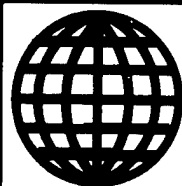


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22 AUGUST 1990



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# ***JPRS Report***

# **Science & Technology**

## ***USSR: Science & Technology Policy***

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# Science & Technology

## USSR: Science & Technology Policy

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### Debate Over RSFSR Academy of Sciences Continues

907A0285A Moscow *LITERATURNAYA ROSSIYA*  
in Russian No 20, 18 May 90 pp 8-9

[Article by Doctor of Philosophical Sciences Professor I. Smirnov under the rubric "A Topical Theme": "The RSFSR Academy of Sciences—To Be or Not To Be?"; first paragraph is *LITERATURNAYA ROSSIYA* introduction]

[Text] This question never received clarification at the meetings of the Presidium of the USSR Academy of Sciences. But, it cannot be unimportant to the peoples of Russia.

In our times—times of dynamic transformations in socioeconomic, political, and cultural life—the deep processes have also affected the sphere of the national self-consciousness of the peoples of our country. They also affected the Russian Federation, which until recently lacked 16 political structures that exist in the other republics. Today it is already clear: The problem of the state sovereignty of Russia is a vitally practical issue.

Spring brought reassuring news. The Presidium of the RSFSR Supreme Soviet adopted a decision on the establishment of the RSFSR Academy of Sciences, while the republic government implemented a number of steps on its formation. However, for the present it is a long way to the celebration—the opening of the first session of the new academy. Many both organizational and substantive, exclusively scientific questions have to be settled before the new research center of the republic will begin to operate.

That is why it makes sense to turn to the discussions, which are being conducted over this burning question, to attempt to outline the group of questions, which constitute the subject of the disputes, and to interpret the conclusions of the opposing parties in the hope of clarifying the underlying cause of the existing contradictions. It is expedient, in my opinion, to turn our gaze in the direction of the USSR Academy of Sciences. It is well known that the opinion of this department is an important factor of the formation of national and state scientific policy, it is taken into account (whether to a greater or lesser degree is another question) when solving the entire set of problems of the social, economic, and cultural development of the country. It is safe to assume that such a problem as the restoration of the Russian Academy of Sciences also did not remain outside the attention of the large academy.

It seems that Russians are fairly interested in familiarizing themselves with the mechanism of the making of decisions of this sort, in taking a look at, so to speak, the "intellectual apparatus" of this process, and in listening to the language that is used here by scholarly men. That is, it is a matter of familiarizing oneself with the opinion of the USSR Academy of Sciences on the question of the

establishment of the republic academy of sciences. Especially as such an opportunity was afforded without difficulty: The journal *VESTNIK AKADEMII NAUK SSSR* (No 2, 1990) published a report on the discussion in the presidium of the USSR Academy of Sciences, at which in October 1989 a discussion of the problems of the establishment of the Russian Academy of Sciences took place.

Let the reader not complain of the abundant quotation of the statements of well-known scientists, but precisely the turning to direct speech makes it possible to report objectively the atmosphere and spirit of this discussion. I will try here to reduce my personal appraisals to a minimum.

President of the USSR Academy of Sciences Academician G.I. Marchuk advanced the idea of the concept of "pluses and minuses" with respect to the future RSFSR Academy of Sciences. Having noted the existence of ambiguous points of view on the question being discussed, Guriy Ivanovich said:

"...As a whole I support the idea of the establishment of the Russian Academy. But here I regard as absolutely unacceptable the proposal on its formation by means of the already established structure of the USSR Academy of Sciences.... It would be a big mistake to destroy this structure and to remove from it institutes, which under the aegis of the USSR Academy of Sciences and the State Committee for Science and Technology are operating efficiently and are accomplishing all-union and state tasks of the development of many important scientific directions."

As a result of the consideration of the available proposals three possible versions of the establishment of the republic academy are discussed. The first presumes the ridding of the USSR Academy of Sciences of all institutes with their transfer to the structure of the republic academy. The second proceeds from the formation of the Russian Academy on the basis of the three departments of the USSR Academy of Sciences—the Siberian, Ural, and Far Eastern—with the attachment to them of all the scientific centers of Siberia. Finally, it is proposed to retain the USSR Academy of Sciences in its present state and to form the Russian Academy on the basis of new organizational and structural principles.

The complexity of the situation being experienced is reflected most clearly in the position of G.I. Marchuk: "...The economic mechanism in the country is such that if we change something, if we disband institutes, we will immediately suffer a crash, for the economic system is not prepared for what is new and is unviable." And still the academician displays concern for the Russian republic. True, here he for some reason sees the future Russian Academy as incapable and lacking in creative potential and the possibility of self-organization and self-development. Hence, too, the questions: "Why hang on the RSFSR Academy of Sciences the burden of institutes? For if we transfer them from the large

academy, we will not create anything new. The old bureaucratic system will be transformed from an all-union one into a republic one. What are the advantages here? None...."

The matter, as you understand, is being held up by money. But if funds are allocated for the RSFSR Academy of Sciences, "by means of them it is possible to announce competitions, in which institutes of the USSR Academy of Sciences, higher educational institutions, and individual researchers will participate. Then the Academy of Sciences of Russia will be able to carry out the review of projects, to unite the efforts of all its participants through coordinating councils, to make scientific forecasts, to prepare models of economic, social, and cultural development, and so on." If funds are available, the prospects of the activity of the future academy also come into view. In such a form it will hardly be able to meet the diverse needs of the republic.

At the same time the process of the forthcoming reform of Russian science is seen as a complicated and multi-stage one. It disturbs the USSR Academy of Sciences that a new scientific organization is arising next to its well-organized structures, although its future today also looks quite unstable and amorphous.

And still the president of the USSR Academy of Sciences agreed that, first, "it is necessary, of course, to support" Russia "by establishing the missing structures. But it worries us that in this process we are deviating from the principle of federation...." The second circumstance is connected with the fact that up to now the union republics received real assistance from an integrating organ—the USSR Academy of Sciences—under the new conditions, perhaps, they will lose it, at least psychologically. The coordination, which took many years to establish, will be destroyed. See, again there is a display of statewide concern.

The discussion proceeded with the greatest consideration for the problem, there were no indifferent people. As G.I. Marchuk stressed, this is the most fundamental question of all the ones which we had to consider. Such a statement says much, if you consider the boundless field of other, exclusively scientific aspects, with which the USSR Academy of Sciences is called upon to deal.

Indeed, the question was posed in the Shakespearean tradition: To be or not to be? The first bewilderment was heard in the reply of Academician A.V. Fokin:

"But excuse me, was the question **OF THE UNTIME-LINESS** (the emphasis is mine—I.S.) of this problem under the conditions of the serious economic and financial state of our country, actually the crisis, which we are now going through, examined? The political reform is proceeding with difficulty, the deficit is growing, there is nothing for the people to eat—there are ration cards for sugar even in the capital. While we intend to establish a new academy! What, is there nowhere to put the money?"

Here, too, you feel, everything is permeated with statewide concern. You immediately understand what zealous managers the scientists show themselves to be: With such a corps of science no troubles are frightening to us, they will not scatter the national kopeck. Doubt involuntarily comes: Perhaps, in reality it is not the time, it is still necessary to endure, for there is an operating, organized structure, there are academicians and corresponding members of the large (indeed, large) academy, and why start a fuss?

Academician A.M. Prokhorov said:

"One would like to know: If we establish the Russian Academy, will not the money, which the state has little of as it is, be **DISPERSED** (emphasized by me—I.S.) among a broader group of institutes? In other words, will not existing institutes begin to be supplied even worse with instruments than now? For this will lead to the decrease of the overall scientific level. Did anyone ponder this?..."

Questions, questions.... It seems that the reality of life broke down for our academicians as if into two planes. One is the real process of perestroika, which reaches the highest statewide levels, and one should, undoubtedly, take it into account and be concerned about its effectiveness. The other, which concerns, in particular, the Russian Federation and supposes its modernization, as if drops out of the present time, which is discernible by the academicians, and does not fit into the process of statewide perestroika.

How else is one to explain the dissatisfaction of Academician V.M. Tuchkevich:

"Is it timely to discuss this question now?... Perestroika is not yet yielding results." "I believe," the academician continues, "that we do not have sufficient grounds to discuss now the organization of an academy in Russia for the simple reason that our Constitution itself should be amended.... It would be proper to put this question aside as a premature one, for which there are not sufficient data."

It is regrettable, of course, that even the Constitution of the country stands in the way of the legitimate and valid desire of the peoples of Russia. Everything is not in favor of the justified aspiration of Russian society not only to aim its own life in the direction of national traditions, but also to realize it within the framework of existing state experience.

Nevertheless, other interests also begin to be visible behind the reasons for the economical attitude toward state money and the concern for the level of state science and even for the dangers of unconstitutional endeavors.

Thus, they made themselves felt in the statement of Academician Yu.A. Osipyan:

"The question of the organization of the Academy of Sciences of the Russian Federation is one of the most dramatic, serious, and important ones for the scientific

community, because it fundamentally **BLENDS WITH THE FATE OF THE ACADEMY OF SCIENCES OF THE SOVIET UNION** (emphasized by me—I.S.)... What will become of the USSR Academy of Sciences after the organization of the RSFSR Academy of Sciences? Will it be preserved and what structures and functions will it have? Will we not destroy it? That is what it is a question of...."

It turns out, however, that it would also be possible to agree with the establishment of the Academy of Sciences in Russia, but then one will have to think about the large academy.

The question of the imaginary "resentments" of Russia is also raised. Academician A.A. Gonchar recalls them:

"It seems to me that the academies (the republic academies of sciences are meant—I.S.) emerged because the republics did not succeed in getting representation in the USSR Academy of Sciences. But Russia was fully represented. Therefore, the argument that the RSFSR was 'offended' has no foundation.... The union republics, but not the RSFSR, could express some resentment with respect to the large academy."

One might think that the RSFSR had already ceased to be a union republic. It is strange to hear from a well-known mathematician popular arguments, which, perhaps, also without realizing it, result in an attempt at the setting of the peoples of our country against each other and their confrontation. Behind them there is either an inadequate understanding of the real situation or the reluctance to meet half-way by no means the "resentments," but the aspiration for genuine sovereignty of the state.

During the discussion of this sort the inaccuracies made themselves felt not in the best sense. How is one to regard the assertion that in the 1920's "the RSFSR united peoples into the Soviet Union"? A reproachful attack meant for the peoples of Russia and the pinning on it, which is hidden in this case, of the blame for the course of events, in the realization of which, as is known today, the people never took part as their instigator and organizer, intentionally or unintentionally lie behind it. A regular deviation from the historical truth is present. For what purposes and in the name of what tasks does it occur at the high forum of Soviet science?

It is also impossible to agree with the apprehensions, which were voiced by the academician, with respect to that fact that soon the RSFSR with its own academy will also find itself in a difficult position, for the Russian autonomies will also begin to aspire to their own academies. The prospect that in a few years "academies will appear in Tataria, Bashkiria, Komi....," worries him. Everywhere, he says, they will have their own academies, and then one will have to establish the Russian Academy, if all the national academies emerge.

But, first, why not? The national self-consciousness of the peoples of Russia is not so primitive that bare

imitative reasons would act as its motivating factor. If the achieved level of science in the autonomous republics requires the improvement of the organizational structures, then, of course, such work will be done. The process of the differentiation of science will be carried out in a democratic framework, it does not threaten either the loss of national integrity or the integration of the peoples of Russia and the Soviet state. Second, for example, in fraternal Georgia the existence of the republic academy did not lead to the appearance of other analogous structures. But in the Georgian SSR there are also autonomous formations.

Even given the agreement in principle with the necessity of establishing the Russian Academy the scientists cannot shake off the hesitations and uncertainty. Something is preventing them from taking a resolute and clear stand. Academician P.G. Kostyuk:

"...From the standpoint of strategy, as well as logic, the establishment of the Russian Academy is a necessary affair. If all the republics are equal, why does one of them not have its own academy?"

It seems that everything is in all fairness, what doubts can there be? However, the obstacle lies in the dragged out crisis, the time of the recovery from which is completely unclear. Here it turns out that "it is a necessary, but untimely affair." And the most, to which it would be possible to agree in such a situation, in the opinion of the academician, is to establish departments of a new type **for the purpose of relieving the large academy** (emphasized by me—I.S.). Of what type? Recommendations are lacking on this account.

As the discussion goes on the passions become heated. And here a kind of bill is presented to the Russian republic. In the opinion of Yu.A. Osipyanyan, much was done, after all, by the large academy: Departments—the Siberian, Far Eastern, and Ural—were established. Even their establishment is a result of the fact of the existence of the large academy, which sent its best people to the provinces. The departments could not have appeared there by themselves. Who is arguing—the regions of Russia are grateful for the given assistance. Locally, of course, it is more evident who made what contribution to the development of science: summoned knights or scientists who grew up in their home region. And how it is possible in this case to divide the homeland!

But it is impossible to agree with the denial of the existence in Russia also of its own potential and fundamental possibilities and conditions of the development of science. Just as it is impossible to agree with the allusion that Russia does not have its own scientists and specialists. But even if such an allowance is made, there is no great misfortune, there is no need to regret this. And here is why. "In my opinion," Yu.A. Osipyanyan gives assurances, "the large academy is managing perfectly its role of the sower of wisdom, the good, and the eternal on the territory (emphasized by me—I.S.) of Russia." So

reap and thresh! There is no reason to fear for your future, all the more as you do not have your own sowers anyhow.

Incidentally, the stand of the representative of Russia at this meeting—Deputy Chairman of the RSFSR Council of Ministers V.G. Zakharov—was specific and consistent. In speaking about the necessity of establishing a national academy of sciences of Russia, he clearly stated: "...This problem should be solved, moreover, in deed, and not in words, precisely now."

The discussion did not get by without turning to history. The attempt to call into question the law-governed nature of the restoration of the Russian Academy as the highest scientific institution of the RSFSR arouses nothing but surprise. The discussion participants referred to the letter of Academician N.P. Bekhtereva, in which, as is possible to assume, the traditions of Russian academic science are traced and the urgency of the restoration of justice—the resumption of the functioning of the RSFSR Academy of Sciences—is substantiated. What disconcerted the venerable scientists, who are maintaining the purity of the centers of national science?

The following lines from the preamble to the article of his colleague, Academician N.N. Moiseyev, which was published in SOVETSKAYA ROSSIYA, cause Academician A.A. Gonchar indignation: "The idea of restoring the Russian Academy of Sciences, which existed for 200 years, is already up in the air." It is intolerable for the critic that this thought "is also exaggerated in other documents." And here in the aspiration for historical justice and in the rejection of the falsehood an amazing conclusion is drawn: "I cannot but disagree—no Russian Academy existed, especially for 200 years. It is incorrect to say that it was wrecked." Without going into the logic of the academician and mathematician, which is unconvincing and far from the historical facts, I will merely note that the connection of the academy with the word "empire" evokes his greatest objection. Therefore, when recalling a provision of one of the first academy charters—"the Academy of Sciences is the preeminent educational institution in the Russian Empire..." he states then and there: "Empire" is a term which has receded into the past. And since this is so, about what continuity and connection can one talk!

Yu.A. Osipyany also repeats in unison arguments of this sort:

"The concept that Russia was left without an academy of sciences and it is now necessary to restore it, is not backed by any facts. It is necessary to pose the political question more carefully, because such strings of public opinion, which it is dangerous to excite, are being excited. I believe that such excitation should at least not come from the Academy of Sciences. The Academy of Sciences of the Soviet Union is the heir of the Russian Imperial Academy."

As we see, the question was considered with allowance made for the most diverse points of view, approaches,

and opinions. What is it possible to advance as counter-arguments and arguments, which are based on assessments of the real state of affairs?

Let us cite again the words of V.G. Zakharov:

"Russia is the only republic which does not have its own structures. Their absence is hindering the accomplishment of many vital issues. Moreover, everyone is ready to manage Russia—no one is renouncing this, but no one wants to assume responsibility for such management."

How can one not pay attention to the arguments, in conformity with which "sovereignty is not only a political and economic concept, but also a scientific, sociological concept."

It is especially necessary to dwell on the problem of the humanities component of the future academy of sciences of Russia. Today unanimity is ripening with respect to the fact that one of the negative consequences of the scientific and technical revolution is connected with the slackening of humanities research, with the underestimation of the role and importance of history, philosophy, linguistics, and, of course, economics, and with the displacement of humanities problems from social consciousness. The disregard of the large set of humanities disciplines is showing in all spheres of life—from enlightenment and education to the formation of state policy in the area of physical production, health care, and culture. Moreover, the overcoming of the low level of culture—the main disaster of our daily life—in many respects depends on the reorientation of the structure of domestic science in the direction of man and, hence, in the direction of humanitarian science.

