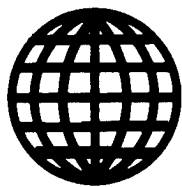
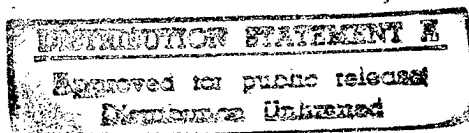


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Science & Technology

***Central Eurasia:
Science & Technology Policy***

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Science & Technology

USSR: Science & Technology Policy

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7 January 1992

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Lakhtin on Boosting S&T Development

927A0042B Moscow PRAVDA in Russian 29 Oct 91 p 3

[Article by Doctor of Economic Sciences G. Lakhtin: "The Gasoline Is Ours, the Ideas Are Yours....' What Will Science and Technology Policy Be Like?"—first paragraph is PRAVDA introduction; last paragraph is PRAVDA conclusion]

[Text] The scientific and technical lag behind the developed countries of the West is the basis for all our other lags. Security and well-being, the competitive ability of products, health, and education—everything depends in the modern world on how developed science is and how its achievements are used. And although political passions have now somehow overshadowed the problems of scientific and technical progress, it all the same remains the key link that governs social processes. What the West has actually surpassed us in most of all is in the speeding up of scientific and technical progress.

The experience of the countries, which are in the lead in scientific and technical development, testifies that their successes have been achieved as a result of the combination of market and state regulation. The willingness to take risks, the pursuit of innovations, and the perception of science as a source of wealth, that is, qualities that the structure, which formed in our country, needs so much, are characteristic of the market. The state, without interfering in specific actions of the researcher and the entrepreneur, creates favorable conditions for the effectiveness of such actions. First of all the state acts as the largest investor—allocations from the state budget cover approximately half of the expenditures on research and development. The state organizes the fulfillment of major national programs. But the main thing is that the state formulates and implements a unified science and technology policy.

The draft of the law "On State Science and Technology Policy," which was approved in the first reading by the USSR Supreme Soviet in the summer of this year, has now appeared in our country. True, now the subsequent fate of the draft law is not clear. But in the end the law is not needed as much as the policy itself is needed. But does it exist?

In its formulation past experience and knowledge in this area are of only limited importance, inasmuch as they were acquired under conditions that absolutely do not correspond to the future socioeconomic structure. It is necessary to direct attention to world experience, but its mechanical carrying over to our soil will also hardly lead to success owing to the fundamental differences. The transition from initial market liberty to a civilized regulated market that observes all "the rules of the game" has taken place "there"; regulators were gradually introduced and organized. "Here" the path to such a market runs from the opposite end—from a completely regulated economy; the regulators are weakening in part and are disappearing. Therefore, without relying on anyone, it is necessary to think out policy all over again.

Now, of course, the hot spots of today are in the forefront. How are the union and Russian academies to coexist? How

is science to be divided between the center and the republics? How are the international nature of the scientific product—knowledge—and the national origin of the sources of financing to be combined? This, of course, is policy, but far from all policy. Division in one proportion or another will occur, passions will subside, but the problems will remain. The need for policy—one that is long-term and stable and encompasses not only what is closer to the surface—will also remain.

The starting point is structural policy, which specifies the basic proportions and first of all what is to be done in science or, rather, what is to be done and what is not to be done and instead of this is to be borrowed from abroad (in the form of patents, licenses, advanced technologies at joint ventures, and so on). Even the Americans, for all their wealth, realized the impossibility of encompassing on their own the entire range of scientific problems and technical directions. In pursuing such coverage, we developed science quantitatively and took pride in the fact that in the number of scientific personnel we were "ahead of the entire planet." But this did not save us from a total lag.

The position of a pursuer presents a choice (the leader lacks such a privilege)—to rely on his own scientific and technical forces or to bank in the direction of the preference of imported technologies. The choice depends on the answer to the question: Is it possible given the present scale of the lag to hope for its elimination by relying on one's own forces? It is this that is the main question of science and technology policy. But in the mentioned draft law there is not a word about it. Apparently, it has not yet been realized that our science is at a turning point, perhaps the most fundamental one in its history.

Into what will the anticipated shift develop? For academic science it will develop into the reduction of orders of an applied and semi-applied nature. The main impact will fall to sectorial science, the largest and most "voluminous" science. With the elimination of industrial ministries the sectorial network of scientific research institutes and design bureaus is losing its master and is already beginning to disintegrate, losing orders and clients. Even without a special analysis it is visible to the unaided eye that it will be a matter of the large (by several fold) reduction of the amounts of scientific and technical activity and, consequently, the number of active participants. But these are the fates of hundreds of thousands of people!

Of course, there should not be a regular cutting off of fruit-bearing vines. There are directions in which we hold sure positions and it is necessary not to lose hold of them. There is a need to preserve the "officer corps," that is, the skilled skeleton, on which in better times it will always be possible to grow muscles. There is also the foreign policy aspect. The restrictions on the export of advanced technologies to the USSR remain, the activity of the Coordinating Committee for Export Control has not been canceled. Most likely the West will supply us with technologies and means of production of yesterday, while maintaining a gap of at least one generation of equipment.

As is evident, some arguments are at variance with others. How is one to combine the very idea of an inevitable reduction with concern for the future of science, for the preservation of its potentials, and for the survival of scientific schools? Obviously, there is one solution: to sacrifice quantity in favor of quality, that is, to replace the policy pursued until now (if this was a policy) with the opposite policy. Instead of thousands of developments, which are lying on shelves, it is better to have tens, but ones of the world level—and in operation.

This question also has another aspect. The unchecked increase of personnel in past years led to "the break of contact with rear services." According to available estimates, the Soviet science worker is supplied by at least a factor of 10 worse with advanced research equipment than his American colleague. The difference in information supply is estimated at a hundredfold. A question arises: Is it necessary, figuratively speaking, to keep in service more soldiers than there are rifles for them? Would not such a large contingent, but a contingent equipped in an advanced manner not prove to be more productive? This would imply the shifting of much capital from the remuneration of scientific labor to the production of scientific instruments and the development of information systems.

It is also necessary to eliminate the disproportion from the other end—by increasing the supply of resources. The material and technical supply of science is not mentioned at all in the draft law—obviously, it is presumed that this is the drowning man's own job, that is, the concern of scientific institutions themselves. Foreign experience serves as a contrast. Thus, in the United States questions of the supply of universities were a subject of attention of congress, which passed a special financing program. In addition to this, a number of steps of the state level were taken—tax credits for purchasers of scientific equipment, its free transfer to civilian users, superaccelerated depreciation, which makes it possible to replace the stock of instruments more rapidly. Apparently, a set of steps, which are subordinate to the common goal, should also figure in our policy.

Thus, the first of the most important trends—the shift of the center of gravity from quantity to quality—is visible. The strengthening of the personality factor and the recognition of the leading role of the creative individual in science act as an affiliated trend. A special direction in management, which seeks methods of the complete exposure of the creative potentials of a person, has appeared in the West.

In this connection a new organizational form being developed in the West, so-called scientific and technical incubators, merits attention. Its point is the following: A science worker or simply an inventor conceived a very promising idea, but he does not have money, premises, laboratory equipment, or an assistant to, as they say, get this idea across. He does not know the market, is unfamiliar with the subtleties of business, and in general is "unworldly." The incubator firm, which makes everything necessary available, of course, not for free, but for a share in the future revenues, when commercial success arrives,

comes to the rescue. In contrast to the principle, which was advanced by Ostap Bender, the opposite principle holds: "The gasoline is ours, the ideas are yours." The incubator is called upon to help the scientist become an entrepreneur on the basis of the contribution of its intellectual wealth; the state supports incubators with finances and the granting of benefits.

Under our conditions can a cost accounting institute or a scientific and technical cooperative become such an incubator? No, it cannot, because the principles of cost accounting, which require everyday cost recovery, do not allow it. It must feed itself, it depends entirely on clients. The main thing—start-up capital to bring an idea up to profitable realization at one's own expense and at one's own risk—is lacking. While the authorities, who watch over centers of scientific and technical creativity, treat subordinate science like pimps: They drive it into the street in search of any client whatsoever, and then also take away what was earned. The policy adopted in the West is conducive to venture projects, risk taking is rewarded. In our country the avoidance of risk is actually stimulated. This is not policy.

The organizational aspect of the matter plays and will play an important role. In what organizational forms will science develop? What fate awaits expanded scientific research institutes? In recent years opposing processes, it would seem, have been going on; on the one hand, large interbranch complexes, science cities, and associations of various types have been established and, on the other, small innovation enterprises have been advancing rapidly, scientific and technical cooperatives have been detaching themselves from large institutes. The disintegration of large forms seems to be occurring. In reality there is no contradiction. The scientific center of the future is a large community of small autonomous highly specialized units that are concentrated around a recognized scientific nucleus, for example, a large university. Supported by the territorial proximity of the participants, such a community forms a technopolis. In contrast to academy campuses this is not only a scientific, but also a scientific and technical city, where the entire chain, including the final stages, that is, production that grew from a test tube, is accomplished.

In the United States there are already about 300 such parks. In Japan they are emerging not independently from below, but owing to state science and technology policy, which envisages the establishment of 19 technopolises, where a powerful potential will be created for the development of advanced technologies, primarily in highly science-intensive fields.

Such complexes will be supported by economic ties. Structures, which were formed by a purely administrative means, just as ties as a public service will disappear. The contract, which specifies the mutual advantage and responsibility of the parties, will succeed the nonbinding agreement on cooperation. Two routes will open up for the medium-sized, rank and file scientific research institute. Either to join a concern, which is emerging on the ruins of a former main administration, and to become an intrafirm scientific and technical center. Or to remain independent

and turn into a "frame" institute, which is a conglomerate of temporary contract collectives that are autonomous in the choice of orders, in the selection and the remuneration of the labor of their staff members, and so on. Such links should be on full cost accounting, including in interrelations with the administration of the institute. The latter will make available to them for money service of all types—management and information service, premises, and security—but will not interfere in the scientific and technical activity of its children.

Along with organizational policy economic policy, which encompasses financing, taxation, depreciation, and anti-monopoly measures, also needs clarity. Fiscal policy appears not only in the amount of money being allocated, but also in efficient methods of allotting it in order to force the recipients to compete and to strive for the greatest return. But this, too, is not everything. By supporting competition and affording various benefits, the state also induces private business to loosen its purse strings for science, if it avoids investments with a long payback period.

Tax policy is an extension of fiscal policy. In the United States there are up to 100 tax credits, which in one way or another affect scientific and technical progress. The main one of them is the deduction of the expenditures on research and development from the taxable income of a company. Moreover, a sum, which is equal to 20 percent of the increase of spending on science in the last three years, is deducted from the profit tax that is paid by corporations. Thus not simply the investment of assets in scientific and technical development, but the increase of these investments are encouraged. So far we do not have such a policy.

Antimonopoly policy is one of the methods by which the state influences the progress of production in developed countries. Its main tool is antitrust legislation, which prohibits any contracts, agreements, and mergers, if they restrict competition and lead to a monopoly. Social consciousness has come to understand that dynamism, which is introduced by competition, outweighs the advantages from the concentration of production in the hands of one person and from monopoly domination on the market. However, it is also taken into account that all domination is not alike. If a high proportion of the market is a consequence of a technological breakthrough or a better product, such monopolism is allowed. Moreover, the association of businessmen for the purposes of devising major innovations and developing new technologies is supported. Initially American legislation made exceptions for such alliances (consortia), then switched to encouragement by the granting of various benefits. In this way a distinction is made: The progress of production needs competition, the progress of the sphere of research and development needs cooperation.

Our legislation has not gotten as far as such fine points. The antimonopoly law of the RSFSR, which came out in the spring of this year, is aimed against the consequences of the existing monopolistic character, but not against monopolism itself. Actions, which speed up scientific and technical progress, are practically absent in it.

From such fragments a whole is also formed—science and technology policy, which encompasses all the means and methods that the modern state has for the development of science and the acceleration of scientific and technical progress. So far it is hardly possible to regard the processes taking place in this sphere as manifestations of a unified, weighed state policy. But meanwhile precisely during the transition period the need for it is particularly great. To simply put science into the market kettle means to destroy it.

Russian Support of All-Union Academy of Sciences Urged

927A0033A Moscow ROSSIYSKAYA GAZETA
in Russian 22 Oct 91 p 3

[Article by Corresponding Member of the USSR Academy of Sciences Sergey Stishov, head of a department of the Institute of Crystallography of the USSR Academy of Sciences, under the rubric "We Continue the Theme": "With Respect to the Per Capita Number of Academicians"—first paragraph is ROSSIYSKAYA GAZETA introduction]

[Text] "How Many Academies Does Russia Need?" is how the article, which was published by us on 27 September of this year, was titled. Questions connected with the establishment of the Russian Academy of Sciences and with the unclear future of the USSR Academy of Sciences were raised in it. A discussion is a discussion, and today we are giving the floor to a representative of precisely the "big" academy. His opinion in many respects is controversial and, undoubtedly, will evoke the disagreement of many of our readers. However, to arrive at the truth it is important to know all the points of view.

The general meeting of the USSR Academy of Sciences was recently held. For the uninitiated I will say that, according to the data for 1 January 1991, 65,575 scientists, including 337 academicians, 651 corresponding members, and 6,531 doctors of sciences, work at the USSR Academy of Sciences.

Academicians and corresponding members participate in the general meeting, moreover, only academicians vote, that is, make decisions (in accordance with the charter of the USSR Academy of Sciences). This time about 200 academicians attended the general meeting.

The general meeting discussed in practice a single question: What is the USSR Academy of Sciences to do under the conditions of the disintegration of the Union?

The results of the general meeting are already well known, and I will only briefly repeat them here. Thus, the 200 highest representatives of the USSR Academy of Sciences (0.3 percent of the total number of scientists) proclaimed the indivisibility of the USSR Academy of Sciences, but decided henceforth to be called the Russian Academy of Sciences, having merged with the new academy that is being established in accordance with a decision of the RSFSR Supreme Soviet.

It was also deemed expedient to preserve the Academy of the Union, but without institutes, as some supreme coordinating and consulting force (something like the U.S. National Academy of Sciences). This academy could watch over several large institutes of interrepublic significance.

Decisions are decisions, but for the present it is not clear how the governing bodies of the Russian Federation will treat them as a result, on what terms the integration of the USSR Academy of Sciences and the Russian Academy, which is being established, will take place, and so forth. In particular, the principle of indivisibility may become a stumbling block in the way of integration if only because Russia is not obliged to maintain several of the institutes, for example, the ones, the main task of which was the writing of reports for the CPSU Central Committee. On the other hand, Russian scientific leaders themselves intend to direct the academy, and they, apparently, would like to accept institutes of the USSR Academy of Sciences into the lap of Russia one at a time, thereby cutting the ground from under the feet of the Presidium of the USSR Academy of Sciences.

From where are all these problems coming? The question, it would seem, is a simple one. Practically all the institutions of the USSR Academy of Sciences, with the exception of a number of alpine stations, observatories, and others, are on the territory of Russia, and it is necessary to announce their transfer to the jurisdiction of Russia, to be called henceforth the Russian Academy of Sciences, and to enter into talks with state organs of the Russian Federation.

