us. You know, they are now growing like mushrooms, there are already thousands of them. They are mobile, react sensitively to everything new, are interested in new technologies and new know-how, and are striving to appear on the foreign market. It is very difficult for them to score great successes on their own, therefore, they are willingly agreeing to cooperation with use. There will be about 20 such enterprises in the concern.

There will also be quite large members. Several scientific production associations and a number of concerns, including construction concerns, have already reported their interest.

NEDELYA: What specifically will all these small and especially large joint enterprises gain, having united in the concern?

V.I. Rybak: Very, very much. Take the same legal protection, legal support of foreign economic activity. Not every enterprise is capable of maintaining the corresponding service, and this is also inefficient. Or the problem of studying the market, the conditions of demand, and prices. It is both disadvantageous and inefficient for every enterprise to deal with this separately. The concern organizes this work at the highest level. It is the same in the area of advertising. I am not talking about the most ordinary, but at times hard to solve problems, such as construction, the renovation of buildings, their equipment with local automatic telephone exchanges for 100, say, or 200 numbers. The corresponding member enterprises will fill such orders of their partners in the concern on the lowest, most favorable terms.

Moreover, we plan to establish our own bank in order to pool financial efforts as well.

NEDELYA: These, so to speak, are privileges for the members. But what will the concern change in the area, with which you and I began the conversation? How will its activity affect the situation with the export and import of scientific and technical developments and innovations?

V.I. Rybak: It will even have a very appreciable effect. The concern will be quite capable of providing developments with an entire set of technological equipment and specialized services and, if required, with materials. Enterprises of all the types necessary for this already are and will be among the members. Thus, the effectiveness of export operations will increase significantly, the foreign currency receipts will grow, and, hence, our possibilities in the import of advanced western technologies, know-how, and equipment will expand.

NEDELYA: The concern, as you said, will not be subordinate to the State Committee for Science and Technology. Thus, will state programs be relegated for you to the background?

V.I. Rybak: Not to be subordinate still does not mean to turn one's back. The filling of major, large-scale orders in accordance with state scientific and technical programs will become one of the basic tasks for the concern. This is extremely advantageous. After all, what orders are supported in our country by guaranteed financing and other types of supply? Look at the practical experience of the West: There very nearly the strongest competition takes place for the obtaining of government orders. And the very composition of the members of the concern and their difference in type are oriented best of all toward the performance of precisely multilevel, integrated jobs, which the state programs are. Previously state institutions dealt with them, but dealt them inefficiently, inasmuch as they did not have sufficiently strong ties on the foreign market and sufficient flexibility for work on the domestic market.

NEDELYA: What will the "brain" of the concern look like?

V.I. Rybak: You have observed correctly: precisely the "brain"! The board, which consists of executives of all the member enterprises, will deal, as is proposed, with the coordination of activity. However, we are assigning a far more important role, the role of the collective brain, to the scientific and technical council, for which we will request the services of the most authoritative scientists, lawyers, and economists, in short, intellectuals. The specific nature itself of our business requires that precisely such a "guiding" organ be formed. It has as much in common with the apparatus as the living human brain does.

Patent Official on Increasing Foreign Technology Sales

907A0329A Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 7, July 90 pp 14-15

[Article by S. Sokolov, chief of the Department for Patenting and Licensing Work, USSR GKNT Goskomizobreteniy: "How To Earn Hard Currency?"; passages in boldface as published]

[Text] **In order to earn hard currency, above all, we must free ourselves of certain rather widespread illusions in**

invention work, believes the author of this article, reflecting the viewpoint of only one of the interested parties.

There are several themes which inevitably arise in conversations, so it is worth talking to several inventors. The LITERATURNAYA GAZETA and IR roundtable, devoted to the problem of compensating inventors' labor, was no exception. In the organizers' opinion, the agenda was probably engagingly direct: "How does an inventor earn hard currency?"

Those who had gathered shared their modest experience in arranging contacts with foreign businessmen. However, for the time being none of them has succeeded in demonstrating the results of these contacts in the form of a bank account or cash. In addition, everyone directed attention to a characteristic feature in the behavior of foreign partners in negotiations: their aspiration to obtain as much information as possible about the essence of an invention, without burdening themselves with obligations or, moreover, assurances.

The 'Bureaucratic Apparatus': Look For Other Culprits

The speech by V. Ignatov, chairman of the V/O "Litsenzintorg" foreign trade association, one of our few professionals in the sale of inventions and other scientific and technical achievements abroad, was not very noticeable against this background. Precisely his speech set forth one of the basic requirements of the foreign market, namely that an invention, like any other result of scientific and technical activity, ought to be a commodity. This requirement has long been known to professionals in foreign economic relations, but only recently has this truth come to the awareness of our leading theoreticians and was set forth in the draft Law on Invention Work.

Having recognized an invention as a commodity and the inventor as its owner, and having included it in the sphere of commodity-monetary relations, society equates the inventor with the owners of other goods: bread, shoes, machines, raw materials, etc.

However, the world is set up such that the market does not chase after the inventor: the innovator himself, independently or with the help of capable organizations, must operate in the market, withstanding the struggle with numerous competitors. More than 200,000 patent claims are considered annually in our country alone, and in the foreign market inventors encounter even tougher competition. Yet, "over there," they have a better knowledge of the specific features, forms and methods for selling inventions; they have greater opportunities for advertising; they are also more knowledgeable about legal matters, about the methods and practice of calculating costs and, in general, about the drafting of licensing agreements.

In this regard, unfortunately, the mentality of domestic inventors reflects the situation in our domestic market. On the one hand, there is the monopoly of the producer, and on the other—the inventor's almost complete lack of rights. (At least, as the situation stands up to now, i.e., before the passing of the new Law). Unobjective, fragmentary information about the unenviable positions of the USSR in the licensing market and about the colossal incomes of inventors in capitalist countries is still being imposed here. This information has a fairy-tale popularity, rivaling that of athletes and movie stars: industrialists and other capitalists, they say, fight each other for the honor of doing great favors for and of enriching the inventor.

The complete ignorance of the specific features of the foreign licensing market creates an illusion to the effect that concluding a licensing agreement is such a trifle, about which it is somehow awkward to speak.

Philistine thinking, the shortage of objective information and the impossibility or lack of desire to acquaint oneself with the domestic practice of trade in licenses for inventions have created a myth about the presence of a powerful bureaucratic apparatus here, whose basic goal is with all its might to fence the Soviet inventor off from business contacts with the rest of the world. And, of course, to give him no opportunity whatsoever to earn hard currency....

Only recently, there were some grounds for such opinions.

The absence of competition in the domestic market, an inflexible tax system which does not react to an innovation and risk related to it, the virtually complete economic disinterest of enterprises in the export of their own production, the dependency of enterprise leaders on instructions from above, the rigid and little reasoned planning of industry and science, the economic irresponsibility of scientific research organizations and producers and many other factors have made enterprises and organizations in practice unreceptive to inventions.

Administrative measures to "introduce" inventions cannot and have not replaced economic incentives for using progressive developments.

Some practical workers, theoreticians and individual high leaders in foreign economic affairs have become possessed by the idea that the capitalists only sell licenses for "old stuff," preferring to export ready-made production. Therefore, we should not fuss. Only after every Soviet enterprise is equipped with one or another progressive domestic machine tool or technology and our export of this production is stabilized or even decreases (after a certain jump during entry into the foreign market with the new commodity)—only then can we allow ourselves to offer foreigners a license.

An Idea...But We Need Commodity Reality!

Conversely, inventors have been possessed by the idea that the foreign contractor is ready to pay cash, and a great deal of it, for their inventions at the idea level. In

LITERATURNAYA GAZETA in the roundtable material with the title "Dearer than Pearls and Gold, Or When We Begin to Trade in Ideas," representatives of the Invention Cooperative Center expressed roughly this thought. However, they overlooked the fact that an "idea" is still far from a commodity. The time and labor of specialists are required to its development—design, technological, etc.—and their salaries in developed countries are high. Often this makes the acquisition of a license at the "idea" level unprofitable. A capitalist in most cases will buy a license only if he can quickly put the acquired design or technology into production and receive a profit, greater that the average for the given sphere of activity.

We must also not forget that in any agreement the seller is obliged to give the buyer a guarantee—technical, economic and patent-legal. However, as a rule, it is impossible to give guarantees at the level of a "idea," especially technical and economic guarantees. Who will be the guarantor here? Of course, one can recall the risk capital companies, but such partners are more the exception than the rule for inventions from other countries.

Methods for Continuous Casting of Steel, Making Sparkling Wines...

Nonetheless, our trade in licenses is developing constantly, although slowly. At the same time, the necessary infrastructure has been created, cadres have been trained and have raised their skills, and the normative base and principles for stimulating the sale of licenses has improved.

The companies and organizations of over 60 countries in the world are now using USSR licenses for inventions and other scientific and technical achievements. They include all of the East European and of the industrially developed capitalist countries, as well as most of the developing countries which are capable of using an advanced technology.

Right now, domestic methods for the dry slaking of coke, continuous casting of steel, the casting of metals in a magnetic field, the continuous addition of carbon dioxide to wines, methods for treating eye diseases and a number of other methods are widespread throughout the world.

The All-Union "Litsenzintorg" Association alone, one of many foreign trade associations trading in licenses, which contracts with more than 2,000 companies and organizations in many countries, is ready to offer licenses for more than 2,500 of the latest developments.

The export of our licenses is developing fairly dynamically. In 1988, for instance, one-third more agreements were concluded than in 1987. About half of these were signed directly by enterprises, organizations, ministries and departments which had received the right to conduct foreign economic transactions without the participation of professional foreign trade organizations.

USSR payments and receipts in the trade of licenses are fairly precisely balanced. We are importing more from the highly developed capitalist countries and are exporting more to the socialist and developing countries. We are selling somewhat more licenses than we are buying.

For most countries which trade in licenses, the payments for licenses purchased exceed the receipts from their sale. Companies in the FRG use the greatest number of Soviet licenses—more than 250. Recently, we sold about 70 licenses to the FRG, approximately just as many to Japan, about 60 to Italy, about 40 to the U.S., and 30 to France. The sale of licenses to England is episodic.

Incidentally, the USSR sold somewhat more licenses in the U.S. than it bought. Such a situation is not at the initiative of the Soviet side.

The assortment of exports of our licenses basically corresponds to the main directions of Soviet invention work. Divergences attest to the influence of the market.

At the start of the 12th five-year period, the structure began to change sharply: the first place (more than 20 percent) was held by licenses in instrument building, radio electronics and communications (including software systems). The share of construction and of the production of construction materials has increased, as well as the share of welding, medicine and various developments by USSR and Union republic academies of sciences institutes and by VUZs [higher educational institution]. Their share is more than 33 percent.

Yes, Restrictions

The normative acts which regulate trade in licenses have changed considerably in recent years. They are simplifying the receipt of permission to export licenses and are reinforcing the principles of material incentive for selling them.

A question may arise: "Are certain restrictions or permission to sell licenses even necessary?" No matter what is created, let them sell it abroad. Let everyone do what he wants!

However, after all, inventions are part of our national wealth and it is hardly justified to sell them right and left, as was recently done with gas and oil. Immediate personal interests must mandatorily be compared to long-term social interests. Incidentally, "they" have highly developed state control over the transfer of inventions and other advanced technical solutions abroad, especially by independent national companies and firms.

When the volume of inventions patented by inventors from other countries grew sharply in the U.S. and the share of science-intensive production of companies in Western Europe and Japan in the North American market increased, the U.S. President emphasized in a message to Congress (January 1987) that it was necessary to improve the legal protection for scientific and technical solutions being created in the country. At the same time, the U.S. administration restricted the leakage of secret economic and scientific and technical information, introducing the appropriate corrections in the Freedom of Information

Act. Protecting the interests of private companies and state enterprises was kept first in mind. (The possibility of independently finding information about to whom an invention really belongs, if it was created by the employee of a company, seems curious to us).

The evolution of state control in Japan over the transfer of technologies abroad through licenses is also interesting. Before 1978, agreements to transfer technology in any sector of engineering had to be approved by three state agencies, including the National Bank of Japan. Agreements in 13 strategic fields (aviation, arms, explosives, nuclear energy, laser equipment, optical communications, new materials, aluminum production, desalinization of sea water, extraction of oil from the continental shelf and leather processing) also mandatorily had to be checked and approved by the Ministry of Finances and the Ministry of Industry and Foreign Trade.

In December 1980, this procedure was liberalized somewhat. They began to sell licenses in the above-mentioned fields to certain countries with only the special permission of the Ministry of Industry and Foreign Trade. In the remaining cases, licensing agreements no longer have to be approved. However, the "necessary minimum measures for control and regulation" have been preserved.

However, these changes in the export of Japanese licenses abroad were related to the growing competitiveness of Japanese goods on the world market and to the strengthening positions of Japanese monopolies in the markets of Western Europe and the U.S. The 1980 law encourages the sale of licenses to the utmost, especially the policy of exchanging patents within the framework of licensing agreements.

These examples show that state control over the export of advanced technology actively functions in the capitalist countries.

So, In Order To Earn, We Must...

In the USSR, the institutions which permit the sale of licenses abroad also offer assistance. Enterprises can receive consultation and whatever documents are necessary in order to get permission from the USSR GKNT [State Committee for Science and Technology] for a sale. Advertising brochures and annotations to them, translations, circulation and publication in the bulletin OTKRYTIYA, IZOBRETENIYA [Discoveries, Inventions] are also prepared.... The companies and organizations of more than 60 countries in the world subscribe to the bulletin. Add to this publications about licenses in a number of journals. Data on licenses being offered for sale are being placed in domestic and international technology data banks. Translated and duplicated advertising materials are sent to USSR trade representatives in other countries, to many agent-companies of the V/O "Litsenzintorg," to other Soviet foreign trade organizations, and to companies which are potential buyers. These data are also used when arranging the exhibitions of "Soviet Inventions," which are carried out by Goskomizobreteniy [State Committee on Inventions] on orders from the USSR GKNT.

Another detail: for demonstrations at these exhibitions of domestic inventions, the lecturers often invite the inventors as booth operators. Who, if not they, can better provide information about their own inventions?

Today, in order to get permission to sell a license, one must prepare and send the set of licensing documents to Goskomizobreteniy in accordance with the USSR GKNT Resolution No. 735 of 25 December 1989.

For participants in foreign economic relations, i.e., for organizations registered with the USSR MVES, it is not necessary to coordinate or approve licensing materials with one's ministry or department.

Assuming that the documents are properly in order, permission should be received a month and a half after their presentation.