And it would be entirely natural to encounter support and approval in the matter of establishing the Russian Academy on the part of humanities scholars who are members of the large academy.

For the sake of fairness it should be said that all the same there was no unanimity both in the rejection of the very idea of restoring the Russian Academy of Sciences and in the doubts concerning its future structure and functioning. To our general delight, Academicians N.N. Moiseyev, V.A. Kirillin, V.A. Koptuyug, G.A. Mesyats, and V.I. Ilichev spoke out directly and resolutely "for." Precisely they also proposed specific means of this, undoubtedly necessary, difficult act. The views of the supporters of the Russian Academy were formed not on a blank spot, they are supported by significant personal experience, by the state practice of organizing science, and, finally, by the opinion of the scientific collectives which work on the Russian land.

What prevented the colleagues first from listening to, and subsequently from studying in detail the practical advice? In my opinion, the fear of being left without work. The anxiety, which was heard in the statement of Academician A.M. Prokhorov, suggests this idea: "It

turns out that the Russian Academy will be more predominant! All the councils will be transferred to it. Why, then, is there the large academy?"

A.A. Gonchar expressed more "serious" considerations. He already sees behind the appearance of the new scientific organization political cataclysms:

"If the Russian Academy is established by means of institutes of the unionwide academy, if it becomes exactly the same as all the republic ones, while a certain Union of Academies towers over it, in our society the dangerous trend toward separatism will intensify sharply."

Academician P.N. Fedoseyev is also worried about national tranquility:

"But it is also necessary to consider the other nations. How would it be interpreted if **RUSSIA TOOK FOR ITSELF** (emphasized by me—I.S.) the scientific base, which was created over 250 years by all peoples and the entire state, and transformed it into the Russian Academy of Sciences?"

Here it turns out that first we will speak ourselves, then will seek those who stir up interethnic lack of understanding and discord.

And still the apprehensions of the academicians with regard to the future establishment of the RSFSR Academy of Sciences, it seems, had a real basis. The basis of the departmental approach, the goal of which is not to give up anything and not to forego anything even in the name of what cannot be removed from real science—from movement into the future, from natural development.

Meanwhile events took their own course. The second meeting of the Presidium of the USSR Academy of Sciences, which was devoted to the same question, was held a month later. The results of the work of the commission, which was specially established for this purpose, were heard. Progress is present—the timeliness of the need for the establishment of organizational structures of basic scientific research was acknowledged. Feel how difficult it is to break through the verbal accumulations that are still being erected on the path to the clear goal!

According to the academic pace and standards much has been done. Although, as we see, the direct statement of the question of the Russian Academy was avoided. The figure of silence is present given the actually universally recognized fact that of the 1.5 million people employed in the sphere of science of the country the RSFSR accounts for 1 million.

How is one to view the proposed versions? It is absolutely clear that without its own institutes the Academy of Sciences in the republic is an illusion. But the large academy also insists precisely on this. For the transfer of institutes from the USSR Academy of Sciences to the RSFSR Academy of Sciences, in the opinion of the

headquarters of Soviet science, leads to dismemberment, to the undermining of scientific organization, and to the elimination of the coordinating role of the large academy, which, as you understand, is unacceptable.

Worrying that the future scientific center of the republic would not turn into a bureaucratic department, the leadership of the USSR Academy of Sciences proposes to worry about the new organizational principles and the fundamentally new system of financing. In short, the government of the Russian peoples should taken upon itself the concern for the Russian peoples' own academy. The allusion is more than transparent. While appealing for the demonopolization of science, the leadership of the USSR Academy of Sciences does not intend to share the sources of its own financing and supply. Of course, it is pleasant and, what is the main thing, customary to read slogan parting words expressing wishes:

"The new academy is called upon to mobilize the entire scientific potential available in the republic for the accomplishment of the vitally important tasks, which face the Russian Federation and are aimed at the increase of the well-being of all the nations and nationalities, which populate it."

From such advice one thing is visible with certainty: The nations and nationalities themselves will have to do everything. One must not, obviously, count on now popular charity. It has become clear that the fate of the Russian Academy depends only on the Russian government, on the will of the chosen representatives of the people, and on how ready they are to convert the hopes of the people into reality.

It would be possible to treat the meeting of the Presidium of the USSR Academy of Sciences, which has already been held, as already a historical event. It might even seem that in general it is not worth stirring up the past, although it is not that distant. Especially as a new composition of the presidium of the USSR Academy of Sciences has already been elected. It is possible to expect that in the immediate future its opinion of the question that worries us will also become known.

On the other hand, the lessons of the past are useful even for the timely recollection of them. Especially as many tangles of the contradictions, which today are also accompanying the settlement of the question of the RSFSR Academy of Sciences, are concentrated in the examined situation.

The opinion of the USSR Academy of Sciences, having been formulated and expressed, lives and will continue to live. And if for some reasons it was not possible to embody it in real deeds or to implement it fully, it all the same exists. It is externally invisible. It is possible to sense its presence either in the promotion of the processes of putting what has been planned into practice or in the resistance, which at first glance as if does not even depend on it.

V.G. Zakharov in his interview to SOVETSKAYA ROSSIYA told about the stages of the coming work. As is possible to be convinced, the fate of the future Russian Academy is entirely in the hands of the midwife. This role is being assigned entirely to the USSR Academy of Sciences. For the composition of the founders is being formed from its members, to whose assistance scientists from a number of union departments have been called. It is merely unclear why the strengthening of the humanities direction will be achieved just by means of the Language and Literature Department and the History Department. After all, there are also other departments of the humanities type.

The Constituent Committee headed by Academician V.A. Koptug, chairman of the Siberian Department of the USSR Academy of Sciences, has also been set up, members of the large academy are also included on it. So the turning to events of the past is very, very topical.

It is difficult to expect the quick settlement of the questions connected with the establishment of the Russian Academy, based on the attitude toward it of the leading scientists of the academic department of the country. It is obvious that this circumstance also influenced the decision to hold the first election to the RSFSR Academy of Sciences in 1991 and to extend the entire campaign to three stages with two-year intervals. So that in its established membership of 500 the Russian Academy of Sciences might gather only in 1995. But if we take into account that the USSR Academy of Sciences itself nearly always violates the dates of the elections, which are stipulated by its charter, our waiting may be dragged out indefinitely.

Of course, the question is not to pick the academy team in a rush manner, to provide it with an academic wage, and, following the advice of "the sowers of everything good," to reap the fruits. Undoubtedly, time, which has been multiplied by consideration, calculation, and adherence to principles, is necessary. But, you will agree, even in case of the observance of all the reasonable conditions and requirements in the matter of establishing the Russian Academy the factor of "the existence of an opinion" will either contribute to it or hinder the process. And, consequently, the question, which was discussed thoroughly, but was never resolved at the meetings of the presidium of the USSR Academy of Sciences—is the Russian Academy of Sciences to be or not to be—has not lost its topicality for the scientific committee and, therefore, cannot be unimportant for the peoples of Russia.

### 'Radical' Reforms Needed To Improve Sectorial Science

907A0238B Moscow SOVETSKAYA KULTURA  
in Russian 28 Apr 90 p 4

[Article by Candidate of Technical Sciences I. Loshchilov under the rubric "Science and Society": "Scientific Darkness"; first paragraph is SOVETSKAYA KULTURA introduction]

[Text] The foundation of sectorial science was laid in the 1920's, when the purposeful scientific support of the embryonic sectors of industry was required. From the very start it was of an exclusively applied nature and was called upon to implement in practice the latest achievements of scientific and technical progress. The representatives of pure science—academicians and professors of higher educational institutions—greeted the appearance of their grubby colleague somewhat disdainfully and in the end paid, for in the area of material and manpower expenditures they were quite soon left behind.

It is believed that at present sectorial science consumes not less than 90 percent of all the allocations and has a good half of the scientific personnel of the country. It is also necessary to add here several million engineering and technical personnel and maintenance personnel. This enormous army is concentrated at hundreds of scientific and design organizations. It is not usual to publish exact official data on their number, so that it remains merely to estimate. Now every self-respecting department has its own branched network of scientific institutions. The well-known Ministry of Land Reclamation and Water Resources, for example, has more than 150 of them, while we have over 50 union ministries of such a rank, now calculate.

What is the return? Here one will also have to estimate. Our sectorial science has to its credit spacecraft and tragic Chernobyl, the discovery of petroleum and gas deposits in Western Siberia and the destruction of the Aral Sea. What tips the scales? It would be possible to enlist more exacting data and with allowance made for the applied nature of sectorial science to analyze how many inventions it provides the national economy. Alas, the available statistics give rise to many questions. We have more than enough inventions, but a negligible portion are patented (less than 1 percent of the total number in the world). What is this, the slowness of patent services or the quality of invention? If we judge from the international classification, our agricultural science is working most successfully in this direction. It persistently provides more than a third of the inventions. Here, it is true, there are no questions—we experiment more than everyone, and a result is available. But in such a sphere as the storage, processing, and transmission of information, which is at the cutting edge of scientific and technical progress, we invent only five percent. So what is our actual contribution?

Among the large number of causes of the unsatisfactory return of sectorial science its departmental affiliation is the main one. Strictly speaking, specialization in science is a natural thing, it ensures the in-depth study of complex problems, although it also narrows the breadth of research. But when problem specialization was superimposed on the strict departmental framework, the freedom of scientific maneuvering decreased to a dangerous level. Science, which was broken down into small units, was squeezed into the rigid framework of the administrative command system and became an integral part of it. The search for the objective truth, which is the



ultimate goal of any study, was replaced by the "what can I do for you?" principle. The substantiation of voluntaristic decisions, which were proposed by administrative practice, became the basic task of science. And it learned to substantiate everything that was required. When the same Ministry of Land Reclamation and Water Resources developed the idea of reversing northern rivers, it gave the command to its science to prove that the Central Asian region would soon be deprived of water. The scientists tried, but the end result seemed unimpressive to administrators. Then after additional research they increased it by twofold: If you must, you must. In similar manner their colleagues from other units to execute social orders substantiated the necessity of deep spring plowing, debunked the idea of artificial intelligence, and analyzed the intensifying general crisis of capitalism. But in a few years again at command they changed their conclusions to the opposite ones. Let us for the time being leave ethical problems aside, the time of universal repentance, it seems, has not come. Let us just indicate several sad consequences of such scientific jealousy.

Creative individuals, a portion of whom have been endowed with the unique ability to be generators of ideas, move science. There are not many of them, only a few percent, but they are like detonators in a heavy land mine. Such scarcely obedient people, who think in non-trivial terms, in games with a given end result play poorly and for sectorial science proved to be unsuitable. Here zealous performers, who gave the overall background an openly gray color, were placed in the forefront. The pursuit of foreign know-how and technical solutions replaced the generation of one's own ideas. In striving to reduce the gap, we began to borrow not only ideas or solutions, but also equipment itself—recall the history of the appearance of Zhigulis or the Unified System of Computers. However, imitation was not able to stimulate creativity. During the decades, while we were assimilating and modernizing what was copied, Fiat and IBM dashed off into the boundless expanses.

Scientific inquiry with a given result was responsible for a unique style of research. The development of subtle methods, which make it possible to obtain the required data, became its main task. "The method is more important than the discovery"—the imprudent phrase of Academician L. Landau was elevated to a principle. For the consolation of failures they proposed even to evaluate the negative results, inasmuch as they are also useful in their own way. And given such intelligence it is possible, it turns out, to organize a happy life and even to make a scientific career. For this there are two inventions which do not have analogs in world practice.

The first is the planning of scientific research. It is accomplished very simply. For example, at an institute with a staff of 400 the average annual salary of associates comes to 2,500 rubles. Consequently, during the year it is necessary to complete scientific jobs worth 1 million rubles. A portion of them are transient jobs, that is, remained from past years. The missing jobs are added

with the help of the client, as whom, as a rule, its own department acts. It also determines the value of the order. The whole trouble is that departments are interested in orders of high value, this is both prestige and additional budget allocations. In case of particular success it is possible to extract a government decree and there to record by a separate point what rewards are due to the participants in the work, up to Lenin Prizes. But of course, the economy is planned, it is necessary to take every kopeck into account. But then, whether or not you want to, you will have to make the award: The plan is a sacred matter. Having received an order for many million rubles, our institute is forced to drag out its fulfillment for many years, to expand, or to select cop performers, having appropriated the head functions. That is how the unwieldy scientific pyramid is built and grows in every department.

But here the annual plan has been imposed, the institute is working. Who tracks the fulfillment of the plan? The department, it is the basic client and the receiver of the performed jobs. An entire system of plan indicators exists for this and the primary one of them is the value of what has been completed. But it is achieved almost automatically, if only due to the fact that the 400 associates punctually received their wage. Theoretically, it is true, it is possible that the client will not accept the completed work, but only theoretically, for then the department should bear responsibility for the poor supervision of subordinates. Moreover, they have learned to get on well with the representatives of the client. It is possible, for example, to include them in the collective of authors for the receipt of a prize, to register them as consultants, to help them to write or simply to write a dissertation. Often such a formality is also not required, for the existing rules also make it possible to confer an academic degree without the defense of a dissertation, simply for the supervision of conducted research. It is not by chance that in our country so many administrators with academic degrees have appeared, and many of them are obliged for their high scientific skill not to their knowledge, but to their position. Now the instances, when a doctor of technical sciences cannot take the simplest integral, are frequent—personal competence, which is the basis for scientific creativity, has ceased to be mandatory!

But this is not the most frightening thing. Departments for a long time have regarded their scientific institutes as a personnel buffer. If some offense has occurred with an administrator, or if it is necessary to react to the routine reduction of the central staff, or if retirement age has simply approached, take a look, but he is already at a subordinate scientific research institute. And the lack of skills of scientific labor do not embarrass him in the least, for former colleagues, the children of his own department, are the clients and evaluators.

The applied principles of planning led to the creation of a closed system with strict regulation which is indifferent to the appearance of new ideas. But the existing practice of planning forces departments to overstate artificially

the value of scientific jobs and to maintain due to this a large number of their own, "pocket" institutes. If one could see somewhere a client, who proposes to take from it a little larger fee! Someone may doubt such a paradoxical conclusion—are there really no objective value indicators or elementary control? There are no objective ones, while the ones that exist are easily overcome. The second invention also exists for that.

It envisages the development of a set of strict restrictions on scientific information, in conformity with which it is prohibited to publish openly everything that is of any public interest. In addition to the official degrees of secrecy every department developed its own classified regulations like "not for publication" or "do not take from the institution," while if they are not enough, the simple authoritative comment: "Do not give!" is in effect. Initial data, standards, methods of calculation, and, finally, obtained conclusions, if they threaten anyone's interests, are classified. Without special permission it is possible to use only the data, which are available in the open foreign press, and then provided they are sufficiently honest. There have become the most popular phrases of our publications: "abroad they believe..." "according to the views of American specialists..." and so forth.

But is such a system, perhaps, actually necessary for the protection of our scientific and production secrets? Then it is necessary to specify, from whom? Countries with a high level of technology, which we are so purposefully seeking, are hardly hunting for the contents of the safes of our scientific and designers. Hence, it is again from our own people. But in the name of what? The answer is simple: Publicity would reveal too obviously the superfluity and groundlessness of much research, while at the same time it would deflate hollow authorities.

Sectorial science, especially that science which is sealed by seven seals, has been corrupted by unique orders from the series "for the first time in the world" and is incapable of responding quickly to the tasks that are posed by daily practice. How much discussion there is about what the defense industry and its numerous priests of science can do for the national economy, but there are no visible confirmations, if only in the form of an ordinary household dosimeter (after three years!). Incidentally, they recently displayed an automatic machine for the cutting of pears into slice, which was manufactured on the basis of conversion—they found the main unit in a rusted food network. True, in five years they promise a more substantial contribution, but for this, it turns out, it is necessary to invest 30-40 billion rubles in conversion. Can you imagine what appetites the priests have?

Excessive secrecy, which often goes beyond common sense, is turning into large material and moral costs. But meanwhile tens of systems of the exchange of scientific information, many of which long ago developed beyond the national framework and are of an international

nature, are operating in the world. Instead of the intelligent organization of scientific affairs in our country long obsolete principles, in conformity with which every scientific institution is a closed self-supporting object, are in vogue. It is no wonder that the lack of glasnost and the restriction of the freedom of scientific debates led to the stagnation of a number of directions. This, however, does not affect the status of scientific personnel. They thrive, study yesterday, defend dissertations, and do not get anxious. Everything that has been studied will be reliably protected, while what has been protected will be placed under guard.