But some time ago, namely on 13 July 1990, under the pressure of certain circles of the scientific community the RSFSR Supreme Soviet, which for some reasons or others was not satisfied with the situation at the USSR Academy of Sciences, made the decision on the establishment of the Russian Academy of Sciences. A response followed immediately. By the Ukase of the USSR President of 23 August 1990 the USSR Academy of Sciences was recognized as an all-union self-administered organization with title to all the property, buildings, and parcels of land, which are in its use. Such a turn of events did not disconcert the Russian parliament members. The establishment of the Russian Academy of Sciences continued, the corresponding organizing committee and the organizing president were appointed, and the election of 150 Russian academicians in December 1991 was set.

Prior to the August events the process of establishing the Russian Academy of Sciences did not particularly disturb anyone, but immediately after them it became clear that if anyone is able to maintain the USSR Academy of Sciences, only Russia is.

There is one alternative—it is necessary to join Russia, but how? For at any moment there will be there its own academy and its own 150 academicians. Let us assume that institutes will join, but who will manage them and distribute the money? The new academicians and the new presidium? Will this be better or worse? And, in general, what will become of the old presidium?

About a month ago as a result of the overtures of various union and republic structures the presidium of the USSR Academy of Sciences made a decision in the spirit of Lev Trotskiy: "no war, no peace," namely it declared the USSR Academy of Sciences to be the Russian Academy, without directing attention to the mentioned decision of the RSFSR Supreme Soviet.

Very little remained further: Suspend the election of Russian academicians, which was set for December, and everything is all right. But the talks with the Russian leadership showed that it would hardly be possible to prevent the election. Of course, committees had been set up, work had been performed, the people had been reassured, and so on.

A new idea—on the integration of the two academies—is emerging. Pardon me, which one with which one? For the USSR Academy of Sciences has institutes and more than 60,000 scientific associates, while the new one has nothing, there will be only academicians, and then in December. It is they who will be united with the old academicians! Now there will be about 500 of them, and we will live as before, but the number of managers of science will be one-third greater. Many new academicians will probably need their own crown domains, estates, this is already in working order. Of course, it is a little embarrassing to unite with provincial doctors of sciences, who have become Russian academicians, more for political than for scientific reasons, for this is for the benefit of the matter. After all, in the past they had to admit to their circle the children and close relatives of members of the Politburo, party functionaries, and others, and it did not matter, they lived.

True, there is one small problem. This is the 650 corresponding members of the USSR Academy of Sciences. What is to be done with them? After all, in their scientific level they are in no way lower than the future academicians of Russia. Should one, perhaps, eliminate the archaic two-level system at the USSR Academy of Sciences? Somehow they cannot bring themselves to do that.... Incidentally, the corresponding members may also come in handy. One of the academicians quickly calculated that if one were to elect one-third (which one?) of the corresponding members as academicians, they, should anything happen, would neutralize the people from Russia, if they prove to be too aggressive.

Nevertheless, the likelihood of the loss of power by the present leading nucleus of the USSR Academy of Sciences is rather great. Therefore, a certain superstructure like the National Academy, where the present leaders would be able to find refuge and peace for themselves, is also being proposed.

In one way or another Russia intends to set another world record with respect to the per capita number of academicians. Will all this do science good? It is very doubtful.

The point is that the average level of science within the former USSR (I emphasize, namely the average) is very low. Science is quite clearly divided into capital and provincial science. I do not want at all to offend provincial scientists, this is not their fault. And the point is not at all

that the financing of science is inadequate, the essence of the problems lies in the system!

No matter how much money the state allocates for science, given the present system of management and distribution this money will never get to the instructor from Torzhok or Naryan-Mar. Although in the present situation money will also not help. The lack of schools, the shortage of information, the limitedness of scientific contacts, and much more are having an effect.

However, one should proceed from the real situation. Apparently, it is rather clear to all sensible people that we simply do not have such a number of prominent scientists in order to elect simultaneously from among them 150 new academicians. Consequently, the newly elected academicians will be, generally speaking, second-rate academicians. This will inevitably lead to many negative consequences, of which the distortion of moral and scientific criteria and the progressive decrease of the level of science as a whole will be the main ones.

It is too late to look for the guilty parties, but still it should be noted that during the six years of perestroyka the USSR Academy of Sciences did practically nothing for the democratization of scientific life and did not take one step to meet the reviving Russian state system.

What is it necessary to do? Russia should decide whether it needs basic science. If it does, there is practically no choice. It should finance the institutes of the USSR Academy of Sciences for want of others. If it is possible to find an effective means of financing science, while bypassing the bureaucratic structures of any academies, in the end it is unimportant whether or not there is another Academy of Sciences in Russia.

However, apparently, for the transition period the academy should be left with distributive functions. In this case the presidium of the USSR Academy of Sciences should send in its resignation: The present membership of this body has completely proved its inability to analyze events scientifically and has demonstrated the lack of a clear civic position, and it is incapable of doing anything else but clinging to the power that is slipping away.

A temporary presidium or committee, which would also carry out the reform of the academy, having ensured in the final analysis its integration not with any other academy, but with the system of higher education, should be elected in its place.

As to the election to the Russian Academy, it is necessary to suspend it. One must not put the cart before the horse, science first and awards and titles later. Moreover, if we keep in mind the forthcoming merging of the academies, the December election with regard to the favorable regional quotas will inevitably lead to the formation in the future Russian Academy of three distinct groups: "people from Russia," who suffer from an inferiority complex, offended corresponding members and academicians of the old pattern, the relations among whom will be rather far from the spirit of mutual understanding and cooperation.

However, whatever happens, one should free scientists, who make science, from the close tutelage of chiefs of all colors and give them the opportunity to interact directly with various kinds of scientific funds, which have to be established.

Name Change for USSR Academy of Sciences Justified

927A0033B Moscow NEZAVISIMAYA GAZETA
in Russian 3 Oct 91 p 1

[Letter to the editor under the rubric "A Letter to NEZAVISIMAYA GAZETA": "Preserve the Potential of Russian Science"]

[Text] In January 1742 the Senate of the Russian Empire issued a ukase on the establishment of the Academy of Sciences. This day went down in the history of domestic science as the day of the founding of the oldest scientific institution of our homeland.

The Imperial Petersburg Academy of Sciences of Russia during the many years of its existence was able to develop in the Russian state first-class science in the most diverse areas of basic knowledge.

After the revolution the academy of sciences was renamed from the imperial academy to the Russian Academy of Sciences. And only in 1925 was the decree on the transformation of the Russian Academy of Sciences into the All-Union Academy of Sciences adopted.

Soon in connection with the development of science in the Soviet republics national academies of sciences, a number of which are very authoritative, began to be formed in a certain sequence.

In the Russian Federation, the only one of the other republics, there was not its own Academy of Sciences, and the all-union Academy of Sciences played the role of such. And this is not by chance, for the USSR Academy of Sciences in practice did not have a single scientific institution outside Russia.

At present in connection with the occurring events with respect to the transformation of the Union the question of the future of the USSR Academy of Sciences is naturally arising. The formation within the former Union of sovereign states and republics with their own academies of sciences signifies, in our opinion, the actual cessation of the activity of the USSR Academy of Sciences as an all-union organization and naturally signifies the necessity of the quickest formalization of its transfer to the Russian Federation.

The importance of such a most prominent center of science as the USSR Academy of Sciences is so great for the fortunes of the country and, in particular, Russia, that the delay of the settlement of this question and the superimposing on its settlement of any political and other external circumstances, which are not connected with the fortunes of the development and preservation of science in our homeland, are completely intolerable. The USSR Academy of Sciences, which, in our deep conviction, should become the Russian Academy of Sciences, is so

complex an organism that some forms or others of its intended or actual destruction will halt the development of basic science for many years.

We urgently appeal to the leadership of Russia and union organs to settle immediately the question of the transfer of the USSR Academy of Sciences to the Russian Federation.

We also understand that a number of existing structures of the USSR Academy of Sciences and its work as a whole need substantial modification and improvement, but all this should be done not by destruction, but by the effective improvement of the work of the academy within the framework of the existence of the Academy of Sciences in the Russian Federation.

[Signed] Academician Yu.N. Rudenko, Academician K.S. Demirchyan, Academician M.A. Styrikovich, Academician A.Ye. Sheyndlin, Academician V.I. Subbotin, Corresponding Member A.S. Koroteyev, Corresponding Member V.I. Kiryukhin, Corresponding Member A.A. Sarkisov

Separate Academy of Sciences Recommended for Defense Establishment

927A0037A Moscow *RADIKAL in Russian* No 31,
14 Aug 91 pp 1, 3

[Article by Yuriy Bobylov, the International Center for the Development of Small Enterprises, under the rubric "Point of View": "For the Defense Complex Its Own Academy of Sciences?"—first two paragraphs are *RADIKAL* introduction]

[Text] In our dynamic and enterprising times you are already ceasing to be amazed at the appearance of numerous and at times unusual organizations. A good and resonant name of a firm contributes considerably to commercial success. But it puts one a little on guard, for example, when an association made up to 30 small enterprises calls itself the Siberian People's Academy.

Nevertheless I believe that several new academies of sciences would actually not be a bad thing for the country. Personally I am for the establishment of the USSR Academy of Technical Sciences (ATN) within our defense complex.

The nontraditional phenomena and trends in the development of sectorial science of the Soviet defense sector are giving rise to this reformative idea. But first it makes sense to make a few general remarks that describe the situation.

Let us recall that no authoritative program of the reform of the Soviet economy passed over either the conversion of military production or the sphere of science. Upon careful analysis another problem arises at the meeting point of the market economy and the sphere of research and development of the defense complex. Today the increase of research and development, which are aimed at exclusively civilian products, is under way in the "defcom" ["oboronka"—defense complex]. Here it is necessary to stimulate the development of new forms of the organization of labor at scientific research institutes and design bureaus,

including international cooperation. But such new forms are being held in check by the barriers of secrecy, which at times is justified.

It is absolutely necessary to carry out within the military-industrial complex the elimination of state control and the privatization of property—if only on the basis of the issuing of stock in many sectorial scientific research institutes and design bureaus of the "defcom," where at times there are no serious secrets. The development of property relations in the "defcom" can also become an important factor of the increase of the effectiveness and efficiency of scientific production activity. The redemption by some scientific organizations in civilian science of their production capital and subsequent truly cost accounting activity give today quite a few vivid illustrations of this. Nonstate scientific organizations have already begun life in the market economy. Why not interest such firms with the proposals to do some work for the Ministry of Defense or the USSR Committee for State Security? The question, as they say, is interesting....

The sudden offensive against the managers of sectorial defense science of the rapidly developing so-called small-scale economy, which is represented by all kinds of small enterprises, centers, and cooperatives, is also plunging it into a difficult situation. The experience of the prohibitive policy with respect to them—for example, of the USSR Ministry of the Electronics Industry—showed that this is fraught with financial, scientific and technical, and personnel losses. If you prohibit the activity of small enterprises near by developments of military production, you will put yourself in a difficult situation. In the interests of the development of a number of scientific and technical areas, which are new for us, and, moreover, the development of products that are competitive on the work market it is necessary today to find compromise solutions. Including solutions that suit the secret services of "dead drops." Incidentally, precisely they have begun today to act as champions of the protection of the commercial secrets of scientific research institutes and design bureaus, at times introducing not entirely successfully in their actions techniques of the protection of state and military secrets.

The mixed nature of our "defcom" and its sectorial science is posing today many complex problems of the reforming of the economy. Without their solution our reforms will stall, for until most recently three-fourths of our industry and science were connected with defense activity.

The elimination of state control over and the privatization of property in sectorial science. How is this to be carried out? In the simplest version it is possible, for example, to suggest the changeover of especially large scientific research institutes and design bureaus to the conditions of the activity of incubators of small science-intensive firms, while on the regional scale even the organization on their basis of technology parks.

The problem of ridding the defense industry of purely civilian production, particularly if they have neither technological interrelations nor the effective diversification of

production, merits discussion. In this respect the elimination of state control over and the privatization of a number of scientific research institutes and design bureaus of the "defcom" are a reality of the immediate future.

Today, perhaps, it is premature to talk about the expedience of the privatization of exclusively military technical scientific organizations with a significant volume of work on the development of arms and military equipment. In particular, such firms as the Central Aerohydrodynamics Institute imeni N.Ye. Zhukovskiy or the State Optics Institute imeni S.I. Vavilov cannot manage without significant state support, which makes the idea of privatization completely senseless for them. And, besides, the state sector itself even in the U.S. market economy has not exhausted its resources.

Another question is, how is one to make our sector of military production more efficient or attractive?!

It is possible and necessary to seek the answers to many similar questions, by refining the concept of our military production, comparing realistically military and nonmilitary production in the sphere of the "defcom," and analyzing the methods of organizing the corresponding enterprises.

Significant reforms in the Soviet defense industry are inevitable. It is necessary to submit them openly for discussion by the public. In this respect it is possible only to welcome the boldness of the Ministry of Defense of the country, which published the conceptual bases of the new USSR military doctrine and the principles of its military technical policy in a number of open periodicals. The first results of the discussion proved to be rather fruitful.

The established forms of the organization of the labor of researchers and developers in sectorial science of the defense complex and the standard legal status of the scientific organizations of the "defcom," as is acknowledged by both managers and scientists, do not conform to the important new tasks of ensuring the national security of the country. The trend toward a lag in the developing "third military technical revolution" is obvious. The results of the Persian Gulf conflict say much. The results of the attempt to convert sectorial science of the "defcom" "to full cost accounting and self-financing" proved to be obviously poor. This is not a "system," if in it defense research and development are less profitable for scientific research institutes and design bureaus than trivial jobs for the national economy are. Is it not from here that the flow of highly skilled specialists from the sphere of military-oriented research and development to cooperatives for the sewing of outerwear comes?

Of course, some redundancy of the potential of the military-industrial complex requires the reduction of the financing of military-oriented research and development. However, common sense and historical experience require one "to keep the powder dry." And it is better if this would be powder "based on new physical principles."

Under the conditions of the reduction of the functions of the industrial ministries of the defense complex, the uncertainty of many personnel about the future, and endless reorganizations and innovations the removal of the sphere of military-oriented research and development from the departmental administration of the "nine" is necessary. Only this will ensure the effectiveness of science without any detriment to industry and the main clients of arms and military equipment. But this should be removal with a clear goal—the formation on the basis of the most science-intensive scientific research institutes and design bureaus, with their experimental and even pilot production, of a specific scientific and technical department.

It is here that it is possible to talk about such a USSR Academy of Technical Sciences, which would introduce in the "defcom" several new principles of activity, which were declared in the Ukase of the USSR President "On the Status of the USSR Academy of Sciences" of 23 August 1990.

The fact, for example, of the recognition of science as "independent" and "self-administered" is very important. And sectorial science of our "defcom" outside the state order should be based on the principles of "a self-administered military technical association of researchers and developers."

The transformation of the functions of the state in our country also requires some elimination of state control over sectorial science. In our opinion, the organization of the USSR Academy of Technical Sciences within the defense complex is also a promising form of such elimination of state control and the formation of the property of a specific public organization. It is impossible to alienate such property, to divide it among the members, or to liquidate it in case of the cessation of the activity of some scientific research institutes and design bureaus or others. The existence of property of the USSR Academy of Technical Sciences is a guarantee of our national security.

Under the new conditions in face of serious defense scientific and technical problems the establishment of an independent organ of the management of the "removed" scientific research institutes and design bureaus of the defense complex, which is stronger than the very respected State Military-Industrial Commission of the USSR Cabinet of Ministers (GVPK KM SSSR), is useful. Such an organ could not only perform specific functions of the management of research and development on an intersectorial basis and at lower levels of the system of management, but also solve specific problems of the USSR State Property Fund as applied to sectorial science which is being converted. There is also an independent goal—to make more appealing scientific and technical activity itself for scientific research institutes and design bureaus, researchers and developers.