The sale of licenses is one of the most highly effective items of export. Therefore, it was stipulated by law that all the hard currency proceeds from the sale of licenses will go to the account of the developer enterprises. Of this sum, up to three percent in the corresponding currency is allocated for the encouragement of the authors of inventions used in the license. Up to five percent of the amount received in Soviet rubles is allocated for awarding bonuses to all employees who directly and actively participated in the development of the object of licensing and in preparing it for sale (including the patenting of inventions included in it). The direct participants in the sale and the executors of the conditions of the concluded agreement are also awarded bonuses.

If the inventor is also a participant in other work, besides the creation of the invention directly, he can then be awarded a bonus on general grounds.

For the sale of licenses abroad in 1988, authors' awards were paid to more than 12,000 inventors.

So, how can the author of an invention earn hard currency? Let us try to formulate the answer in brief statements:

First, one must create an invention which substantially raises the production, utilization or other parameters of production or of a process.

Then, make sure that nobody has ever created anything like it; obtain patent protection in the USSR and in other countries; advertise the work and reveal a potential partner; substantiate its technical and economic guarantees; correctly calculate the price, draft and sign an agreement; fulfill the conditions of the agreement; receive the money which was earned; intelligently spend the money which was earned.

The entire set of work (except the last two) is best done with the business cooperation of inventors, patent specialists and foreign trade professionals.

Elimination of Georgian State Committee for S&T Protested

907A0340A Tbilisi ZARYA VOSTOKA in Russian
30 Aug 90 p 2

[Letter to the editor by Honored Journalist of the Georgian SSR David Kakabadze under the rubric "Letter to the Editor": "Forecast the Coming Changes"; first paragraph is ZARYA VOSTOKA introduction]

[Text] The economy of the republic is in a complicated situation, and this does not cause anyone doubts. One of the main reasons is the serious lag in the area of scientific and technical progress and the inadequate use of the latest equipment and advanced technologies.

The development of scientific and technical progress may already in the immediate future have a decisive influence on such economic categories as the intensification of the national economy, the increase of labor productivity, the decrease of the cost of a product, the increase of its quality, the saving of raw materials, materials, and manpower and material resources, and so on and so forth. Let us take, for example, the problem of the intensification of production. The real picture in the republic is as follows: During the first half of this year the growth rate of industrial production came to only 90.5 percent, while the production volume decreased in not only cumulative, but also physical terms, and so on. As a whole for the republic 476 associations and enterprises, or 48 percent of the total number, decreased the production volume.

Or take the problem of the increase of labor productivity. In 1989 this indicator for the republic decreased as compared with 1985 by 0.4 percent instead of the anticipated increase of 16.4 percent. And it was difficult to expect otherwise—after all, we have the very poor technical equipment of associations and enterprises, a large amount of equipment became obsolete long ago, the level of the mechanization and automation of nearly all production processes is very low.

But here is an example, when the introduction of new equipment can in a short time literally reverse the fate of an enterprise. It is a matter in this case of the Kutaisi Knitwear Factory, where for a long time they did not obtain high-quality output. They decided, at last, to agree to radical steps and to carry out the renovation of the works: They installed Italian NC machine tools. This immediately increased the quality of items significantly and made them competitive. Now the factory will be able to sell its products for convertible currency, to acquire the necessary imported equipment, and in the future to appear freely on the foreign market.

What could be simpler, some reader will say—to take and install western equipment, which does not need special representation, its technical and technological level is traditionally so high. Of course, all this is so. However, it is not at all easy to acquire what is needed, even for foreign currency. Here, as a rule, many problems arise. The numerous cases, when obsolete equipment and technology are purchased abroad, truly astronomical sums in foreign currency are spent, but then everything stands idle and is not used, are well known. The supply of production units with advanced machinery and equipment is one of the components of science and technology policy. On this level past years were far more productive for the republic—the Georgian SSR State Committee for Science and Technology, which performed a multilevel volume of work, including acting as an expert which coordinated the scientific and technical activity of academic and sectorial scientific research institutes and VUZ chairs and laboratories, operated at that time.

Moreover, this was a liaison organ for the efficient interaction of science and industry and so on. But they did away with it, and this immediately had an appreciable effect on science and technology policy in the republic. Such a situation alarms many authoritative specialists, to which a number of publications in the press in recent times, in which the question of the need to intensify the pursuit of a goal-oriented science and technology policy under the aegis of the National Committee for Science and Technology is raised, also testifies.

There is no doubt that the future National Committee has to perform immense work at the initial stage of its activity. And this is understandable—for the structural changes in industry, agriculture, and so on may change the entire infrastructure of the republic. It is impossible to foresee the process in detail—for what investments and manpower resources will be used. In this initial chaos the fate of science, scientific institutions, and scientific personnel, particularly at first, may turn out to be very complex. It is necessary to prepare for this and already now to forecast to some degree the coming changes. The National Committee for Science and Technology can perform such work.

The decrease of centralized capital investments in science, and not only in basic science, but also in sectorial science, will undoubtedly create serious difficulties. It is not ruled out that things may go as far as the closing or reorientation of individual sectorial and, perhaps, academic scientific research institutes. Both spheres, particularly the meeting point of these two spheres, should be under the control of the National Committee, in order to negotiate with the minimum losses the stage of the formation of a new infrastructure under the conditions of a market economy. But these are tasks of the committee for the immediate future, until the new organization of the economy and science appears. A market economy also has the advantage that here it is not the scientist who begins to "chase" the enterprise, the executive of a department, and the party worker, but all of them begin to seek the scientist, whose ideas and developments industry and agriculture actually need. A market economy is being introduced in order to turn everything completely around and to improve relations,

including the relations of science and production. In this case the National Committee for Science and Technology can act as a reliable middleman, a kind of advertising agent at the highest level of competence, to which those interested in the development of their production will turn.

It seems to me a profound meaning has been incorporated in the very name—"National Committee." It not only reflects a politcal and national meaning but also the economic processes, which are occurring and will occur, moreover, with increasing force. It, of course, reflects the centrifugal forces that exist and will exist in science. It is clear that the fate of scientific research institutes very soon will to an extremely small degree worry and interest union ministries and departments. Everything will rest on the shoulders of the republic. Undoubtedly, this is both great wealth and a heavy load, inasmuch as for many years we developed in an extensive manner a large scientific potential, which, we will say frankly, yielded a very modest return. It simply remained a potential, a force, which did not show its capabilities. Task number one is to make this potential serve the republic. It is not ruled out that things will go as far as the elimination of many union ministries and departments, which will place sectorial science under completely different conditions and will force it to seek a consumer of its product independently. Does sectorial science know how to do this? No, it does not, or it knows how to poorly. Here, too, the National Committee for Science and Technology, which has all the data on the needs in one sphere or another and concentrates, constantly updates, and "sorts" scientific and technical information, can give invaluable assistance.

If we do not rule out that tomorrow many scientific research institutes may be reoriented or closed, under these conditions, apparently, one of the tasks of the National Committee is to contribute to the creation of new places for scientific personnel and new spheres of the application of their forces.

The establishment of the National Committee for Science and Technology should not signify the confinement of science within the republic and region. On the contrary, one of its tasks is to strive persistently to make science of the republic a universal factor of union and world science and to put it into the worldwide context. The discussion on the establishment of the National Committee for Science and Technology has been going on for a long time, but the matter thus far has not gone farther. Meanwhile, the settlement of this important question is being dragged out intolerably, but the lack of a national science and technology policy is throwing the economy of the republic back and does not make it possible to use the scientific and technical potential effectively.

Lithuanian Academy of Sciences Declares Independence

907A0339A Vilnius EKHO LITVY in Russian 4 Sep 90 pp 1-2

[Interview with President of the Lithuanian Republic Academy of Sciences Juras Karlovich Pozela, by EKHO LITVY correspondent L. Grinberg, under the rubric "Our Interview": "'We Are Striving for Cooperation.' A Conversation of Our Correspondent With President of the Lithuanian Republic Academy of Sciences Juras Pozela"]

[Text]

EKHO LITVY: Juras Karlovich, in the spring of this year the Lithuanian Republic Academy of Sciences declared itself an independent scientific organization. The other day the same status was conferred by the Ukase of USSR President M.S. Gorbachev on the Academy of Sciences of the country. Do you not find that both phenomena are of the same order?

J.K. Pozela: Does one stem from the other? I would not say so.... We began earlier, but it is impossible to say that we have achieved more. The conclusion of the similarity of the processes occurring at both academies would be more objective. Both we and they are working on the tasks on the more efficient development of basic science and are proceeding from an understanding of the necessity of vigorous, urgent actions. But it would be incorrect to regard the actions themselves as the blind copying, the imitation of each other.

EKHO LITVY: A difference exists all the same: Our academy "liberated itself" independently and, as they say, at its own risk declared itself to have come out from under the tutelage of government organs. Freedom was granted to the union academy as if "from above." Which version is preferable?

J.K. Pozela: Everyone should take his own path. Moscow is striving in its own way for creative independence and the granting to institutes and laboratories of the right of independent activity. We are achieving the same goal by our own means. There is much in common, inasmuch as contracts, which were concluded on the basis of an agreement, link us. There are also differences.

EKHO LITVY: For example, in the existing difference of allocations and the material supply of scientific personnel?

J.K. Pozela: Here we, unfortunately, are lagging. The republic parliament is still just preparing to consider a package of questions of the material sphere in science, while in the Ukase of the USSR President the immediate increase of state budget allocations and the revision of the prevailing salaries and rates in favor of a significant increase are spoken about directly. Incidentally, the

government of Estonia has also sanctioned the approximately twofold increase of the wage of scientific associates of academic institutes and laboratories and instructors of higher educational institutions. This is one of the steps on the attraction and keeping of scientific personnel and a realistic attempt to prevent their departure for the ranks of cooperative members and producers of scarce physical assets, which are successful in the sense of the budget. It is also time for us to learn to display farsightedness. Basic research yields the maximum return, while the production of syringes or ankle-high boots satisfies only immediate demands. And it is simply a misfortune if people with a broad scientific outlook, who have simply been forced due to material circumstances to agree to such a step, appear among these producers.

EKHO LITVY: Has such a negative process already acquired here a threatening scale?

J.K. Pozela: I do not presume to judge the scale. I will say merely that, having become independent, we have changed radically the attitude toward scientific directions, giving preference to basic directions and creating the necessary conditions for their development.

EKHO LITVY: In the structural respect such division and separation of spheres of activity, which to an ill-informed person may seem absolutely inexplicable, have occurred at the academy. Where there was one institute, two have appeared. On the other hand, laboratories, which are subordinate to institutes, or even an entire plant have disappeared, as happened, for example, with the Gelikon Plant. Is there a system here?

J.K. Pozela: Yes, and a very strict one. The scientific circle of the republic is experiencing the same problems as our entire society. Democratic processes are advancing actively in society. The same thing is happening in its own way with science: the decentralization of the system of management, the granting of extensive rights for unimpeded initiative and fruitful scientific creativity. Scientists themselves are also forming the optimum, in their opinion, scientific structures. Thus, for example, new institutes—of ecology; of theoretical physics and astronomy; of the Lithuanian language; of culture and art criticism; of geography; of immunology—have appeared. The Kaunas Botanical Garden has received the status of an academic institute. We assume that chairs of higher educational institutions and scientific laboratories of individual departments may also become a part of the academy—provided that they can actually contribute to the development of basic research. Everything is gradually moving toward the establishment of a park of scientific institutions for the solution of basic scientific problems. Or, more simply speaking, it is possible to call it a science park, which is similar to what exists at Cambridge, where somewhere around 70 independent scientific fields are successfully cooperating.

EKHO LITVY: Do you consider it premature to say that we also have science parks?

J.K. Pozela: Why should I? A science park as such already exists. But with the stipulation that structurally it has not yet been completely formed. As an example I can cite the group of institutes of the agricultural type, which formed a cooperative among themselves. At one time a number of these institutes were seized "by supreme command" from the Academy of Sciences. Important basic directions at the remaining institutes were also seized. An orientation toward an immediate profit from research was set. "Impatience" at the state level led to the degeneration of the levels of research being conducted. The personnel themselves also became degenerate professionally. Seeds, which could have raised the standards of research, did not remain at the institutes. Which also led to the disastrous state of the land and animal husbandry, which we have to this day. Now we have to take reverse steps—to cooperate, to unite institutes on the basis of collaboration, to establish on their basis a scientific center of veterinary medicine: Without this we will not appear on any international market and will not solve the problem of a healthy herd.

EKHO LITVY: But what happened all the same with the Gelikon Plant, which not that long ago was in the department of the Institute of Semiconductor Physics?

J.K. Pozela: A discussion about Gelikon is a discussion about the property rights and claims of individual subdivisions of the Academy of Sciences. On the property level it was more profitable for Gelikon to get out from under our tutelage and instead of producing labor—consuming parts to engage in odd jobs that yield an instantaneous economic impact. Of course, we cannot tolerate the nearsightedness of manufacturers and their aspiration to rid themselves without a second's hesitation of the troubles that are connected with the implementation of scientific plans. We had to liquidate the enterprise and thus to attach it with respect to property to the scientific tasks, for the accomplishment it was initially established.

EKHO LITVY: That is, the people remained, the capacities remained. Was only the status of a plant lost?

J.K. Pozela: Exactly, but along with it the opportunity to declare its desire to devote itself to science.

EKHO LITVY: But is there a reverse example, when an enterprise under the aegis of an academic institute displayed farsightedness and lived to see times that are good for itself and for science?

J.K. Pozela: The Bitas Plant attached to the Institute of Mathematics and Cybernetics. In principle it could also have taken the easy way of creating instant values. But it did not do this and stuck to the direction given by the institute. Today it is already making foreign currency products, the annual turnover of the enterprise comes to

several million dollars a year. Bitas has a great professional reputation—the Lithuanian-Austrian Baltik-Amadeus joint firm originated on the basis of the enterprise.

EKHO LITVY: The contract system of offering work to scientists from abroad is specified by the new status of the USSR Academy of Sciences. But what about here?

J.K. Pozela: I returned a few days ago from an international conference in Sicily, where a new scientific organization—the World Laboratory—was held. This is a nongovernmental organization, which has set as its goal to unite the efforts of scientists of the entire world for the solution of such global problems as the elimination of the consequences of ecological catastrophes, the monitoring of the cleanness of the environment, the combating of AIDS and other diseases, and so on. Many countries, which have affiliates of it, belong to this scientific association. The same kind of department of the World Laboratory will also be opened, I believe, in Lithuania. On this level I am hoping for the understanding and support of the government. Today it is clear to everyone that the independence, the autonomy of the republic Academy of Sciences should not be understood as its isolation from the scientific organizations of other republics and countries. On the contrary: We are striving for broader and broader cooperation.