They are attempting to counteract the deepening isolation of scientific research with traditional means from the modest arsenal of the administrative command system. As a fresh example it is possible to cite the just adopted decision on the establishment of the Central Scientific Research Institute of the Economics and Conversion of Military Production. If a problem is of particular importance and should be solved by the free efforts of several sectors, a special state organ can be set up. But the State Committee for Science and Technology serves for the overall coordination of the basic scientific directions. However, its efforts are also, it seems, not enough, inasmuch as there is some talk about the necessity of establishing a Council for Science and Technology under the head of state, now, it follows, the President. As we see, the management pyramid is growing, and the administrative possibilities with respect to the coordination of research have approached their limit.

Another means of the same arsenal is the demand on the quickest changeover of sectorial science to cost accounting. Under present conditions it hardly justifies the hopes being placed in it: While the departmental monopoly of the truth exists, it is difficult to expect any objective economic evaluations which are the basis of any cost accounting. The observed practice of its introduction also shows this: now the entire matter reduces to establishing the labor intensiveness of the basic stages of scientific research and design operations and making by means of it monetary entries. Here the question of the necessity of the operations themselves and the quality of the scientific and technical solutions is left aside.

In recent times the problems of the development of science have become the topic of serious discussions. The All-Union Applied Science Conference, which was devoted to the problem of improving the management of scientific and technical progress, was held in February of this year. At it the "command style" in scientific and technical policy was discussed and the necessity of its replacement with democratic methods, in particular, with alternative approaches, contention, and competitive principles, was acknowledged. It was proposed to use as the basic levers of centralized supervision a flexible investment, tax, and credit policy, prices, and advanced forms of the remuneration of labor. The necessity of the closer integration of academic, VUZ [higher educational institution], and sectorial science was spoken about.

Such views, of course, are of a progressive nature, but are not of decisive importance directly for sectorial science. While strict administrative subordination exists and the financing of research institutions is carried out through departmental channels, the command style will flourish. The most fundamental steps and first of all the removal of scientific institutions from the tutelage of departments and in the future, with the completion of the dismantling of the administrative command system, the elimination of sectorial science altogether are needed here.

As confirmation of the advisability of such radicalism it is possible to cite the experience of leading countries. Government orders, even ones directly connected with the assurance of national security, are handled on a competitive basis with the participation of a large number of potential contractors.

Here is not the place to discuss the specific organizational forms of the restructuring of sectorial science, this is the subject of a separate discussion. Apparently, the most efficient means consists in the utmost support and expansion of the sphere of activity of interbranch scientific technical complexes (MNTK's) and the strengthening of their personnel, material, and pilot experimental base by means of sectorial scientific institutions. Such highly organized complexes, which are furnished with the latest equipment, could fill orders for various scientific and technical products. They would become kinds of scientific centers of regions, which closely cooperate with local institutions of science, centers of the scientific and technical creativity of youth, and cooperatives. Given such an organization of the matter in each sector it is sufficient to have a limited number of scientific subdivisions for the substantiation, placing, and tracking of the required orders.

The success of perestroika will depend in the final analysis on the extent to which we succeed in intensifying the commenced processes of the improvement of society. All the key units should be clearly specified in the administration command system, which for the present is still faceless. Sectorial science is also among them. It should come out into the light and be reoriented from global schemes to the development of our disordered life. Let glasnost reach at last the secret departmental depths and let the darkness perish!

#### Lagging Reform Effort in USSR AS Criticized

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Morning edition p 6

[Article by Doctor of Biological Sciences Professor V. Glezer: "Will Creators or Smart Operators Determine the Future of Our Science?"]

[Text] The Academy of Sciences has come, as they say, to the finish line—the election of new members of the fellowship. The fate of our science repeats the fate of the country: The mechanisms, which led to the crisis, are similar. These are centralization, bureaucratization, the

administrative command system, and the disregard of public opinion. Hence as an inevitable consequence there is the lack of feedback, an indispensable attribute of an optimally regulated complex system, and an inevitable negative result is the pushing of incompetent managers into the upper spheres.

It should be said that in the comparison of the state and science (as complex systems) the state proves to be in a more advantageous position. In a precrisis situation the forces, which are capable of conducting the necessary reforms, mature in it. For the collapse of the state is the collapse of all strata, including the most egoistic strata. Therefore, they also can no longer take comfort in the fact that "the deluge will be after us."

But science is dying in silence. Its collapse does not entail immediate destructive consequences. Here the ideology of "the deluge is after us" is practicable. Moreover, it is easy to create the illusion that it will not happen, that the crisis itself does not exist. Look how many discoveries are now being registered, how many prizes—state and academic—are being handed out. However, the incantations of past years that we have the most genuine science, now no longer convince anyone. It is obvious to everyone how low the productivity of scientific labor is and how poor the quality of our products is. The major achievements in individual fields are merely islands in the sea of trouble.

A set of reforms is necessary. What should they concern first of all? Undoubtedly, the system of the selection of personnel.

It is impossible to disregard the adverse effect of the decades, which we now recall with horror. And it is impossible to confidently assert that in the country they are not guided to this day by the Stalinist approach to science and its personnel. At that time it was believed that in any sphere of human activity there should not be and there are no irreplaceable people. Scientists are also merely similar screws of a large mechanism. Such an attitude made it possible not to value highly gifted creative individuals. Precisely this was also needed. For they represented the greatest danger for the totalitarian dictatorial regime.

The results were appalling. And it would be a delusion to believe that we have already been able to overcome the consequences of the scientific devastations. The way of thinking and the corresponding selection of personnel cannot be have an effect even in a far-off time. Yes, they stopped shooting scientists. They stopped appointing them. Selection was made by the bureaucratic apparatus, for which the authority of a scientist in his own field was not of importance. But from what criteria was the apparatus able to judge him? From biographical data? From participation in public life? From the ability not to go against generally accepted dogmas?

It is a disastrous position. The ability to create is the ability to doubt accepted truths and the ability to sacrifice everything for the sake of seeking the truth. Genius

and pragmatism are "two incompatible things." There are immoral scientists, but science can exist only in a highly moral environment.

As a result a significant stratum of people, whom it is possible to call scientists of the stagnation period and who are more smart operators than creators, emerged.

Such people have academic titles and skillfully strive for academic and state prizes and membership in academies. But given their consumerist attitude toward science they are corrupting the young scientists who are subordinate to them, demonstrating by personal example: know how to adapt to circumstances. Mediocrity gives rise to mediocrity. And this is the most terrifying thing: the ousting of people of science by some quasicientists. This is the first and main cause of stagnation in science.

I by no means want to say that today's academy consists entirely of smart operators. Their share in each field is limited by the possibility of the practical verification of the contributions to science. Such a thing is possible in the case of nuclear physics or space, but not in the case of history or biology. Here during the stagnation years the ratio of creators and smart operators steadily moved in the worst direction.

The role of the administrative command system—a self-sufficing and system-organizing role—first of all affected and is now affecting the selection of personnel. The bureaucratic apparatus now also has the deciding vote. Here personal or clan group interests of the leadership often have the result that weak directions receive recognition. Nepotism, the pulling of relatives and acquaintances into academic posts has assumed an impermissible scale.

Another item, which is preventing us from getting out of the crisis, is the very organization of science.

In the West the laboratory exists as an administrative unit, but in fact it is a conglomerate of scientists who deserve recognition. They specify themselves their own direction. A group of young people, for the most part from other countries, forms around each of them. This group is also called a laboratory—the laboratory of Doctor X or Y, a person whose name has authority in the eyes of the scientific fellowship. This is an informal administrative unit.

By contrast with such a flexible system in our country the institute consists of a group of strictly fixed departments and laboratories, which should encompass the sections of a given science.

It has become common knowledge that the way out of the difficult situation, in which our society is, is through decentralization. Unfortunately, the academy does not have such a trend. Here, as before, the presidium is the absolute master, while at academic institutes the directors are. The scientific council has merely a deliberative voice. If the council is not entirely obedient, the director

has the power to shake it up—to replace the staff. And this corrupts the best, most honest executives. For a prominent scientist is also subjective—he has preferences for specific directions, and he is deaf to the interests of directions that are far from his own interests.

The concentration of power in one's hands leads to a monopoly, which inevitably develops into dogmatism, while dogmatism always fights against heresies. Consequently, also against what basic science should do. It goes against copybook maxims.

The system of financing for goal programs also works in favor of the development of the most harmful centralization.

Programs cannot be the sole form of the organization of science. They are good for applied scientific tasks, for the development of new technologies, and for the thorough elaboration of the results of basic science, when a discovery has already been made and it is necessary to extract from it all the scientific and applied aspects. But programs are absolutely meaningless for the development of basic science. Discoveries in principle cannot be programmed. That is why they are discoveries.

The formal introduction of programs, which is now beginning, is very dangerous. It is assumed that in every field there will be a few (a very small number) programs, officially recognized leaders will be in charge of them. But precisely among them there are a very significant number of people, who were appointed leaders during the stagnation period. Even if a real scientist were to be in charge of a program, in this case not only the threat, but also the real possibility of monopolism would arise without fail. The supervisors of programs are in charge of assets, funds, and positions.

Thus, programs will lead to even greater inflexibility, to the increase of monopoly and development according to plan—the scourges of our science.

It is necessary to democratize the system of the academy. In conformity with the charter the associates of academic institutes are not members of the academy. This is an unquestionable anachronism. If one develops the comparison of the organization of our society with the academy, one should identify the academy in its charter designation with the nomenclature of the party and soviet apparatus. The academy is also reinforced first of all by the organizational nomenclature—directors of institutes, rectors of universities, as well as departmental bureaucrats.

The need has arisen to include scientific associates in the academy and to give the latter rights.

This step has become imminent not only owing to the democratic trends in society, but also owing to the necessity of the development of science itself. The advantages, which the oligarchic organization of science gives (rather, can give in the ideal), have been lost. Only democratization can change the situation for the better,

having made it possible to formulate points of view and approaches to the solution of scientific problems, which are alternative to the official leaders. Recent events have shown this: during the election of people's deputies from the academy the scientific community clearly and impartially revealed the sores of the academic structure.

It is possible to assert that the middle-level personnel of the scientific community are more interested in perestroika than its leaders. Therefore, it is necessary to include in the solution of the main problems not only members of the academy, but also representatives of scientific institutions (academic and nonacademic), selecting the leaders publicly and placing trust in them.

Democratization should take place not only at the level of the academy, but also at the level of institutes. Apparently, here it should be accomplished by the electivity of the scientific councils of institutes and the significant broadening of their rights.

Hopes are now being placed in the councils of labor collectives at academic institutes. It is possible that the merging of the scientific councils and the councils of labor collectives would be the most effective means of democratization. People, who have been elected in accordance with a specific quota from each of the subdivisions, should be represented in the latter.

To get the opinion of the scientific community out of a latent state and to make it an effective force to counterbalance the monopolism of the nomenclature is a task of the first order of priority.

In the departments of the academy each discipline, as a rule, is represented by one specialist. Therefore, the department can give a conclusion by relying on the opinion of only this representative of its, and this once again creates the conditions for the unification of scientific opinion. The opinion of the specialist in a department, who is "accountable" for his discipline, is the truth in the last resort.

Independent expert councils for a specialty should actively work to counteract such a formed situation.

The expert councils should be elected in a democratic manner, on the basis of the public opinion of all scientist. Precisely then people, who have adequate scientific and moral qualities, will come to be on them.

Sociologists could develop methods of the selection of such councils, for example, in accordance with a system like rating on the basis of evaluations, which are given by doctors and candidate of scientists and recognized specialists, who work in the given specialty.

Owing to the junction of disciplines, which is typical of modern science, the areas of the functioning of councils will overlap significantly. It is not necessary to fear this. Given some duplication of councils and in case of their disagreements compromise decisions can be made by arbitration commissions.

Here it would be possible to draw an analogy with the role of the commissions which issue grants abroad. Now attempts at introducing a system of financing through grants are also being made in our country. It is natural that precisely those, in whose hands real power is, are seizing them. But if distribution is turned over to expert councils, the competition of ideas, not the competition of hierarchies, becomes possible. The councils should give, thus, recommendations for the determination of promising directions, laboratories, and groups, which are working at the level of world standards. The experts could help the informal leaders. This would make it possible to take the next step in the direction of the establishment of a flexible structure of scientific collectives.

The functions of expert councils can be quite diverse. One of them is the acceptance of defenses in their specialty. Now the specialized scientific councils are such only in name. In the scientific council one or two specialists can evaluate the work of the dissertation writer, the others are forced to trust the opponents. However, throughout the country it is possible to select people, who are actually capable of evaluating a dissertation or work in every specialty.

The deprivation of members of the academy of supplementary monetary payments is very important for the increase of its real prestige and its purging (if only in the future). For such is the custom at nearly all academies of the world (an exception is the Spanish academy, apparently, as a legacy of the totalitarian regime of Franco). It is necessary to pay (as is done throughout the world) for the work actually being performed, for the achieved results, and not for rank. Full members and corresponding members belong to the "category of super well-to-do" people of our society, which comes to 0.25 percent of the population. The rates are too high to entertain the illusions that under the conditions of a corrupted society the most worthy people will always be elected.

The proposed steps are not designed for an instantaneous impact. The purging and revival of our academy are a lengthy process.

The solution, which is proposed here, is very likely not the best one. But under our conditions one does not have to choose between the oligarchy of prominent scientists and the democratic opinion of the scientific community, inasmuch as the monopoly of the actual supervisor of the given field of science actually exists.

The author clearly realizes that under the conditions of our intimidated and corrupted society the restructuring of science is a long and agonizing process. The revival of our science is first of all the revival of morality. This thesis might seem speculative and idealistic, if the possibility of implementing it, having lent real strength to the opinion of the scientific community, did not exist.

The prerequisites for the process of reviving morality have been created by perestroika. Will the scientific community be able to take advantage of them?

**Formation of Markets for S&T Production**

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[Article by Doctor of Economic Sciences Professor Nikolay Ivanovich Komkov, head of a laboratory of the Institute of Economics and Forecasting of Scientific and Technical Progress of the USSR Academy of Sciences, and Anatoliy Vasilyevich Todosiychuk, graduate student of the Central Institute of the Increase of the Skills of Management Personnel and Specialists of the National Economy in the Area of Patent Work of the State Committee for Inventions and Discoveries attached to the USSR State Committee for Science and Technology: "The Formation of a Market of the Scientific and Technical Product"; passages in italics as published]

[Text] The transition from the directive vertical management of scientific and technical activity, which is characteristic of the administrative command system, to the combination of vertical management, which is based on economic methods, with steps of centralized influence on this activity presumes the formation of new economic relations in the chain "developer—producer—consumer of innovations." Such relations are realized by means of the socialist market of the scientific and technical product, which, being a commodity, has both a value and a use value.

Of course, it is impossible to talk about the formation of a market of the scientific and technical product in isolation from the establishment of a market of material resources, a labor market, and a financial market. All the indicated markets are fundamentally interconnected, the formation and functioning of each of them are achieved by means of interaction with the others: Changes and the lack of equilibrium on one of the markets are transferred through the "chain" to the others.

At the All-Union Applied Science Conference on Problems of Radical Economic Reform the establishment of a market of financial resources was named as one of the conditions of the formation of market relations. On the strategic level it signifies the replacement of the administrative apportionment mechanisms of management with flexible methods of supply and demand.<sup>1</sup> Such replacement is especially important in the management of scientific and technical progress, where the inflexibility and inertia of administrative command methods became long ago an obstacle to development.

The contempt for market relations both in theory and in practice, which existed almost throughout the economic development of our country, could not but adversely affect the development of science and its interrelations with physical production and the scientific and technical level of the latter and lead to its lag behind developed countries.