An important argument in favor of its own academy in the defense complex is the assurance of the preservation of the accumulated scientific and technical potential under the conditions of the worsening of the financial status of both

clients and industry (the factors of conversion, the economic crisis, market inadaptability, social instability for purely political reasons, and so on).

The advisability of establishing in the USSR Academy of Technical Sciences a number of specialized departments is already evident from the example of electronic engineering and technology. For example, in applied electronics. As is known, today electronics is being dealt with only in the USSR Ministry of the Electronics Industry. But owing to the pursuit of narrow departmental interests the usual coordination of research and development at times is impossible. Sectorial secrecy is also fulfilling its adverse mission. Within the USSR Academy of Technical Sciences it is possible to gather all resources as if in one fist. The goal program management of research and development in this sphere can also promote this.

With the establishment of a specialized department it is possible, at last, to improve both intra-union cooperation (the USSR Academy of Sciences, the USSR State Committee for Public Education, national economic and republic complexes, and so on) and international cooperation.

People may ask whether there are similar structures, which are like the Academy of Technical Sciences, abroad. Here it is possible to cite as an example NASA [the National Aeronautics and Space Administration] of the United States. This department deals only with space, has 24,000 staff members at research centers and institutes, and at the same time does not have its own plants. The activity of departments, including in the interests of the U.S. Department of Defense, is rather efficient. NASA and our Academy of Sciences in their size are nearly comparable. All this testifies to the fundamental possibility of organizing the Academy of Technical Sciences. The questions of efficiency are being settled in other aspects.

With the help of the USSR Academy of Technical Sciences it is possible to free oneself from the dictation of industry and accordingly industrial ministries, which frequently completely ignore the specific features of the sphere of research and development and the labor of researchers and developers. Thus far scientific research institutes and design bureaus are feeling the strong pressure of many standard acts on economic activity, which have been adopted for industrial enterprises. Hence, too, the periodic appearance of ridiculous instructions—for example, on the determination of labor productivity in sectorial science, quarterly planning and reporting with the corresponding stage-by-stage financing through the banking system, and so on.

The establishment of the USSR Academy of Technical Sciences, obviously, conforms to the national traditions of the management of science. This is not the American and not the Japanese way of adapting military-oriented science to the market economy, but our, our own, domestic way, which relies on our own progressive practice.

Union Science Organizations Set Up 'Intellectual Property Exchange'

927A0042A Moscow IZOBRETATEL I

RATSIONALIZATOR in Russian No 7, Jul 91 pp 34-35

[Interview with Viktor Dmitriyevich Markov, president of the International Intellectual Property Exchange, and Sergey Vladimirovich Raspopov, representative of the International Intellectual Property Exchange, by an IZOBRETATEL I RATSIONALIZATOR correspondent; date and place not given: "Intellect Is Worth Money"—first paragraph is IZOBRETATEL I RATSIONALIZATOR introduction]

[Text] Materials of the International Intellectual Property Exchange, which was recently registered in Moscow, were published in No 4 of IZOBRETATEL I RATSIONALIZATOR. The editorial office considered it expedient to inform readers in greater detail about the activity of this unusual organization. Viktor Markov, president of the MBIS [International Intellectual Property Exchange], answers the questions of a correspondent of the journal.

[Markov] The International Intellectual Property Exchange was founded by the USSR Academy of Sciences, the USSR Science-Industry Union, the All-Union Agency for the Protection of Copyrights, and the Scientific and Technical Information Agency, says Viktor Dmitriyevich. Among the founders of the Exchange there are no "casual" organizations: The Academy of Sciences is interested in increasing the revenues of its subdivisions and in the development of scientific and technical innovations. The Science-Industry Union is interested in seeing to it that its enterprises, organizations, and institutions could acquire developments at the most reasonable prices, while the VAAP [All-Union Agency for the Protection of Copyrights] is also called upon to protect the interests of authors who sell their developments. The MBIS was contemplated as a market structure in the sphere of intellectual labor and in this capacity is a completely new phenomenon both for the USSR and, perhaps, for foreign countries. Our exchange has no analogs.

[IZOBRETATEL I RATSIONALIZATOR] In your opinion, are the concepts "market" and "intellect" compatible?

[Markov] Certainly. Moreover, the technological lag of the USSR, in my opinion, is connected precisely with the fact that people are not accustomed to paying for the work of "intellect." For long years the very word "intellectual" was regarded as all but a curse, the intelligentsia was called everywhere and anywhere by the strange word "stratum" [prosloyka]. At present it is difficult to overestimate the role of the intelligentsia in our country. Now as never before new ideas, technologies, and inventions are needed. It was Lomonosov who asserted that "the Russian land can give birth to its own Platos and quick-witted Newtons." And he was right. In spite of the immense social upheavals, the country as before has a mighty intellectual potential. It

is necessary merely to learn to use it properly and efficiently under market conditions. With the aid of the Exchange, which is a market structure, we hope to achieve this.

[IZOBRETATEL I RATSIONALIZATOR] What are the basic tasks and goals of the operation of the exchange?

[Markov] The Exchange first of all is oriented toward the extensive dissemination on a commercial basis of objects of intellectual property, which are ready for immediate use in production. Scientific and technical developments, efficient technologies, and other innovations can be these objects. Today it is not necessary to convince anyone that an efficient and effective mechanism in the sphere of the use of the achievements of scientific and technical progress does not exist in the USSR. The MBIS, according to our intention, to some degree should fill this gap.

[IZOBRETATEL I RATSIONALIZATOR] And specifically how will this mechanism operate?

[Markov] Before answering this question, I would like to say why, in my opinion, the "developer—consumer" chain in its present form operates inefficiently. For the present it is simply UNPROFITABLE for enterprises to introduce innovations. Fewer inventions means less confusion. It is possible to hold out for some time by working "in the old way." The goal of the Intellectual Property Exchange is to include market mechanisms in the process of introducing innovations and to speed it up as much as possible.

In carrying out the search for and selection of the most effective developments, the MBIS gets information on them to a wide range of potential consumers by means of the exchange information bulletin. The consumer, having selected the development he needs, applies through the exchange to its owner and acquires the commodity of interest. This is a simplified outline of the activity of the MBIS. If we talk in greater detail, a broker of the Exchange, who finds a consumer and offers the needed development, carries out the information service of the consumer, and under special contract can assume functions on the tracking of the development up to its introduction, also participates in this process.

[IZOBRETATEL I RATSIONALIZATOR] Thus, the Exchange ensures a significant number of sales of each development. By this it is attractive for the owner of intellectual property. But on what can the consumer count?

[Markov] Work with the Exchange is, of course, also advantageous for the consumer. I will try to illustrate this with a specific example.

Recently they offered us for sale a unit for the efficient treatment of sewage, the expenditures on which together with the prototype come to about 1 million rubles [R]. It is natural that the selling price, which was proposed by the developer to the Exchange, was not less. However, the Exchange would hardly be able to sell the unit at such a price to more than one buyer. Therefore, our experts proposed to sell the development at R50,000. At such a price not less than 100 enterprises, according to the most conservative estimates, will gladly acquire the unit.

Accordingly the sales revenue will come to a minimum of R5 million. Thus, in this case with a decrease of the cost of the development to one-twentieth the revenue increases by fivefold. This is advantageous both for the owner and for the consumer, since the cost of the development becomes more reasonable.

[IZOBRETATEL I RATSIONALIZATOR] Viktor Dmitriyevich, you are talking about very large sums of money. They are, it appears, real. How are the payments for sold developments distributed? How does the financial mechanism of the Exchange work?

[Markov] The payments are distributed in the following manner: The owner receives 100 percent of the cost of the development. The Exchange receives from the consumer a commission which is used for offsetting the expenditures on the sale of the scientific and technical achievement. However, it is important to stress that a condition of the interaction of the owner of the development with the Exchange is his agreement to the payment from the sum, which was obtained for the innovation, 9 percent to his developers, 5 percent to the authors, 5 percent to the brokerage, and 10 percent to the managers of the enterprise that introduced the development. If you recall my example, these percentages will have a significant monetary expression: The developers of the innovation will receive R450,000, the authors will receive R250,000, while the managers of each of the enterprises, which introduced the development, will receive R5,000 each.

The reward, you will agree, is more than sizable. In the USSR, it turns out, intellectual labor can be paid for according to its deserts. Incidentally, one of the supertasks of the Exchange is to prevent the "brain drain" to the West.

[IZOBRETATEL I RATSIONALIZATOR] You spoke about the payment of bonuses to the managers of enterprises that introduced innovations....

[Markov] The bonus is paid to them on the condition of the submission to the Exchange of a certificate of introduction or another document that confirms the fact of the introduction of the innovation. There is another condition for the receipt of this bonus—the enterprise should be a subscriber of the Exchange.

[IZOBRETATEL I RATSIONALIZATOR] Thus, do subscribers of the Exchange enjoy substantial preferences? In what do they consist?

[Markov] A detailed answer to this question was given in No 4 of IZOBRETATEL I RATSIONALIZATOR. But nevertheless I will briefly repeat it. For a fee, which is more than moderate for the present times, subscribers of the MBIS will receive all the information about the activity of the exchange, that is, the most detailed database on computer diskettes, which will be of invaluable assistance in the establishment of strong horizontal ties between enterprises, as well as free exchange bulletins and video appendices to them. Subscribers will be able to use free of charge the information materials at the showrooms of the Exchange and its broker and dealer offices. Incidentally,

broker's seats on the Exchange will be made available to subscribers on preferential terms. But if you consider that the seat of a broker on a commodity or stock exchange costs hundreds of thousands of rubles, this benefit is of no little importance.

[IZOBRETATEL I RATSIONALIZATOR] I know that you have addressed to enterprises application forms with proposals to become subscribers of the MBIS. What are the enterprises, which do not have these forms, to do?

[Markov] First, it is possible to use the cover of the journal IZOBRETATEL I RATSIONALIZATOR, No 4. And, second, it is possible to apply in writing to the Exchange at the address: 103070, Moscow, Old Square, 10/4. Incidentally, the amount of the registration fee has already been specified—R1,870, while all restrictions regarding the subscription periods have been eliminated.

[IZOBRETATEL I RATSIONALIZATOR] Do you have enough proposals on the sale of innovations? How can organizations offer their developments to the Exchange, can they send them in by mail or bring them in?

[Markov] Neither. The owners of innovations can send to the Exchange written applications with a list of their developments. The MBIS if necessary will request from the owner extensive information about the innovation. This is connected with the fact that the Exchange has already received enough proposals.

[IZOBRETATEL I RATSIONALIZATOR] Can organizations send to the Exchange their proposals of broker services?

[Markov] Of course, but I should recall that the preference to become brokers is left to subscribers of the MBIS.

[IZOBRETATEL I RATSIONALIZATOR] Viktor Dmitriyevich, what are the plans of the exchange on the international market?

[Markov] We are proceeding from the fact that the sale of domestic scientific and technical developments abroad will yield a considerable influx of currency, which the country needs so much. We plan to begin work in this direction and to appear on the international market in the shortest possible time.

Necessary Explanations

Although the International Intellectual Property Exchange has just begun to operate, the R1 million, which have been spent on advertising, are already making themselves felt: The MBIS and our journal are beginning to receive letters with proposals, questions, and requests. They number will soon exceed 1,000. Therefore, the editorial office of IZOBRETATEL I RATSIONALIZATOR, in satisfying the natural curiosity of readers M. Khositashvili of Tbilisi, D. Miroshin of Stariy Oskol, L. Shkulev of Nizhniy Novgorod, and many others, asked S.V. Raspopov, a representative of the Exchange, to clarify several circumstances:

[Raspopov] We are receiving very many letters from individual authors, inventors, and efficiency experts.

These are not only proposals to accept some developments and ideas or others for sale on the Exchange, but also various questions and requests, Sergey Vladimirovich said. In connection with this I want to stress once again that the MBIS does not work with individual authors. It is not that we do not want this cooperation. It is rather the other way round. But "individuals," while finding brilliant solutions and developing high-quality prototypes, unfortunately, in the majority of cases are simply incapable of preparing the documentation necessary for introduction in production. The MBIS works ONLY with enterprises that are capable of preparing technical specifications in accordance with All-Union State Standards, the Unified System of Design Documentation, and other standard acts. I will note that here our own fancy has nothing to do with it: The requirements are connected with the specific nature of the dissemination of documentation in the West (I will recall that the Exchange is an international organization). Technical documentation in these cases should not only be translated competently into English, but also be adapted for western standards, which, of course, is far easier to do if the documents have been drawn up in conformity with domestic norms. The Exchange has a small staff of associates, and its functions include the dissemination of scientific and technical information, but not its preparation. On the other hand, it would be unfair to throw so enormous an amount of work on the shoulders of the authors.

Therefore, the Exchange suggests that individual authors apply to the councils of the All-Union Society of Inventors and Efficiency Experts and regional centers of the scientific and technical creativity of youth or establish their own organizations for the "documenting" of inventions.

In the future the MBIS plans the establishment of its own organizations which give assistance to authors in the preparation of the technical aspect of inventions. It is also planned that many brokerage offices of the Exchange will assume such functions.

But all the foregoing nevertheless does not mean that the enterprises, organizations, and institutions, which apply to the Exchange, should send us the complete technical specifications. The Exchange does not examine, does not accept, and does not evaluate such materials. INITIALLY IT IS NECESSARY TO SEND TO THE EXCHANGE CONCISE ABSTRACT INFORMATION ABOUT THE INNOVATION (a description of the innovation, the tentative price, the potential consumers). Experts of the Exchange, after evaluating the innovation, will inform the owners about all the requirements and the terms of cooperation with the MBIS.

[IZOBRETATEL I RATSIONALIZATOR] The journal is also receiving many questions regarding the brokerage organizations of the Exchange. Have they begun to operate? How does one become a broker of the MBIS?

[Raspopov] I will note that the brokers on the Intellectual Property Exchange perform specific functions that differ from the functions on commodity, raw material, and stock exchanges. Being between the Exchange and the consumer,

they assume the role of promoters of scientific and technical achievements. Their goal is to identify the problems of the consumer and to suggest developments that solve these problems. In this connection I want to stress that we are inviting not individuals, but sectorial scientific research institutes, regional centers, Scientific and Technical Information Centers, and other similar organizations to become brokers—it is a matter first of all of subscribers of the Exchange. In case of the conclusion of a deal the brokers of the MBIS receive not less than 5 percent of its amount. At the brokerage offices we plan to locate exchange halls that are furnished with video equipment and computers, where consumers will be able to familiarize themselves in greater detail with the suggested innovations.

But the functions of the brokers of the MBIS are not confined to this. The brokerage offices most often will be specialized companies. Conditionally speaking, we will not propose to sell medical innovations to a plant that produces internal combustion engines. And indeed, only a specialist will be able to explain competently to the buyer all the advantages of one innovation or another. The

brokers of the MBIS should know perfectly well the market conditions in their field and have exhaustive information about the levels of supply and demand. And here, of course, organizations, which have a substantial scientific and technical potential, will look more preferable.

An organization, which has decided to become a broker of the MBIS, should not pay anything. It is necessary to send to our address a letter, which confirms the desire to become a broker, and a brief description of the activity and specialization of the organization (what area it has, how many people are engaged in production, and so on).