Debate Continues Over RSFSR Academy of Sciences

907A0322A Moscow SOVETSKAYA ROSSIYA in Russian 14 Aug 90 p 2

[Article by Corresponding Member of the USSR Academy of Sciences N. Pokrovskiy (Novosibirsk): "Semilegal Science. Reflections on the Formation of the Russian Academy of Sciences"]

[Text] The Presidium of the USSR Academy of Sciences after lengthy debate settled on a concept, in conformity with which the Russian Academy of Sciences will have its own administrative bureaucratic superstructure and about 500 of its own academicians and corresponding members. However, it will lack its own scientific research structures—institutes and laboratories. Russia will be able to finance its own science only through competitive scientific projects, the fate of which by departmental tradition will be decided in the capital corridors of scientific power. The preliminary July debate in the RSFSR [Russian Soviet Federated Socialist Republic] Supreme Soviet has already shown that the new legislative and executive power of Russia categorically does not agree with such a model. The formation of the RSFSR Academy of Sciences has been halted. A fierce debate with the participation of the community at large is expected in the fall.

I have already more than once had occasion to stress in the press that with the transition from the unitary Russian Empire to the unitary Soviet Union the imperial Russian Academy of Sciences did not disappear. It simply became the all-union Academy of Sciences. The unitary state is rapidly being transformed before our very eyes into a confederation, and the reverse transformation of the academy into the Russian Academy would be entirely logical. Similar ideas have been repeatedly expressed by our most prominent scientist. But what would seem an entirely logical solution is coming up against a large number of difficulties, of which the unwillingness of members of the "large" academy and associates of academic institutes to be transformed from "first-rate" ones into "second-rate" ones and their entirely understandable misgivings concerning the decrease of the standard of living and laboratory opportunities are in first place. But meanwhile the "brain drain" abroad is gathering at a more rapid pace. The problems of prestige will be relegated to the background as the prestige of the sovereign Russian Federation itself increases. But the main question remains: Will the republic be able to handle the enormous financing of the institutes of the "large" academy, which shoulder a huge share of expensive military research? And basic natural science research costs an enormous amount of money, while the RSFSR Council of Ministers already this year owes the Siberian Department of the USSR Academy of Sciences, which it finances, several tens of millions of rubles. Academician V. Koptyug and many others believe that the transfer of the territorial departments of the USSR Academy of Sciences to the jurisdiction of the RSFSR Academy of Sciences is a simple and entirely feasible matter. I do not consider myself competent to solve the problems of the natural and technical sciences. As to similar problems in the humanities areas of knowledge, they, I dare say, are no less urgent and must not be put off.

All the movement for the establishment of the Russian Academy is taking place against the background of the powerful explosion of national self-consciousness. Without the most serious assistance of academic science this explosion assumes at times destructive forms that lead to national isolation and national animosity. Meanwhile the material capabilities of the Russian humanities do not meet any norms of civilized states. At the Siberian Department of the USSR Academy of Sciences, for example, the humanities account for less than one and one-half percent of the budget allocations. Even in developing countries they spend not less than 15-20 percent on them. Moreover, the absolute weight of each percent in our country is tens of fold less than in Europe, Japan, and America. The sharp increase of the financing of humanities research is absolutely unavoidable, if we want to recover from the present crisis. But if we take these millions and throw them to the academic administrative system, they may simply sink into the sand. At the supreme academic headquarters they will decide to allocate considerable assets for an important scientific program, but then, as usual, Moscow will take for itself the lion's share of these assets and will allocate something to Leningrad, while the provinces will receive crumbs. Moreover, at every bureaucratic level the authorities will grab a piece for themselves, without

intending in so doing to take part in the fulfillment of the corresponding program. But meanwhile precisely in the Russian provinces the development of basic humanities research is now needed most of all. Without it you will not restore the broken bond of cultural historical traditions. Add to this the internal crisis of the humanities....

I see the solution in the speeding up of the establishment of humanities scientific research structures within the Russian Academy, but structures not of the traditional type. First of all it is possible to appropriate allocations only where there are genuine research schools that are recognized by the all-union and international scientific community. Moreover, only for specific programs, with the strict monitoring of their fulfillment with the help of experts who are appointed by the legislative and executive authorities of the Russian Federation. Unfortunately, here one also cannot avoid the monitoring of the receipt of the allocated assets by the addressee—the immediate performer. But then in January the Presidium of the USSR Academy of Sciences made a very good decision on the development of basic historical philosophical research, the program was estimated at more than 3 million rubles, including capital construction. Of this amount the eastern part of Russia accounted for less than 100,000 rubles, but the Presidium of the USSR Academy of Sciences decided to be economical precisely with it. What part of the most important program, which envisages the publication of a basic series of documents of Siberian history of the 16th-18th centuries—from Yermak to the academic expedition of G.F. Miller, the texts of Siberian literature of the 17th-18th centuries, the memoirs of Siberians of the 19th century, the works of Maksim Grek, and much more—will we now be able to fulfill?

At the Siberian Department of the USSR Academy of Sciences archeologists, linguists, literary scholars, and philosophers have been lumped together in one institute. It is envisaged to carry out it division into three or four institutes with a common administrative structure by 1995. So then, will we wait five years with academic support of Russian national revival? Here is a specific field of activity for the Russian Academy of Sciences.

The majority of republics of Central Asia and Transcaucasia have their own excellent institutes of ancient manuscripts. Their buildings are masterpieces of architecture. Does Russia really not need something similar? For archeographic expeditions in the Ural-Siberian region alone have collected more than 6,000 ancient manuscripts. They are invaluable treasures of ancient Russian culture and literature and a previously unknown large layer of monuments of folk literature of the 18th-20th centuries! It would be possible to establish the Ural-Siberian Institute of Manuscripts with a flexible structure, practically without an administrative apparatus, and with reliance on such centers of archeography as the Ural and Novosibirsk universities, the Institute of History, Philology, and Philosophy of the Siberian Department of the USSR Academy of Sciences, and the State Public Library of the Siberian Department of the USSR Academy of Sciences. Its priority task is the development of a computer data bank on ancient manuscripts of the eastern part of Russia, which could then become a national data bank. Are we not ashamed that the resources, skilled specialists, and computer hardware, which are being allocated abroad for the study of Russian history, significantly surpass what our country is allocating for the same purposes? For example, talented American researcher Robert Crummey worked several weeks in Moscow archives, having at his disposal a fine team of computer operators. For our collections he published a splendid directory, which contains complete biographical descriptions of all the members of the Russian boyar duma of the 17th century. Now the Russian historian cannot get by without this American work. A few more years of our lag, and we, when studying our history, will be forced to resort first of all to qualified western works. In Western Europe, America, and Japan they are well-informed about the real value of our humanities research. Even given the fact that researchers themselves still cannot make they way through to these countries to meet with colleagues.

In a quarter century we have trained in Novosibirsk quite a number of specialists of a rare and now very necessary specialty—experts in medieval consciousness (including Christian consciousness), medieval culture and bibliophilism. The works of the Ural-Siberian school of archeographers are well known at Oxford, Cambridge, Heidelberg, Harvard, the universities of California and Oregon, the Hawaiian Islands, Tokyo, and Prague.... And the Russian Government, by financing now academic humanities, would be entirely able, following international traditions, also to resort to foreign expert appraisals of the authority of some schools of ours or others.

The established hardworking collectives, which have been recognized by the leaders of Soviet and foreign schools, should have the main say in solving all these truly national problems.

Laverov Interviewed on Impact of Market on Soviet Science

907A0332A Moscow PRAVDA in Russian 25 Aug 90 2nd edition p 3

[Interview with Academician Nikolay Pavlovich Laverov, chairman of the USSR State Committee for Science and Technology, by PRAVDA correspondent A. Pokrovskiy, under the rubric "Science in the Modern World": "Science and the Market"; date and place not given; first three paragraphs are PRAVDA introduction]

[Text] Academician N. Laverov:

"Unfortunately, inadequate attention is being devoted in our country to scientific and technical progress. Vital problems of today, which require immediate solution, often overshadow questions of the development of science and technology, although socioeconomic transformations and the quality of life of Soviet people not only in the distant future, but also in the immediate future depend on their effective solution."

The conversation of a PRAVDA correspondent with the chairman of the USSR State Committee for Science and Technology began with these words:

PRAVDA: Is it not true, Nikolay Pavlovich, that the theme of our conversation today sounds unusual against the background of the discussions on the transition to a market economy, which have been carried on constantly in recent times? In any case in the numerous discussions on the implementation of economic reform and the transition to market relations it is seldom possible to encounter if only a reference to scientific and technical progress. But then the Ukase of the USSR President "On the Status of the USSR Academy of Sciences" was published yesterday....

N.P. Laverov: In case of a multistructure economy the conditions for free and fruitful scientific creativity and the development of "big science" are created on the basis of the step-by-step democratization and decentralization of the system of management, the elimination of state property, and the granting of broad rights to academic institutes and laboratories in the organization of their scientific activity. In this connection the Ukase of the USSR President on the granting to the USSR Academy of Sciences of the status of an all-union self-managed organization, which operates on the basis of USSR laws and the charter of the academy without any interference of state and other structures and independently ensures the efficient work of institutes, laboratories, and other subdivisions in the area of basic scientific research and the training of scientific personnel, is of the greatest importance.

Here it is very important that all the fixed capital and other property of institutes, laboratories, enterprises, and organizations of the USSR Academy of Sciences are being transferred to their exclusive ownership. The academy is called upon to perform an important integrating role in the sphere of science: Both it itself and its organizations and institutions should cooperate closely on a contractual basis with the academies of sciences of the union republics, striving by joint efforts for the increase of the overall level of basic research in the country.

As world experience shows, the scale and effectiveness of basic research in many respects are determined by its reliable and increasing material and financial support on the part of the state. Here we are proceeding from the fact that "big science," which has as its task the conducting of the most important theoretical research and the solution of intersectorial scientific and technical problems of statewide importance, needs stable financing through many sources.

Allocations from the state budget, which have been increasing from year to year, remain the main one of them. Thus, in the last five years the financing of basic research at the USSR Academy of Sciences and the academies of sciences of the union republics has been increased by nearly one and four-fifths-fold.

Along with budget financing it is envisaged to develop the proportionate participation of interested enterprises, organizations, banks, ministries, and various funds, both on a reimbursement basis and on credit terms. The formation of an all-union state budget fund of basic research, which a scientific council will manage, seems promising.

PRAVDA: In the USSR State Committee for Science and Technology, which you head, I saw the quite voluminous bound publication "The Program Plan of Work on the Support of the Transition of the Scientific and Technical Sphere to the Market." There the preparation of the draft of the USSR Law on State Science and Technology Policy is the first item. Could you tell PRAVDA readers about this in greater detail?

N.P. Laverov: To date we do not have developed legislation, which regulates relations in the sphere of science and technology and specifies the policy of the state in their area. Here we have fallen very far behind. In the United States, for example, about 100 laws, which regulate relations in the sphere of scientific and technical progress, are in effect. Life has shown that we also need a strong legal basis of the development of science, engineering, and technology in the country. After all, we have a scientific and technical complex that is enormous in its scale.

Therefore, an entire package of laws, which regulate relations in the area of science and technology, is being developed. These are the Law "On Invention in the USSR," which has already been turned over to the USSR Supreme Soviet, and the laws "On Production Prototypes in the USSR" and "On Trademarks and Service Marks," which have been submitted to the USSR Council of Ministers for consideration.

It is anticipated that the Law on State Science and Technology Policy will be a fundamental act, which secures the role of the state in the support of basic, priority research, the development of democratic principles in the management of scientific and technical progress and self-management in scientific societies, the development and strengthening of

the sovereignty of the subjects of the federation in the scientific and technical sphere, and the independence of scientific collectives in research activity. The increase of the receptivity of production to scientific achievements, world scientific and technical ties, and the status of scientific personnel are also a subject of this law. And the primary thing is that the law is called upon to secure the transition of the scientific and technical sphere to operation on the principles of a market economy.

And here two main tasks are being worked on. On the one hand, to protect science and its creators against potential negative factors during the transition to a market and, on the other, to give free range to creative initiative and enterprise for the active use of the results of scientific activity in industry, agriculture, the social sphere, and other areas.

The draft of the law is being prepared in accordance with a decision of the government of the country with the participation of representatives of the union and autonomous republics, the scientific community, ministries, and departments. It should be submitted to the USSR Council of Ministers in September of this year and then be turned over for consideration by the fourth session of the USSR Supreme Soviet.

We believe that by reason of its social importance this law could play the role of a kind of constitution in the scientific and technical development of the country and become a consolidating factor under the conditions of the increase of the economic independence and the strengthening of the sovereignty of the union and autonomous republics.

PRAVDA: In recent times many very critical shots have been taken at the monopolism of leading groups of scientists in one field or another of knowledge. But, on the other hand, how fruitful is the pluralism of opinions in science?

N.P. Laverov: Monopolism in science and the predominance of departmental and group interests are doing serious damage to its development. As a result the developments of many collectives, as well as individual specialists, who do not belong to head organizations, are not receiving the necessary public recognition and are being poorly used and the development of the intellectual potential of the country is slowing down.

The creation of a market of scientific and technical products presumes the elimination of the monopoly of individual scientific organizations, and first of all head organizations. Alternative principles in the conducting of research and development, which are conducive to the development of contention and competition in the sphere of science and technology, are already undergoing development. More than 1,000 projects were submitted, for example, for the competition in accordance with the program "Technologies, Machines, and Works of the Future." Of these projects about 100 of the most promising ones were selected by experts and were included in the program.

The high scientific and technical level of the selected projects, which in many respects lead the world technical level, testifies to the fruitfulness of such "pluralism."

An example is the project of a set of technologies of the application of coatings, which have dielectric, decorative, current-conducting, wear-resistant, and other useful properties. With the use of these technologies coatings can be applied to any materials—from ferrous and nonferrous metals to paper. This is due to the fact that the coating processes take place at low temperatures. The use of such technologies in the production of microelectronic items, for example, integrated circuits, is particularly efficient. The indicated technologies are undoubtedly "breakthrough" technologies and do not have analogs in world practice.

As a whole the goal is to create through the corresponding economic privileges and stimuli and legal guarantees favorable opportunities for the display of initiative in the sphere of science and technology and for the development of diverse forms of enterprise.

Practical experience testifies that innovation activity is carried out in the most dynamic manner at small enterprises and organizations. The directions of their activity include: the conducting of scientific research, mainly of an applied nature, design and retooling, software development and scientific and technical information, advertising and economic training.

Although there are many difficulties and costs here, this matter seems promising. Recently the USSR Council of Ministers adopted the decree "On Steps on the Establishment and Development of Small Enterprises." Legislation on antimonopoly steps is being prepared.

PRAVDA: Do you see possibilities of competition for your committee and the USSR Academy of Sciences on the part of some nonstate organizations? And if so, what do you think of this?