Along with the general laws, which are characteristic of any market, the market of the scientific and technical product and its formation have peculiarities, which are

governed by the properties of this product. The scientific and technical product is called upon to meet social needs by being involved in the formation of the use value of new products for production and consumption purposes, as well as acts as a means of the extension and broadening of knowledge and the acquisition of new knowledge. Being a commodity, it transfers its value to the commodities being produced. It is possible to group with the significant peculiarities of the scientific and technical product, which influence the formation of market processes, the instability of the demand for it, a more dynamic competitive ability and sensitivity to scientific and technical progress, a specific price formation, dependence on the innovation potential of the consumer, and the existence of different degrees of completeness. The determination of its use value is also one of the essential peculiarities of the scientific and technical product. In the end the latter is materialized in the increase of the overall economic, scientific, and technical potential of the country. In our opinion, the basic evaluation characteristics of the scientific and technical product should be: 1) the amount of the value of a unit of the main (complex) technical parameter of the idea; 2) the share of the use value of the scientific and technical product in the creation of the final use value; 3) the contribution to the broadening and extension of the object of knowledge, the acquisition of new knowledge. A characteristic feature of any scientific and technical product is its stage-by-stage development over the life cycle. The continuous improvement of the consumer properties of the scientific and technical product owing to the appearance of new knowledge and needs, as well as to the effect of the law of value, which reflects the dynamics of the socially necessary expenditures on the production of material wealth, occurs within each stage.

The start of the formation of the market of the scientific and technical production is connected with the start of the process of transforming science into an immediate productive force. Based on the existing economic and social results of scientific and technical progress, by the stage of the development of the market of the scientific and technical progress there is meant the period between two major qualitative changes in the development of science and technology, which are due to the dynamics of social needs, the broadening and extension of the object of knowledge, and the effect of the law of value.

There were typical of the mechanism of the exchange of the scientific and technical product, which had formed in our country: an extremely high degree of centralization of planning; the directive establishment of bilateral relations between the consumer and the producer of this product, which either completely eliminate the effect of the law of value or lead to its deformation; a high level of the monopolization of scientific and technical activity; endogenously fixed prices; the guarantee of sale, which affords the possibility of selling an obsolete product. All this could not but lead to the slowing of the processes of disseminating the achievements of science and technology in production.

There is required for the formation of the market of the scientific and technical product, first, the development of its information support by the publication of advertising bulletins and classifiers, statewide and departmental catalogs and directories, individual information reports, and the establishment of a network of data banks on various types of this product. Second, a scientific economic analysis of the bilateral and multilateral relations in the chain "developer—producer—consumer of innovations" and the study of the conditions of their stability are necessary. Third, methods of the economic regulation of market relations with respect to the development and dissemination of the scientific and technical product at the statewide and departmental level, as well as at the level of enterprises and economic associations should be developed.

A developed commodity market stimulates scientific and technical development, creating the conditions for the supplanting and updating of an obsolete product and thus determining its economically advisable life cycle. The rate of the dissemination of innovations and the pace of their replacement with new, more advanced ones determine the pace of scientific and technical development. Two most important factors, in our opinion, have an influence on the latter: state policy in the area of scientific and technical progress and the degree of saturation of the market.

It is well known that a commodity appears on the market in accordance with the "social order" of consumers. In case of developed market relations a new product gradually "wins" a market. With the increase of the production volumes the saturation of the market, then the gradual decline of the sales volume occur. The mechanism of market pressure on producers is such that at the stage of the saturation of the market new products come into competition with traditional products, as a result the process of the obsolescence of the latter begins. And although the sales volume of an obsolete product continues to increase, the amount of profit begins to decrease. The necessity of maintaining strong positions on the market forces the producer to switch to the development and assimilation of new types of products.

Thus, given the existence of competition on the commodity market the economic mechanism of the formation of the life cycle of a commodity on the basis of the determination of the critical value of the ratio between the sales volume and the amount of profit, which is connected with the gradual saturation of the market with a new product, which is succeeding a obsolete one, operates. The ceaseless development of a new product and its placement on the market are the main requirement, the fulfillment of which makes it possible to maintain and expand sales.

Even under the conditions of a developed market with a high intensity of competition scientific and technical development, which leads to the dissemination of innovations and to their subsequent replacement, does not occur automatically, in conformity merely with the

potentials of producers and consumers. It should be managed and stimulated by the state. The processes of the dissemination of innovations and their replacement should be managed on the basis of the goals and socio-economic interests of the national economy and be specified by state policy in the area of scientific and technical progress. State science and technology policy under the conditions of an unsaturated and even a deficit market, in which the influence of the consumer on the producer is negligible or is lacking altogether, and the dictation of the latter is unconditional, plays all the more an important role.

Inasmuch as the introduction of advanced achievements of science and technology in production is accompanied by increased costs during the period of assimilation of an innovation, which have a substantial influence on the profitability of production, the state first of all should devise a mechanism of the economic stimulation of scientific and technical development by compensating enterprises for the additional expenditures. At the same time sets of economic sanctions, which make it possible to confiscate groundlessly high profits from the sale of an obsolete product, the production of which was set up long ago and well, should exist.

Unfortunately, the system of the state stimulation of scientific and technical progress (by the allocation of assets of the state budget, sectorial funds of the development of science and technology, the system of wholesale price markups and discounts), which is in operation in the country at present, owing to its inflexibility and inertia and the impossibility of taking into account the interests of all the participants in innovation activity is not capable of solving the entire range of problems, which are dictated by the dynamics of the development of the world market of science-intensive products.

The procedure of stimulating the development and assimilation of new types of equipment by means of assets of the Unified Fund for the Development of Science and Technology (YeFRNT) was repeatedly criticized by our economists, who complained, in particular, of the fact that the assets of the Unified Fund for the Development of Science and Technology are insufficient for the reimbursement of all expenditures; as a result a significant portion of them were written off by enterprises to the production cost, by which the conditions for the fulfillment of the plan on the profit became complicated.<sup>2</sup> One of the causes of the inadequate economic interest of enterprises in the assimilation of the production of a new product lies in this.

At the same time, according to estimates, as a whole for industry not more than 50 percent of the corresponding expenditures were covered from the Unified Fund for the Development of Science and Technology. Here about one-fifth of the amount of the Unified Fund for the Development of Science and Technology was not used annually due to the fact that the plans on new equipment



failed to be fulfilled by some enterprises, while the applications of others for financing from this fund were not answered.<sup>3</sup>

As of 1986 a new procedure of establishing incentive price markups was specified for the stimulation of the production of high-quality equipment. Thus, the maximum amount of the markup (30 percent of the wholesale price) is approved for new generations of machines, equipment, and instruments, which surpass previous analogous products in performance and reliability by 1.5- to 2-fold. But this is analogous to the inclusion of the increased costs of the production of innovations in the production cost and to the shifting of the burden of assimilation onto the consumer, who, in turn, on the basis of the principle of profitability raises the price.

In essence, thus far the state remains a passive subject of innovation activity that is organized in this way. The pace of scientific and technical progress is determined by the directive orders of superior organs, by the innovation potential of producers and consumers, as well as by the purchasing power of the latter.

The classical definition of economic equilibrium specifies the agreement of the economic interests of all parts of the economic system in the process of the production, use, and consumption of a product. Since in principle equilibrium prices, which to an equal degree would interest the producer in the output of an innovation and the consumer in its use, cannot exist, the state by means of economic stimulation should regulate the processes both in the sphere of production and in the sphere of exchange. The assets, which have been obtained by means of deductions from the profit of enterprises, which is formed in case of the use of the results of past innovations, should be the source of such stimulation.

The economic meaning of the reimbursement by the state of the increased costs in the process of assimilating innovations consists in participation in innovation activity with the rights of partnership with the producer and the consumer and in the receipt of dividends from the invested assets.

The discrepancy between the amounts of expenditures on innovations and their profitability is the basis for the conflicts of the economic interests of the participants in innovation activity. The state should create economic prerequisites, which are capable of ensuring the continuity of the process of developing new equipment (from the conception of the idea to the industrial production of items). This task cannot be accomplished without the introduction and strengthening of cost accounting relations in the area of scientific research and scientific and technical development. The changeover from budget financing to cost accounting at scientific research and design and technological organizations is making it possible to strengthen the goal orientation toward the development of new equipment, which is competitive on the world market, and the more complete meeting of the needs for new items.

The imperfection of the mechanism of the formation of the wage fund remains one of the obstacles to the introduction of innovations in production. And under the new conditions of management the close functional (linear) dependence between the amount of the wage fund and the gross output remains. The decrease of the planned volume of produced output in physical terms at the stage of the introduction of innovations in production causes, first, the decrease of the wage fund and, second, the increase of prices. Both of these consequences have a common basis: at the initial stage of the production of new items, because of the lack of development of the technology and the inadequate level of the skills of workers, the total labor intensiveness of the manufacture of a product increases. In order to offset the losses, which arise as a result of the decrease of the output volume in physical terms, innovator-enterprises for the strengthening of their financial condition increase the "gross" in value terms by raising prices. The established trend of "incorporating" in the price of a new product already at the stage of experimental design work a manifold "reserve" with respect to the labor intensiveness is another obstacle on the path to technical progress. This enables enterprises to carry out the annual planned "reduction" of the labor intensiveness quietly, without any technological changes. As a result producers frequently slip their hand illegally into the "pocket" of consumers.

In general the setting of standards of labor for complex scientific and technical innovations is one of the most complicated and unsolved problems that directly influence the assimilation and dissemination of new commodities. This problem is becoming even more urgent under the conditions of the deficit and the strictly set bilateral and multilateral relations of consumers and producers.

It seems that under the conditions of our unsaturated and monopoly market the norms of labor expenditures on the manufacture of a new product should be specified exclusively for the recording to the real production costs for the purpose of making a decision on the advisability of the production of an innovation, as well as serve as the basis for internal settlements. Then the enterprises, which introduce new products on the market, will be forced to "adapt" the prices of their products to the market prices and not to increase the "gross" in value terms. The objections against the centralized establishment and regulation of market prices as an activity, which is at variance with the policy of increasing the economic independence of enterprises, do not have sufficient grounds. Under the conditions of a monopoly and unsaturated market, where the price is not a function of time, the elasticity of the output of a product, and the growth of the market (that is, the tendency for it to decrease subject to the effect of the above-indicated factors is absent), it loses the function of the control of the socially necessary labor expenditures and turns into a tool of the recording of the labor expenditures of a specific producer.



Let us also note the influence on the process of the "passage" of innovations of the existing procedure of forming the wage fund, which leads to an excess of the amount of the actual wage over the planned age. The constancy of the standardized fund-forming coefficient, which is approved by the superior organ for the enterprise and takes into account the level of the wage per unit of product in physical terms or per ruble of the output volume, is the cause of such a situation.

During the period of the assimilation of an innovation primarily the piece-rate form of the remuneration of labor is used. This leads to a deviation from the fund-forming coefficient, which was established during the preceding year and in accordance with which the planned wage fund for the following year is calculated. Inasmuch as the amount of the piece-rate wage is determined by the amount of actually spent living labor with allowance made for the technological percentage of the yield of acceptable items, at the end of the period under review when summarizing the balance of monetary outlays the overspending of the wage fund comes to light. According to the prevailing statute it is offset from the material incentive fund, which is an important source of stimulation of engineering and technical personnel. As a result the conflict of the economic interests of workers and engineering and technical personnel appears.

The imperfection of the organization of the scientific potential had an inhibiting effect on scientific and technical development. Its increase occurred mainly by the establishment of new scientific research organizations and the increase of the staff of scientific subdivisions. The established organizational structures often proved to be unsuitable for the solution of the new scientific and technical problems, to which the needs of production and the very logic of scientific and technical progress give rise, and predetermined the elaboration of problems, for the solution of which they were best tailored. As a result, instead of revolutionary "breakthroughs" in fundamentally new directions scientific and technical activity took the path of evolutionary transformations and the improvement of what had already been developed.

The interrelations of science and production cannot get by without state economic organizational regulation. First of all the areas and directions of scientific and technical development, in which direct contractual relations on an economic basis between scientific organizations and enterprises are preferable, should be its objects. The state should give support to diverse economic organizational forms of the interaction of science and production (scientific and technical and intermediary cooperatives, temporary scientific and technical collectives, centers for the dissemination of innovations, scientific technical complexes, and others), especially at the stages of the mass dissemination of innovations. Along with the creation of conditions, which are conducive to the formation of flexible organizational structures, a mechanism of the elimination or self-elimination of obsolete structures should be developed.

For the combating of the monopolism of individual scientific and technical organizations it is necessary within the framework of state regulation to use a *system of flexible taxation*. If, say, the share of some scientific and technical product, which is developed by one organization, exceeds 30 percent of the entire domestic (all-union) market, the deductions from the profit for such an organization should increase sharply. At the same time it is necessary to stimulate the development of a similar product by other scientific and technical organizations and small organizational forms.

The system of flexible taxation, in our opinion, is one of the most important economic methods of the indirect influence of the state on scientific and technical progress, since it makes it possible to react sensitively to a change of expenditures in the process of assimilating an innovation and to fluctuations of market demand. Such a system assumes that the saving from the use of a special variable tax credit is left with the enterprise. As a result, the production of innovations proves to be profitable even at the early stages. With allowance made for the standardized time of assimilation and the discounted coefficient of profitability special tables, in which the amount of the tax credit is specified in conformity with the actual level of the profitability of an innovation at the end of the fiscal year, should be developed for similar products.

Thus, the changeover from the system of standard tax withholdings, in case of which the financial status of enterprises subject to their innovation behavior is not taken into account, to *personal taxation* is necessary. But such a changeover gives rise to a number of problems.

First of all the "sensitivity" of taxes at different stages of the life cycle of a commodity on the market should be determined. In our opinion, at any moment of the life cycle of a commodity it can be changed through the ratio of the level of the change of the profit to the level of the change of expenditures per unit of product. During the period of the assimilation of an innovation, which involves increased production costs, a credit on the basic tax is established. The leaving to the innovator-enterprise of a portion of the assets (in the form of tax accumulations) stimulates the development and assimilation of a new product. The progression of the income tax changes from zero, when the innovation is unprofitable (the price of market equilibrium is lower than the expenditures on its production), to the amount of the base tax rate, when the innovation has been assimilated and its production and consumption are stable. The sensitivity of taxes should change with allowance made for the trend of the changes of the use value of commodities, which are reflected in the price. The use of "personal" taxes will make it possible to stimulate the innovation activity of producers, while avoiding an increase of prices.

Under the conditions of our unsaturated market the system of flexible taxation should be sensitive to the elasticity of consumption on the world market. Standard

taxation in case of an unsaturated market strengthens the stability of the annual revenue, which is derived from previously assimilated commodities, in spite of the fact that on the world market they have become obsolete. Therefore, the amount of the taxes on the profit from obsolete commodities should increase sharply as alternative products appear on not only the domestic, but also the international market. An increasing flexible tax on the profit from the production of an obsolete product contributes to the decrease of the price of equilibrium as the market is saturated through the reduction of the profit rate to such amounts, when the production of the commodity becomes economically inadvisable.

The cyclical nature of the effect of the system of flexible taxation will promote the process of the continuous updating of products on the market, without aggravating the conflicts in the system of economic interests "producer—consumer." This system is especially necessary for science-intensive products with increased expenditures on research and development and with the faster (as compared with traditional types of equipment) interchangeability of models.

Let us also note that the system of flexible taxation, in making it possible to offset the increased expenses of producers at the stage of the introduction of an innovation on the market (the difference between the individual and socially necessary expenditures of labor), performs the role of an effective anti-inflation means which ensures equilibrium between the commodity market and the financial market.

#### Footnotes

1. See N. Slyunkov, "The Strategy and Tactics of Economic Reform," PRAVDA, 15 November 1989, p 3.

2. See V.Ye. Astafyev, L.Ya. Povolotskiy, V.P. Khaykin, "Ekonomicheskiye stimuly NTP v novykh usloviyakh khozyaystvovaniya" [Economic Stimuli of Scientific and Technical Progress Under the New Conditions of Management], Moscow, 1988.

3. See V.G. Lebedev, editor, "Upravleniye nauchno-tekhnicheskim progressom" [The Management of Scientific and Technical Progress], Moscow, 1984.