Only legal entities can become brokers of the MBIS. This is connected with the fact that every participant in the process of exchange bargaining should bear responsibility for his work, tactlessness in which can lead to substantial material damage. This damage can amount to such a round sum that it simply does not seem possible to recover it from an individual. The brokers should bear responsibility for the quality of the offered commodity and the level of formulation of the technical specifications.

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Financial Crisis of Sectorial Scientific Research Institutes

927A0043A Moscow RADIKAL in Russian No 32,
21 Aug 91 p 7

[Article by Aleksandr Tikhonov: "Is the Ship Sinking? It Is Necessary To Save the Crew. But Not the Commanders"—first paragraph is RADIKAL introduction]

[Text] The sharp reduction of financing put them on the verge of complete collapse. One of the executives of the All-Union Scientific Research, Planning, and Design Institute of Metallurgical Machine Building is proposing urgent steps on saving the sinking ship. First, to exempt sectorial scientific research institutes from taxation. Second, to permit them to include the cost of development in the production cost of the finished product. Third, to keep by force under them pilot works, which are striving to acquire financial independence.

Many people are now coming forward with similar proposals, and at first glance it might seem that such steps will actually save sectorial science. But is it a question here of science? And not of the saving of traditional departmental structures and the preservation of the bureaucratic hierarchy, which is using academic titles as a cover?

Quite recently the life of sectorial scientific research institutes was in full swing. As we remember, not so much new technologies, which are vitally necessary for production, as the defense of the interests of their own department and the preparation of various reports, statutes, instructions, and so forth for the needs of management were their primary product.

Almost every day tasks on the establishment of new works, the expansion of the assortment, and the increase of product quality—particularly in directions that are of interest for the military department—were posed in the offices of the CPSU Central Committee and the USSR Council of Ministers. However, it was a secret for hardly anyone that these tasks came from the same scientific research institutes, to which they then returned as decrees that require irreproachable fulfillment. And these decrees were irreproachably fulfilled, but...primarily on paper.

The secret of the financial prosperity of sectorial scientific research institutes was most simple. Industrial enterprises allocated to their ministries without fail up to 85 percent of the profit, while they spent the received assets at their own discretion. And they turned over a small guaranteed amount of these assets to their beloved children, the sectorial scientific research institutes.

Of course, industrial enterprises were not very happy that numerous scientific research institutes were living off them. But they did not shrink from their services, moreover, they managed to get these services through bureaucratic ministerial channels—through plans, through orders, through memoranda. Scientific research institutes themselves did not let themselves be forgotten, issuing all-union state standards and model standards of enterprises in batches and fixing prices. The share of purely office subdivisions of sectorial scientific research institutes

came to 20-30 percent, while at the head institutes of associations it was even higher.

And here theoretical money spun and revolved over the circuit: plant—ministry—scientific research institute—plant. One out of every 2-5 rubles [R], which were earned by a plant, settled at a scientific research institute. This also gave grounds to proclaim that each ruble, which has been invested in science, supposedly yields a profit of R2-5, although in reality precisely this ruble was lost. For when it came at last to the introduction of some development, money that was once again taken from plants was allocated for this, which did not make enterprises assiduous managers, interested clients, or even conscientious participants in introduction.

As a whole among production workers for all their respect for talented engineers and process engineers, who work at scientific research institutes, an ironic attitude toward these offices predominated.

Moreover, although the staffs of sectorial scientific research institutes were, to put it mildly, rather slightly large—at sectorial scientific research institutes, these cozy little nests of stagnation, there were a large number of people, who were fixed up through the influence of a ministry, or else higher instances—frequently specific assistance had to be sought from neighboring higher educational institutions and scientific research institutes of "other people's" departments, while spending additional assets on this.

But it would be a big mistake to claim that all the associates to a man of all sectorial scientific research institutes are bureaucrats, loafers, and time-servers. Among them are a large number of genuine masters of technical developments and generators of nontrivial solutions. Moreover, the sectorial scientist is a person, who is prepared for any difficulties and deprivations and is capable of overcoming them.

Now at first they thought: We will give such a scientist freedom, he will show properly what he can do. They thought and thought, and for some reason did not finish thinking.

But they did not finish thinking about the fact that neither scientific research institutes nor the plants, which are watched over by them, both had and have a manager. But in turn there are loads of chiefs. While between the manager and the chief there is an enormous distance. The task of the manager is for his enterprise to prosper. The task of the chief is to keep subordinates in check and to please superiors.

But then perestroika with its formal cost accounting came to sectorial scientific research institutes. There is, it would seem, freedom, I will not work if I do not want to. But what happened in reality? Sectorial science proved to be unnecessary to plants—on account of the general shortage consumers will jump at any product. Ministries began to receive from plants only about 10 percent of the profit and they are threatening to take that away: Here they have no time for science, they ought to survive themselves. While

at scientific research institutes the members of the healthy collective began to divide the cost accounting money among themselves—both directly and through cooperatives, small enterprises, and joint ventures.

Understanding people spoke long ago about the fact that a healthy, civilized market economy needs not bureaucratic structures of sectorial scientific research institutes, but laboratories at firms. As at Bell or Kodak. But not as at scientific production associations, which when it came to the test proved to be for the most part purely arbitrary structures, in which they inflate the former bureaucratic staff, but for some reason scientific production work itself is not to be seen. Now pilot plants, which are poorly capable of producing a real product, began to seek independence and to leave scientific production associations. But the power structures of scientific production associations proved to be very durable. You will not dismiss "alpha" that easily, and "beta" is no fool....

But this is yet to come, while for the present truly difficult times have begun for the people of sectorial science. Today the wage of a kiosk attendant or a metro ticket collector is not less than that of a lead scientific associate. And the

people have begun to fly from scientific research institutes—no so much abroad as to where they can offer a decent salary. Far from the best and far from the worst associates are flying, nevertheless the authorities are not worrying very much—after all, their power remains unchanged. But the fewer people there remain, the more of a wage fund there will be per person who has remained.

The hidden point of the appeals for various forms of the extramarket support of sectorial science (exemption from taxes, the shifting of all expenses onto the shoulders of the consumer, the enslaving of pilot works) consists namely in this. In reality this is not concern for science, but concern for one's own well-being.

Therefore, administrative steps on the preservation of sectorial science will be used not for the preservation of science, but for the preservation of the positions of the management of scientific research institutes. It is possible to achieve the genuine preservation of sectorial science only by the prompt uniting of developers and producers into real scientific production firms, which have genuine economic independence and bear genuine economic and moral responsibility before their collectives and before society.

U.S. Institutions 'Swallowing Up' Soviet Physicists

927A0038A Moscow SOVETSKAYA ROSSIYA
in Russian 26 Oct 91 p 5

[Article by Jean-Paul Dufour under the rubric "LE MONDE: The West Is Swallowing Up Valuable Personnel of Soviet Science": "Like a 'Black Hole'—first paragraph is SOVETSKAYA ROSSIYA introduction]

[Text] The article from the Paris newspaper LE MONDE on the present state of Soviet science, which was obtained by us through TASS channels, is reprinted with several abridgments.

Andrey Linde, author of the model of the expanding universe, is regarded by his colleagues as one of the "great minds" in theoretical physics. When in recent months his intention to leave the Physics Institute imeni Lebedev in Moscow became known, the European Council for Nuclear Research (CERN), in the words of one French physicist, immediately invited him to work there. However, Stanford University, the American rival of CERN, as they say, "doubled the stakes," having also offered a position to his wife, Renata Kallosh, who is also considered as brilliant theorist.

The married couple will join up in the United States with a large number of other Soviet scientists, who have emigrated over the last not quite two years. Among the most well-known ones among them are physicists Aleksandr Polyakov (who works at Princeton), Pavel Vyegman (in Chicago), and Aleksandr Zamolodchikov (at Rutgers University). Incidentally, his twin brother Aleksey, also a physicist, works in France at one of the laboratories of the National Research Center. "Of the seven positions, which were established at the Theoretical Physics Institute of the University of Minnesota, five were given to Soviet researchers," says Edouard Bredain, director of the physics department at the Ecole Normale Supérieure in Paris.

Soviet science, like the economy, is experiencing a complete collapse. And this is being accompanied by a "brain drain" to the West, which is causing anxiety among leading figures in Moscow. According to Soviet data, in 1989, 250 associates of various institutes of the Academy of Sciences went abroad for long periods and, in several cases, for permanent residence. Moreover, this time the emigration, to all appearances, is explained mainly by causes of an economic and professional nature.

Indeed, the times, when the Stalinist dictatorship engaged in the petty tutelage of and directed the work of researchers, have receded into the distant past. During those gloomy times scientists frequently paid heavy "tribute," particularly during the mass "purges" in the 1930's. But their work, as a rule, had nothing to do with this. Most often of all they were the victims simply of the envy of their colleagues, who wrote denunciations, or persecutions on the part of the authorities, who were afraid of their critical manner of thinking and openness in opinions, which their social status or contact with their colleague scientists of the entire world allowed them. But Marxism, which originated in the industrial era, is based on an

analysis of society, which aspires to scientificness. Lenin back in 1918 asked A.F. Ioffe—at that time a professor of the Petrograd Polytechnical Institute—to busy himself with the formation of a new scientific intelligentsia, which, in turn, would be able to train engineers and researchers for the development of the industrial potential of the new socialist society.

Ioffe chose the most advanced method—the scientific training of a small group of physicist-mathematicians, who then dispersed throughout the country in order to open other institutes. Among the associates of Ioffe or his first pupils were, in particular, Nikolay Semenov, winner of the 1956 Nobel Prize in Chemistry for works in the area of chain reactions, Lev Landau, winner of the 1962 Nobel Prize in Physics for theoretical research in the area of superconductivity, and Kurchatov, designer of the first particle accelerator in the Soviet Union and the father of Soviet nuclear physics.

Today Soviet physicists are also still among the best in the world. True, owing to the atom bomb they were always "favorites" of the regime: Both Stalin and Beria tried not to repel these scientists, even the most "troublesome" ones of them, like Sakharov, inasmuch as they were able to afford them the opportunity to withstand powerful America.

The communist system had, in spite of all its excesses, aspects that were rather favorable for the development of science. "As a whole the socialist state, which is strictly centralized and is ruled by a single party, is better suited for the implementation of major research programs than countries, in which executives are forced to consider the opinion of the public, parliament, or the press," dissident biochemist Zhores Medvedev, who lives today in emigration in London, explained in 1979.

As a result the Soviet Union became the first state, which was able to put a man in space, and today still remains the only one that is constantly conducting space research. The largest optical telescope in the world is in the Soviet Union, namely at the Zelenchukskiy Observatory, in the Caucasus. The famous tokamaks (research reactors, by means of which major countries are trying to master thermonuclear fusion) were developed in the Soviet Union, and it still holds leading positions in this area.

Today the transition to a market economy is creating a threat for this fine building of science, which in places has already been shaken due to economic difficulties. The state is gradually dissociating itself from this sector, which it previously fostered in every possible way.

"There everything is for sale," one French industrialist of the space sector asserts. "I was simply amazed," he says further, "by the high level of their achievements in several areas, for example, in composite materials." "We have to discover an entire new world," Mme. Brigitte Godelier, the CERN representative at the Academy of Sciences in Moscow, notes on her part. "In particular, at the laboratories which up to now were controlled by the army. These excellently equipped laboratories are only now beginning to be opened for international cooperation. Even in

biology, that is, in the field of science, where, as we believed, the Soviet Union lags greatly, they, it turns out, have achieved a very high level, for example, in the processes of crystallization or purification."

The West is also displaying a great interest in scientific personnel. "The United States like a 'black hole' is swallowing up Soviet scientists," Isaak Khalatnikov, director of the Institute of Theoretical Physics imeni L.D. Landau, one of the best known basic research centers in the world, said recently. Indeed, it is very hard for a Soviet theoretical scientist to resist the offered temptations. For his wage is often less than that of a worker. If he is already close to 40, he has no hope for further advancement: The venerable men of science, who sit securely in their chairs and who frequently do not have an aversion even to inserting their name among the coauthors of works written by younger colleagues, block everything.

But money is not the only inducement of the "brain drain" abroad. Particularly for the most prominent scientists, whom their fame saves from all material problems in the Soviet Union. There are no doubts that in the West first of all the incomparably better working conditions attract them.

In order to help the Soviet Union preserve its national scientific property, France and a number of our European countries decided to place the emphasis on cooperation. The French Government established last year an interministerial commission for Central and Eastern Europe, to which 48.8 million francs were allocated this year. The most sensational of its actions is, undoubtedly, "the operation of sworn brotherhood," which is being carried out under CERN supervision, between the Ecole Normale Supérieure and the Institute of Theoretical Physics imeni L.D. Landau. The first group of high-class Soviet scientists has already worked half a year, within the framework of this operation, at various laboratories in Grenoble and in the Paris region (the Ecole Normale Supérieure, the Polytechnical Research Institute of the Meudon Observatory, and the University of Paris).

Soviet physicists and mathematicians "are distinguished by a far broader cultural outlook than we have," notes Daniel Toulouse, science director of the CERN department for mathematics and theoretical physics. "We in France frequently suffer from too narrow specialization. They bring us a breadth of vision of the interrelations between various disciplines, which we lack."

Similar agreements have been concluded with the University of Turin and the Weizmann Scientific Research Institute in Rehovot (Israel).

Will this be enough to keep the best Soviet scientists in the country?

Kurchatov Atomic Energy Institute Signs Own Union Agreement

927A0038B Moscow *RADIKAL* in Russian No 31,
14 Aug 91 p 1

[Article by Valeriy Kamnev: "The Institute of Atomic Energy imeni I.V. Kurchatov Has Signed Its Own Union Treaty"]

[Text] The largest atomic center of the country—the Institute of Atomic Energy imeni I.V. Kurchatov—chose not the most trivial of means of surviving in the present critical situation. Strictly speaking, for some reason for the present trivial means are not being observed at all in our country, and the problems of the Kurchatov institute differ somewhat from those, with which our other scientific research institutes have been faced today. The institute is too unwieldy, is too complex in structure, is practically unmanageable, and requires too much money to exist just somehow.

Recently the institute changed its status—now in its activity it is guided by the charter of the Institute of Atomic Energy imeni I.V. Kurchatov and, of course, by the corresponding union legislative acts like "The Law on Enterprises in the USSR." Henceforth the subdivisions of the Institute of Atomic Energy imeni I.V. Kurchatov are receiving very much independence. In addition to their direct, scientific activity, they have been given the right to engage in practically anything they want—the publication of books, consumer goods production, commerce, mediation, and in general everything that can provide money for the pursuit of basic science.

In short, the scientific empire, having sensed the threat of impending collapse, disintegrated on its own initiative and formed a federation of not as large sovereign principalities—the former departments. There appeared for each of the newly formed sovereigns its own official (or more precisely, the opportunity to acquire such), its own account, and complete freedom to obtain money for living by all means conceivable for the scientific institution.

In contrast to academic institutes, which have now become a sort of very subtle property, which is interpreted however you like, either of the directors or of the Academy of Sciences, the Kurchatov institute remains the property of the state. All its "privatization" reduces to the fact that the rights of the owner with respect to the economic use of possessions are delegated to it. Moreover, the state, which is the owner, does not intend to lose control over the institute. Through the USSR Ministry of Atomic Power and Industry as its mediator it retained the right to appoint the director (on the representation of the board and the scientific council of the institute), while he, in turn, retained the right to appoint and remove the administrators of the departments that have been given sovereignty. The departments elect half of the members of the board, which in accordance with the charter is the highest body of management of the institute and accordingly has been vested with all kinds of powers. The other half of the board is appointed and removed by the ministry.