N.P. Laverov: The transition to state-public regulation is one of the main directions of the improvement of the management of scientific and technical progress under the conditions of the radical economic reform. This presumes the close cooperation of organs of legislative and executive power and the scientific and technical community in the management of scientific and technical progress and the participation of the scientific community on a democratic basis in the elaboration and making of the most important decisions in the area of science and technology at all levels of management. The role of public formations in the choice of the priority directions of scientific and technical progress, which are capable of having an effective influence on the structural reorganization of the economy of the country, the technological modernization of enterprises, and the solution of ecological and other social problems, is increasing more and more.

Of course, these public formations will give their own appraisals of the state of affairs in the scientific and technical sphere and will advance alternative approaches to the solution of scientific and technical problems. And although

the reconciliation of the different points of view under the conditions of such unique competition will be a difficult matter, in our opinion, this will undoubtedly promote the elaboration of the optimum decisions that take the interests of society more completely into account. Moreover, while attaching great importance to an objective and competent examination when formulating and implementing science and technology policy, the USSR State Committee for Science and Technology believes that public examination and, in particular, the USSR Committee of Public Examination are called upon to play an important role here.

It must be said that in the USSR State Committee for Science and Technology quite close contacts with the USSR Union of Scientific and Engineering Societies have already formed. Academician A. Ishlinskiy, chairman of the board of the USSR Union of Scientific and Engineering Societies, being a member of the collegium, for many years now has been actively participating in its work. A joint working group for the cooperation of the USSR State Committee for Science and Technology and the USSR Union of Scientific and Engineering Societies in the area of the formulation of science and technology policy was recently established. All this is contributing to the involvement of these public formations in the processes of state-public regulation of scientific and technical progress. Cooperation with other public organizations, particularly the USSR Union of Leaseholders and Entrepreneurs, the USSR Union of United Cooperatives, and the USSR Union of Centers of Scientific and Technical Creativity of Youth and Small Venture and Innovation Firms, whose executives, Comrades P. Bunich, V. Tikhonov, and I. Ordzhonikidze, were approved by members of the USSR State Committee for Science and Technology, is being organized.

PRAVDA: How, in your opinion, will "big science" feel in case of a multistructure economy? For small enterprises, cooperations, and so on are simply not capable of financing major scientific research.

N.P. Laverov: The transition to a market economy precisely presumes the formation also of a market of scientific and technical products and the extensive inclusion in the economic turnover of the results of intellectual labor. However, peculiarities of the transition to a market exist in different areas of scientific and technical activity. If we talk about basic research, it should be of a noncommercial nature and not depend on market conditions. And the state should give constant support to this research, particularly the directions, which are capable of ensuring breakthroughs and providing a stimulus for the development of fundamentally new, revolutionary technologies.

State support should also be given to the work in the priority directions of scientific and technical progress. Scientific and technical programs of statewide importance are being formulated for their realization, thus far there are 16 of them in all.

The state scientific and technical programs are of great social importance. Many of them are inseparably connected with the solution of the most vital problems of the development of our society. Thus, the program of the development and introduction of highly efficient processes of the production of foodstuffs is aimed at the increase of the fertility of soils, the obtaining of ecologically clean products, the elimination of the shortage of food and fodder protein, which now comes to about 1.2 million tons a year, and the assurance of the stable yield of plants and the stable productivity of animal husbandry. It also envisages the development of effective methods of the storage, transportation, and processing of agricultural products.

For the accomplishment of the posed tasks genetic and cell engineering and biotechnological processes are being used and efficient equipment, particularly for the processing industry, is being developed. Academic, sectorial, and VUZ science is participating extensively in research, foreign specialists have also been enlisted in it.

New economic forms that are typical of a market economy—associations, joint ventures, and scientific and technical centers, which are capable of performing work at an advanced level—are being used for the quickest implementation of the results of development. The EKOS Association for the production of biological preparations for ecologically clean farming has been established, a scientific technical center for the production of ecologically clean agricultural products has been organized, an association of enterprises for the production of children's food is being established. In the future it is intended to establish on the basis of these organizations a concern for the production of ecologically clean foodstuffs.

It should be stressed that the state support of these programs is envisaged not only as direct influence through state orders and budget financing, but also as indirect stimulation on the basis of tax, credit, and price privileges and the use of accelerated depreciation.

As to applied research and development, which are aimed at the development, assimilation, and extensive dissemination of new equipment and technologies for the modernization and retooling of production, they should be carried out with the maximum use of market mechanisms, as a rule, on a cost accounting basis in accordance with contracts with clients, while their results should be sold as a commodity.

The share of the allocations, which are being spent in this sector of science and technology, is approaching 50 percent of the total spending on innovation activity in the country.

PRAVDA: How under market conditions will matters stand with scientific instrument making, in which we have fallen greatly behind the world level and without which major steps on the path of scientific and technical progress are now impossible?

N.P. Laverov: In principle domestic science in the area of new methods and means of measurement is at a modern

level and often surpasses this level. We are losing at the subsequent stages—engineering development and the output of instruments.

For example, the Institute of Chemical Physics and the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences developed an acoustic microscope—a unique instrument, in which the latest achievements of microelectronics, acoustics, and technology were used. In its technical parameters it surpasses the best foreign analogs. It is necessary, it would seem, to begin to produce these instruments as quickly as possible in order to enjoy all the commercial advantages, while they have not become obsolete. But, as has already become customary, the question got bogged down in the search for a manufacturing plant....

Here it is appropriate to note that in developed countries firms and manufacturing plants of scientific instruments, which are well known to the entire world, operate mainly near research centers or universities (for example, the instrument and computer products of Cambridge University are well known). In our country the advantages of such a symbiosis thus far have not been understood.

Thus, in 1989 the USSR State Committee for Science and Technology made an inspection of the pilot experimental bases of instrument making institutes of Moscow and Moscow Oblast. It turned out that pilot plants or works exist at only 70 percent of the institutes, while the total volume of their services comes on the average to 10 percent of the total amount of work being performed. The profit, which is derived from the production of instruments, barely covers the maintenance of the pilot works proper and actually does not give the author-developers anything. Given such a "mechanism" the universal lack of interest in the production of complex advanced scientific instruments becomes understandable.

It seems that the introduction of market relations will also promote the development of scientific instrument making. But, taking into account the particular importance of this direction, additional economic benefits and new organizational forms are necessary for the development of the existing scientific, technical, and production potential and the enlistment of the new scientific, technical, and production potential in the development and production of advanced instruments and automation equipment for scientific research. The defense sectors of industry within the framework of the conversion being carried out should be enlisted more extensively in this matter.

It is also intended to give support to the establishment of small enterprises, which deal with the development of scientific instruments and information measuring systems. A policy of the formation at large scientific and educational centers of the country of a branched network of centers of the collective use of scientific instruments is being pursued.

PRAVDA: I believe that the question of the "brain drain," which in our country is obviously picking up speed, is closely associated with the preceding question.

N.P. Laverov: This problem, which is becoming more acute, worries us. Many scientists and skilled specialists are leaving today for a job abroad. Tomorrow, with the passage of the Law on Exits, the process will become more intense. It would not cause particular anxiety, if foreign scientists and specialists would come to our country for work, but thus far this is not happening.

It is not only that abroad more attractive living and everyday conditions are made available to our scientists and specialists. In the majority of cases the departures are connected with the higher level of supply of foreign scientific centers with advanced equipment and experimental hardware.

Therefore, it is very important, along with the provision of our scientists and specialists, especially young ones, with well-deserved living and everyday conditions, to solve in a priority manner the problems of improving the material and technical base of research. This, undoubtedly, will yield good results. It is also necessary to make use of the foreign experience of organizing technopolises and technology parks. The assurance of the genuine freedom of creativity of the scientific worker, equivalent remuneration for his labor, and the increase of the prestige of the scientist, engineer, and process engineer should be come integral elements of state policy in this area.

The possibility of the conducting by Soviet scientists and specialists of research, examinations, and consultations under contracts with foreign firms with payment in foreign currency, the publication of scientific works in foreign journals, and the joining of international scientific and technical associations, committees, and clubs should be afforded. It is necessary to support the establishment of the legal stability, protection, and social confidence of the scientist, engineer, inventors, and worker-innovator. These steps, in our opinion, will make it possible to overcome so negative a trend.

PRAVDA: Will we also not lose highly skilled personnel during the conversion of defense sectors?

N.P. Laverov: Undoubtedly, such a danger does exist.

The conversion being carried out will lead to the cutback of a number of military development efforts and plants and will require the change of the specialization of defense enterprises and organizations. A certain number of personnel, including highly skilled personnel, will transfer to other sectors. At the same time one must not allow the collapse of formed collectives, which are called upon to ensure a high level of defense hardware and are capable of developing new directions of scientific and technical progress in the interests of the entire national economy. This pertains first of all to the sphere of informatization, communications facilities, aerospace equipment, new materials, and a number of others, on which the structural reorganization of our economy depends.

Therefore, it is now necessary to support such collectives, enlisting them actively in the fulfillment of programs of the entire national economy, particularly in the directions, in

which the scientific and technical potential of these collectives could be revealed most completely. Within the framework of the state scientific and technical programs such a policy is being pursued by the USSR State Committee for Science and Technology, organizations of defense sectors are being enlisted in the competitions of projects and the implementation of programs.

Great prospects for the application of the scientific and technical potential of defense sectors exist, in particular, within the State Scientific and Technical Program "Ecologically Clean Power Engineering" in the direction of nontraditional power engineering and within the State Scientific and Technical Program "Machines, Technologies, and Works of the Future." In the first of the named programs the project of the development of a standardized 1,250-kilowatt wind-operated electric plant, which was submitted by the Yuzhnoye Scientific Production Association of the Ministry of General Machine Building, was successful in the competition.

It also seems advisable to subdivide defense enterprises and organizations, to lease the shops and sections, which are being converted, and to establish small enterprises, which are oriented toward the development and output of civilian products. It goes without saying that a personnel retraining program is also needed.

PRAVDA: Can it be said that the practical adaptation of scientific and technical organizations to work under market conditions has already begin, meaning the establishment of technopolises, technological exchanges, and so forth?

N.P. Laverov: The prerequisites for the creation of a market mechanism in the sphere of scientific and technical activity in essence were established already during the changeover of scientific organizations to full cost accounting and self-financing by the introduction of contract prices for scientific and technical products, by the granting of freedom in the choice of a client, the formation of plans, and the disposal of available assets, and by the transition to a system of wholesale trade in material and technical resources.

The transition of scientific organizations to work under the conditions of a market has actually begun: The volume of orders, which are being filled under direct contracts, has increased sharply, the maintenance of scientific organizations by means of the centralized assets of ministries has practically been halted, the system of internal institute cost accounting has received universal dissemination, the number of scientific organizations, which are switching to a collective and lease contract, is increasing, such new structures as state associations, concerns, and consortiums are being established.

The formation of such structures makes it possible to hope for their successful "incorporability" in the market economy. The formation of technopolises and technology parks will be the nextir successful "incorporability" in the market economy. The formation of technopolises and technology parks will be the next important step. This process has already begun. A technology park has been established in Moscow (at the Exhibition of USSR National Economic Achievements). It was formed in collaboration with the Italian concern Grasseto, the ISMES and IRITEC firms, and Financial Projects as a complex of joint research and introduction laboratories and enterprises for the experimental checking and optimization of Soviet research and development, the devising on their basis of production prototypes, and the introduction of products on the markets of western countries within the framework of cooperative works and joint ventures. Information science, biotechnology, and new materials are the priority directions of its activity. There are proposals on the formation of technopolises in Leningrad, Tomsk, Zelenograd, and other cities.

The restructuring of the financial support of such structures is also occurring. For this purpose investment banks and funds are being established. For the extensive implementation of advanced technologies technological exchanges, on which it will be possible to buy the technologies necessary for a specific works, will be established.

PRAVDA: What role is the introduction of the concept "intellectual property" called upon to play in the development of scientific and technical progress in the country under the new conditions?

N.P. Laverov: So that the scientific and technical product would fully become a commodity, it should have an owner who could dispose of it. The concept "intellectual property" also reflects this new socioeconomic situation, specifying who is the owner of the results of scientific research, experimental design, and technological operations—the scientific association or the scientific associate, the scientific collective or the individual researcher. Of course, the concept "intellectual property" encompasses the results of any creative labor, but for the sphere of scientific and technical progress it is very important for us to distinguish and specify the owner of the results of research and development and in this connection scientific intellectual property.

Objects of scientific intellectual property differ substantially from material objects of property. When I turned over a material object, I as the owner am deprived of it, when I turn over an idea, it all the same remains mine. This basic peculiarity and a number of other specific features brought about the concept "scientific intellectual property" and the need to establish a special legal regime for it. Therefore, the introduction of the concept "intellectual property" under the new conditions is playing an exceptionally important role for scientific and technical progress and the transition to market relations in the scientific and technical sphere. Moreover, it makes it possible to estimate at its true worth the contribution of a scientist, to increase the prestige of scientific labor, and to create the conditions for the realization of the capabilities of a person.

The USSR State Committee for Science and Technology has prepared the draft of a USSR law on scientific intellectual property, which in the immediate future will be submitted for discussion by the scientific community.

In the aggregate in 1991 we will already have a legal basis of the activity of the scientific and technical sphere

under the conditions of a market economy, which is an important step on the chosen path.

[Boxed item, p 3]

Figures for Consideration

In the USSR about seven percent of the total allocations for science is earmarked for basic research while in the United States about 14 percent is. In the opinion of experts, by 2005 we need to increase the share of expenditures on basic research to not less than 11 percent.

In our country more than 4 million people, including 1.5 million scientists and science teachers, are employed in the sphere of science and technology. From the state budget 24 billion rubles a year are allocated for the financing of science.

State scientific and technical programs have begun to be formed in our country on a competitive basis. More than 50 competitions, for which over 10,000 projects were submitted, have already been held. Approximately 1,400 projects were selected from them by an extradepartmental independent expert commission for implementation.

By the end of 1989 the number of centers of scientific and technical creativity of youth, the All-Union Society of Inventors and Efficiency Experts, and the Union of Scientific and Engineering Societies and scientific technical cooperatives came to more than 11,500, having exceeded by four and one-fifth-fold their number at the beginning of the year. Nearly 1.5 million people are employed in these organizations, while the amount of performed work increased by three and nine-tenths-fold, having reached the sum of 4.7 billion rubles.

In 1989 more than 300 million rubles were additionally allocated from the state budget to the USSR Academy of Sciences and the academies of sciences of the union republics, where the bulk of basic research is concentrated. Moreover, 400 million rubles were allocated for technical equipment on a one-time basis.... In 1990 an increase of allocations by more than 300 million rubles is envisaged.

In the supply of scientific research institutions with scientific instruments and automation equipment, we lag behind industrially developed countries by a factor of four to six.