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#### III-Effects of Self-Financing on S&T Progress

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in Russian No 5, May 90 pp 56-60

[Article by Candidate of Economic Sciences Teymuraz Aruilovich Beridze, lead scientific associate of the Institute of Economics of the Georgian SSR Academy of Sciences: "Scientific and Technical Progress and Cost Accounting"<sup>1</sup>; passages in italics as published]

[Text] The foreseeing (forecast) of the consequences of some innovations or others is an extremely complicated

problem of the development of any economy. It is a paradox, but in our, until recently supercentralized economic mechanism a very important unit was missing: In the decision-making system there was no integral evaluation of their possible consequences. Unfortunately, the situation on this level in practice has also not changed since the start of the radical economic reform. Moreover, many negative consequences of the made decisions became a result of the fact that during their preparation the real economic situation and the enormous inertia of the established forms of the organization of economic life were not taken into account.<sup>2</sup>

One of the negative consequences of this sort was the fact that, in the words of Academician L.I. Abalkin, technical progress came to a standstill.<sup>3</sup> The possibilities for the comprehensive intensification and qualitative increase of the efficiency of social production are directly connected with the present scientific and technical revolution. With the changeover of enterprises to the new conditions of management the question of the place of scientific and technical progress in the cost accounting activity of enterprises is becoming urgent. In examining this question, A. Yeregin, in particular, correctly notes that the opportunities of individual enterprises to introduce the latest achievements of scientific and technical progress are limited.<sup>4</sup> Moreover, the cost accounting interests of enterprises often come into conflict with the interests of scientific and technical development. At the same time it is hardly legitimate under the conditions of the independence of enterprises to take beyond the sphere of cost accounting management such a major block as innovation activity, subordinating it mainly to centralized management "from above." And although there are no serious grounds to hope that the interests of society and the enterprise in questions of scientific and technical progress will always coincide, the logic of the radical economic reform, in my opinion, will not allow the unambiguous conclusion that innovation activity under the conditions of the extension of commodity-money relations is not included at all in the group of interests of enterprises.

In order to answer the question, in what economic sphere innovation activity can (or, on the contrary, cannot) be included in the sphere of interests of the enterprise, first of all the content of scientific and technical progress at the enterprise and the conditions of the activation of the innovator should be specified. The *permanent updating of the technological base of equipment* is this content. Only after accomplishing the new technical overhaul of the national economy is it possible to count on stable economic growth and the steady surmounting of the chronic shortage of goods for production and consumption purposes and services.

In analyzing the experience of developed capitalist countries, it is necessary to note that the emphasis in the structural reform of the economy, which is being carried out by them on a broad scale, was placed on resource conservation and the use of the latest equipment and technology. The sharp acceleration of the updating of the

active portion of technological equipment was the consequence of such a policy. While not being worn out, it was obsolete, inasmuch as it did not conform to advanced technologies.

The lack of receptivity of the national economy to innovations was the main obstacle to scientific and technical progress in our country. Even the foreign currency assets from the export of petroleum and other raw material resources were used not for the modernization of the production apparatus, but for current purposes.<sup>5</sup> At the beginning of 1989 of the 880 licenses purchased abroad production was not begun with respect to 205, of them the deadline of assimilation had passed for 20.<sup>6</sup>

Given a standard period of the updating of equipment, which is equal to 10-11 years, the actual time of its use comes on the average to 20 years. At the end of 1988 the proportion of equipment 20 years old and older came to 11.1 percent.<sup>7</sup> The operation of worn out and obsolete equipment is ruinous for the country.

In order to determine the factors that are checking the assimilation of the achievements of the present scientific and technical revolution, one should first of all identify its motive forces, determine the content of the interest, which "pushes" one to innovations, and "build" a mechanism of the resolution of the contradictions of the scientific and technical revolution into the new economic mechanism. In connection with this a number of questions arise: What is the internal logic of the management of scientific and technical progress under the conditions of socialism? Is this management possible in the localized framework of enterprises? Who is the agent of scientific and technical progress, the innovator?

The problem of management in general and the management of scientific and technical progress in particular in reality is merely a different statement of the question of the relationship of centralism and independence in socialist management. The boundaries of centralism and the independence of economic units in the carrying out of production (and, accordingly, innovation) activity are objective, and their movement is governed by the development of production relations and by the level of the actual socialization of production. There is a certain block of questions, which can be settled mainly in a centralized manner (such as, for example, the specification of the general strategy of development, the observance of the proportions, structure, and balance in the national economy). The pursuit of a unified scientific and technical policy is also among them.<sup>8</sup> This, however, does not imply that the enterprise should not be concerned with scientific and technical progress and should not be interested in innovations. If scientific and technical progress is impeded at an enterprise, it is necessary, apparently, to seek the reasons in the economic environment, in which the labor collective has to function.

The contradictoriness of the cost accounting method of management is well known. It finds expression, in particular, in the different interpretations of its content.

The purely market version of cost account is equivalent to the complete rejection of the centralized management of scientific and technical progress. Under the conditions of the chronic shortage this means that economic competition among producers develops not in the sphere of scientific and technical progress, but mainly in the area of pricing. The dictation of large monopoly producers of goods over their consumers, which inevitably arises on this basis, turns into a mere formality the "sovereignty of the consumer" and his possibility to influence the producer. The replacement of departmental monopolism with purely market monopolism occurs.

In general the shift of the center of gravity in the solution of the strategic problems of scientific and technical progress, intensification, and efficiency to the level of the enterprise is incompatible with the implementation of a unified technical policy on an economywide scale.<sup>9</sup> The balance of production and needs due not so much to the improvement of the reproduction structure of the national economy as to the flexibility of price parameters may become the consequence of such a shift.<sup>10</sup> Here losses and squandering of resources, which are connected with the constant fluctuations of supply and demand and with the establishment of proportionality merely "in retrospect," through disproportionality, are inevitable. Even if it is assumed that the counteraction of the trend toward the "draining" of resources and their squandering will exist, a new type of losses will appear. These are the artificial "holding back" of a scarce product for the purpose of establishing and maintaining a high price and stagnant disproportions, which find expression, for example, in the underutilization of production capacities, the hypertrophied production of luxury items in case of the actual shortage of some items or others of mass consumption, and the "cutting off" by rising prices of a portion of the essential needs of a significant stratum of the population.

The versions of the restructuring of the mechanism of the management of scientific and technical progress on a purely market basis, in my opinion, are also unpromising on the level of the steady maintenance of a higher pace of scientific and technical progress and the intensification of production as compared with developed capitalist countries. This is also understandable, inasmuch as the market mechanisms that function in the West, which have been mechanically transferred to our "soil," come up against the restrictions that are imposed by public property: the support of the principle of full employment, the intolerance of unlimited personal enrichment and bankruptcies, that is, the "withdrawal from the game" of the stimuli that have the strongest effect under the conditions of private property.

The peculiarity of current cost accounting as a method of management is such that the area of its application

extends first of all to the accomplishment of current tasks, not strategic tasks. The assimilation of scientific and technical achievements, like the need for the constant updating of the output being produced, is along the lines of the long-term, long-range interests and goals of the enterprise. The reorientation of cost accounting toward them is one of the most complicated problems of the improvement of the economic mechanism.

Innovation processes realize namely the long-range interests of both the enterprise and the national economy as a whole and serve as an indispensable condition of long-term economic growth. For enterprises innovation activity is a guarantee of the increase (with the achievement of the rated indicators) of the volumes of the sale of products and the derived profit. However, the growth of the profit becomes stable, as a rule, four to five years after the start of the assimilation of innovations. Additional financial, labor, material, and other expenditures precede this. Thus, past expenditures are a condition of future achievements.<sup>11</sup> The gap in time between the expenditures on the assimilation of new equipment and the results from its use gives rise to conflict between the current and long-range economic interests of the enterprise, which becomes even more acute with the change-over to full cost accounting and self-financing. With the decrease of "free" state capital investments the assimilation of new equipment becomes a clearly perceptible burden for the economy of enterprises. It is also possible to group with the adverse consequences of the change-over to cost accounting the fact that, based on considerations of current advantage, enterprises often agree to a reduction of staff mainly at the expense of engineering personnel. Such a nearsighted policy is fraught with a technological lag in the future.

Genuine cost accounting ensures the efficiency of the current results of management and the saving of expenditures on the production of products. However, even while being a socialist method of the management of enterprises, in itself it does not ensure (and cannot achieve this) the active economic influence of society on the development of the structure of needs and on the movement of the property differentiation of society and the social structure of production. In itself it also cannot ensure the concentration of resources for an effective innovation policy. For this the *regulating role of the state is needed*. I foresee a question: Does such an approach signify "nostalgia" for administrative bureaucratic management? In my opinion, modern society cannot manage without a bureaucratic apparatus, provided one understands by it a highly skilled and competent stratum of necessary specialists. Therefore, it should be a question not of the elimination of management structures, but of the democratization of economic life, departure from technocratic principles and constructs, and the assurance of *economic democracy* as a universal principle of management. People need a vision of the future, which has a powerful motivating force and invariably goes beyond the framework of localized units of management.<sup>12</sup> This

also implies the necessity of an integral and future-oriented idea of the organization of society, authoritative powers, and political relations, which affect, even though indirectly, the status of a person at his workplace, his fate, and his attitude toward work and the affairs of his enterprise (organization).<sup>13</sup>

In conclusion I will voice my own opinion concerning the fact that under present conditions given the high level of concentration of production and the decisive influence of scientific and technical progress on economic development the reliance on purely market regulators is at least nearsighted. It blocks the effective accomplishment of the tasks of structural policy, does not ensure the maintenance of a balance in the national economy, and leads to the increase of the differentiation of sectors and regions and to social conflicts. It is necessary that the state and enterprises would act as equal partners who are equally interested in the solution of the problems of the development of scientific and technical progress. Therefore, innovation activity should not be confined to the enterprise and should not be limited by its opportunities to finance independently the development and introduction of innovations.

The primary function of national economic planning and the management of scientific and technical progress is the substantiation and conducting of basic and applied research, as well as development in the priority directions of scientific and technical progress, which should be financed by means of centralized sources.

#### Footnotes

1. For purposes of the discussion which was announced in No 5, 1989.
2. See N.I. Ryzhkov, "A New Legislative Basis for the Strategy of the Intensification of Economic Reform," PRAVDA, 3 October 1989, p 2.
3. See IZVESTIYA, 22 September 1989.
4. See A. Yeremin, "Cost Accounting and Technical Progress: The Problems Are Becoming More Acute," EKONOMICHESKIYE NAUKI, No 11, 1989, p 25.
5. See "Materialy Plenuma Tsentralnogo Komiteta KPSS 25-26 iyulya 1987 goda" [Materials of the CPSU Central Committee Plenum of 25-26 July 1987], Moscow, 1987, p 40.
6. See IZVESTIYA, 9 October 1989.
7. Ibid.
8. These questions are also settled in a centralized manner in the West. Well-known American economist W. Leontief, for example, believes that the state should deal with scientific and technical progress (see KOMMUNIST, No 12, 1987, pp 125-126). In the capitalist countries attempts at the state regulation of even structural changes are being made. "The references to the fact that the speeding up of structural changes in the Soviet economy is impossible due to the lack of a capital market

and the corresponding automatic regulators, are unsupported. The capitalist countries are actively using state regulation precisely in this area" (S.S. Shatalin, Ye.T. Gaydar, "Ekonomicheskaya reforma: prichiny, napravleniya, problemy" [Economic Reform: The Reasons, Directions, Problems], Moscow, 1989, p 15).

9. The experience of Yugoslavia, in my opinion, convincingly showed that the hypertrophy of the functions of local units in the investment (and innovation) sphere can undermine the centralized management of the economy and paralyze the possibilities of pursuing an effective structural policy.

10. Academician S.S. Shatalin characterized such actions of enterprises and cooperatives as "cave egoism" (see LITERATURNAYA GAZETA, 11 October 1989).

11. At present an extensive program of the reduction of production capital investments is being implemented. Its implementation should be well thought out. It is necessary to foresee the consequences of the steps being taken, which such consequences as the increase of the technical lag of our production base and the decrease of the possibilities of economic growth in the future may become.

12. It is rather interesting that P. Samuelson, in analyzing the economic role of the state, noted: "Man today, apparently, is no longer guided by the consideration that the state, which regulates least of all, regulates best of all" (P. Samuelson, "Economics: An Introductory Analysis," Moscow, 1964, p 188).

13. For example, Japanese managers, understanding the importance of the development of the sense of a common goal, try to see to it that every worker would clearly understand his own responsibility for the survival and success of his company.

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### GKNT Allocates R765 Million for Priority S&T Programs

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No 7-8, 27 Apr 90 pp 1, 14

[Article by V. Kaplun: "How Priorities Are Distributed"]

[Text] *IZVESTIYA* recently reported that 15 priority state scientific and technical programs had been formed and that 765 million rubles had been allocated for these programs for 1990. I would like to know in more detail exactly what these programs are and how each is being financed. S. Svetlov, candidate of physical and mathematical sciences, Moscow

As A. Gorin, head of the GKNT [State Committee for Science and Technology] Department for Financing Scientific and Technical Progress, told our correspondent, state budget allocations amounting to 765 million rubles,

as opposed to 433 million rubles in 1989, have been designated for the implementation of these programs in 1990, which comprises a 76.6 percent increase.

Here is what these programs are and what specifically the amounts of financing for them are:

#### 1. HIGH ENERGY PHYSICS: 90 MILLION RUBLES.

Study of the structures and interaction of elementary particles, the possibilities for their practical utilization. The solution of a number of problems in microelectronics, robotic engineering, information science, and the creation of materials with assigned properties.

#### 2. HIGH-TEMPERATURE SUPERCONDUCTIVITY: 150 MILLION RUBLES.

The creation of new types of machines, instruments, and equipment and their application in the national economy.

#### 3. MARS: 33 MILLION RUBLES.

Study of the surface and atmosphere of Mars. Preparation for a manned expedition. Broad application in the economy of developments obtained in the course of implementing this program.

#### 4. THE HUMAN GENOME: 32 MILLION RUBLES.

The complete deciphering of the molecular structure of the human genome and the creation, on this basis, of new methods for the diagnosis and treatment of diseases.

#### 5. PROMISING INFORMATION TECHNOLOGIES: 60 MILLION RUBLES.

The development and creation of highly productive devices for information technology. The creation of computer networks with access to general European computer networks.

#### 6. TECHNOLOGIES, MACHINES AND INDUSTRIES OF THE FUTURE: 45 MILLION RUBLES.

The new generation of systems and complexes of machines. Automated plants, automated warehouses, factory-farms and robotic construction complexes, all on the basis of ecologically clean, low-waste [words missing].

#### 7. PROMISING MATERIALS: 46 MILLION RUBLES.

The creation and production of new construction and functional materials. Radiation-resistant steels and alloys for nuclear power engineering, metals and alloys with amorphous and microcrystalline structure, materials with "shape memory," capable of functioning in aggressive environments under a broad temperature range. Structural ceramics for highly efficient engines.

#### 8. THE LATEST METHODS IN BIOENGINEERING: 30 MILLION RUBLES.

Obtaining new pharmaceutical preparations, cultivation of new varieties of plants, obtaining fodder protein, and the extraction of metals and ores from slag-heaps.

**9. HIGH-SPEED ECOLOGICALLY CLEAN TRANSPORTATION: 37 MILLION RUBLES.**

Transportation systems with magnetic suspension. The development of untraditional ecologically clean engines for automotive transport.

**10. ECOLOGICALLY CLEAN POWER: 58 MILLION RUBLES.**

Ecologically clean sources of energy—solar, wind, and geothermal waters. Ensuring the operational safety of nuclear power plants.

**11. RESOURCE-CONSERVING AND ECOLOGICALLY CLEAN PROCESSES FOR METALLURGY AND CHEMISTRY: 25 MILLION RUBLES.**

Continuous and combined processes in metallurgy (the reduction of waste by a factor of 2-3, and of energy expenditures by 30-20 percent). New technologies for chemical processes in turbulent flows (15-20 percent reduction in raw material outlays). An ecologically safe technology for cellulose production.

**12. HIGHLY EFFICIENT PROCESSES FOR FOOD PRODUCTION: 109 MILLION RUBLES.**

Raising soil fertility, developing new methods for protecting plants from pests, decreasing the losses of agricultural production during storage. The use of nitrogen-fixing soil bacteria and a reduction in application of nitrogen fertilizers. The creation of new fertilizers without harmful admixtures.

**13. THE STRUGGLE AGAINST THE MOST COMMON DISEASES: 25 MILLION RUBLES.**

New medicines, the successful diagnosis and prevention of AIDS, cancer, hepatitis, sugar diabetes, and arteriosclerosis.

**14. STROYPROGRESS-2000: 25 MILLION RUBLES.**

The creation of a new generation of buildings and structures based on new materials and technologies for the accelerated solution of the housing problem.

**15. CONTROLLED THERMONUCLEAR FUSION AND PLASMA PROCESSES.**

The final, fifteenth program was included on the list as the very last part, when financing had already been determined. Therefore, the question of the budget aspect of this matter remains open here for the time being.