Revolutions from above are never noted for excessive radicalism, but in turn they are bloodless and never lead to parades of sovereignties, to a war of laws, and to interethnic strife. In any case the charter was received calmly by the people of the Kurchatov institute, and the election took place without particular squabbles. God knows what will come of this—there is room here both for skepticism and for optimism. On the one hand, the commercialization of basic science is not a particularly fine solution, for, being

almost a reflex response to the threat of death by starvation, it is in itself very toxic and, if we continue the analogies, can lead to scientific anemia, which is a little better. But if scientists themselves, that is, a priori intelligent people, carry out commercialization, if they carry it out while being concerned not so much about the keeping of their chairs as about the prosperity of their shop, then, it appears, there is hope—perhaps it will work out.

The people of the Kurchatov institute ought not get used to sovereignty. Their institute earlier was also always something like an exterritorial state, moreover, a more democratic state than the one "beyond the gate"—the state with its own defended borders, with its own laws, with its own, as is now customary to express oneself, mentality. It goes without saying that during the decades of its existence the institute began to change for the worse, the inordinately expanded bureaucratic structures and what the people of the Kurchatov institute modestly call the "infrastructure" began to suffocate it, the Chernobyl "groggi" did not take place without leaving a trace for the institute, and a long time ago associates began to talk about the fact that their "Lipan" (the very first, secret name of the institute—the Laboratory of Measuring Instrument of the USSR Academy of Sciences) was falling apart. But, as we are well aware, large structures do not fall apart that easily, they have a greater vitality, and if everything is done sensibly, there is hope that the Kurchatov institute not only will survive, but will also actually become a most prominent national scientific center, as is proclaimed in its new charter, without a superfluous "infrastructure," without arrogant guards with pistols, but with its own scientific schools, with a name, and with scientific results that are worthy of this new status, which for the present is still unusual for our country.

Funding, Technology Limitations Threaten Super-Deep Borehole Program

927A0039A Moscow *RADIKAL* in Russian No 31,
14 Aug 91 p 2

[Interview with Doctor of Geological Mineralogical Sciences Yuriy Kuznetsov by *RADIKAL* correspondent Vladimir Pokrovskiy under the rubric "The Extraction of the Essence"; date and place not given: "The Borehole Also Wants to Live"—first paragraph is *RADIKAL* introduction]

[Text] On 18-24 September the presentation of the Kola Superdeep Borehole, which is well known to everyone, will take place on the Kola Peninsula. If we divert our attention from this somewhat humorous word combination "presentation of the borehole," the question "Why?" still remains. Indeed, we have become accustomed to the fact that a presentation is the submission to the public at large of something new—a firm that has just arisen, a book or record, which has been released to the general public.... But what new thing can a hole in the ground, even though it is the deepest one, but has been familiar to everyone ever so long, has gotten into all the newspapers, and has even been exposed in *The Guinness Book of World Records*, present to us? What new thing can the borehole, which already in

the middle of the 1980's, at the very peak of its popularity, ceased to gain kilometers and, thus, to produce new stunning information about the secrets of the depths of earth, present to us? The question, even though asked in a rather inflexible way, you will agree, is logical, and, therefore, our correspondent Vladimir Pokrovskiy addressed it to Doctor of Geological Mineralogical Sciences Yuriy Kuznetsov, a geophysicist, one of those people whose scientific life is connected most closely with the Kola Superdeep Borehole.

[Kuznetsov] This, Yuriy Kuznetsov believes, is a kind of attempt to preserve the borehole. At a recently held meeting of the collegium of the USSR Ministry of Geology it was decided starting in 1992 to halt the financing of drilling operations at the Kola Superdeep Borehole and to give it a new status—the status of a geophysical observatory. In September we intend to invite all interested domestic and foreign specialists to joint work.

A borehole, at which drilling operations are not being conducted, is lost very quickly. We cannot allow this. If we do not want to lose this unique work of domestic science and technology, if we do not want to lose the most precious geophysical tool today, we should continue the work at it regardless of whether or not the ministry has money for drilling, we should change the status of the drilling expedition to the status of a geophysical observatory. There is, perhaps, no alternative.

In the majority of scientific directions our country is lagging behind the rest of the world, but our geophysics and geology were always strong, here we were always in front. Not without reason does our geology, like no other of the sciences, have its own ministry. Geology gives the country too much for it to be ignored—you must not cut the branch on which you are sitting. They also recognize this abroad—not without reason was the 1984 International Geological Congress held precisely here, in the USSR.

Incidentally, precisely the Kola Borehole was the hero of that congress, the highlight of its program. At that time we made public for the first time the discoveries made at it and for the first time reported its depth. But it is very difficult to dig more than 12 km, technologically this task is comparable to the launching of a large space station. At first they simply did not believe us. Many western scientists set as a condition of their presence at the congress a trip to the Kola Peninsula—they wanted to be convinced with their own eyes that the 12-km hole in the earth's crust is not an illusion. The Kola Peninsula is a restricted area, the kingdom of the military is there, but they brought the scientists to the borehole, they stood on the trestle and counted how many stands they raised. They believed only when they were able to see them raise 12 km of drilling pipe with their own eyes.

And not only the technology astonished them. The discoveries made by means of the borehole turned upside down our notions of the structure of the earth's crust.

[Pokrovskiy] Just what discoveries?

[Kuznetsov] You see, until the appearance of the Kola Superdeep Borehole the study of the structure of earth reduced merely to indirect geophysical observations—the analysis of earthquakes and so forth. In 1909 Yugoslav geophysicist Mohorovicic discovered at a depth of approximately 50 km a boundary that separates the mantle from the earth's crust. The latest observations showed that the crust consists of several layers. It was believed that under the top layer—the sedimentary mantle—at a depth of approximately 4 km there is a layer of granites, and then, after a few kilometers, there are basalts. During the drilling of the Kola Borehole everything turned out not to be so.

As was expected, having reached a depth of 4.5 km, we entered a granite layer. The so-called Konrad boundary, which separates the granite layer from the basalts, on the Kola Peninsula approaches the surface closest of all (on the order of 7 km), but, having reached the 7-km mark, we did not find any basalts. Granite on exposure to high temperatures and pressures simply passed into a different state, in particular, it shattered. It turned out that the structure of the earth's crust has nothing to do with the alternation of rocks, the change of the physical properties of the layers is connected only with the change of the state of matter, and not with the matter itself.

This conclusion, which at first glance is interesting only for abstract science, is of colossal importance. In particular, it turns upside down our notions of the depths at which it is possible to seek ore. According to the theory that exists today, so-called endogenous ore deposits originate owing to the filtration of solutions that are present in the ground. In those places where the solutions are filtered, they eject excess metallic ores. Earlier it was believed that below 3 km the earth's crust is impermeable for solutions, that they do not pass through the granite layer and, hence, do to reach the basalts. The presence of shattered rocks increases substantially the permeability of the crust—perhaps to the Mohorovicic Discontinuity itself. And, thus, there are no limitations on the depth of the occurrence of ore deposits.

The Kola Peninsula is famous not only for the superdeep hole—a rich nickel deposit, which has not been worked to this day, exists here. We discovered that the nickel structure is ore-bearing not to 3 km, but to 7 km. Moreover, we came across entirely by chance another rather large ore body. Now its nickel reserves have been calculated, a mine has already been sunk—this alone compensated for the borehole, although from the very start it was intended for purely scientific purposes.

Another practical conclusion of this discovery concerns the possibility of storing radioactive waste in the depths. On the one hand, the permeability of the rocks leads to a not very comforting prediction—deeply concealed radioactivity is able to come to the surface together with ascending flows of aqueous solutions. On the other, it is possible to find places where there are no ascending flows, and we already have the corresponding methods of calculations, we already know how to estimate the degree of danger. At any rate, this is far more reliable and cheaper than storing waste in exhausted salt domes, as they are

doing in the United States—this is very expensive gratification. And all the same this is better than the barbarian storage methods that are being used in our country. On the basis of what we are doing, incidentally, an entire science of burials—nuclide ecology—is now emerging.

Unfortunately, these and a number of other results, which were obtained at the Kola Borehole, remained to a large degree unclaimed by world science. At first these results were generally classified by the Ministry of Geology. This was a departmental secret which has nothing to do with the state secret. The ministry simply hoped to sell these secrets at a little higher price or by some other means to derive benefit from them. But, without ever deriving any benefit, it found itself in the role of a dog in the manger—it cannot use it nor will it let people use it. By the already mentioned 1984 congress a portion of the data had been declassified. We prepared a book on the results of our research, but the ministerial editors greatly ruined this book and made its data practically unfit for further scientific use. Due to unwarranted and illogical, in my opinion, classification the final text resembled more the speech of a stutterer than that of a normal intelligent researcher. A man, it seems, was on the point of talking, suddenly there is silence, a finger to the mouth.... Until recently I was not at all able to talk with a journalist as I am now talking without having obtained special permission of the ministry for that—but just try to get it! Only recently did they begin to completely declassify our results, and this process is still going on.

In the middle of the 1980's they wrote very much about the Kola Borehole—in newspapers, in popular science journals, and in specialized journals. But as a result of such semisecrecy the published data bore the stamp of unreliability. Someone read something somewhere, someone heard something, there was very much misleading information. It reached the point of paradoxes. Once a Finnish youth newspaper, in celebrating 1 April—April Fool's Day—published a notice that our borehole had reached hell and devils had begun to climb out of there. Several of our newspapers reprinted this report under the rubric "In the World of the Interesting." We then had to make a disclaimer.

[Pokrovskiy] But why, if the borehole is such a unique one, are they not continuing to make it deeper today?

[Kuznetsov] They actually ceased to make it deeper back a year before the 1984 congress. At that time we had reached a depth of 12,066 meters, while today we are at the level of 12,255 meters. After eight years this is negligible deepening. Everything happened because at the depth of 12 km our drilling equipment and technology reached their natural limit. The pipes began to break under their own weight, breakdowns increased sharply in frequency, each meter comes today at the price of incredible efforts and far from justifies the assets being invested in drilling. New technologies and new drilling rigs are needed. They are now being developed, but this is a lengthy process.

If the borehole is granted the status of a geophysical observatory, if some joint experiments are conducted at it, while performing all the preventive operations, which are

necessary to the preservation of the hole, and working simultaneously on the development of new, advanced drilling equipment and technologies, it is still possible to save the situation, moreover, with great benefit for all the participants.

It is expensive to drill a borehole, and the country does not have such money. The Kola Superdeep Borehole is 23 years old. It was the first of 11 similar boreholes, which were sunk or which it is proposed to sink in the Soviet Union. Now due to the lack of assets all these boreholes have been idled. But they are close on our heels. In Sweden and Germany they have already begun the drilling of similar boreholes. The Swedes have already reached the 8-km level and want to go farther. Japan plans to sink 11 boreholes with a depth of 20 km. We must not stop under any circumstances, if we want to preserve our priority if only in the area of geology.

[Pokrovskiy] But all the same, what is a geophysical observatory? With what will researchers deal there, if the borehole is not made deeper and, thus, does not provide new information about the structure of the earth's crust?

[Kuznetsov] A geophysical observatory is, in essence, the same telescope, only aimed not at the sky, but at earth.

[Pokrovskiy] Pardon me, but a telescope can survey the entire sky, while your deep-well "telescope" will be aimed in just one fixed direction and only to a certain depth. What is interesting in such "astronomy"?

[Kuznetsov] A large amount of everything! A large amount of the most diverse information. Various experiments, various observations at various depths at pressures and temperatures, which are inaccessible for the earth's surface. We can observe the processes of variation at these depths. There are slow, geological processes, but there are rapid ones which it is possible to track. In 23 years of the existence of the borehole we managed, for example, to observe how the formation of new minerals occurs—geochemists at that time jumped for joy.... We can also observe the tides in the earth's crust, for, like the ocean, the earth's surface every day rises and sinks 40 cm. We absolutely do not know what happens in this case in the depths. Even from a borehole that is not being made deeper it is possible to extract much unclaimed information.

And, what is the main thing, I repeat, the well should live. Now there is very much talk going on about the fact that it is impossible to spend money on drilling, when there is nothing to eat, there is talk of the fact that it is necessary to do away with the Ministry of Geology. I do not know, perhaps we will manage without the ministry, but one thing is absolutely clear—we must not switch geology to the remainder principle. At one time, having turned against fruit flies, our country doomed itself to a meat shortage and annual purchases of overseas wheat. Having attacked cybernetics at that time, we took as a result a back seat to the new information society. I hope that we do not do the same thing to geology!

Retention of All-Union 'Patent Office' Recommended

927A0044A Moscow PRAVDA in Russian 5 Nov 91 p 6

[Interview with Valeriy Ivanovich Budkin, director of the All-Union Scientific Research Institute of Patent Information, by A. Batygin under the rubric "A Topical Interview"; date not given: "The Patent Expert? No, He Is Not Needed"—first two paragraphs are PRAVDA introduction]

[Text] But towards the end of the interview I related to V. Budkin an incident from my own journalistic practice. Nearly 20 years ago I had occasion to prepare for one journal a report on a large design bureau. For a long time they struggled there with the development of a potato harvester. And when it came into the world, it turned out: They had contrived the same kind in Germany at the end of the last century.... At the design bureau they "forgot" to make a check for patent purity, they had "reinvented the bicycle."

"Now many many find themselves in such a ridiculous situation," Valeriy Ivanovich summarized my story.

A report of the Moscow Labor Exchange, which astonished me, brought me to the office of the director of the All-Union Scientific Research Institute of Patent Information (VNIPI), which faces the Kremlin. Most often people with a higher education apply here, but among them, today's clients of the exchange, patent experts are in first place. At many state enterprises and associations, at scientific research institutes and design bureaus the reduction or else the elimination of patent offices has begun and is proceeding rapidly. There is one reason—there is nothing with which to pay wages. But why were specialists, without whom no western firm manages, the first to come under the "market knife"?

The All-Union Scientific Research Institute of Patent Information is also in a fever. Its director, V. Budkin, several times during the conversation said anxiously: "The main task today is to survive." But we do not have that many strong scientific centers like that—enormous wealth has been gathered here: information on discoveries, inventions, trademarks, and production prototypes, the patent collection of 55 countries on any theme for any industry. Here they can make for you a marketing analysis, provide you with descriptions of the "very most" advanced developments—on paper, on magnetic medium, or on microfiche—output data on introduced and priority inventions, put you in touch with their authors, and inform you about the economic impact. The All-Union Scientific Research Institute of Patent Information publishes the bulletin OTKRYTIYA, IZOBRETENIYA and the journal IZOBRETENIYA STRAN MIRA, and subscribers are always in the know about all the events in the sea of world patent information.

And now the very existence of the unique all-union collection, the bank of inventions, which has been accumulated since 1924 and is accessible to all the republics and citizens of the country, is endangered. During these first November

days in accordance with a decision of the Russian leadership a new patent office—the Russian patent office—should appear in place of the all-union patent office. It is unknown into what scheme the same All-Union Scientific Research Institute of Patent Information will "fit," where is the inventor from other republics to go with his concerns?