Academician Petrov on Biology, Genetic Engineering Developments

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[Interview with Vice President of the USSR Academy of Sciences Academician Rem Viktorovich Petrov, by N. Mishina, under the rubric "Science in the Modern World": "The Basic...Gene. The Subject of Our Interview Is Academician R. Petrov"; date and place not given; first paragraph is PRAVDA introduction]

[Text] Genetics, which deals with infinitesimal magnitudes, but the importance of which for vital processes is infinitely great, is renowned for great discoveries and tragic events. We know this from our domestic history. And, therefore, it is an honorable pursuit to talk about what the science, which until recently was sealed with the stamp "pseudo," has achieved. It would seem that what has been irrevocably lost has been made up by the efforts of people who are truly dedicated to their cause, if only in order to give the steadfast obstinate people—among whom Rem Viktorovich Petrov, now an academician and vice president of the USSR Academy of Sciences—their due. As a researcher he is known for his works in the field of immunogenetics, the development of vaccines of a new type, and the diagnosis of AIDS [Acquired Immune Deficiency Syndrome]. In him the combination, which is rare in our "narrow specialized" times, of academic strictness and the freedom of creative movement, which is characteristic of a writer, is also attractive. As an author of scientific fiction books, which have been published in large editions both in our country and abroad, Rem Petrov for a long time has belonged to the USSR Union of Writers. And in addition to this, last year he, one of our few compatriots, was elected to the World Academy of Arts and Sciences.

PRAVDA: At the recently concluded annual assembly of the USSR Academy of Sciences the problems of the development of biology in our country were touched upon in the reports and statements. What most impressive achievements in the last year or two would it be possible to point out in our country in such a field as, for example, gene manipulation?

Petrov: Here there actually is something to rejoice over and something in which we have surpassed the entire world. Take if only the unique work of Academician Knorre. He learned to synthesize mirror images of short segments of genes. These artificial formations are capable of combining with their natural doubles. Interacting purposefully with them, they shut off the flow of sense information, which is received from the corresponding gene. It is easy to imagine that if this gene codes in a living cell the production of some protein, its synthesis is halted. If this is the gene of a virus, the virus dies. That is, enormous prospects of the curing of cancer, viral diseases, and AIDS are afforded.

Academician A. Spirin learned to clone, that is, to duplicate, the coding molecules of nucleic acids outside cells. He developed techniques of protein synthesis in a cell-free medium, having thereby discovered fundamentally new basic laws and new means of biotechnology, which is irreproachable in the ecological sense.

The research of Academician G. Georgiyev on the identification and isolation of the gene, with which the capacity of cancer cells for metastasis is connected, merits much attention....

PRAVDA: You know, no matter how many laboratories I visit, for me it simply remains inconceivable how it is possible to manipulate the smallest particles of what is living. Therefore, most likely, my next question is to

some extent naive. And all the same: Genetic engineering, is this very delicate manual work or is the main thing all the same in it intellectual efforts?

Petrov: Both enormous intellectual abilities and the exceptional skill of an experimenter are required here. Both superadvanced equipment and tools—centrifuges, chromatographs, and analyzers with the use of computers—are necessary. Indeed, one has to deal with molecules or parts of genes, they are divided, combined, and separated. The structure that carries the given gene, the so-called plasmid, should get into the required cell. In short, it is a very exact and expensive science.

Does it pay for itself? Today throughout the world and in our country the production of genetically engineered human insulin is beginning. In different countries from one to five percent of the people are diabetics. How is it possible to measure the rate of recovery of expenditures of this sort, if without this drug some portion of mankind cannot live? It is always very difficult to say, although attempts have been made to calculate what, for example, polio vaccine has provided. According to the data of Professor Tsinader, 65 million dollars were spent on its development together with scientific research. Before its use in the United States alone 25,000 people annually became ill with polio, 2,000 died, 15,000 remained disabled. The estimated income from the average American during his life comes to 225,000 dollars. Here it turns out that the losses came to 6 billion dollars a year.

PRAVDA: I want to specify that my question is connected with the possibility of the extensive introduction of drugs and preparations, which have been obtained in the laboratory. After all, not only the scientific achievement in itself, but also its practical use are important.

Petrov: What can I say here? Genetically engineered interferon is available in drugstores. Human insulin of the same origin is being produced and used for the treatment of diabetes. Genetically engineered vaccines against hepatitis B and a preparation for the diagnosis of AIDS have been developed. That is, we now already have a significant output from the manipulation of genes, all this is a part of biotechnology. Moreover, a mechanism of the implementation of scientific developments thus far has not been organized in our country. There are no flexible, mobile works, for which it would be profitable literally to seize from the desk of a scientist the freshest idea and to embody it. While, for example, in Cambridge the unique park, at which the headquarters of a large number of production firms are located, astounds everyone. They surround the university in a solid ring. In order to be alongside science, in order not to miss discoveries, in order not to allow it to fly beyond the fence of the park and to become the property of competitors.

PRAVDA: And in this connection, in the sense of a direct advantage, it is impossible, apparently, to overestimate such a creation of genetic engineering as plants and animals, which previously did not exist in nature.... Somehow this is reminiscent of the legends about chimeras and sphinxes.

Petrov: I believe that such parallels are permissible. If you wish, associates of a group of institutes—the Institute of Molecular Biology of the USSR Academy of Sciences, Moscow State University, the Institute of Molecular Biology and Genetics of the Ukrainian Academy of Sciences, the Institute of Plant Physiology of the USSR Academy of Sciences—have developed several legendary beings. They have developed various technologies of the transfer of genes from some plants to others. As a result so-called transgenic strains of tomatoes, which are resistant to the antifungal preparation kanamycin, were obtained. Clover and potatoes, which contain the gene of reserve protein from legumes, which under our conditions can solve the problem of the shortage of fodder and food protein, were obtained. In a number of countries and in our country by means of the transgenic introduction of additional growth hormones giant carp and other fish have been obtained. In the immediate future transgenic animals can become producers of milk and wool of special quality and have resistance to diseases.

PRAVDA: Is it not dangerous from an ecological standpoint to create higher organisms that previously did not exist in nature?

Petrov: Yes, this is a very serious problem. And now, when the introduction of transgenic technologies has already been started, it is the right time to remind mankind about caution and the potential danger of the intrusion of man-made chimeras into the natural environment. I have in mind the possibility of the expansion of transgenic plants and, as a result, the destruction of natural biocenoses with unpredictable ecological consequences. The spread of monsters in the form of aggressive animals, especially insects, is also not rules out.

PRAVDA: In such a case is it not more peaceful to breed plants and animals by means of selection? Incidentally, in recent times for some reason they have been writing little about breeders—the supporters of such protracted, painstaking work.

Petrov: This is a very significant remark. The scrupulous work, which requires in truth an entire lifetime, is not stopping for a day. New strains of plants and breeds of animals are being developed. At the same time new unexpected tasks have arisen. The selection of highly efficient nitrogen-fixing communities is under way. From our school years we know that the rootlets of legumes carry microorganisms which are capable of taking from the air the nitrogen needed for a plant. If they were to begin to "nest" near wheat, then one would not have to pour nitrogen fertilizers onto fields. The selection of special hardy organisms (bacteria, viruses, insects) for the destruction of pests of orchards and forests is continuing. Today mankind can no longer get by without chemical fertilizers and pesticides, which, of course, it is necessary to use most competently. However, the time, when ecologically ideal biological methods of protection will become the main ones, is not far away. A few examples for illustration. There is such a weed of American origin, ragweed, the pollen of which causes allergic asthma. Thus, scientists of different countries

united in order to breed by selection a ragweed striped leaf beetle. This beetle was introduced by the Zoology Institute of the USSR Academy of Sciences in 16 krays and oblasts—from the Ukraine to the Far East—for the control of this weed. Now associates of this institute have begun the selection of insects that destroy the strains of hemp (marijuana), from which narcotics are obtained. American biologists have reported the breeding of caterpillars which selectively devour coca plants—the source of cocaine.

In speaking about our breeders, it is impossible not to say that they are really in dire straits. The lengthy and random process of selection cannot be financed on the basis of a simple economic contract with a kolkhoz or sovkhoz, which requires the quick production of results. Today selection work should be extended credit on a guaranteed basis for several years. For a strain, which has been developed and turned over to a farm, the selection stations should receive constant deductions from the revenues. They should have the real right to authorship and, just as creative personnel, should receive royalties for the duplication of developed strains and breeds. However, thus far such legislation does not exist.

PRAVDA: Have we not digressed from the basic theme of our conversation?

Petrov: Not in the least! Everything, about which we are talking here, is needed in order to give modern biology and genetics their due, in order to show that imposing goals face our science. Of course, the real mastering of genes will begin when the genomes of basic organisms have been completely deciphered. The Human Genome Program is already being implemented. In our country Academicians A. Bayev and A. Mirzabekov are in charge of it. The drafting of the Genome of Animals Program and the Genome of Plants Program lies ahead.

PRAVDA: What does "to decipher the genome" mean?

Petrov: This is an imposing scientific task. It is possible to cope with it in the foreseeable future only owing to the joint efforts of scientists of the entire world. Judge for yourself: this in many ways technical work consists in dividing into parts a chain made up of millions of genes of a living organism, which consists of nucleotides—four basic molecules in different combinations. Having deciphered the structure of each of the genes, we will obtain information on how any attribute of the human body—normal and in pathology—is programmed. And, consequently, first, to understand the operation of this system and, second, to obtain a tool to influence it. Assume that we will know the structure of the gene, on which the growth of a cancerous tumor depends. What D. Knorre developed, for example, will make it possible to construct a mirror image of this gene and to insert it in the cell, and then precisely this harmful cell will be "blinded," while all the others will function as usual. Of course, this is a very simplified example. Now it is difficult even to predict that the deciphering of the genome can give mankind. In practice this is knowledge of the foundation of the foundations of living matter.

PRAVDA: What has been sketched resembles a science fiction story. I can imagine how difficult it is to get money for projects, the implementation of which it is hardly possible to define by a real time frame.

Petrov: Why? The work will be completed in 10-15 years. But as to financing.... I would like to stress once again that modern biology and genetics have begun to be expensive. But invaluable treasures of knowledge about the increase of the biological quality of life lie hidden precisely in their storerooms. This concept is now becoming an international one. It has been included among the interests of UNESCO, WHO, and other international organizations. A set of needs, for which civilized mankind is fighting: the adequacy and full value of nourishment, health and a long life for everyone, nature conservation and a favorable ecological environment, is incorporated in it. Not by chance in many developed countries, including England, the United States, France, and Sweden, does the specific financing of biology and biomedicine come to approximately a third of the assets being invested in science. We cannot for the present brag of this.

PRAVDA: Rem Viktorovich, you, if it is possible to say it this way, became a victim of Lysenkoism. "A student crippled by education" is what you wrote about yourself, recalling your undergraduate years. Is there really, as they sometimes say, fear in our genes? Or is this just a metaphor?

Petrov: I studied at the very height of Lysenkoism—1948-1953. Genetics was banned. We did not know anything about it, except what they instilled in us: this is a pseudoscience, obscurantism. In place of genes the well-known Lepeshinskaya invented "living matter," from which cells also originate.

Once I attempted to calculate how many such crippled students were turned out by our higher educational institutions—biological, medical, agricultural, and pedagogical. There turn out to be millions. After all, Lysenkoism reigned until 1964. How did we get out of this darkness? And did everyone succeed? Not everyone. I was lucky. In 1957 I became a member of the circles of "free thinkers," who grouped around Nikolay Vladimirovich Timofeyev Resovskiy, who, following the example of D. Granin, is known now to everyone by the name Zubr. It was then that I received a genetics education—at his lectures, at his fruit fly practical course at the Miass Preserve, where he worked. In 1960, when Lysenkoism still raged, I and a group of young biologists (V. Korogodin, A. Neyfakh, and others) wrote a book saturated with genetics, while I began to study the genetic control of immunity. Although all this was still dangerous.

So fear has not penetrated the genes. And this is impossible in reality. In order to breed a "pure line," say, of identically shy people, at least 40 generations of closely related marriages are necessary. But this is nonsense.

PRAVDA: Nevertheless, generations of scientists are still feeling the consequences of the persecutions, the consequences of the times, when genetics was transformed into a semidesert. For the breaches of a material,

personnel, and moral quality gape to this day. What is it necessary to do to correct the formed situation?

Petrov: A special decree of the government on the official rehabilitation of genetics and on its further development is necessary. It is necessary to commend and reward the scientists who held out during the years of Lysenkoism, to which Stalinism gave rise. For the present it turns out that we annihilated it totally, in a state manner, but are restoring it in small parts.

On the initiative of Academicians G. Georgiyev, N. Dubinin, V. Strunnikov, and others we held one and one-half years ago the All-Union Conference of Geneticists, at which a program of the further development of theoretical and applied genetics was prepared and the question of the necessity of a state approach to the implementation of this program was raised pointedly. However, the draft of the decree got held up somewhere at the level of coordinating departments, and there is already talk that such state repentance is not needed....

PRAVDA: Tell me, please, about the new biology journal of the Academy of Sciences, of which you are the editor. It is well known that this journal is published simultaneously in English and is being disseminated throughout the world.

Petrov: The journal is called BIOMEDITSINSKAYA NAUKA. Articles of Soviet researchers, who work in the area of genetics, molecular biology, biochemistry, biophysics, physiology, immunology, and other fields of biology, which constitute the scientific foundation of medicine, are published in it. We publish it in London jointly with the Tour-Pion publishing house of the Royal Society of Science of Great Britain. The scientific works of Soviet biologists reach the foreign reader three-six months after their writing. Previously, two-two and one-half years were spent on this. Not by chance did the English journal THE ECONOMIST, which published a praising review in the first issue of our journal, call it BIOGLASNOST.

PRAVDA: In conclusion I would like to find out about your writing plans.

Petrov: I want to write a large book on the art of scientific inquiry, of which the problem of who directs whom: the researcher directs research or research directs the researcher, will be the main theme. I have gathered a large number of historical and personal examples in favor of both situations. The skill of a scientist lies in making the correct creative choice, and, if he has made a mistake, having the courage to return to the origin of the error, to the mistake....

Publishing of Scientific Papers in English Advocated

907A0306A Moscow POISK in Russian No 26 (61), 29 Jun-5 Jul 90 p 8

[Article by Lyudmila Milovanova under the rubric "The Dossier of POISK": "Glasnost in the Scientific Style"]

[Text] Why for the present are we not hurrying like the Germans, French, and Japanese to switch to English in the scientific press? Very much is hindering this: ideological, technical, and financial difficulties. But if we want to follow in the course of the world process of integration, this will have to be done one way or another. For they will learn about our specialists in the world only when they have their works published abroad. But for the present we remain practically silent in the modern scientific world.