An anti-monopoly fund of over 30 million rubles has been formed under the GKNT. The money that went into creating it are reserve funds. A scientific collective can turn to this fund, for which it should send a letter to head of the GKNT, indicating the theme of its work, the

necessary outlays, a substantiation of the project, as well as the scientific collective (monopolist) working on this problem. The GKNT Scientific Council will examine this letter, involving experts if necessary, and will come to a conclusion on it.

Moreover, an innovation fund amounting to 30 million rubles has been created on a joint-stock basis. The entry fee for stockholders is no less than 2 million rubles. For it, the GKNT annually deducts up to 0.5 percent of the budget allocations designated for scientific research work by the Ministry of Finances. Development workers will receive money from this fund only for a specific project. If development work is successful, a certain percentage of the profit is paid back into the innovation fund by the enterprises that have introduced said project, plus the debt to the developer is paid back.

**USSR Academy of Sciences Faces Budget Crunch**

*907A0262A Moscow POISK in Russian No 19 (54), 11-17 May 90 p 3*

[Interview with Aleksandr Ivanovich Konoshenko, chief of the Main Planning and Economic Administration of the USSR Academy of Sciences, by POISK correspondent Vladimir Shlemin, under the rubric "What Is Science To Be Like?": "Money Without Secrets"; date and place not given; first two paragraphs are POISK introduction]

[Text] Today the fact that scientific priorities are the key to leadership in the world economy is no secret for anyone. However, it is impossible to achieve priority outside the laws of economics. Put more simply, it is necessary to pay for first place in any field and pay in considerable amounts. By economizing on the development of science, the only thing that we will probably get is a commodity that is worse in quality than that of the competitor.

The center of basic scientific research in our country is the USSR Academy of Sciences. Hence, it is possible to judge from its financing the state of science in the Union. What is happening with the budget of the Academy of Sciences, how is it being developed, what awaits scientists in the immediate future? Correspondent Vladimir Shlemin addressed such questions to Aleksandr Konoshenko, chief of the Main Planning and Economic Administration of the USSR Academy of Sciences.

**POISK:** Aleksandr Ivanovich, what is the budget of academic science today?

**A. I. Konoshenko:** Let us immediately specify that we will talk precisely about the budget of the USSR Academy of Sciences, without touching upon the republic academies and regional departments, which are financed from other sources.

Thus, last year, in 1989, all types of investments amounted to 1.6 billion rubles. A little more than 1 billion rubles were directly from the state budget,

approximately 320 million rubles were from the State Committee for Science and Technology for the implementation of state programs, and about 200 million rubles were in accordance with contracts with departments and clients. It seems to be rather good, but the trouble is that the amounts allocated for the needs of science are unstable, they fluctuate greatly by years. Moreover, whereas up to now they have increased, although very unevenly, this year our budget in accordance with a government decision was simply frozen.

**POISK:** What does its decrease actually mean? For in the past year the prices for materials and services, energy, and transportation increased, the cost of living jumped. In addition, as I know, due to the changeover to self-financing many organizations refused to pay for entire series of studies that were begun jointly with you. And what about the launching of new directions that require priority financing? Moreover, a considerable amount. And is all this from the same amounts as last year?

**A. I. Konoshenko:** Unfortunately, the situation is even more complicated. Thus far we have received less than was promised. But the government is trying to find the missing 100 million rubles, you yourself understand that today this is not at all an easy task.

**POISK:** But is the Academy, perhaps, demanding too much?

**A. I. Konoshenko:** Let us compare. Thus, our constant rival—the United States—invests in basic research, given the very conditional equality of the monetary units, about sevenfold more assets.

On what is the money being spent? This year 18 basic programs of the presidium of the USSR Academy of Sciences require mandatory financing. Development on medical lasers, which is being conducted at the Institute of General Physics, awaits large investments. Assets are needed for research in the field of controlled thermonuclear fusion and power engineering based on it, for space, and for the programs on information science and computer technology. Without constant support it is impossible to continue research in molecular biology and biotechnology. And is it permissible to halt work on ecology?

**POISK:** For some reason we have been talking all the time about the natural sciences? But how are things with the humanities? Does it not seem to you that precisely such a “natural” bias was to some extent the cause of the neglect of our own history and the spiritual and moral impoverishment of our society?

**A. I. Konoshenko:** Yes, for a long time extremely little attention was devoted to the humanities. Now we are trying to change the situation. This year we allocated an additional 5 million rubles to linguists and philologists.

**POISK:** From the total 1.6 million rubles? This is charity, alms for the poor!

**A. I. Konoshenko:** Not, this is a substantial addition to the 7 million rubles, which the humanities had. We would like to do more, but given the deficit, which is forming in our budget, there are no other possibilities.

**POISK:** If the state is not capable of financing your work, while the purchase of soap for foreign currency worries it more than thermonuclear fusion, it is worthwhile dealing yourself with the problems of your own existence. Or is your research so far from real life that the cost accounting methods of obtaining assets are inapplicable to it?

**A. I. Konoshenko:** In short, are you interested in whether we are capable of turning the results of our research into a commodity? Into a product, for which the buyer will be able to pay “live money”?

The question is complicated. I will not give, perhaps, a clear answer to it.

Let us consider. Who, except for the state, is capable of financing, for example, research on the problem of the destruction of the ozone layer of the atmosphere? Will a buyer be found for research efforts on the topology of space and on specific items of theoretical physics? Which of the manufacturers will the behavior of fields in the sphere of a “black hole”—one of the mysteries of deep space—interest? What department will fight at an auction for the right to finance the search for neutrinos? All right, it is possible to reject all this. But will man remain man, if he loses opportunities for knowledge?

On the other hand, without advanced methods of mathematical analysis and integral calculus—the product of the same “academic science”—in principle computer technology and the entire field of information science are impossible. Without the discoveries in nuclear physics there would be no modern power engineering, by which all the comfort of civilization is supported. A breakthrough in genetics is new breeds of livestock and birds. And what about the composites which were developed on board our space stations? Today they are five- to sixfold more valuable than gold: A kilogram is worth from \$1 million to \$3 million.

And no matter how amateur pragmatists vulgarize the ties of basic science and society, there is a development which recovered once and for always all the expenditures on academic research. This is the steam engine of Watt. Who will list all the innovations and revolutionary changes, the road to which this, in the opinion of contemporaries of the scientist, “intricate toy” opened?

**POISK:** Hence, do the Academy have a path of cost accounting and self-financing?

**A. I. Konoshenko:** Full cost accounting for academic science is a dead end. There are in other countries, it is true, decisions which to a certain degree make it possible to reduce the shortage of assets to a minimum. In China, for example, a number of independent introducing firms were established under the Academy of Sciences. In



contrast to our scientific and technical cooperatives they are not becoming middlemen between state enterprises, but are taking entirely upon themselves the development and sale of an applied solution in some direction of basic research. This is yielding a rather good profit.

We could also begin such activity. Especially as our interbranch scientific technical complexes—Biogen, Svetovod, and others—are something similar. But, I will recall, far from every direction can realize its results in the applied sense. In addition the same shortage of assets gets in the way. It has been calculated: If, let us assume, one unit of assets is required for the obtaining of a result of basic research, seven units are already needed for development as applied to direct introduction, while from 20 to 100 units of assets are needed for introduction. For the present neither our clients nor we have such financial capabilities.

However, all the attempts to force institutes of the Academy to earn assets have not yielded anything except the sharp decrease of the amount of exploratory research. Exclusively applied, "money" themes, which at times are not of serious importance, have begun to be put in first place. That is, I will stress once more—one must not make basic science completely dependent on self-sufficiency.

Although, of course, the new methods of management also have their advantages. And we have already begun to feel them. They are stimulating the concentration of scientific forces and are making it necessary to switch from the financing of scientific organizations to the financing of specific problems and themes. The new approach dictated the necessity of democratization and competitions in case of the formulation of programs and directions of research. That is, it forced us to review our attitude toward the spending of allocated finances.

It is impossible not to see, however, that the monopolism of individual schools and trends, which makes it possible to obtain the maximum subsidies owing to the position held by their leaders in the department, section, and institution, remains a serious problem here.

**POISK:** But it is possible to combat monopolism. After all, the system of grants, which is used extensively in the United States and England, is aimed precisely at this. Or do we understand it not entirely correctly?

**A. I. Konoshenko:** Grants in our country have become surrounded by myths and legends. This year I had occasion to take a special course of directors of programs, which was organized by the U.S. National Science Foundation (NSF) for Soviet specialists. And I can state responsibly that our notions about the system of grants of the NSF far from always conform to the truth.

Of course, in the United States any scientist can apply for a grant. But will he receive it? The representatives of major scientific and educational institutions have greater chances to become competitors for grants. However, it is not enough to submit an application to the

foundation. The theme should undergo in advance an independent and thorough examination: at the first stage at the institute or university, then among specialists of the NSF. But even the received grant is not turn over to the competitor. It is included specially in the program of financing of the institution which submits the theme for the competition. With detailed planning by years and items of expenditures.

The USSR Academy of Sciences has also come to the conclusion of the necessity of a large number of funds of the financing of science regardless of its territorial and departmental affiliation. The first steps in this direction have already been taken: Now the USSR Academy of Sciences jointly with the State Committee for Science and Technology is elaborating suggestions on the organization of a unified all-union fund of the financing of basic research programs. Scientific institutions of the union and republic academies and regional departments of the USSR Academy of Sciences and organizations of the higher school could take part in it. So that even given our, let us state frankly, poverty, it is possible and necessary to seek assets for kinds of grants.

And this means to give additional impetus to the development of basic science. For without basic sciences, progress of society is impossible.

#### **Failure of Self-Financing To Accelerate Introduction of New Technology**

*907A0284A Moscow MOSKOVSKAYA PRAVDA  
in Russian 23 May 90 p 2*

[Article by V. Rassokhin, professor of Moscow State University imeni M. V. Lomonosov, under the rubric "Science: Why Is Path of Developments of Scientists So Long and Thorny?": "Introduction in the Tentacles of the Octopus"]

[Text] About three years ago one machine building ministry approached me with a proposal to participate in the development of "a special system of the rapid introduction of major scientific and technical innovations in production." I was slightly intrigued: Did such a recognized department of what is called "the nine" actually and really wish to engage in the solution of "the problem of introduction"?! Conversion is conversion, but what will become of the mass of deep-seated departmental interests, which, like the tentacles of an octopus, always and inexorably held back locally the introduction of any fundamentally new achievements of science and technology? Is something even here indeed really beginning to change?

It is not, of course. The entire matter suddenly came to a halt, the development of "a special system of introduction" was deemed superfluous. The official, to whom I addressed my, honestly speaking, affected bewilderment, confidently (as always) explained: "No systems of the management of introduction are needed now. The Law



on the Enterprise will take effect, cost accounting will begin to work—and the problem will be solved of its own accord....”

I understood this figure perfectly well. For if his ministry were to begin in earnest to set spinning the heavy wheel of introduction—be it even of some achievements of science and technology, which are very important for civilian production—it would very soon have to trample on the throat of its own main departmental song. The same song, in the first lines of which for many decades now they have sung with frightening vigor: “The gross! The gross! The gross! This is the command of life! In ton and rubles, by the first day of the month! The gross! The gross! The gross! The best gift to the Fatherland!...”

Later I found out that the circumstances had taken shape as follows: It was necessary somehow to report very quickly that “a special system of the introduction of major achievements of the scientific and technical revolution will be put into operation here.” They praised the ministry at the highest level. But then the situation changed, the Law on the Enterprise drove up. It came in very handy to the ministry (and not only this one). And how! Self-financing. Self-management. Self-crime and self-punishment. And, of course, self-introduction. Let the wheel set cost accounting spinning....

How much longer will we play the poor cab driver with this special cost accounting of ours? With cost accounting without a market, without competition, without the inevitable fight for the consumer. For without these conditions there will always be not genuine cost accounting, but what we see—just bewilderment. The empty hopes for a magic effect of such cost accounting are particularly evident, if you approach in earnest the difficulties of the introduction of fundamentally new technologies.

Indeed, why not take advantage of cost accounting methods in this most difficult innovation process? After all, this would be so tempting, and the very problem of introducing the fundamentally new achievements of the scientific and technical revolution would then lose its serious, insoluble nature under present conditions. But, alas, the nature of revolutionary scientific achievements and their main peculiarity—technological and economic uncertainty, which appears most markedly during introduction—are hindering this.

First, it is impossible to switch “a pig in a poke” over to cost accounting, that is, it is impossible to determine if only approximately the outlays of resources and time, which are required for the successful introduction of any major achievement of the scientific and technical revolution. It is impossible to determine in advance the economic result of its introduction and when and how much of a profit one can expect to derive during introduction. Cost accounting requires certainty, while the introduction of achievements of the scientific and technical revolution is distinguished by surprises, both technical and economic, which no one is able to foresee.

Second, a very high economic risk is connected with this, but our cost accounting does not like risk. An enterprise will take a risk only under the conditions of the thorough development of competition and a fight for the consumer, while given such cost accounting he needs only what will probably pay for itself immediately.

Third, cost accounting methods cannot ensure the high concentration of resources on the basis of their redistribution on the scale of a sector, several sectors, or even the entire national economy. But this is an indispensable condition of the introduction of major achievements of the scientific and technical revolution.

Fourth, the process of introducing achievements of such a scale is distinguished by long-term unprofitability (although it also promises in the end an enormous impact for the national economy). And here the methods of repayable credit can far from always help. Centralized state subsidies for the covering of such long-term expenses are needed. All developed countries are taking this path.

Fifth, cost accounting is rigidly linked with the interests of individual isolated units, first of all the basic unit—the enterprise and the association. But at the first, most difficult stages one must not link with the interests of individual enterprises precisely the introduction of fundamentally new achievements. For cost accounting requires well-defined relations among the subjects: the client—the developer, the producer; the supplier—the buyer. And with respect to the content of the economic relations, there should be a direct cost accounting connection: expenditures—revenues.

But at the first stages of the introduction of major achievements of the scientific and technical revolution it is clear only where, in what units, the expenditures are concentrated. Revenues will be obtained no one knows when and no one knows by whom. Although an immense impact is anticipated, the interest in obtaining it is a long-range interest of the national economy or society as a whole. And only at the last stages of introduction, when the period of unprofitability and other difficulties have been overcome, can cost accounting relations among isolated units emerge and will a direct connection between expenditures and revenues appear.

That is why at the first stages of the introduction of major achievements of the scientific and technical revolution it is impossible to find a specific individual cost accounting client, who would take upon himself the basic economic burdens of introduction. At these stages only the state can act as the client.

Consequently, state policy can contribute to the successful passage of the first, most difficult stages of the introduction of the most important achievements of the scientific and technical revolution. But no policy will be able to solve “the problem of nonintroduction,” until the economic system itself is changed. The isolation and exclusiveness of departmental sectorial structures and

their interests come into fundamental conflict with comprehensiveness and with the multidisciplinary, multisectorial content of any major scientific and technical problem. Sectorial scientific institutions, which are subordinate to a ministry and serve its scientific interests, either reject research and development on major intersectorial problems or attempt to change artificially the very statement of such a problem, squeezing it into the Procrustean bed of departmental interests.

What are called the "head" institutes received absolute power in their sphere of science and technology. They keep independent scientists and inventors away from the channels of any influence on the scientific and technical policy being pursued, blocking their paths to publications of alternative scientific and technical solutions and especially tightly the paths to the introduction of their inventions and developments in production. This is one of the most severe problems of sectorial science.

The wave of reforms, at last, is also approaching basic science. The urgent vital necessity of perestroika in this special sphere is realized by everyone who has anything to do with the affairs of "large-scale science."

Academic science, which is most independent of departmental influences, was unable to be free from the pressure of the administrative bureaucratic system, which formed in the past, and experienced serious deformations. The very spirit of science is incompatible with bureaucratic despotism. Freedom of creativity is the oxygen of science, and if it is cut off, science is suffocated and becomes weak.

In recent decades an essentially bureaucratic, strictly hierarchical system of management took root within the Academy of Sciences. The real status of a researcher depends first of all on his position in the levels of the academic hierarchy. This leads to the concentration of power in science in the hands of individual figures—bosses, who manage the resources, which have been allocated for the development of scientific disciplines, and other opportunities, without which a researcher cannot exist (publications, participation in international conferences, and so on).

Any steps of democratization and self-management in science will remain nothing more than a change of purely formal procedures, if the system of the distribution of resources and their management remains the previous system. In other words, if the power over resources remains in the hands of the administrative hierarchy—people, who hold official posts and have divided among themselves the spheres of influence in science. Nothing of the sort has existed for a long time now in the scientific communities of the developed countries, which are in the forefront of the scientific and technical revolution.