"Our patent service is universal, it was formed in accordance with the laws of the international system, the International Classification of Inventions, in accordance with which the entire world operates. In no country do they split up, pull apart the national collection—be it the united Germany or Czechoslovakia. Nineteen European countries are negotiating about a unified economic space, while we in an instant are pulling down a system that was decades in the making," says V. Budkin.

"Incidentally, in Riga," he continues, "a conference of representatives of republic scientific and technical information centers was recently held. Everyone unanimously declared the necessity of cooperation of the present patent offices of the republics, which have remained in the Union, and the new Baltic states. And there is more. We are now successfully preparing information files on various themes for the PRC, Mongolia, and Germany. There they are also wondering—with whom are they now to cooperate? Is it worth severing old ties for the sake of new ones? Incidentally, in the Science-Industry Union of the country they are speaking in favor of preserving the patent office within the Union."

"And there is more than enough confusion with your institute...."

"Yes, complete uncertainty. We are living on budget allocations. Thus far it is unknown whether we will be financed for 1992. Therefore, the immediate prospects are unenviable—we have to reduce the staffs and dismiss the most experienced specialists. We are holding together as it is by means of the old backbone. Judge for yourself: For science at our institute the average wage is 400 rubles [R], for the publishing house it is R250-300. People with two higher educations and a knowledge of several foreign languages are earning less than a cleaning woman in the metro!

"So the sad 'leadership' of patent experts among the unemployed of the Moscow Labor Exchange can only be consolidated. Of course it is possible to drive patent specialists into the street, how many 'bicycles' they will reinvent in the foreseeable future!

"Add here also the problem of personnel—the influx of patent experts is decreasing all the time," V. Budkin continues. "People, particularly young people, are not very willingly going to our institute for the improvement of skills (the All-Union Institute for the Improvement of Skills). It is far easier to get work at a cooperative, a joint venture. How, with what will I be able to keep programmers at our computer center?"

...Many of our all-union ministries, departments, and organizations over their long tranquil history swelled like

soap bubbles, engaging mainly in paper shuffling and self-service. The majority of them are entirely justifiably being shut down, only the organs, which are as close as possible to the affairs and concerns of the regions, remain. But what is to be done with medicine, social security, the same patent service? Are reduction and the shutting of old, established structures, which yield a considerable impact, always good for the homeland? For it is easiest of all "to raze to the ground...."

I wrote 20 years ago about how technical ignorance had canceled out the labor of hundreds of people. Is history really repeating itself?

Problems Seen in USSR, Impending RSFSR Patent Laws

927A0034A Moscow NEZAVISIMAYA GAZETA
in Russian 9 Oct 91 p 6

[Article by Candidate of Technical Sciences Moisey Gelman under the rubric "Examination": "The Number of Inventors Is Decreasing. Legal Norms of Intellectual Property Are Lacking. The Russian Parliament Should State Its Opinion"—first paragraph is NEZAVISIMAYA GAZETA introduction]

[Text] Recently the USSR Supreme Soviet passed the Law "On Inventions in the USSR." Taking into account the criticism of a fundamental nature, which are heard repeatedly in address of the passed law, incidentally, far from the first of the versions, valid doubts are arising: Does a general concept of the creation of legal norms, which concerns some comprehensive problems or others, exist and will this standard act promote the introduction of promising developments?

In the law it is recorded that the State Committee for Inventions and Discoveries, which has changed sign (today this is the USSR State Committee for Patents), supposedly carries out the examination of applications for inventions, but in reality a special scientific research institute is engaged in this, which calls into question the independence of the experts, taking into account their subordination. Thus the bureaucratic department is trying to "legitimize" its further existence. Other departments are also creatively applying a similar "perestroyka" innovation, it must be assumed, in the name of survival.

It seems that the replacement of the goal with one of the means of its achievement in many respects gave rise to all the absurdities and contradictions of this law, while its passage will not benefit either society as a whole or inventors in particular. And here is for what fundamental reasons.

In the law (in contrast, incidentally, to the previous old standard act) the object proper, that is, the invention, is not specified, conditions and norms of the qualitative improvement of inventions, which would orient their creators toward the achievement of an increasing social impact, are absent. Thereby in the absence of competitive market relations the monopoly manufacturers of a product will acquire a "legal" basis for the further worsening of the consumer properties with the complication and the

increase of the cost of the items being produced, which, moreover, is encouraged by the exclusion of tax rates. The inventions needed by society will, as before, be rejected.

Today legal norms of intellectual property are lacking. The fact that this and a number of other issues are declared ambiguously in the law being discussed will lead to arbitrary administrative actions and to numerous litigations. In provoking these litigations, the authors of the law provided at the same time for the organization of a new court system—the patent court.

The proposed system of examination and the protection of inventors looks rather like the second line of defense disposed in depth, in which some bureaucrats from science and technology would like to dig in, if they leave unwillingly the trenches of the first line. Did they not envisage for further comfortable existence numerous fees, which the applicants will have to pay, starting at the moment of the submission of applications? Under present conditions, it seems, such "cost accounting" will lead only to the sharp decrease of both inventions and the number of inventors themselves, particularly among young people, which the nowise justified time of the consideration of applications—from a year and more (previously it was six months)—will additionally promote.

The recording in one document of a limited term of effect—a patent—of the copyrights and the right to the exclusive use of an invention, as well as the annual fees will deprive the inventor of freedom of actions and will force him to become a hostage of a different patent holder, first of all the State Fund of Inventions, which is being newly established. At the same time this will hinder the development of new technical solutions that are ahead of their time, while if they are developed, their subsequent introduction will not make it possible to use hundreds of thousands of domestic inventions, which were developed 15-20 years ago and have not been claimed by the departmental economy in the decades that have passed, and so on. It is unclear for what purpose the writers of the law rejected the possibility that had existed of obtaining both an inventor's certificate and a patent. Their consistent issuing would make it possible not to pay annual fees for who knows what in case of the materialization of an invention and the preparation of the corresponding commodity production. Today under our conditions from three to 10 years are spent on this. Therefore, the inventor, without having original capital, will be forced to turn over the patent to other people and, as a consequence, to go with outstretched hand after the reward. All this already existed.

The law as a whole resembles a vinaigrette with ingredients that are not very compatible in taste qualities. An instruction on the drawing up and examination of applications and norms of labor, retirement, housing, legal, tax, and patent legislation have been dumped in a heap. While the enormous section "The Use of Inventions" obviously reflects the nostalgia of its writers for not so distant times and is aimed in many respects at replacing free market relations with decreed market relations. Moreover, the inventor is deprived almost entirely by the norms being

introduced of the opportunity to become the owner of the results of his labor and an equal subject of the market economy, at best the role of a petty rentier is in store for him.

The foregoing far from exhausts the list of negative aspects of the law. It is necessary, it seems, to write it all over again, moreover, on a different conceptual basis, based on the set of interconnected legal problems of the development and use of new equipment and new technologies, and not just inventions, which for some reason are depicted as the ultimate goal of the creation of norms. A standard act on patent legislation is necessary.

The Law on Inventions in the USSR was put into effect on 1 January of this year. But, as events have shown, the USSR State Committee for Patents is not prepared to this day for its fulfillment. In particular, the amounts of all the fees, the first of which—for the submission of an application—as well-informed people believe, will come to 400 rubles, have not been specified. Therefore, so that the extermination of the “hens” that lay the “golden” eggs would not begin, the fees should be abolished.

Now the RSFSR Supreme Soviet already intends to consider the draft of the Russian law on inventions. The principle of the so-called presentation system of patenting,

which excludes the examination of applications for world novelty, was made the basis for it. A declaration of the applicant will actually be sufficient for the obtaining of a patent, which may provoke him to ordinary slyness. The industrially developed countries abandoned such a patent system long ago, and it is being used only in a few underdeveloped countries.

By having such a Russian patent, it will be impossible to offer it on the world market, since in the RSFSR there will not be an organ that guarantees the appropriate quality of such a commodity. Therefore, the potential subjects of market relations—inventors, owners of an intellectual commodity—will not be able to realize themselves in this capacity, just as, incidentally, other potential holders of the proposed patents à la RSFSR—state and private enterprises.

The Russian patent law, if it is passed, will require the establishment of a new “office” for its initiators in place of the old one—the USSR State Committee for Patents. Although neither one is necessary, since the All-Union Scientific Research Institute of State Patent Examination can directly “write out” patents on behalf of the state, if it is proposed in the future Union to pursue a unified policy in this area.

**Estonian Academy of Sciences President
Interviewed***927A0040A Tallinn VECHERNIY KURYER
in Russian 28 Sep 91 p 3*

[Interview with President of the Academy of Sciences of Estonia Arno Keerna by Valli Ehatamm: "Goeconomics Is Succeeding Geopolitics"—first two paragraphs are VECHERNIY KURYER introduction]

[Text] From the conference of researchers of the future.

The integration of Estonian science in world science is already becoming a fact. President of the Academy of Sciences of Estonia Arno Keerna recently returned from a regular scientific business trip, this time to Spain.

[Ehatamm] What took you to Barcelona, the city that is now known more as the site of the holding of the future Olympic Games?

[Keerna] Barcelona—the capital of the province of Catalonia—is a recognized scientific center. The Federation of World Future Researchers chose this city for the holding here of its 12th world conference. It lasted nearly a week (17-21 September), and about 800 researchers from 70 countries participated in its work. Inasmuch as I was the only representative of the Baltic states, while immediately prior to this I had gone through the active process of the recognition of our state independence, the interest in my radio and television statements, as well as in the report at the conference was great. The majority of participants came precisely from states that had conveyed to us diplomatic recognition. Therefore, I sensed very warm and cordial treatment. During the intermissions of the conference I had occasion to receive congratulations and wishes for success.

[Ehatamm] Your report at the conference was, obviously, connected with our current problems. What did scientists of different countries think of it?

[Keerna] My report was entitled "The Path of Estonia to a Market Economy," its theses were cited in the collection that was distributed to the participants. Of course, in it I could not avoid the present, but the look was aimed nevertheless at the future. For the most part I examined the economic problems of Estonia and their peculiarities. They are in many respects similar for all three Baltic states. Hence, too, the interest that was displayed in the report.

[Ehatamm] A representative forum is an opportunity for meetings and the exchange of opinions with scientists, as well as politicians.

[Keerna] That is so. There were the most diverse meetings, including at the governmental level. A meeting with scientists, at which they also took an interest in our problems and congratulated me in connection with the admission of the Baltic states to the United Nations, was held in the parliament of the province of Catalonia. Perhaps, the reason for special attention is the fact that in Catalonia itself the national movement is very strong. The province with a population of 6 million differs from all the rest of

Spain in language, they are interested in greater economic and political independence than the present autonomy provides.

[Ehatamm] Exactly what world problems were examined at the conference?

[Keerna] Inasmuch as scientists from all over the world gathered there, very much was said about the integration processes that are typical of the present world, as well as about the fact that the geopolitical paradigm is gradually being replaced by the goeconomic paradigm. Economic issues are acquiring greater and greater importance. Japan, for which not so much political relations with one state or another as the firm establishment and consolidation of its economic positions are important, was cited as an example. Such an approach is already typical of many countries. The more and more extensive activity of international multinational corporations testifies to the economic approach. Many speakers emphasized that although it is impossible to ignore national movements and boundaries, it is necessary to promote the formation of national states without economic and political barriers. Development is proceeding precisely in this direction.

A favorable economic policy, as a rule, is common for many states. On this level they view more preferably the European Economic Community and in general the integration trends in the international economy.

[Ehatamm] Obviously, all this is also of importance for the further development of Estonia.

[Keerna] They viewed our acquisition of independence with understanding and approval. But at the same time attention was directed to the integration processes that lie ahead of us in relations with the European and in general the world market.

Many specialists warned of the dangers, which may lie in waiting for us on the chosen path, and about the difficult period of choice. Much depends on whose sphere of influence Estonia will come into, what socioeconomic choice it will make, and what type of democracy it will select as the basis for further development. It is possible, for example, to select a democracy like the Nordic countries or to take as a model the new national states of Africa. The threat lies in the fact that in young national states, which have acquired independence, as a rule, a pointed political struggle, which can lead to undesirable conflicts or even military clashes, develops, as is possible to observe in Georgia.

[Ehatamm] What are the plans of our scientists in the area of the study of the future?

[Keerna] All research, which is connected with economic and social problems, should be aimed at the future. If we speak specifically, in January in Tartu it is planned to conduct the international seminar "The Baltic Region Today and Tomorrow." For the present I can say that the participants, besides our scientists, of course, will come from Latvia, Lithuania, Finland, Russia, Sweden, and Denmark.

Academician Reviews History, Prospects of Academy of Sciences

927A0035A Moscow NEZAVISIMAYA GAZETA
in Russian 8 Oct 91 p 5

[Article by Academician Pavel Volobuyev under the rubric "Ideas and People": "The Academy of Sciences Yesterday and Today. But What About Tomorrow?"—first paragraph is NEZAVISIMAYA GAZETA introduction]

[Text] The highest educational institution of the country is in a state of crisis. Two decades of the domination of the gerontocracy, the gross violation of the principle of the intelligent cooperation of scientists of different generations, unfounded complacency, and monopolism in science had an effect. The title of academician has been devalued in the eyes of the scientific community due to the influx of so-called organizers of science. Many institutes as before remain the inherited estate of their directors. The equipment of laboratories outside the military-industrial complex does not stand up to criticism. The lag of domestic science behind the world level is growing. Will we wait while its ship sinks to the bottom?

The debate about the union Academy of Sciences, which has developed in the country, interests exceedingly not only the scientific community, but also broad groups of the public of our country. It is also understandable. However politicized our society is and however serious our economic ailments are, without developed science we will not stand firmly on our own feet and will not enter in a fitting manner the 21st century. It seems that for the formulation of weighty opinions and suggestions concerning the future of the Academy of Sciences it is necessary to know its past and present. In other words, to take into account the most rich experience and traditions of domestic science.

As is known, the Academy of Sciences was founded in 1724 on the initiative of Peter the Great for the "installation" in Russia of large-scale science and the training of national scientists. Peter, having studied the experience of the activity of academies of sciences and scientific societies in the West European countries (particularly in France), established the Russian Academy with allowance made for the concrete historical conditions of our country. Therefore, the Academy of Sciences was established not as an association of informal scientific institutions or a voluntary union of prominent scientists, but as a state institution. Peter the Great understood that in a poor country it is impossible to guarantee the emergence and development of science without state material support of the Academy of Sciences and its figures. All the subsequent governments of Russia right up to October 1917 on the whole followed this principle. The academy upon its founding received the name of the Russian Academy, for a short time was called the St. Petersburg Academy, then was called the Imperial Academy. During 1783-1841 another academy—the Russian Academy—which was a scientific center for the study of the Russian language and literature, operated in the country. Having become in 1841 a part of the Imperial Academy, it formed in it the department of the Russian language and literature (in addition to two others: the physics and mathematics department and the

history and philology department). After the February Revolution, in May 1917, by a decision of the general assembly the academy was renamed the Russian Academy, which it actually was. In 1925 by a decree of the Central Executive Committee and the USSR Council of People's Commissars it was proclaimed the highest educational institution of the USSR and began to be called the USSR Academy of Sciences.

In prerevolutionary times in its internal affairs it enjoyed autonomy, although it was under the control of the ministry of public education. Either people of the imperial family or the highest dignitaries were its presidents. The first freely elected president appeared in May 1917 (Academician A.P. Karpinskiy). In Soviet times, starting in 1928-1929, the autonomous rights of the academy gradually came to naught, and it turned out to be an object of vigilant "concern" on the part of the CPSU and, of course, the People's Commissariat for Internal Affairs—the People's Commissariat for State Security—the KGB.