What is being done in this direction? We have begun to publish two journals in English. POISK has already mentioned one: it is the publication in the United States of KVANT, which is well-known to everyone. The journal NATURE also devoted a note to this event. But this, as they say, is for children and youth. There is also something for adults. It is a matter of the start of the publication of the journal BIOMEDICAL SCIENCE, which is devoted to the problems of modern biomedical research. The English journal THE ECONOMIST called this event "bioglasnost."

Until now, the journal notes, the results of Soviet scientists reached western "consumers" very slowly. Our results became accessible to the western reader only two years after they were obtained. The journal compares such results with the reports of Captain Cook on the desk of a modern geographer. In this respect we have so far hardly overcome the legacy of the "cold war," as THE ECONOMIST believes, when the ideologization of biology during the years of the heyday of Lysenkoism under Stalin and Khrushchev reached its apogee. The new journal will help Soviet scientists to "reunite" with all the rest of the world. It is difficult for them to achieve publication in prestigeous western journals simply because they do not have a "reputation" there and are unknown owing to the lack of publications in English. Unfortunately, as THE ECONOMIST notes, glasnost here is still not helping very much. After all, for acquaintance with their western colleagues Soviet scientists should travel much, which again requires foreign currency.

The new journal is a joint venture with the British Pion scientific publishing company and the Royal Chemical Society. According to estimates, the journal may already in a few years yield a profit of about $350,000 a year. If, as the publishers hope, success is achieved, the money will also be allocated for paying for visits of Soviet scientists to the West.

New Book Reveals 'Secret' Details of SLBM Development

907A0264A Moscow POISK in Russian Nos 18, 19, May 90

[Excerpts from Yaroslav Golovanov's book "*Korolev.*" "Portrait Gallery: Underwater Thunder"]

[Text] [No 18, May 90 p 6]

At the end of last year, Yaroslav Golovanov finished work on the chronicle "*Korolev,*" begun in 1968. The secrecy of the Chief Designer of missile and space equipment often closed off access to documents. Therefore, besides the archives, he had to work a great deal with living people, with the actual participants in the events described. Today, we continue publication of excerpts from this book. A new chapter speaks

of little-known facts: the creation in S.P. Korolev's OKB of the first submarine-launched ballistic missile, and of Academician V. Makeyev, a remarkable student of Korolev's and twice a Hero of Socialist Labor.

Caption: The testers of the first Soviet submarine missiles. The "B-67" launch team, which participated in the first trial launches, from left to right: Senior Chief Test Engineer, Lieutenant Captain Anatoliy Aleksandrovich Zapolskiy; Lieutenant Technician Konstantin Mikhaylovich Abrosimov, telemetry console operator; Senior Lieutenant Technician Anatoliy Gavrilovich Yushkov, launch console operator; Senior Lieutenant Engineer Yuriy Batayev, calculating instrument operator. Northern Fleet, September-October 1955. [Figure not reproduced]

It is no rarity in Russia when the most serious matter suddenly turns into a comedy, when something incongruous and curious, setting the entire system into confusion, into, forgive me, some kind of farce, pops up suddenly and unexpectedly out of a system that had been suitably pleasing to the eye.

Alas, our most glorious missile technology also suffered an ordeal, adorning its chronicle of history, until now never written down anywhere, but so similar to true folk tales and fables that it, unquestionably, is worth writing down, not to mention the historical significance of this chronicle, speaking of the irretrievable past. So....

In one of the central oblasts of Russia (we know which one, but we will not name it, so as to calm the censors' heartbeats), there was a large depot of long-range missiles. This fact in itself can be no secret, since the leader of our state, Nikita Sergeyevich Khrushchev, informed the whole world from his high rostrum that we were making these missiles in a huge quantity, like sausages. However, with such a speed of production, on the one hand, and the absence of a war, on the other, the missiles would inevitably accumulate, which means that a depot for storing them was both necessary and mandatory, taking into account the importance and expense of the objects themselves. The depot was so big that it was managed not by some extended-service non-commissioned officer, living quietly like a worm in an apple, surrounded by the free and juicy pulp of Army prosperity, but by a real general with the name of Volkodav.

Not far from the depot ran a river, not large, but also not small, the name of which you probably know, but which we once again will not name. Not only for the above-mentioned reason, but also because any particular elaboration would deprive our story of its epic nature, reducing it to the level of a mere adventure. So, in January 1953 an unexpected and sudden warming, which encompassed all of European Russia, led to an abundant thawing of the snow already on the ground, overflow of the river, and flooding of the lands. However, the missile depot was constructed so carefully and was so well-planned that no water whatsoever managed to reach its edges. Yet, the water did get into thousands of mice burrows in the fields and meadows surrounding the depot. Their owners had been prepared for a peaceful and calm winter, but had now been driven out of their native bounds by the elements, which had in an hour deprived them of food accumulated over many months of labor. There was nothing more for the poor field-voles to do but head for the long-range missile depot, seeking rescue in the warm and dry bellies of the enormous devices. Like the way that Fish-Whale sheltered to an entire town in the remarkable fairy-tale of Horse-Hunchback, the R-1 ballistic missiles were occupied by thousands of victims of the capricious winter. Neither barbed wire nor other obstructions, nor the exemplary guard service, nor the prohibitions of General Volkodav himself could halt this great journey of innocent sufferers. Probably, it would have been best to have generously set out food bins with grain, thus distracting the unfortunate refugees from the military equipment, but this Volkodav did not see this solution. He considered it disgraceful for a Soviet general to feed kolkhoz field pests, and did not do so. However, the great instinct for self-preservation forced the host of mice, who had not expected Volkodav's politically short-sighted decisions not to feed them, to seek their own means of salvation. And find them they did. The insulation to the electrical wires within the missiles, although not tasty, turned out to be nonetheless edible. So, the mice ate up the insulation! Along with the insulation, they also ruined Volkodav: it was no joking matter to destroy such an important arsenal!

An unbiased person might not immediately see such a disparagement of our army's military capability as the personal fault of General Volkodav. However, it has long been known that if soldiers are punished for offenses committed by them personally, then the officers or, the more so, the general are usually also punished for these crimes, having nothing to do with them personally, but only having occurred within the area under their control.

Soon, General Gaydukov came to the depot and removed poor Volkodav from his post for criminal negligence. At the design bureau, additional technical specifications were released, excluding the use of edible materials in missiles. Cats and repairmen were rapidly brought to the missile storehouse from the experimental plant. Having heard this story, Korolev laughed himself to tears. Later, he thought about it. Of course, it was not a question of edible insulation. Volkodav, destroyed by the mice, once again reminded him of the imperfection of the R-1 and its sister (if not to say twin), the FAU-2. This was not his missile: it was a rough draft that he had written before starting his own essay. He too well saw the flaws of the "1" and also saw that he had managed to eliminate only a few of them in the "2." Therefore, when the plant in Dnepropetrovsk was already prepared to start the production of long-range missiles, he had already conceived of a new machine which ought to replace the "1." While retaining its advantages as much as possible, it should be freed of most of its shortcomings. Above all, it required mobility, freedom from a previously built concrete launch pad. Liquid hydrogen kept the R-1 on a tether, like a dog on a chain. The conditions for storing the super-cold liquid made the missile awkward. Hydrogen had to be replaced with a so-called high-boiling oxidizing agent based on nitric acid, which can be stored in a fueled missile for a long time. The missile had to be small, compact, easy

to use and inexpensive to produce. Isayev suggested an engine without the turbine pump assembly, which cost as much as the engine itself. The fuel will enter the burn chamber without pumps; it would be squeezed, pushed out of the tanks by elevated pressure. Korolev knew Lomonosov's great formula, "that which increases in one place decreases in another," and realized that he would have to pay for all these advantages—reduced size, simplicity and mobility. And he did pay, with distance. The R-1 flew 280-300 kilometers. The R-11, as the new device was called, could fly 140-150 kilometers. However, if this missile were considered operative-tactical, precisely as it was intended, these figures are then first-class. It seems, the military also realized this.

Of course, Sergey Pavlovich was attracted by this work, but many OKB veterans said that it would be a mistake to call this missile Korolev's favorite child. He regarded it with a reserved coldness, realizing that the Army needed it and was waiting for it, and that he himself needed it in order to reinforce the positions of the OKB, but nothing more. The "godfather" of the R-11 was Vasiliy Pavlovich Mishin. This machine also in many ways determined the path toward missile technology of another remarkable designer, outstanding missile armorer, future academician, twice Hero of Socialist Labor, winner of the State and Lenin prizes, Victor Petrovich Makeyev.

Makeyev became involved in this work during the first flight tests of the R-11, held in the spring and summer of 1953. Ten launches revealed the flaws of the engine system. This was Isayev's first joint work with Korolev, and Aleksey Mikhaylovich did not want his engine to be inferior to Glushko's, which at that time propelled all of Korolev's missiles. Therefore, Isayev decided to look into everything fundamentally and did not react to Korolev's goading. Only after a year, in April and May of 1954, were the tests conducted: the missile had learned to fly well, and by July 1955 the R-11 was taken to arms.

Korolev sent Makeyev to the bureau to set up the production of the R-11, while he himself burned with a new idea: what if a marine version were made? And not even simply marine, but submarine? In Leningrad, he found the chief submarine designer, Isanin, and besieged Nikolay Nikitich with the pressure inherent only in him. People have often written about the fruitful cooperation of the two remarkable scientists, Korolev and Kurchatov, who created the nuclear missile shield, but never mentioned the no less remarkable cooperation between Korolev and Isanin, which not only reinforced this shield even more, but also required a radical review of many global military doctrines.

The R-11 FM, the marine version of the land missile, was interesting to Korolev, above all, because of the novelty of the launch: the missile had to hit the target accurately, flying from a vessel, beyond any dependency on what was at sea, be it calm or storm. The launch system for a submarine-launched missile, called the "Horn and Hoof" by the missile designers, was the child of Anataliy Petrovich Abramov, one of the most talented designers in Korolev's OKB. At Kapustin Yar, he had already made a special rolling platform from which experimental launches of the marine missile were conducted.

Even before this, they had built a dummy submarine at the testing field with periscopes and antennas, from which several launches were conducted in order to make sure that the stream of burning-hot gases would not damage the submarine itself.

Korolev appointed a young and very talented engineer, Ivan Vasilyevich Popkov, whom he loved and, unquestionably, trusted, as chief designer of the R-11 FM, but when tests began in the Northern Fleet, Korolev was unable to sit in the office. This is reminiscent of Planerskaya Station, to which Fridrikh Tsander drove Korolev in order to show him how well the missile flew tailless. The years were different, the technology was different, but psychologically there was a great deal in common here.

Korolev's first trip out to sea occurred in 1953 and was completely unnecessary for the work: it was simply very interesting for him to travel on a submarine. However, as of 1955 Sergey Pavlovich in fact directed all the marine tests. Having experience with Kapustin Yar, Korolev brought his railway car to Severodvinsk with a small meeting room, an office and a sleeping room (by that time, everything had been built in Kapustin Yar and the car was unnecessary: they lived in cottages). As in Kapustin Yar, here as well he had his own head of the testing field, Ilya Alekseyevich Khvorootyanov, a future admiral. The only thing that created an uncustomary mental discomfort for Sergey Pavlovich, most likely, was the fact that the official leader of all the work was nonetheless not he, but Isanin. This did not hinder their friendship, but Korolev, of course, envied Isanin his work, although he concealed this, calling Nikolay Nikitich the "head" designer with a kind smile.

In September 1955, the "B-67" submarine, commanded by Captain 2d Class S. Kozlov, was ready for the first missile launch. Korolev arrived early and carefully followed all the operations to load the missiles onto the submarine. In the missile compartment, he sat behind the operators, monitoring all their actions during the general tests. Early in the morning of 16 September 1955, the submarine went to sea. It was a calm but overcast and gray day, and the sea was calm, which greatly upset Korolev: rolling would have complicated the task and would have given more interesting results. Positioned on the surface of the water, the submarine approached the assigned point of the testing area. At first, Korolev and Popkov sat behind the console. Next to Anatoliy Zapolskiy, commander of the launch team, and the other sailors, they looked rather wild in their civilian jackets. Frankly speaking, inside the submarine they felt like cockroaches who had crawled into an alarm clock: They understood roughly as much about it and the purposes of all the controls, levers and buttons as this insect would in a clock, although Isanin enlightened them as best he could. The "battle alert" was sounded. However, everyone had already been at his station for a long time and it remained only to put on the helmets with earphones. Korolev went up to the conning tower. Standing next to the commander, he

read the orders to the launchers. His voice was even and calm. He realized that everyone was worried, and he himself was quite worried, but it was necessary to remove everyone else's worry. Then, one's own will go away.

"Launch!" said Korolev in a loud, yet somehow pensive tone.

And there was quiet. The sailors were sure that the roar would begin at that very instant and for a moment were worried because of the quiet. Then suddenly something thundered and crackled, louder and louder, then quieter and quieter... That was it?! That was it.

They hugged and congratulated each other.

"Sergey Pavlovich," said Zapolskiy, "today is a historic day: the birthday of a missile for the Navy!"

"True, precisely so! You are a great fellow, Anatoliy Aleksandrovich!" Korolev firmly shook the officer's hand. He was improbably excited by the success of these first tests and was unusually talkative. On the way back to the base, when all the officers not on watch had gathered in the wardroom, Sergey Pavlovich happily spoke of how he had flown when he was young and had once crashed in a glider....

[No 19, May 90 p 6]

[Text] In December 1955, another officer, Ivan Ivanovich Gulyayev, was appointed commander of the first experimental missile-carrying submarine. Korolev did not like this: in matters of various official rearrangements, he was a conservative person. And not only in matters directly concerning him. At the testing ground, the replacement of any staff officers, managers or even communications specialists irritated him. Therefore, at first he was guarded toward Gulyayev, but already after the first firing with the new commander he trusted and "accepted" him. Gulyayev turned out to be an unusually precise and strong-willed person, who brilliantly organized the tests in the briefest periods of time: in less than a month, eight missiles were launched without a single failure.

Now a new test faced the submarine missile-carrier: they had to make sure that the prolonged storage of fueled missiles under the conditions of a long trip would not lead to a launch failure. The submarine with missiles went out to sea for a month, then two, and later, for many months. Other sailors have always envied submariners: at any moment they could avoid bad weather by sinking down several meters, but Gulyayev's submarine specially sought out foul weather and never hid beneath the waves. These were most difficult trips, even for former sailors. The storms reached nine points: in this regard, for hours the vessel listed up to 45 degrees. The experimental missile-carrier traveled more than 10,000 miles in three seas of the Arctic Ocean under overall difficulty during these trips.

Korolev did not participate in these trips, not out of fear of the hardships, but simply because he could not be away from the design bureau for such a long time. However, on returning from a trip Gulyayev always saw the stocky figure of the chief designer at the moorage: Korolev invariably met the submarine. Gulyayev took Sergey Pavlovich on board and left for the testing area. After firing the missiles, they put Korolev off at the base, collected more missiles and once again went out to sea.