The question is not in what manner a director is to be elected (this is not that vital). It is important to differentiate what functions and powers should be executed by directors, vice presidents, and presidents of academies

and by other people of the official hierarchy in the system of management of scientific research, and what ones should be executed exclusively by representative commissions and councils of scientists, which are formed by the scientific community itself and make authoritative decisions on the basis of the objective conclusions of independent expert groups.

Financing and the distribution of the most valuable material and technical resources on a competitive basis (about which there is now much talk) will make sense only if the following absolutely necessary conditions exist. First, no executive in the official scientific hierarchy should have the powers to personally dispose of planned resources. Second, a multiplicity of funds, to which an individual scientist or a collective of like-minded people (which is united on the basis of a new scientific idea, not a manning table) can address an application on competition, should be ensured. Third, the expert competition commissions should be completely independent of the administration of the system, in which the resources are distributed.

If we accept these conditions, it is possible to form various funds from the allocations, deductions, and financial resources, which are being earmarked for science. For example, the basic research fund (the holder of the fund—the USSR Academy of Sciences, the State Committee for Science and Technology—should not have anything to do with it). The next one is the intersectorial fund of applied research and development (the holders are ministries or state committees). There should also be a fund for the development of priority research and development. The State Committee for Science and Technology and the USSR Academy of Sciences manage it, the fund is used for the additional financing of the most important and urgent jobs. Finally, innovation funds, which any organizations, including banks, which invest their assets on the basis of their own interest and voluntary consent for the special-purpose financing of scientific and technical progress, establish, are needed.

Neither the departments, which are the holders of funds, nor their executives of any level can on their own authority dispose of the assets of the funds. Administrative commissions, which are formed on the basis of the democratic and authoritative representation of the scientific community, should be given such powers.

For example, the administrative commission of the Basic Research Fund could be formed of representatives of the USSR Academy of Sciences and the union of scientists. Only scientists, who are directly and actively performing basic work themselves and enjoy great authority in the scientific committee, should be made members of this commission. Organizers of science and the people, who hold official posts in the scientific administrative hierarchy, cannot be members of the commission. The administrative commissions of other funds should also be formed on the basis of the same principles.

The officials in the scientific administrative hierarchy, who are the managers of credits, should have the right to perform these functions in case of the distribution of planned resources only within the limits and on the basis of the competent decisions of the administrative commission, which makes decisions precisely on the basis of the conclusions of independent expert groups. How is one to ensure the objectivity of expert evaluations, findings, and conclusions? In world science a procedure, which affords such a possibility, was developed long ago. This is the anonymity of the experts, who are unknown to each other and as which leading scientists of different

countries can act. This is the use of special objective methods of the generalization of the conclusions of individual experts and so on.

On the basis of such a system of the making of the most important decisions in science the competitive organization of research, as well as the principles of self-management can actually become a part of the life of the scientific community. While this is the most beneficial basis for scientific and technical achievements to find application in practice. For the wheel of introduction to finally be set spinning.

### Economist Urges Increasing Foreign Trade in Licensing

907A0231A Moscow *FINANSY SSSR in Russian No 3, Mar 90 pp 32-37*

[Article by Candidate of Economic Sciences M. L. Bashin: "The Sale and Purchase of Licenses"]

[Text] At present the financial mechanism in the sphere of scientific and technical progress is being formed in a new way. The status of a commodity is being given to the results of the activity of scientific production associations, interbranch scientific technical complexes, scientific research institutes, and design bureaus. It is necessary to pay for it with the corresponding price, which is agreed upon by the parties on the basis of economic contracts. Cost recovery, the profit, and profitability directly depend on the scientific and technical level and the effectiveness of the results of research and development. The financial liability of the developers of new equipment for the scientific and technical level of development is also increasing. Let us examine the financial questions which pertain to patents, licenses, and know-how, which hold a special place in the activity of scientific production associations, scientific research institutes, and design bureaus. The labor of scientists, inventors, and developers of new equipment is materialized in them. Even the most advanced countries can no longer achieve on their own major successes in all directions of science and technology. The latest scientific and technical information has become the most expensive and prestigious commodity.

In the sphere of science and technology patents, licenses, and know-how are taking a more and more conspicuous place. Therefore, in recent years the international market of their sale and purchase has undergone extensive development. Both the seller and the buyer, who are exploiting the advantages of the international division of labor in the sphere of science and technology, are proving to be winners. The greater scientific and technical potential a state has, the greater the share in it that falls to the "product of ideas." This is reliable capital, which provides with time an ever increasing profit. It is important to learn to use effectively the prospects of its circulation on the international market. In 1989 the trade in scientific and technical ideas came to \$34 billion, and in subsequent years it will expand. The reason is clear—the financial resources for conducting research and development on one's own and time are saved.

The volume of financial agreements in the area of the purchase and sale of know-how is increasing most rapidly—in 1989 more than half of all contracts (according to UN data). This is connected with the fact that know-how has the most precious technical experience of firms: methods of manufacturing science-intensive products, new types of equipment and testing methods, which have stood up in practice, and much else, which is not an object of patenting, since it is carefully guarded by the

owners. Familiarization with this experience is often a condition of the effective assimilation of new technology with subsequent appearance on the world market.

The purchase of patents, licenses, and know-how involves outlays of foreign currency assets. Therefore, highly effective financial preparation before the conclusion of every commercial deal is required. The main thing in the work is the substantiation of the prospect of assimilating the object with allowance made for the need of the domestic market and the world market.

The expansion of mutually advantageous trade in patents, licenses, and know-how is one of the means of speeding up the retooling of the national economy. It is possible to achieve this only by the production of new equipment on the basis of the most advanced technology. While subsequent appearance on the world market is an important criterion of the efficiency of the work of scientific production associations, scientific research institutes, design bureaus, and enterprises under the conditions of the restructuring of the economic mechanism.

The opinion that the importing of foreign scientific and technical experience supposedly testifies to technical backwardness, while its exporting testifies to advanced technology, still exists. But the financial statistics of world trade in licenses and know-how testifies that such countries as the FRG, Japan, Italy, France, and others, which have highly developed and science-intensive industry, purchase more patents, licenses, and know-how than they sell. So that the country would buy on the world market the best scientific and technical innovations, we should on the basis of advanced scientific and technical ideas develop our own innovations and successfully sell them.

In recent years the number of new developments—potential objects of the export of technical ideas—has steadily decreased. And the time of their devising has been too dragged out. At sectorial scientific research institutes and design bureaus on the average six years are spent just on research and development, their rapid obsolescence is occurring. Given the abundance in the country of scientific production associations, scientific research institutes, and design bureaus under the conditions of cost accounting and self-financing the national economy should be saturated with new equipment of the highest level with its subsequent appearance on the world market. The scale, structure, and forms of the activity of numerous scientific research institutes and design bureaus, just as our participation in the international trade in patents, licenses, and know-how, still do not correspond to the developed scientific and technical potential. The Ministry of the Machine Tool and Tool Building Industry, for example, delayed the production of high-torque hydraulic motors, which do not have analogs in the world and make it possible to accomplish the extensive introduction of hydraulics in mining and

other equipment, to increase labor productivity by several fold, and to improve working conditions. The innovation was developed at the Institute of Mining of the Siberian Department of the USSR Academy of Sciences. But the potential foreign currency receipts have been reduced to naught. The sale of a license for this innovation was delayed. For foreign customers are waiting for its realization in metal. Only then can the sale and the receipt of financial resources in foreign currency follow. It is also possible to cite other examples, when due to the slowness of our organizations we are incurring large financial losses.

In recent times our country has produced a third of the world scientific results and a fifth of the new technical solutions, which are registered abroad as patents. An authoritative organ of American businessmen cites a long list of achievements of the USSR and gives them a high rating. At the same time the western press is deliberately distorting the state of trade in licenses, asserting that our country buys more than it sells. The facts testify otherwise. In the past five years the USSR sold just to U.S. firms threefold more licenses than it purchased from them. By the end of 1989, 2,140 U.S. patents had been registered in our country, while more than 6,000 Soviet patents had been registered in this country. The rails of the Washington metro were welded with the aid of our equipment, American physicians are suturing organs being operated on with the aid of "surgical pistols," which were developed in accordance with Soviet licenses. Firms of FRG, Canada, Japan, and other countries have purchased Soviet licenses for flash resistance welding, which was developed at the interbranch scientific technical complex of the Institute of Electric Welding of the Ukrainian SSR Academy of Sciences, which traditionally holds a leading position in the world in this technology.

The financial relations with foreign partners of the USSR are based on the principles of equality, mutual advantage, and long-term cooperation. The longstanding relations with the FRG firm Stetter are good confirmation of this. We buy from it licenses for the production of hydraulic equipment and sell licenses for construction and installation items. The volumes of financial agreements with firms of Finland, Austria, Switzerland, and other developed countries are steadily increasing.

Domestic research and development should be oriented toward the highest world achievements. Some experience in this area has been gained in the country. Thus, at the Kriogenmash Scientific Production Association the share of new equipment in the output being produced annually comes to 60-70 percent. The key sector of machine building is at leading levels. Licenses for the equipment developed here are being sold to many countries. Today well-known firms of the FRG, Japan, and other countries are buying its products, as well as the technical specifications for them.

However, the inflexibility of the economic mechanism and the lack of initiative among the financial services of

a number of sectors, scientific production associations, scientific research institutes, and design bureaus are hindering good work. It is important that not only executives—from the minister to the director of the scientific production association, scientific research institute, and design bureau—but also commercial services would be competent in matters of the sale of scientific ideas and would know all the financial fine points of this complex sphere. Energetic financiers and businessmen, who are capable of promptly understanding the conditions of the world market and of being enterprising, are necessary. The purchase of licenses makes it possible to use the available scientific potential and to save large financial resources for the broadening of the front of our own development in those directions of science and technology, in which we are traditionally strong.

It should be taken into account that some foreign firms are trying to sell us not the latest technology, while, having sold it, to subordinate us to themselves, using cunningly the situation, when an operating enterprise needs the delivery of firm spare parts and the coming of consultants and technical personnel, the services of whom are paid for in foreign currency. It is difficult to shut down an operating enterprise. Knowing this, individual firms under various pretexts raise the prices for their services. Such issues should be stimulated clearly and in detail at the time of the conclusion of the licensing agreement.

In the FRG, for example, a power-generating unit was purchased. After its warranty service life our power engineers tried to disassemble it on their own—it did not turn out. They appealed to the supply firm, but for the transfer of know-how the firm demanded a price equal to half the cost of the power-generating unit. But experienced financiers and patent experts had only to determine in a skillful manner the technical prospects and the state would have saved significant financial resources.

There are other negative things. Domestic plants often assimilate innovations slowly. Foreign firms, having purchased licenses for them, successfully handle this task. A short time later foreign businessmen, by cunningly changing the name of the technology and making negligible improvements in it, also sell us such an "innovation." Thus, the USSR Ministry of Instrument Making, Automation Equipment, and Control Systems purchased in the FRG a license for a laser instrument for rolling mills. The attempts to recreate the instrument ended in failure. At the same time the Novosibirsk Institute of Automation and Electrometry of the USSR Academy of Sciences developed a domestic instrument and introduced it in a pipe-rolling shop of the Novosibirsk Metallurgical Plant.

The reverence of our economic managers for "foreign packaging" has not yet been eliminated. At one plant of the Ministry of the Chemical and Petroleum Refining Industry the production of a new product for agriculture had been readied. Experts insisted on the modification

of the domestic technology. Their recommendations were simply added to the correspondence. The plant director insisted on purchasing foreign technology. The logic of the bureaucrat is simple: the introduction of technology requires the development of a design, a large amount of installation and start-up work, as well as other efforts, while the foreign firm guarantees the turnkey delivery of the facility. The actions of this smart operator cost the state a large amount of foreign currency.

At the Inlegmash exhibition (Moscow) specialists liked the carding machine of the firm Shubert and Sahlzer (the FRG). Its introduction would make it possible to increase labor productivity by 250 percent. But only 4 years later did they conclude a licensing agreement, while after 6 more years they began the production of the "innovation." Tests showed that even our old machines are better than this "innovation." In all 130 such machines were produced. The price of departmental arrogance is losses of several million rubles. The typical situation which hinders the development of our foreign trade: the lack of promptness in settling specific questions and the grueling system of coordinating the details of forthcoming deals put off or break advantageous contracts for the sale of domestic patents, licenses, and know-how.

The representatives of foreign firms have many complaints against our organizations. It is believed that only a large and wealthy firm, which is capable of financing numerous and expensive trips of associates and endless negotiations and alterations of the technical and economic documentation, can "bear" trade with Soviet partners. After all, for them this involves large foreign currency losses. Hence, radical restructuring should also take place in the sphere of license policy. The high professional training of executives of departments and their orientation toward the prospects of the development of the sector are necessary for its active pursuit. One cannot get by here without the skillful assistance of financial services at the sectorial level. Only then do licenses, which have been purchased and assimilated in good time, cover with interest even large foreign currency expenditures. For example, the Volga Motor Vehicle Works. Its establishment in many respects was based on the purchase of foreign licenses and know-how. Today it is successfully exporting products to 47 countries.

The sale of scientific and technical information in the form of patents, licenses, and know-how does lead to the loss of "fixed capital" for it remains in the hands of its creators, while the foreign currency receipts from such sales only increase its amount. Japanese specialists believe that there are no useless inventions. Even having been forgotten with time, they can provide a stimulus for a new technical solution. Japanese firms have expressed the desire to purchase from us all rejected applications for inventions. The reckoning is simple—great potential values are concealed in them.

Scientific and technical ideas, which are embodied in patents, licenses, and know-how, are a commodity. In connection with this new financial problems are arising. Patenting and the subsequent sale of licenses are not only a responsible, but also a very complicated process. A knowledge of all the fine points of the patent legislation of countries, the precise drawing up of application documents, information on world market conditions, and well-organized commercial advertising are required. It is important to study the experience of leading foreign firms which are succeeding in this sphere with great advantage for themselves.

The modular semi-automatic machine for the machining of band saws, which is produced by plants of the Ministry of the Machine Tool and Tool Building Industry, is protected by 72 patents. The sector has come out with proposals on its export to 27 countries. Several scientific research institutes of the Ministry of the Chemical and Petroleum Refining Industry in the past 5 years have sold 12-15 licenses each for new materials. The USSR maintains foreign economic relations with more than 140 states.

The restructuring of the economic mechanism also has a direct bearing on the organization of patent and licensing activity. Its directions in this sphere have also been specified. It should be combined fundamentally with steps on the significant broadening of the rights and responsibility of scientific production associations, scientific research institutes, design bureaus, and enterprises, which guarantee the development on the basis of full cost accounting and self-financing of items of new equipment, which correspond to the highest world level, and on the increase of the license potential. It is a matter not only of the elimination of foreign currency losses, but also of large receipts of freely convertible foreign currency.

The production associations of our industry have the conditions for the sale of the scientific and technical experience gained by them. For example, the Leningrad Izhorskiy zavod Production Association set up the Izhorneshtorg structural subdivision. The firm is appearing on the foreign market with its own equipment and, what is particularly important, with licenses and is establishing direct contacts with clients. At the same time the rights of ministries, scientific production associations, scientific research institutes, and design bureaus are being broadened and their responsibility is being increased; the elimination of the economic and organizational isolation of the production and foreign trade sphere is envisaged. The conditions for the direct interest of organizations in patent and licensing work are also being provided.

In 1988 the 11th meeting of the members of the American-Soviet trade and economic council proposed to implement joint projects on the development of advanced technology. Soviet scientific research centers and design bureaus can focus efforts on inventions and technological innovations. American firms will buy

licenses for them. In return they not only will make financial subsidies available for the conducting of research, but will also pay well-deserved royalties.

For three years, 22 sectorial ministries and over 200 scientific associations and large enterprises have been appearing independently on the foreign market. They provide more than 20 percent of the foreign trade turnover. The process will pick up speed. Funds of foreign currency deductions for the financing of export-import operations, which are formed by means of the receipts from export at standards that are stable until 1990, have been formed. The deductions for the sale of advanced technology come to 40-50 percent, while for the sale of raw materials they do not exceed two to three percent. This is stimulating the sale of licenses and know-how.

The levels and proportions of world and intra-union prices do not coincide. Therefore, differentiated foreign currency coefficients, which make it possible to take into account the specific nature of sectors, the objects of export, and the foreign currencies of payment, have been introduced for the conversion of the actual values of foreign trade deals into Soviet rubles.