The Academy of Sciences, although established "from above," took root comparatively rapidly on Russian soil. In the 18th century it became the center of Russian science, while in the second half of the century it moved into one of the first places among the other academies of the world. In the 19th century in connection with the shift of scientific activity to universities, it ceased to be the only scientific center in the country, but continued to play a major role in the development of domestic science, since, as a rule, leading scientists were members of it (starting in approximately the 1840's Russians, and not foreigners, began to make up the majority at the academy and in general among scientists).

By 1917 the system of the organization of scientific research activity in Russia included the Imperial Academy of Sciences, universities and higher educational institutes (technical, agricultural, and others), scientific societies, as well as various academic committees and commissions. As before the Academy of Sciences was the highest scientific institution of the country (according to the official terminology of those times "the preeminent academic estate"). There were 45 full members (academicians), moreover, there were 86 corresponding members and 15 honorary academicians, who at that time were not members of it. The academy had five laboratories, seven museums, two observatories (the Pulkovskaya Astronomical Observatory and the Main Physics Observatory), and 21 commissions. And at the beginning of the 20th century universities and other higher educational institutions, their chairs and laboratories were the basic scientific centers. Here the pursuit of science was not considered mandatory for the professors (scarcely more than one-third of the professors engaged in it). The tsarist regime did not favor science and education with special attention. It is not surprising that the financing of science and higher educational institutions was meager. In 1911 "the most august president" of the academy himself, Grand Prince Konstantin Konstantinovich (a well-known poet, whose songs are also performed now, until recently without the indication of the author), in a letter to the minister of education wrote that

"the situation of academic institutions (for lack of allocations and staffs—P.V.) has become quite critical." While well-known geologist Academician F.N. Chernyshev wrote with bitterness: "Who does not know that in Russia they frequently threw away enormous sums on useless, but eye-catching ventures (this is probably an ineradicable property of the domestic bureaucracy—P.V.), while our highest schools and scientific institutes are deprived of the opportunity to make the most necessary expenditures."

Nevertheless Russian science, first of all natural science, by 1917 was at the worldwide level. As Academician V.I. Vernadskiy, who was not inclined to exaggeration, noted, Russian natural scientists, in spite of adverse working conditions, "stood side by side as equals in strength with their colleagues in the West and across the ocean."

Russian scientists back at the beginning of the 20th century realized the necessity of the nationwide (statewide) organization of science and scientific activity and the transition to such a new form of the organization of research work as specialized institutes. Higher educational institutions, including universities, were no longer coping with the increased amount of scientific research work and the diversification of science. Moreover, the teaching load of professors and docents in prerevolutionary Russia, just as now, was much greater than at foreign higher educational institutions. Our famous physicist, Prof. P.N. Lebedev, wrote even about the "bondage" of Russian scientists to educational institutions as a hindrance to the pursuit of science. In 1911 scientists of the Academy of Sciences attempted to establish in the system of the academy the first modern research institute, having conferred on it the name of M.V. Lomonosov. And although they succeeded in securing the approval of Tsar Nicholas II himself, due to bureaucratic delays and the commenced war nothing came of this idea. By 1914 there were only a few scientific research institutes in Russia, while in Germany the Kaiser Wilhelm Society alone had 37 research institutes. Academician Vernadskiy, who correctly regarded scientific research institutes as "a vivid manifestation of scientific life of our times—the 20th century," in 1916 delivered the program report "On the State Network of Research Institutes" in the area of natural science, technology, and culture.

Whatever you think of the October Revolution, it is impossible not to admit that science under the conditions of Soviet power received considerably greater freedom for its development, for the influx into it of new creative forces from the midst of the people ("cook's children"), and, finally, for the practical implementation of prerevolutionary plans and ideas of Russian scientists. During 1918-1919 alone 19 institutes, which were large for that time, were established, while in 1922 there were already more than 40 of them. Several institutes were also established in the Academy of Sciences. It gradually took the leading position in the scientific life of the country, having concentrated on the elaboration of basic problems of natural science and the humanities. The present system of the organization of science in the USSR formed in the early 1930's. In connection with industrialization such a

form of it as sectorial institutes underwent much development (first under the Supreme Council of the National Economy, then under the people's commissariats), VUZ science also developed vigorously. During the prewar and, for the most part, the war and postwar periods the republic academies of sciences were formed on the basis of affiliates of the union Academy of Sciences (the Ukrainian Academy of Sciences appeared in 1918). The academy itself in 1934 was transferred from Leningrad to Moscow. It is obvious that with the formation of academies of sciences in all the republics the USSR Academy of Sciences again, in reality, became Russian, performing coordinating functions with respect to them.

By the beginning of the Great Patriotic War, in contrast to the past, a solid front of modern science had formed in the country, while the war showed that Soviet science and technology in the basic directions had achieved a high level of development.

Stalinism also did not pass over science with its destructive effect. People speak in an entirely justified manner about Soviet science as "repressed science." Of just the full members of the Academy of Sciences up to 40 percent were repressed (were shot or died in prisons, were exiled, were confined in prisons and camps, and were forced to emigrate from the USSR). It is well known what harm the persecutions of genetics and cybernetics and the long-standing monopoly in biology of aggressive ignorance in the person of Academician Lysenko did to science. But who will undertake to count all the pogroms and slatings, to which historical and economic science, philosophy and law, sociology and philology were subjected up to 1985?

Three times during the years of Soviet power liquidation threatened the Academy of Sciences. In 1918-1919 the "left communists" and Proletkultists from the People's Commissariat of Education, regarding the academy and universities as "seats of conservatism" and "alien to the revolution in spirit," attempted to reform them so that, in essence, nothing would be left of them. The first time the intervention of V.I. Lenin, who in 1919 specially warned People's Commissar of Education A.V. Lunacharskiy "that no one is 'to make mischief' around the academy," saved the Russian Academy from breaking up. The reasons for Lenin's actions were entirely pragmatic: It is easy to destroy the scientific potential, while to recreate it all over again is a difficult matter that requires decades.

The second time the clouds thickened over the academy in 1928-1929 in connection with what is called the "big election" to the academy (at that time the staff of academicians alone actually nearly doubled—from 45 to 87, moreover, several communist scientists were elected for the first time) and with the attempt of the Unified State Political Directorate to organize a celebrated "academy case" with the charging of a number of prominent scientists with anti-Soviet activity. Behind this there actually lay the aspiration of the Stalin leadership "to replace the academy, to break down the deaf opposition of influential academicians to the dictatorship of the party, to put an end to the academy's autonomy, and, as the same Lunacharskiy stated frankly at that time, 'to introduce everywhere

the unity of thought and a certain unity of the system.” The third time the Academy of Sciences almost became the victim of the voluntarism of N.S. Khrushchev, who was infuriated by the fact that his protege Lysenko was not elected to membership in the academy.

In our troubled times voices in favor of not only the reforming of the Academy of Sciences, but also its elimination under the pretext of the transition to “more advanced,” that is, western forms of the organization of science are again being heard. But before considering their validity, we should speak briefly about the so-called privileges of the academy and academicians. The privileges of the Academy of Sciences are of a twofold type. First, like all scientific communities, it should base its activity on autonomy and self-administration. They were very relative in tsarist times and after short-term flourishing in the 1920’s were under the pressure of the totalitarian party regime. True, the Academy of Sciences remained an island of elitist democracy: The elections of its full members and corresponding members were carried out by secret ballot by the members of the academy themselves. But who does not know that, except for the 1990 election, academic elections were always accompanied by interference and pressure on the part of party organs of various levels.

According to my observations, after decades of the lack of freedom the Academy of Sciences has not yet grown accustomed to using and does not know how to use its autonomy in the organization of internal life. Meanwhile it is impossible to deny the right of its members to the independent settlement of some questions or others, of course, with allowance made for the opinion of the scientific community.

Second, since the time of the founding of the Russian Academy its members received higher pay. Peter I and all subsequent rulers understood that under the conditions of an underdeveloped country or a country of average development, which prerevolutionary Russia was, the preservation of domestic science is impossible without the material support of the scientific elite. In 1912 academicians received: a salary of 1,800 rubles [R], a dinner allowance of R1,800, R900 for housing, R600 for the title, and in all R5,100 a year, which is only R1,00-1,500 less than a minister received. The salary of an ordinary university professor came to R3,000 a year. Hence it follows that in tsarist times the labor of scientists and VUZ professors was much more highly paid than in Soviet times. The Soviet government, in paying tribute to Marxist postulates and the equalizing trends of the popular revolution, from which it emerged, substantially reduced the remuneration of the labor of scientists, while having preserved, however, the higher financial support for members of the academy. For the same purpose of saving scientific personnel and creating normal conditions for their work in late 1919, when the class approach ruled the ball, the Central Commission for the Improvement of the Living Conditions of Scientists attached to the RSFSR Council of People’s Commissars (the famous TsYeKUBU) was established. All scientists and VUZ instructors were switched to special supply with food and manufactured consumer goods,

moreover, academicians were formed into the highest category. V.I. Vernadskiy had precisely this in mind when he wrote about “the relatively privileged position” of academicians. And subsequently the poverty of our society, which dragged on for decades, made it incumbent to retain certain privileges in the remuneration of labor for the scientific elite. But today the “life annuity,” which is giving some champions of equality no peace (R500 for academicians and R250 for corresponding members, that is, which is almost equal to the stipend of an undergraduate), does not deserve at all any serious discussion. It is still necessary to learn to differentiate social privileges, which are intolerable, and privileges for the creative output of scientists, figures of the arts, and so forth, which in one form or another will always exist.

Let us proceed to the present and to the question: What is to be done with the union Academy of Sciences? Soviet science (the natural and technical sciences) experienced the peak of its development at the turn between the 1950’s and 1960’s, when owing to the efforts of a galaxy of brilliant scientists in some directions it led world science, in others was at the world level, and in still others had approached it. During the years of stagnation, when world science under the conditions of the scientific and technical revolution rushed ahead, we either advanced through inertia or marked time, but often moved backwards, while at the same time proclaiming from the house top the achievements of Soviet science. Let us state frankly that today it is in a state of crisis, which, on the one hand, reflects the crisis in society and, on the other, has its own internal causes of an objective and subjective order. Whereas within the country the prestige of science has declined appreciably, in the global context our science is losing more and more its former positions and the lag is “building up.”

The USSR Academy of Sciences also bears responsibility for this, but first of all the highest state leadership, which proved to be incapable of formulating a science policy as applied to the new conditions of the scientific and technical revolution, bears the responsibility. The system of the organization of Soviet science is unwieldy and undemocratic. The number of institutes and their size, particularly of sectorial and departmental institutes, exceed all reasonable limits and the real needs. Among scientific personnel at one pole there are many “lords” and “generals from science,” who subsist on the labor of capable scientists who depend on them, and at the other there are many loafers and self-seekers, and now also “businessmen,” for whom science is merely a convenient cover. Our institutes and laboratories outside the military-industrial complex are poorly supplied with instruments, computers, and duplicating equipment. Each and everyone knows about the meagerness of the remuneration of scientific labor, moreover, it, as a rule, does not depend on research results and reflects the very same leveling. The break between scientific institutions and the higher school, which was artificially created by the ruling bureaucrats in the later 1950’s and early 1960’s, is a tragedy of our science.

The union Academy of Sciences is also in a state of crisis, although academicians do not like to talk about this. Two decades of the domination of the gerontocracy, the gross violation of the principle of the intelligent cooperation of scientists of different generations, unfounded complacency, monopolism in science, and the gradual supplanting of scientific schools by closely united groups of vigorous mediocrity have had an effect. Due to the influx into the academy of so-called organizers of science, including from the military industrial complex, and party and ministerial personnel, the title of academician has also been devalued in the eyes of the scientific community. People from the nomenclature, of course, have taken managerial positions at the institutes.

Perestroika and democratization have taken at the academy only the first steps and are proceeding slowly. Many institutes as before remain the inherited estate of their directors—as a rule, members of the academy. Not all of them are scientific leaders, while more often they exercise their, in essence, unlimited authority by administrative methods. The role of scientific councils has been belittled, while the councils of labor collectives, wherever they exist, are also not authoritative. The administrative staff of the presidium of the Academy of Sciences and institutes, which is bureaucratizing the development of academic science, is excessively large. Thus, at institutes with 200-300 people the directors have two or three deputies each, while at ones with more people they have up to four or five each.... This alone testifies to the unhealthy predominance at the academy of power structures to the detriment of scientific structures. Quite a few directors, in essence, do not manage their institutes, having shifted this troublesome job onto numerous deputies. Financing is still carried out for institutes, and not for specific scientific programs and directions, which are being developed by certain collectives of scientists. The contract system of the hiring of scientific personnel is being introduced laxly. The proper conditions have not been created for the growth of young scientists on the basis of the optimum combination of the older and young scientific generations.

For all that the USSR Academy of Sciences in the sense of the concentration of creative forces and the scientific potential is the best of all that we have in the area of basic science. VUZ science, for example, cannot compete with it, except the possibilities of leading university centers. Therefore, if we approach the matter practically, not the hasty breakup of the Academy of Sciences, but its well thought out radical reform and democratization from top to bottom are necessary. The thoughtless imitation of the western model of the organization of science would be very dangerous, although everything constructive in this experience should be accepted. Thus, I believe, the return to the old, primarily university science, from which Russian scientists themselves moved away in the 1920's, would be a step backwards, although it is necessary to increase sharply the role of VUZ science. Under our conditions the changeover to the system adopted in the West: "foundations—experts—scientists," is all the more impracticable. I also doubt that the establishment of a special Russian Academy of Sciences will make it possible to identify and

to unite in a strong creative corporation still unknown prominent scientists and thus to give new impetus to the development of science. Generally speaking, the anxiety of the community with regard to the abundance of all kinds of academies with the limitedness of the group of scientists—the generators of new ideas—is valid. As to the members of the academy, today the words of the great M.V. Lomonosov are also topical: "It should be seen to that they in sciences would practice more for the augmentation of knowledge than for their own subsistence and not in the way that some people, having won themselves bread, not long continue the practice of learning with zeal."

It seems that under the new conditions—the disintegration of the unitary USSR and the formation in its place of a new state system—the reformed Academy of Sciences could serve the new Union and all the republics. But in the interests of saving Russian science and its traditions the gradual transfer of the Academy of Sciences to the jurisdiction of Russia is most preferable of all. It is necessary to return to Russia the academy that rightfully belongs to it!

Market Transition Creates Crisis for S&T Book Publishing

927A0041A Moscow *RADIKAL* in Russian No 31,
14 Aug 91 p 2

[Article by Petr Deynichenko: "Mir and Progress Have Appeared on the Market. Will They Let Nauka Go?"]

[Text] Information is the blood of science. Our science is suffering from anemia. We will not talk now about data banks, computer networks, and libraries. Let us begin from the very start—with scientific works.

There are serious grounds to believe that very soon the trends, which exist in our book publishing, will return us to the times of the Middle Ages.

The crisis of scientific book publishing is merely one of the aspects of the general crisis of publishing. The voluminous document, which was prepared by the Association of Soviet Book Publishers ("On the Basic Trends in the Thematic Structure of Literature Being Published in the Country Under the Conditions of the Transition to the Market", will give the interested reader a full picture of this process, which is tragic for our literature. Its essence is clear: The catastrophic state of our economy is forcing people to give up spiritual food in the name of daily bread.