After the completion of these months of work, the State Commission, of which Sergey Pavlovich was also a member, noted in its conclusion that "for the first time, a series of important experimental data has been obtained, necessary for the further development of missile weapons and of the carrier vessels for these weapons, and experience has also been acquired in using the systems and devices that are part of the missile weapon complex."

In 1956, Commander in Chief Admiral Gorshkov held a large conference on the results of the tests. Gulyayev gave his report. The Commander in Chief sternly interrupted him several times, but Ivan Ivanovich put up a good show and did not let himself be distracted. Ustinov, minister of the defense industry, Slavskiy, the minister of Sredmash, Korolev, Isanin and others supported the report and praised the submariners. Gorshkov liked this and softened somewhat: in his conclusion, he also praised them, although in the reserved expressions befitting the Commander in Chief. After the conference, Korolev detained Gorshkov and told him about the submariners' burdens. The admiral nodded assent and promised to help.

Korolev's best recollections were about the work with the sailors, most likely because these tests were unusually successful and occurred almost without failures or nervous strain. During the entire time of the tests, only once did a missile fail to launch. Activated, it remained at the launch point and did not want to fly. The whole vessel froze: they awaited the technical leader's decision. Korolev thought. He wanted very much to take the missile ashore, to calmly investigate the causes of the failure there. This must be done, so that the failure not be repeated. However, going to the base with an activated missile..., if it did not launch when it was supposed to, what will prevent it from launching when it should not? And why in general would it not start up suddenly on the ship? No, it was impossible to take it to the base. They would have to drown in in the devil's mother....

"Emergency ejection!" commanded Korolev. The missile sank into the depths.

"Sergey Pavlovich, you have never been in such a situation, yet you seemed used to it and calm," said executive officer Vadim Konstantinovich Korobov.

"It is impossible to get used to this," Korolev responded tiredly. "My entire shirt is soaking wet..."

The sailors remembered yet another case, when a transformer burned out on the way to the test area and Korolev, without losing time, ordered a return to the base. Unfortunately, at that time the deputy commander in chief was there. The ship had barely reached the pier before he fell on Gulyayev: how dare he return to the base without permission?! Then Korolev emerged from the vessel, like a bear

from his den, and so bellowed at the admiral, that he was dumbfounded—his admiral's imagination could in no way comprehend: who, besides the commander in chief, could yell at him thus on HIS base?!

The naval military leadership little differed from the land military leadership: there were more than enough skeptics. In the best case, they stayed quiet, having sensitively turned their ears toward Moscow. Therefore, Korolev was quite grateful to Sergey Georgiyevich Gorshkov for his support. He was younger than Korolev, had become commander in chief of the Navy at the age of 46, and had done a great deal to re-equip it. However, most often among the cadre sailors the attitude toward the missiles was guarded and, which was especially insulting for Korolev, not always respectful. One day, Fleet Commander Chabanenko came with him on a launch. Korolev, whom life had forced more than once to believe in the reality of the "visit effect," was nervous: the submariners, having such a high-ranking officer on board, of course, were also worried. The launched occurred, so to speak, without a hitch, smoothly.

"Well?" Korolev asked the commander without pride in his voice.

"It rumbles like a saucepan," the admiral answered querulously and turned away.

It was hard to insult Sergey Pavlovich any more painfully....

The marine missiles were completed and became a special type of armament. In the first launches, commanded by Korolev, they were fired, strictly speaking, not OUT OF the submarine, but FROM the submarine. The vessel rose to the surface and a launch platform was moved up from the bottom of a shaft along with the missile, from which the launch was conducted. A submarine could take only two missiles on board. In the future, the launch system was improved so that the vessel could fire from underwater and its ready inventory became significantly greater. In 1957, a submarine with missiles (after its crew had abandoned it and it had sunk into the depths), was attacked with depth charges, testing the detonation safety of the missiles. The missiles stood up to these tests. Korolev no longer participated in them.

"Now all your questions should go to Viktor Petrovich Makeyev," he told the submariners. "He is our real old salt..."

Yet, the "old salt," when he began to do this work, was 29 years old...

Tsiolkovskiy was our first generation of missile designers, the start, Korolev was the second, and Makeyev was already the third: he was 18 years younger than Sergey Pavlovich. It was not a question of age, but of working conditions. Makeyev went into missile engineering when it had already been recognized and had become a privileged branch of engineering. It was easier for him to start, since he followed a track already rolled smooth, yet it was harder to outdistance people—there were no weak ones on this route.

Makeyev was born near Moscow in a workers settlement by the Kolomno steam-train building plant, where his father was a worker. After six years the family moved to Moscow and his father became a lathe operator at an aviation plant in Filiye. Viktor finished seventh grade and also went to work at the plant—he became a draftsman at Bolkhovitinov's design bureau. At that time, remarkable young men worked at Filiye: Yangel, Chertok and Makeyev, but the plant and the design bureau were too large for them to have met each other. Indeed, the difference between the educated engineer Yangel and the boy-draftsman Makeyev was too great at that time. When the war began, the plant was evacuated to Kazan.

"There I saw Korolev for the first time," recalled Viktor Petrovich.

"And then what?"

"And then nothing! I saw him and then forgot about him!"

"There was no 'inner voice' whatsoever?"

"Complete and utter silence!"

We were lying on a green hillside on the bank of a lake. It was July and warm. Many yachts and boats were floating about on the lake. There were squeals, shouts, splashes—the sounds of the human crowd near the water. However, for some reason this in no way hindered our conversation. This is the relaxation area for his design bureau and plant. Everyone here knew him by face, but no one was paying him any attention whatsoever. Maybe the chief designer in a swimsuit was not perceived as Chief Designer! It was not easy to drag Viktor Petrovich to this hillside, but it was even more difficult to converse in his office with constant telephone calls, with papers appearing every minute, silently brought to him by people, unheard, like air penetrating into the office. Here, there is no telephone and the only pen is mine—he is entirely disarmed...

"I was not thinking about missiles at all," said Makeyev, biting a blade of grass. "I was in love with aviation. As soon as we returned from the evacuation, I immediately attended the Moscow Aviation Institute. It was a difficult and hungry time. I found work where I could. At the "Ducat" Factory, they paid with cigarettes. At one institute, they paid with alcohol made from dead snakes. At TsAGI, I worked with Myasishchev. I came to do my diploma work with Korolev. He himself approved the theme, and knew the themes of all the students working on diplomas. Mine was on man's flight into space. Where would I find work later? I reached an agreement with one organization near my home. Korolev became angry, removed my diploma work from defense, seized the drawings, and challenged me:

"What is going on!??"

"I live in Filiye, it takes me two and one-half hours to travel one way to Podlipki..."

"What if I give you housing? Will you believe that I will give you housing in three-four months? Will you believe me?"

I was listening to Makeyev and thinking: "Well, why did Korolev latch on to him? He was green, a graduate student, why was he needed? What unusual sensitivity to talent did the chief designer possess...."

"I worked in the design department with Sergey Sergeyevich Kryukov," continued Viktor Petrovich, "and was a very active Komsomol member. I was chosen for the Komsomol body of the OKB. I did not have to wait for Sergey Pavlovich to fulfill his promise of an apartment; we built a building using the "Komsomol construction" method, and I settled there. Later, I was chosen for the Komsomol Central Committee. They made me an instructor for the department on working youth. I worked in metallurgy and coal. There were endless business trips: the Donbass, the Kuzbass, Tula... I worked a great deal. They decided to encourage me and sent me to the Olympiad in Helsinki as deputy head of the free-style and classical wrestling team in the political section. Apparently, I inspired all the young men improbably, because all 15 gold medals were ours....

"I returned to Moscow and thought: well, enough inspiration, it is time to get to work. I went to Podlipki and saw Korolev: indeed, this work is not for me, I want to come back. It was the return of a 'mischievous son.' Here, they attached me to the R-11 project... I went to the tests in Kapustin Yar, before they had taught it to fly.

In the summer of 1955, on 6 June, as I recall, I went for the first time to put the R-11 into series production. I did this and returned. Korolev called on me:

"Viktor Petrovich, what would you say if we offered you the position of deputy chief designer of the Urals branch?"

"I thought about it and said:

"No, Sergey Pavlovich, I will go to the Urals only as chief designer."

"Korolev was stupefied by this effrontery, looked at me and was silent. After all, after the Komsomol Central Committee I had only worked at the OKB for 3 years. I was a mere boy, a puppy, only 30 years old. Sergey Pavlovich was not upset. He did not get angry, he was simply very surprised. Indeed... Later, I also told this to Ustinov. He only smiled and shook his head. Yet, I really wanted very much to be chief. I wanted the freedom and thought that I could cope...."

"There was none of this there," he encircled the swimmers and boaters with a hand. "I cried cuckoo alone in the hotel room. After a year, I received an apartment, brought my family, and began to live there.... Well, that is all, most likely...."

Behind the hillside in the woods stood small homes, sort of like clean hen-houses, and the chief designer's hen-house in no way differed from the rest. There we had supper and talked for a long time, until evening.

That with which Makeyev ended his story was not the end, but the beginning. In the beginning of 1956, Viktor Petrovich received a draft design for a new modification of the marine missile from Korolev, and here, in the Urals, turned this draft design into his first missile. From that moment, he began to acquire independence and autonomy.

"Korolev was not jealous," said Makeyev. "He realized that he could not work on everything. However, he always wanted to put his missiles 'in good hands.' People talk that way about pure-bred puppies, too," he laughed.

I did not ask Viktor Petrovich about his latest developments, about the secret military equipment. So to speak, "the less you know, the sounder you sleep." Indeed, all this no longer has any direct relation to Sergey Pavlovich. Makeyev probably made the first missiles for the Fleet, once he had received the Gold Stars. Viktor Petrovich was often in Moscow and gave me his Moscow telephone number, but we never met once in Moscow. Only once did I see him in Moscow, on a damp, chilly day at the end of October 1985. Strewn with late, pale asters, Viktor Petrovich lay in a coffin in the Palace of Culture at the same plant where he once came to work as a draftsman. Makeyev, just like Yangel, died on his own birthday. He was 61 years old and, most likely, many of the flowers which were placed on the coffin had been purchased to give him on his birthday...

The funeral was very well-attended, but quiet. Even dead, the academician remained secretive, and the service followed this routine, so that the ribbons on the farewell wreaths did not, heaven forbid, have "post office box" numbers. In the official obituary, the words were vague: "...he had proposed a number of original solutions for the design and testing of complex technical systems... which served as a basis for the organization and conduct of extensive scientific research and design work, which ended with the creation of important models of new equipment."

A year later, in his birthplace of Kolomno, they put up a bronze bust of him, yet the people there clearly did not know why....

Law for Protection of Intellectual Property Advocated

907A0333A Moscow IZVESTIYA in Russian 30 Aug 90 Morning edition p 3

[Article by S. Leskov: "Do Not Give Up Ideas! The Lack in the USSR of the Protection of Intellectual Property Is Increasing the Lag of Science Behind the World Level"]

[Text] Last summer Professor P. Roberts, a prominent theorist of "Reaganomics," came to Moscow. At one of the lectures of the scientist they asked: What reform, in his opinion, does the Soviet Union need first of all for the stimulation of the economy? The American professor did not hesitate a minute: It is necessary to pass legislation on various types of property, including "intellectual" property. It seems that if the recommendation of P. Roberts had found support only among a negligible portion of the audience, then the ideas of other economic innovations

would be far more comprehensible. In a year we have covered at an unprecedented pace the course of the elimination of economic illiteracy, and now the arguments of the American scientist would not be a revelation.

But the attitude toward intellectual property practically has not changed. Moreover, I believe that this very term needs explanation. In international practice it unites a wide range of concepts, which have a spiritual value, but do not have a direct physical expression.

Taking the risk of seeming like a boring pedant, I should give several more exact definitions, without which the picture will be incomplete. In the USSR the copyright applies to works of art and literature. Technical inventions and discoveries are protected by author's certificates and patents. But an immense layer of scientific research activity in practice is not reflected in USSR legislation. The USSR is a member of the International Intellectual Property Organization, but, as often happens, our domestic laws lag considerably behind foreign policy declarations. The mention of intellectual property in the Law on Property in the USSR reduces, in essence, to its formal recognition without any standardized analysis. Only a very short article on the trade secret was included in the Law on the Enterprise in the USSR.

Incidentally, during the past period we passed many laws—the results are not perceptible. A law is not a fetish, it begins to have an effect and justifies itself only when the real needs of society bring it into being. But however much we need legislation on intellectual property, is this not of no consequence? These are questions that are not unfounded, for our science scored significant successes during the years, when scientists worked in "little worlds" and did not even think about the ownership of their own ideas. Someone will observe: Here it is, the path of domestic science, which has been national from time immemorial—docents need iron discipline with candidates!

G. Novozhilov, general designer of the Experimental Design Bureau Imeni Ilyushin, was closely acquainted with many scientists who had gone through the school of "little worlds." When I repeated the opinions cited above, Genrikh Vasilyevich burst out laughing: People are saying much about these legendary "little worlds," but are forgetting one important thing. The designers in "little worlds" received a considerable reward for every machine that went up in the air. But now, Genrikh Vasilyevich makes a helpless gesture, although 1 million airplanes, which have been made in accordance with your drawings, are flying, you will not receive a quarter kopeck more.

I am not at all trying to idealize power methods of the management of science. They were able to ensure temporary success and success in individual sections and, what is the primary thing, only at the initial stages of the development of the scientific and technical revolution. Starting in the 1960's in many countries it picked up speed with gigantic strides, while our administration by mere decree brought science back where it started, society found itself on the fringe of scientific and technical progress.

Our society is moving toward a market economy, the emancipation of enterprises and personal initiative is seen in it. How will science live under the new conditions, is a market of the scientific and technical product possible?

The idea of a market without the right of property, including intellectual property, is coming undone. But in the USSR Supreme Soviet, where so many copies regarding the new economic relations have been altered, the discussion has touched on intellectual property, if I am not mistaken, only once. During the discussion of the Law on Property in the USSR F. Burlatskiy and A. Sobchak, in stressing the importance of the problem, demanded the transfer of intellectual property to a separate law. The reaction of the majority of the assembly to this proposal makes it possible to predict the course of the debates, when this law has been prepared and submitted for discussion.

For 70 years, having cut ourselves off from the entire world, we attempted to build an independent economy, true, we only half succeeded. The world learned to get by without us, while now we are desperately trying to save the situation and to appear on the international market. But on this market such a commodity as intellectual property is dearly valued, while for us this is for the present an empty phrase, nothing. The problem is a particularly urgent one in the area of science-intensive technologies, where cooperation is most desirable for the USSR. How are the joint ventures and western firms, which operate on USSR territory, to work under the conditions of legal "incompatibility?" For the present absolutely nothing can prevent a staff member of a joint venture, having provided himself with the necessary secrets, from going over to a competitor.

In recent times I have had several occasions to go to various computer forums, international seminars, and exhibitions on this theme. The USSR is persistently trying to approach the level of computerization of developed countries. But foreign scientists unanimously note that the USSR in this race is adhering to the tactic of "computer piracy." In our country people obtain illegally—by the copying of finished foreign solutions—from 50 to 99 percent of the software, depending on the class of computer. Of course, without the knowledge of the author. In the West they shut previously their eyes to these "pranks"—informatization in the USSR was in an embryonic state. But now, when the Soviet market has begun to be of some interest, foreign firms are displaying legitimate uneasiness with regard to their intellectual property.

Last year at the Moscow Technology-89 Exhibition one of the Minsk scientific research institutes proudly demonstrated a program that was prepared on a computer of the YeS series. Spellbound onlookers crowded around the stand. Only specialists of the American Microsoft Corporation were not enraptured, they recognized without difficulty their own child and "in a simple-hearted manner" asked to be sold the wonder computer. Dollars changed hands—our people forgot caution. The deal, of which a huge scandal would have been the result, fell through at the last moment. If our computer people out of their provincial nonexistence

intend to appear with such manners on the world software market, then, as Ostap Bender said, "soon your red curls, Shura, will become familiar and they will begin to hit you." Economic sanctions and large fines are inevitable. After all, the USSR has signed international agreements, while the fact that in the country no one has heard about them will not be an excuse.

Incidentally, how can we respect other people's property if we do not value our own? A significant number of cooperatives, enterprises of the scientific and technical creativity of youth, and intermediary firms are making available information, introduction, and other services that are based on gross disrespect for the intellectual property of other people. The usual picture is: An engineer or scientific associate on institute equipment or in accordance with institute methods performs development "on the side." In western countries no trade union would save such a resourceful associate from immediate firing with the worst recommendations.

But what makes an engineer take an iniquitous path? Here, too, I completely agree with designer G. Novozhilov: Is it really fair that a song-writing poet receives deductions for every performance of his popular song in a restaurant, while a scientist, who developed a new drug or a new type of aircraft wing or devised a new mathematical formula, which is used everywhere in calculations, has practically nothing for these decisive discoveries? In the United States Pythagoras with his theorem would have become a millionaire more rapidly than Ford—and this would be honest. Our "Newtons," in order to make ends meet in life, have to aim their "quick reason" at semilegal extra earnings.

Or to agree to advantageous western invitations, of which our scientists are not experiencing a shortage. The "brain drain" from the USSR has assumed an unprecedented scale. There are different opinions in this regard, but for the present they are saying nothing about one thing: Scientists are going to distant villages with ideas, on the elaboration of which large scientific collectives worked for decades. Of course, our volunteers do not bear even a kopeck—pardon me, a cent—of liability for the safekeeping of the intellectual property of their former colleagues.

But do not think that I am advocating the attachment of a scientist for his entire life to one place and the granting to the firm of the indivisible right to veto all the ideas that have occurred to him. But it is utter frivolity to shut one's eyes to these ticklish things. What is one to do, for example, if a scientist thought up something, for which the administration did not ask him? Is it possible to buy a person, as they say, "lock, stock, and barrel"? In world practice the right of "the first night" is reserved for the employer, but he may also not exercise it. The most famous example on this theme is the story of the development of personal computers. Two young electronics workers, who were working under contract in the aerospace industry on completely different problems, as the law requires, offered their still quite "crude" idea to their own firm. Only after it renounced the rights to the "unpromising" idea did they begin their own development in some junk-filled garage. The Apple Corporation, the largest corporation for the production of personal computers, which captured nearly the entire world market, emerged in just a few years. The result: Not only did the authors of the idea succeed, the state became more powerful and all of society grew richer. While there can be no claims on the part of the firm which let slip the brilliant idea—except against itself.

But here is how similar stories develop in our country. Doctor of Philological Sciences I. Shekhter developed a method of teaching foreign languages. The results are high, the responses from authorities are most favorable. And here the institute, at which I. Shekhter works, feeling that it is the indivisible owner of the ideas of associates, concludes a deal—it sells the method of the Italians. The author objects: Why is the method being disseminated without his consent in distorted, abridged form and why is he personally receiving nothing whatsoever from the contract? From an ethical standpoint the questions are legitimate ones, but it is possible to argue endlessly, for in the absence of legal norms such conflicts are irresolvable in principle.

I say, someone will say that they offended the scientist! And here it must be stressed that the problem of the protection of intellectual property does not reduce merely to tangible material categories. The questions of scientific priority, which in many respects determine the morality of science and the atmosphere, in which work requiring complete spiritual equilibrium is performed, are no less important. The history of Soviet science is furrowed with tragic and irreplaceable losses of most important discoveries, which, not being protected by law, drifted abroad and there under different authorship received world recognition, up to Nobel Prizes.

Unpunished thefts occur even more often in our own house. Several years ago I had occasion to deal with one extremely unpleasant event, which literally poisoned the atmosphere of one of the Kiev academic institutes. Academician P., a prominent Soviet mineralogist, worked 20 years on a monograph, the result of his entire life in science. In the opinion of specialists, this monograph should have become a reference book of all mineralogists of the world. The scientist came to the end and entrusted the manuscript to his favorite student, Candidate of Sciences G., for retyping. Suddenly the academician with an incurable disease ended up in the hospital. To the end of his days he never learned the most frightening thing: The most valuable chapters of his work had disappeared without a trace. G. asserted that he had "lost" them.

Many people, who were initiated into the details of the very strange event, surmised the theft of the manuscript, which in camouflaged form will still see the light under another name. However, no one is looking for the monograph, in accordance with legal canons it is impossible even to look into the desk of the "favorite student." For this it is necessary to begin an investigation and to call G. to account. But what for? The situation is a phantasmagorial one, everything is clear to everyone, but

everyone is at a loss. G. is unsullied like the tear of a child, but only according to the letter of the prevailing law. But if we had a law on the protection of intellectual property, things would have turned out differently.

The moral, spiritual aspect is important in any law. Moreover, I believe, precisely ethical factors also determine the character and prospect of a law. And that is why a law on intellectual property is invaluable for the revival of our skidding science. The fate of generations of Soviet scientists makes it incumbent to recall the novel of Aleksandr Belyayev and the unfortunate Professor Douel, whose brain for a sip of oxygen was forced to serve its master. In this way among our intelligentsia the opportunity to think and create was also supported by the minimum means of exists, while in case of the slightest display of dissent the "oxygen" was easily shut off. The possession of property and the opportunity to dispose of the produced product guarantee the independence and freedom of every person, and here the scientist here is no exception.

The law would be the first step toward the reduction of the "brain drain" to the West, which is acquiring dangerous speeds for the future of all of society. The recognition of intellectual property is not only the renunciation of the obsolete semifeudal practice of urging on workers of mental labor. This is the increase of the prestige of the occupation of scientist, engineer, and designer, this is a step toward the spiritual revival of society, which for decades steadily degraded its intellectual potential. Finally, this is the only opportunity for scientists to feel not like "screws" and not like "servants," but like full-fledged and equal masters in their own country.

President of New, Independent S&T-Industrial Union Interviewed

907A0327A Moscow IZVESTIYA in Russian 15 Aug 90 Morning edition p 2

[Interview with USSR People's Deputy Arkadiy Ivanovich Volskiy, president of the Scientific-Industrial Union, by IZVESTIYA correspondent Ye. Leontyev, under the rubric "Facing the Market": "A Union With Common Sense"; date and place not given; first two paragraphs are IZVESTIYA introduction]

[Text] The appeal of the scientific-industrial group of USSR people's deputies to industrial and scientific circles of the country to unite for the protection of their interests in a special independent organization was published in IZVESTIYA, No 139 of this year. The appeal received an unexpectedly strong response. The constituent congress of the union was held literally in a month, while before long a significant portion of the managers of USSR industry were in its ranks.

USSR People's Deputy A. Volskiy, president of the largest public organization of manufacturers and scientists in the country, and our correspondent Ye. Leontyev talk about its goals and tasks.

IZVESTIYA: Arkadiy Ivanovich, more than 500 enterprises, institutes, ministries, banks, and concerns have already become members of the scientific-industrial union. Practically all the previously established large associations and unions, such as the USSR Union of Leaseholders and Entrepreneurs, the USSR Union of Scientific and Engineering Societies, the USSR Union of United Cooperatives, the Association of Young Managers, and many others, have become collective members of it. Will you further expand the union? And does it not threaten in such a case to seize all our industry?

A.I. Volskiy: We are trying not to expand. But the number of applications is growing and growing. Do you see what kind of bundle is on my desk? During the first two weeks alone we received about 2,000 letters and telegrams from practically all the republics and all the economic regions of the country. It is really a kind of unifying element....

IZVESTIYA: The situation in the national economy is such that manufacturers, having lost the former point of support, by which our economy was held up, are seeking a new one.

A.I. Volskiy: Yes, they are seeking it in our union. Pardon the expression, but many of them are reminiscent of a dog which has lost its master—they are unprotected and do not know in what direction to move. But do you remember how many factors have contributed in recent times to this lost feeling? There are the administrative state order, which has brought many people to an impasse, the useless state acceptance, the lack of legal rights of managers of enterprises, and their absurd election. But, tell me, what rights did the Law on the Enterprise give them? I have in mind the recently rejected law. And the new one is of little use. Ministries and departments are fading away, but are still fighting for their own place in the sun and are not letting enterprises free.

IZVESTIYA: The numerous public associations of managers and specialists, which have appeared in recent times, have not been able to accomplish their main task—to protect themselves under these conditions. Do you believe that the new union (a union of unions) will cope with this?

A.I. Volskiy: They were disunited. And each one individually virtually lacked the opportunity to influence the policy of the government and legislative organs and was unable to form in society an atmosphere of deference to entrepreneurship. Moreover, these were premarket unions and associations, therefore, they also had a slightly different group of tasks than the Scientific-Industrial Union has. That is why today, on the threshold of the market, entrepreneurs saw—no, felt intuitively—between the lines of the appeal to them an independent organization of a new type, which is capable of standing up for rights and promoting their interests in the sea of present and future problems. I believe that the union will become the consolidating force, which will help to get the economy out of the crisis, to saturate the market, to raise the standard of living, and to stabilize the situation in the country.

IZVESTIYA: How do you intend to accomplish such large-scale tasks?

A.I. Volskiy: I will begin with the protection of interests. Powerful organizations, which have a substantial influence on economic life, have been established in all "market" countries precisely for this purpose. This, perhaps, is one of the most noteworthy attributes of the business world of these countries. During the postwar period the process of their formation intensified—such was the response to the broadening of the scale of state intervention in the economy and the intensification of the trade union movement. This is especially characteristic of the United States, France, the FRG, Great Britain, Sweden, and Japan. By consolidating the efforts of entrepreneurs, such associations are quite capable of influencing government policy, on the one hand, and of collectively opposing the unfounded demands of trade unions, on the other. Moreover, what is very important, they represent the interests of industry in organs of power. But the primary thing, perhaps, is the maintenance of a climate of trust in the relations between entrepreneurs and hired workers and the protection of the guarantees of their individual rights and freedoms.

We consider it our duty to borrow from such long-established organizations everything that justifies itself and to find the optimum forms of the use of their experience on the basis of our own concept.

IZVESTIYA: And methods of work with legislative organs will, of course, be included in it.

A.I. Volskiy: Certainly. We are generalizing already now the suggestions, which the representatives of various sectors of industry and entrepreneurs have, in order to formulate a common stand in the face of legislative power. For the opportunity to participate in the drafting of market laws is one of the most important reasons for their joining of our union. For the commodity producer it is most important of all today to establish horizontal ties among various sectors, enterprises, and territories, that is, the establishment of an all-union market, which is impossible without the corresponding laws, is important. The elaboration of proposals on a common tax and legal policy, on the convertibility of the ruble, and on the foreign economic protection of domestic enterprise, of course, worries them.

Quite naturally, here there are many problems, to which neither legislators nor science have yet given an answer. For example, is it possible to switch to a market simultaneously all across economic relations? The union members themselves are also trying to find an answer to these questions. Not by chance will we submit the questions of the establishment of an all-union market to our second congress—it is planned to hold it at the end of this year. While the preparation of the draft of a law on entrepreneurship became our priority action. Mainly the scientific-industrial group of USSR people's deputies prepared it.

IZVESTIYA: It would appear that you intend to establish something like a parliament, are you not?

A.I. Volskiy: Call this what you like, but we will not just come forth with legislative initiatives. If such a need arises, we will exert pressure (I am not afraid of this word) during the preparation and passage of fundamental laws that concern the interests of manufacturers. We are an organ which will promptly and regularly present our tasks before the Supreme Soviet of the country, before the President, and before the government.

IZVESTIYA: Arkadiy Ivanovich, are you not deliberately fostering the gigantism of the union, since you have declared that you will force not only legislators and performers, but also rightists and leftists to reckon with it? Will such a large organization be manageable?

A.I. Volskiy: Let us try to get away from old concepts. What does manageable mean? There are no principles of democratic centralism and no planning and control or fiscal and financial organs in the structure of the union. We have a self-managing organization. And the common interest of its members in the establishment and functioning of one or another joint subdivision and in the accomplishment of one or another task is the basis of this "self."

If there appears for an enterprise the need for commercial information on the market of our or another country, it turns for service to a cost accounting subdivision of the union, which lives and operates only while they are interested in it and only to the extent in which they are interested. If a task disappears, the need to have a structural formation also disappears. And we will not artificially support someone.

As to rightists and leftists, here I will say the following: The paradigm of our thinking is common sense. For it there are no leftists and rightists—it chooses the tack which fills the sails with the wind of enterprise and effect.

IZVESTIYA: Is it precisely for this reason that you took the risk of uniting here organizations, which are so different in their political orientations, like the USSR Union of United Cooperatives and the Association of State Enterprises of Industry, Construction, Transportation, and Communications?

A.I. Volskiy: It is precisely for this reason. I believe that all the members of the Scientific-Industrial Union first of all need independence and need an open road to the world of enterprise and to the world of open opportunities.

IZVESTIYA: In recent times it has become clear: Without radical political reforms economic reforms are hampered. Hence the politicization—and what politicization—of production unions and associations began. And although you are not afraid to combine what does not seem combinable, still we will ask the question: Taking into account the present situation, is not the wave of politicization also lying in wait for the new union?

A.I. Volskiy: As to its transformation into a party, say, an industrial party, thus far such a question is not coming up.

IZVESTIYA: And what about its transformation into an enormous ministry?

A.I. Volskiy: Administrative command management is still the core of the ministry. We are a voluntary association of subjects who need each other. We are now insisting on this.

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