It is well known that throughout the world a book is expensive. A scientific book is particularly expensive. It is unprofitable for the printing and publishing industry, it is difficult to sell it. We are only now beginning to understand the real meaning of these axioms. The cost of a scientific book in the West often exceeds \$50. In this case in the West scientific publications are supported by a system of subsidies, while in our country scientific literature does not have any privileges—and, placed under equal conditions with Chase, invariably loses.

Judge for yourselves—the cost of a ton of offset paper has increased to 12,000 rubles [R] and continues to rise, printing plants demand for their services double to triple

the list price, moreover, the quality of the work is not improving in the least. Let us also not forget the trade markup, which has already exceeded 25 percent. Given the most favorable circumstances a scientific book should now cost not less than R15-35 subject to the number of copies and the size.

Who will be able to buy it? But this is the minimum price, which is unprofitable for publishing houses. Incidentally, the very concept of losses has now acquired a new meaning. For example, at the Progress Publishing House the percentage of unprofitable books as compared with last year has not changed, but the losses themselves have increased by a factor of 10.

The consequences of such a state of things are obvious. Publishing houses, in order to save themselves from ruin, have been forced to decrease sharply the publication of scientific literature and to engage in trade. The number of titles of scientific publications is decreasing, the number of copies printed is declining. For 1992 the plans of many publishing houses have been cut in half. Many scientific journals are on the verge of shutting down. People are suffering. Publishing houses have been forced either to reduce personnel or to cease the payment of wages.

Perhaps, precisely here unemployment showed its teeth for the first time. They are discharging not only lazy-bones, who for years wore out the seat of pants in easy chairs. Unique specialists have been forced to look for a job. And this is not someone's ill will, but a bitter necessity. It is will difficult to make up for the losses. They do not train science editors anywhere, they mature over years in the heart of publishing houses. Of course, specialists of such a class do not beg alms in underground pedestrian crossings and fairly quickly find themselves a job, often even a higher paid one. Those left without a job are forced to change specialty. But a vacuum remains at their place, for not less than 10 years are required for the training of a good science editor. This process inevitably leads to the further decrease of the output of scientific literature and the worsening of the quality of publications.

At publishing houses they understand that it is necessary to save the situation, and most often they turn for this to western experience. The "erosion" of medium-sized publishing houses is now occurring abroad. This process is not as well defined as it seems to many of our publishing personnel, there are also countertendencies, but still today either very small publishing houses—several staff members, 10-20 titles a year—or giants, at which thousands of people work and thousands of titles of the most diverse products—from newspapers and magazines to video movies and recordings—are published, have the greatest profitability. Such publishing concerns are usually divided into several firms, which have the right to pursue an independent publishing policy, but have a common financial center.

In our country Progress took such a path, having actually carried out the "demonopolization" of the publishing house. Subsidiaries were established on the basis of the former editorial offices, while the publishing house itself

was transformed into a closed joint-stock company. Everywhere 51 percent of the stock belongs to the parent company, but the subsidiaries are independent in the formation of their plans and in the choice of partners. The Nauka and Mir Publishing Houses for the present are retaining their traditional character, but Mir editor in chief Aleksandr Yastrebov is of the opinion that it makes sense to transform Mir into a publishing group—a conglomerate of small publishing houses with a common insurance fund and a common economic policy. Such reorganization should do away with the common kettle ideology that for the present predominates in the consciousness of people. The situation, when several successful trade books—not necessarily even detective novels—can ensure the well-being of an entire publishing house, also has its reverse side. If 20 percent of the personnel are entirely capable of feeding the entire publishing house, why should the others work? An absurd situation arises, when it is more profitable to pay wages to staff members, who are languishing from idleness, than to put out by their hands an obviously unprofitable scientific work. If you divide a publishing house into small firms, the publication of commercially profitable literature will ensure the well-being of the entire company as a whole, but by no means of its individual components.

Of course, the situation of Progress and Mir differs substantially from the situation, let us assume, of Nauka or the Publishing House of Moscow State University. Departmental publishing houses have a far more complicated life, because the degree of their freedom is significantly less. Nauka, for example, is unable to form its plan independently, as in former times they send it down from above. Until last year the publishing house scraped by owing to the 10 percent "for enterprising jobs," but given the present prices for paper you will no longer cover the losses. They gave the publishing house subsidies only for periodicals, which are nearly all unprofitable, so that without substantial financial injections the publishing house will simply cease to exist. Quite recently the Academy of Sciences issued a statute, which obliges scientific institutes to pay the publishing house for the publication of their works. But the scientific institutions of the academy are themselves suffering from a severe lack of money. Humanities institutes no longer have anything with which to pay Nauka. At the publishing house they have already more than once delayed the payment of wages, since 80 percent of the cash had to be transferred to the account of the printing plant.

Printing plants are fleecing all publishing houses for their services, but scientific publishing houses here are also in the position of "whipping boys." Scientific literature is so unprofitable for the printing and publishing industry and, given our antediluvian technology, requires such high skill of workers that printing plants try with all their strength to refuse orders of scientific publishing houses. As a result the publishing houses are doomed to print a large portion of their publications at their own base, which usually does not enjoy priority in supply with advanced equipment and materials.

The printing plants of scientific publishing houses are overloaded. The best printing plant of the Nauka Publishing House—the Second Printing Plant—is backed up with journals, the numbers of copies of which rarely exceed 5,000, while the outlays on their publication exceed all reasonable limits. The publishing house has repeatedly made proposals to decrease the number of unprofitable journals, many of which duplicate each other, but this is not finding a response at the Academy of Sciences. It is strange obstinacy—after all, the “files of unpublished works” of the majority of publishing houses are practically empty, the number of copies of them are declining. The best specialists prefer to publish their works in foreign publications, which are more efficient and are more accessible to colleagues.

The publishing house should receive freedom. Only then will it be able to work at the level of its capabilities. Unfortunately, at the Academy of Sciences they simply will not understand that the publishing house is not a machine bureau, and continue to stuff the limits with an unmarketable commodity. This problem is hardly capable of solution without the radical reform of our academic science.

Publishing houses are also seeking a way out of their difficult situation in international cooperation. Those of them, which already have longstanding experience of such cooperation, are treating it with greater caution. In particular, the ideas of disseminating abroad our scientific literature in Russian are arousing skepticism. Of course, it would be possible to sell more of it than now, but in any case this is a trifle. The path of joint publications, when the translation and the original dummy are prepared here, while the book is printed abroad, seems more productive. But will this go beyond isolated experiments?

At the Mir Publishing House they believe that we can disseminate our literature abroad with a profit only in a few narrow directions. These are, in particular, literature on theoretical mathematics, including educational literature, and literature on several areas of medicine.

We also have something to offer in the humanities. In the West they are displaying interest in our classical and modern psychology, in works on history, ecology, and demography, and in archive publications. The Progress Publishing House, which proposes to publishing them in the West, is not counting on mass printings, but hopes nevertheless not to remain at a loss.

It is necessary to publish our books in the West, although this will not yield mountains of gold. We simply need currency for the acquisition of copyrights. For the present our publishing houses are living through the publication of translated books, the rights to which were acquired by the All-Union Copyright Agency. As soon as the reserves of the All-Union Copyright Agency are exhausted, we will immediately experience an acute shortage of the latest western scientific literature. While if the Soviet Union were to join the Bern Convention, it would also have to pay for books that were published before 1973.

Recently the problems of scientific book publishing were mentioned in the Open Letter to the USSR Cabinet of Ministers, which was signed by the USSR and RSFSR ministers for the press and representatives of republic committees for the press. The letter spoke, in particular, about the mandatory state order for noncommercial educational and scientific literature and about the necessity of stable prices for paper and printing services. This will hardly be sufficient. At publishing houses they believe that, as long as the planned system of the output of scientific publications is preserved, our science is doomed to a lag, while scientific publishing houses are doomed to losses. Publishing houses should have complete freedom in the formation of their plans, regardless of whether or not they are departmental. Of course, it is necessary to subsidize the publication of scientific literature in priority directions, but the list of these directions cannot be endless. Scientific publishing houses urgently need the latest printing technologies, for without them they will not succeed in establishing an advanced system of the dissemination of scientific publications.

If the existing situation remains for some time to come, scientific literature, in the opinion of many publishing workers, will simply disappear. Authors will have either to write “not for publication” or to publish books at their own expense. But, let us add, this will happen only if we do not change the entire approach to scientific book publishing already today.

Tomorrow may be too late.

Double Counting in Soviet Science Statistics

927A0041B Moscow RADIKAL in Russian
No 26, 9 Jul 91 pp 2, 3

[Article by Candidate of Economic Sciences Boris Saltykov, deputy director of the Analytical Center of the USSR Academy of Sciences for Problems of Socioeconomic and Scientific and Technical Development: “Do We Have Much Real Science?”—first two paragraphs are RADIKAL introduction]

[Text] According to revised data, the expenditures on science in the country did not increased by 9 billion rubles [R], but decreased by R1.5 billion.

The second Soviet-American seminar “Science Indicators and Science Policy” was recently held in Moscow. The working meeting of specialists of the two countries was conducted within the framework of a joint project of the U.S. National Science Foundation and the USSR Academy of Sciences, the goal of which is the analysis and comparison of the systems of indicators of the scientific potential of each country and the practice of their use when formulating science policy.

In the 1970's our countries had already made an attempt to conduct a similar meeting, but due to the complete “secrecy” of the data on the indicators of the development of Soviet science this work did not yield any significant and useful result. To any questions of the American side, which concerned the breakdown of the expenditures on science by individual sectors of industry or directions of

research, our specialists were forced to respond that these figures are not published in the open press.

Back four to five years ago journalists (and not only they) wrote with delight that one-fourth of the scientific personnel of the world work in the USSR, while we have several fold more engineers than there are in the United States. Now such statements evoke only a sense of shame. I am ashamed and offended that our science was one of the "Potemkin villages" of the administrative system, which too often used it for evidence of the next advantage of socialism.

Ideological dogmas dictated not only science policy, but also the approaches to statistics. In the early 1970's the accounting system was changed so that tens and hundreds of thousands of engineers, "who conduct research and development in accordance with an approved plan," were included among scientific personnel.

Today we have finally learned that in our science things are not splendid. At the same time I want to caution against indiscriminately destructive assessments of Soviet basic research, for the centuries-old traditions of the best domestic scientific schools are not a myth, but a reality. The results of the examination of the level of basic work, which was conducted two or three years ago, also testify to this. One of its main findings was that in approximately 40 percent of all directions of modern science we are at the world level. And this is given the poor technical supply of laboratories and an outdated instrument and computer base.

In the present urgent situation questions are natural: How much "real" science and how much "so-called" science do we have? Whom should the state provide with everything necessary for the conducting of research, and whom is it possible to turn over to the elements of the market? In other words, what share of scientific operations should be financed from the state budget, and what will the plants and other independent organizations, whose property they would be, pay? A large number of questions of this sort, which are connected in one way or another with the commenced denationalization (and at times privatization) of our science, are arising.

Today it is difficult to give rational answers to them, because all these years we lived in our own "frame of reference" and used a system of the statistical accounting of science and technology, which was suited only for us. Here we did not properly know ourselves how many of our

1.5 million scientific personnel were engaged in research and development, for example, in biotechnology and how many in computational mathematics. First, such information simply was not collected in our country and, second, the body of concepts itself differed significantly from the one adopted in the industrially developed countries of the world. Such a simple question at first glance as the comparison of the number of scientific personnel of the USSR and the United States required the conducting of special research, moreover, the results gave a spread in values of 20-30 percent.

Starting in 1988-1989 the processes of democratization and glasnost began at last also to spread to statistics. The data on our expenditures on military research and development were published for the first time—in 1988 they came to about 50 percent of the total expenditures and nearly three-fourths of the spending of the state budget on scientific research and development. The USSR State Committee for Statistics jointly with organizations of the USSR Academy of Sciences and the State Committee for Science and Technology began to make radical changes in the methodology of the accounting of scientific personnel and other resources of science in order to bring it as close as possible to the standards adopted in the civilized world (particularly UNESCO standards).

The concept "scientific and technical activity" regardless of who engages in it and where, was made the cornerstone (let us note: Earlier the formally defined "scientific research institution" was the basic subject of our statistics).

As a result information on scientific personnel and the research and development being conducted began to be gathered not only for the 5,000 scientific institutions of the Union, but also for all organizations, including scientific production associations, design bureaus, and plants (in all more than 8,000 organizations were encompassed). The combined accounting form "1-nauka," which replaced more than 10 old reporting documents of the Central Statistical Administration, which were not coordinated with each other, became the specific tool of the implementation of the new statistical approach.

Now we have begun to understand far better what Soviet science is today. In particular, in the practice of analyzing scientific personnel we switched for the first time to the use of the generally accepted concept "specialists engaged in research and development." Now the direct comparison of these categories of personnel in the USSR and the United States is becoming more specific and informative.

Number of Scientific Personnel of the USSR and the United States (on 1 January, thousands)

Scientific personnel	USSR		United States	
	1986	1989	1986	1989
Specialists engaged in research and development	1,599.4	1,654.6	1,725.5	2,026.9
Moreover, science teachers	423.1	436.3	494.0	no data

Owing to the new procedural approaches it was possible to obtain for the first time relatively reliable data on the breakdown of the expenditures on basic and applied research, as well as on experimental design development. In 1989 in the USSR these shares in percent were the following: 7.0, 34.1, and 58.9. In the United States for many years now a different structure has been maintained: 12 percent of the expenditures are for basic research, 21 percent are used applied research, and about 67 percent are for development. The comparison of these indicators makes it possible to confirm the conclusion that suggested itself on the basis of other observations as well: In our country too few assets are being spent on basic science and unjustifiably many assets are being spent on applied operations, which do not end with anything specific.

Finally, in the last two years an attempt has been made to estimate what is called "double counting" in our data on the expenditures on science. The point is that according to the old methodology the data on the total expenditures of every organization were included in the report regardless of whether research was performed on its own or a portion of the money was transferred to other organizations via economic contracts. Here some expenditures, of course, were reflected in the reports twice, and at times three times.

Having eliminating from the total expenditures on research and development the share, for which settlements between competitors accounted, statisticians obtained directly sensational results. The real Soviet spending on

research and development, which is moderate as compared, for example, with the United States (in 1990 the expenditures on science in this country came to \$150 billion), decreased by 20-30 percent. Thus, according to the data of the State Committee for Statistics, in 1988 the expenditures on science in the USSR, which had been freed of double counting, came to R32.3 billion (instead of the previously published R37.8 billion), while in 1989 they came to R30.8 billion (instead of R47 million!). Of course, in these data there is also much that is not clear, but the change of the system of accounting, undoubtedly, is heading in the correct direction.

All this "news" of Soviet science statistics was the topic of frank and heated discussions at the mentioned Soviet-American seminar. However, they constitute only the visible part of the enormous iceberg of new problems, with which Soviet statisticians and economists are being faced already today.

One of them concerns the accounting of new subjects of scientific and technical activity—cooperatives, centers of scientific and technical creativity, unions and associations of scientists, and so on. Today no one can evaluate reliably their contribution to research and development, although the annual volume of work of this sector already exceeds R5 billion. It is also necessary to organize the accounting of such new processes for our science as unemployment, emigration, and inflation. The relations with republic organs of statistics will also have to be organized in a completely new way.

Now, however sad, we still cannot give a clear-cut and complete answer to the question of what Soviet science is.

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