The extensive entering into independent export-import operations is giving our organizations not only new partners, but also the opportunity to purchase abroad electronics and other advanced equipment. But the demands on the level of development of domestic scientific and technical ideas, which have become a commodity that has a high price, are also increasing.

Financial services of all levels are obliged to explain constantly to the developers of new equipment that a product, which is protected by patents and licenses, has a higher price and better chances to find buyers. If in sold scientific and technical documentation the buyer detects serious errors, their identification and elimination should take place "before the border," not "beyond the border." After all, this leads to large financial losses in foreign currency. Foreign currency funds are called upon to play a significant role in the increase of the economic interest and responsibility of organizations in the expansion of the sale of patents and licenses.

The changeover to primarily economic methods of the management of the national economy also presumes the more complete use of such a comparatively new method for us as marketing. As applied to our conditions it is possible to define it as a system of the comprehensive study of the needs and demand for the purpose of the organization of production and services, which are oriented as much as possible toward the meeting of the needs of specific consumers and the provision of the most effective forms and methods of sales and service. The level of marketing plays no less a role than the scientific and technical level of licenses and know-how.

Previously a system of foreign currency deductions was in operation. Now the foreign currency funds are turning into the base element of the system of the self-financing

and cost recovery of foreign trade operations with the prospect of attaining full cost accounting. This gives a number of significant advantages to the sellers of patents and licenses. For the broadening of the independence of associations and enterprises they are permitted to establish their own funds of foreign currency deductions. Their replenishment is ensured by the receipts from export, including the sale of patents, licenses, and know-how. The principle of foreign currency self-financing and cost recovery by means of one's own assets, which have been earned or borrowed, is being introduced. It is also important to determine the real exchange rate of the Soviet ruble, which ensures the objective comparison of domestic costs with the international level and world prices. The problem of the convertibility of our ruble is also urgent.

The changeover to full cost accounting and self-financing is creating new stimuli for scientific production associations, scientific research institutes, and design bureaus, which are capable of developing and selling profitably to foreign firms original scientific and technical ideas and designs. The economic reform has laid a solid foundation for the large-scale expansion of the sale of domestic patents, licenses, and know-how and has created the conditions for the purchase, which is advantageous for the national economy, of the advanced scientific and technical experience we need from foreign firms.

The optimization of the adverse financial situation in a number of directions of science and technology involves the resolute overcoming of the costs of the stagnation period, first of all the increase of the competitive ability of the results of research and development in science-intensive sectors and the extensive development of commodity-money relations when devising items of new equipment. The success of financial policy in this sphere in many respects is connected with the increase of the level of work of the financial and economic services of scientific research institutes, design bureaus, scientific production associations, and interbranch scientific technical complexes, as well as the corresponding sectorial ministries. Now all the objective conditions exist for the conclusion of long-term commercial contracts with foreign companies and organizations of many countries.

In the developed countries today particular attention is being devoted to the analysis of the large-scale steps on the transition of our country to new forms of international economic cooperation, especially to the drafting and approval of enforceable enactments, which contain new evaluations of the conditions of the sale of licenses, patents, and know-how.

The new approach of the USSR to international trade and financial relations, which is based on the recognition of the interdependence of all the members of the international community, is finding in the developed and other countries more and more supporters, who realize that in the business and financial world there cannot be discrimination, especially in the area of the latest technology.

In January 1989, the draft of the Law "On Invention Activity in the USSR" was published. It is aimed at the efficient use of the enormous creative potentials of inventors and developers of the most advanced technology, the increase of the competitive ability of domestic equipment on the world market, and the further growth of the sale of licenses, patents, and know-how. The increase of the financial interest of inventors and the protection of their rights, which will contribute to the increase of the volumes of the export of the achievements of Soviet technical thought, are envisaged by the draft of the Law. In this sphere the cost accounting interrelations among the organizations, which are participants in the development and introduction of items of new equipment, will undergo further development. The rapid passage of this important law is necessary.

The increase of exports was also always the primary source of additional possibilities of imports in the sphere of scientific and technical progress. Precisely for this reason such steps, which will make it possible in the next few years to implement the constantly increasing scientific and technical potential and to speed up the retooling of the sectors of the national economy, by using the available achievements of foreign countries in the corresponding directions of science and technology, are being carried out in our country.

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### **Hungary, Estonia Sign Scientific Cooperation Agreement**

*907A0201A Tallinn SOVETSKAYA ESTONIYA  
in Russian 30 Mar 90 p 1*

[ETA article: "Agreement Concluded"]

[Text] On 25 March in Tallinn, Arno Keyerna, president of the Estonian Academy of Sciences, and Tidi Yozhof, vice-president of the Hungarian Academy of Sciences, signed an agreement on scientific cooperation between these scientific institutions.

The agreement proposes cooperation in the natural and social sciences by way of conducting scientific research, the exchange of scientists, specialists and scientific information, as well as the use of other forms of cooperation, including the creation of joint scientific collectives.

Today, cooperation between the scientists of Hungary and Estonia is implemented primarily in areas of science such as physics, cybernetics, agriculture and economics. Direct contacts between institutes and other scientific institutions will enable clearer definition of the research directions most interesting to both parties.

The Hungarian Republic has significant experience in economic management under the conditions of a market economy; therefore joint work with Hungarian colleagues in the area of economics may be of great interest for our scientists.



**Report on Armenian Academy of Sciences 1990  
Annual Meeting**

907A0263A Yerevan *KOMMUNIST in Russian*  
12 May 90 p 3

[Article (ARMENPRESS): "At the Annual General Assembly of the Armenian SSR Academy of Sciences"; passages in boldface as published]

**[Text] In the Departments of the Academy of Sciences**

The restoration of the normal rhythm of scientific life was one of the most important tasks of the Armenian SSR Academy of Sciences during the past year. Its institutes were occupied with questions of the organization of assistance to those who had suffered from the earthquake and to refugees and with the strengthening of scientific and technical ties with Nagorno-Karabakh Autonomous Oblast, as a whole the fulfillment of the plan of scientific research work was ensured. In connection with the consequences of the destructive disaster the concepts of the development of basic science were reviewed and the priority scientific directions in the republic were specified.

The activity of social scientists was stepped up significantly; in their research much attention was devoted to the economic problems of perestroika and to the analysis of the historical, socioeconomic, political, and legal aspects of interethnic relations. The institutes of the academy were enlisted in the formulation of basic research programs of the USSR Academy of Sciences—in accordance with the results of the held competition 20 institutes began coproducers of 14 programs. During the year under review research at institutes of the academy was conducted on 400 themes, of which 142 were included in 35 all-union scientific and technical programs and republic and other programs. In all 28 themes and the elaboration of 127 stages of the State Plan of Economic and Social Development of the Armenian SSR for 1989 were completed.

The assemblies of the departments of the academy, at which the basic results of their activity during the past year were examined, were held on 7-8 May. The academician secretaries of the departments, Academicians of the Armenian SSR Academy of Sciences G. Garibyan, S. Vardanyan, V. Kazaryan, B. Arakelyan, and G. Brutyan, Corresponding Member of the Academy of Sciences G. Areshyan, and Academician of the Armenian SSR Academy of Sciences A. Gabrielyan, chairman of the Earth Sciences Section, delivered reports.

**At the Institute of Mathematics of the Physical and Mathematical Sciences Department** research was conducted in the area of complex and object analysis, approximation theories, differential and integral equations, statistical physics, and statistical simulation. New results were obtained in the area of other basic research.

At the computer center special programming models, which are of great importance for the automation of

scientific research, were developed. An algorithm of the optimization of irrigation systems, which will find use when redistributing the limited water resources, was developed.

**At the Institute of Radio Physics and Electronics of the Physical and Technical Sciences and Mechanics Department** a multifunctional system for the measurement of the spatial distribution of the intensity of thermal radio radiation in the shortwave section of the millimetric wave band was developed and produced. The order of the arrangement of layers, in case of which multilayer anisotropic elastic and viscoelastic plates have the greatest critical force of the loss of stability, was discovered at the Institute of Mechanics.

At the Special Design and Technological Bureau of Composite Materials the technology of obtaining a new construction material—basaltoplastic and various items made of it—is being developed, at the same time the mechanical properties of basaltoplastic subject to the technology of processing are being studied.

On the basis of this research an experimental model of a sidecar for individuals made of a carbon-filled reinforced plastic composite was produced. The weight of the sidecar is approximately half the weight of a metal sidecar.

At the Special Experimental Design and Technological Institute of the Armenian SSR Academy of Sciences a laboratory autoclave like the S-049, which is intended for the carrying out and study of chemical and physical chemical processes in the liquid phase, was produced and delivered to the client.

On the order of the Institute of Physiology of the Academy of Sciences a special instrument for the study of thin tissues was developed.

**At the Institute of Chemical Physics of the Chemical and Geological Sciences Department** during the year under review new results in the area of the conversion of natural hydrocarbon raw materials into unsaturated hydrocarbons under the conditions of a cold flame were obtained, catalytic systems of the obtaining of high-class hydrocarbons from natural gas were developed. They are of great production importance.

At the Institute of General and Inorganic Chemistry a method of producing ultrapure calcium carbonate was developed, an efficient technology of the production of optical glass was assimilated.

At clinics of the country the study of the narcotic analgesic fenaridin, which was developed at the Institute of Fine Organic Chemistry, was completed. The pharmaceutical committee of the institute was ordered to submit the necessary documents for the authorization of its production.

A number of other potential medicines are undergoing preclinical studies. At the experimental shop of the institute 10 drugs worth a total of 1.34 million rubles

were produced and delivered to pharmaceutical administrations. The profit comes to 220,000 rubles.

At the Institute of Biochemistry new polypeptides, which enlarge the coronary vessels of the heart, which regulate the contractility of the smooth muscles of blood vessels, were extracted from the brain in a pure state.

At the Institute of Geological Sciences detailed fault maps of the northern rayons of the republic, on which the active faults, seismogenic faults, and seismic gravitational and seismic vibration formations are distinguished, were drawn up. This work in the future will also encompass other rayons of the republic, since they are exceptionally important for the detailed seismic zoning of the territory of the Armenian SSR.

**At the Institute of Botany of the Biological Sciences Department** it was established that 50-60 percent of the alpine pastures of the republic are at the highest degree of breakdown, while the productivity of the grass cover in the last 50 years has decreased by 25-30 percent. At the institute the scientific principles of the efficient use and the increase of the yield of the plant cover were developed. A method of the fine-mesh propagation of capers was developed. It makes it possible to organize the production of this food plant. The scientific principles of the cultivation of forests in the alpine zone of the republic were also developed, measures on the accomplishment of this were proposed.

At the Institute of Zoology information data for computer programming were prepared, which will make it possible to obtain automatically comprehensive information on the collections of the institute. On the territory of the republic 160 species of rare and disappearing invertebrates were identified by expeditionary studies.

At the Institute of Virology a number of new strains of bacteria, including five strains, which destroy 100 percent of the larvae of the Colorado beetle, were isolated and studied. In accordance with a decision of the interdepartmental commission a new bacteriological method of controlling mosquitoes was accepted for introduction.

At the Institute of Experimental Biology the leading role of sodium thiosulfate during alcoholic poisonings for the regulation of lipid disorders of the membranes of cells of the liver was identified. Similar results were obtained in studies of the effect of double-helix ribonucleotide. It was shown that it promotes the migration of phospholipids, which have appeared as a result of a heart attack in the membranes of cells of the myocardium.

At the Sevan Hydrobiology Station it was established that a significant peculiarity of Lake Sevan is the gradual decrease of the amount of phosphorus in the water. This phenomenon is connected with the gradual submersion of organic substances in the water, including phosphorus compounds, as a result of which their quantity in the water is decreasing, while in the bottom sediments it is increasing.

**At the Institute of Economics of the History and Economics Department** during the year under review the compiling of the comprehensive program of scientific and technical progress of the Armenian SSR for 1991-2010 was completed, the formulation of the concept of the economic and social development of the republic for the long-range future (the basic provisions) was also completed. On the instructions of the Government of Armenia the institute jointly with the Scientific Research Institute of Economics and Planning of the State Planning Committee, Yerevan State University, and the institute of the national economy formulated the concept of the economic independence and territorial cost accounting of the Armenian SSR. This document was published in the press for national discussion.

The Institute of History is preparing for publication in Russian a history of the Armenian people in four volumes. It will encompass the history of Armenia from the most ancient times to our day. The questions of Armenian liberation movements, social trends, and the history of the Soviet period are also being studied at the institute.

**The Institute of Philosophy and Law of the Philosophy and Philology Department** after the Spitak earthquake developed a new scientific direction—the sociology of the disaster. The basic task of this direction, which is being developed, is the development of a general theory of natural and social disasters, including the study of the social and sociopsychological consequences of the earthquake, as well as the formulation of the social tasks of the preparation of the population for getting out of emergency situations and preventive measures. This is of great importance, particularly for the choice of the correct strategy of rehabilitation.

The Institute of Language imeni R. Acharyan published the monograph "The Semantics and Word Formation of Modern Armenian," in which a semantic analysis of the roots of Armenian is made. The monograph "Lexical Stylistics of Modern Armenian," in which the types of stylistically materialized words and the stylistic layers of vocabulary are examined, was also published.

The Institute of Literature imeni M. Abegyan published the collective monograph "The Applied Historical Significance of the Literary Work" (based on material of Armenian classical literature), in which the role of a number of famous works of Armenian literature in the spiritual life of society is studied.

At the Institute of Art the scientific elaboration of the problems of the history and theory of Armenian art is being continued. The second volume of "The History of Armenian Architecture," which is devoted to architectural monuments and building skill of the early Middle Ages, was prepared for publication.

**In the social sciences departments** some work was performed on the scientific study of the questions connected with the history, culture, and spiritual life of Artsakh. Thus, a detachment of the Institute of Archeology and

Ethnography worked in a suburb of Stepanakert—Armenavan—and the discovered materials supplemented the regional studies museum of the oblast center. The Institute of Art prepared for publication the works "The Artsakh School of Armenian Architecture" and "The Applied Art of Artsakh."

The results of the scientific research of institutes of the academy were reflected in reports at 343 international, all-union, and republic congresses, conferences, and symposiums.

Full Member of the Armenian SSR Academy of Sciences D. Sedrakyan, academician secretary of the Academy of Sciences, delivered a report on the basic results of the scientific and scientific organizational activity of the Armenian SSR Academy of Sciences during 1989.

He noted that two general assemblies, one of which was devoted to the priority tasks of the academy and the second of which was devoted to the election of its new members, were held during the period under review.

This election, however, did not make it possible to rejuvenate the staff of the academy. Now the average age of our academicians is 71.1, while that of corresponding members is 62.5

At the meetings of the presidium and bureau of the Academy of Sciences more than 200 questions were discussed, moreover, basic attention was focused on three priority problems—seismology, ecology, and the present tasks of social science. Temporary maps of the seismic microzoning of the territory of the republic and the question of the choice of the territory for the restoration and further development of Leninakan, Kirovakan, and Spitak were discussed and adopted, the map of the seismic zoning of Yerevan was made more precise. A decision on the compiling of an atlas of the Spitak earthquake was made. Great efforts were exerted on the organization of restoration operations at institutions of the Academy of Sciences. The construction of the Institute of Geophysics and Engineering Seismology was begun.

At the same time it was noted that the research connected with the forecasting of earthquakes is lagging excessively. There is no specific principle of the approach to the buildings and structures, which are being erected and exist, and to seismic stability. Steps on the protection of the population during a strong earthquake have not been formulated. The task was posed to establish under the republic Council of Ministers a permanent government commission, which would deal with all questions concerning earthquakes. A scientific council, which the problem council for seismology and earthquakeproof construction, which has been established in the system of the academy, could become, should operate under the commission. As to the problems of ecology, the speaker noted that in accordance with a joint decision of the presidium of the academy and the State Committee for the Protection of Nature a center of noosphere and ecological research has been established

under the Institute of Geological Sciences. An environmental protection program has been turned over to the Armenian SSR State Planning Committee, proposals on resource conservation and the use of nontraditional sources of energy were formulated and submitted to directive organs. The task of coordinating scientific research work within the framework of ecology was set for the center. The speaker noted that shortcomings and oversights also exist in the work of the presidium of the academy. The establishment of the scientific center of the Academy of Sciences in Leninakan is being dragged out, the network of scientific councils has not been revised, the monitoring of the fulfillment of adopted decisions has been relaxed. The decrease of the number of inventions being introduced is disturbing. From the standpoint of the development of foreign economic relations the role of inventions for the academy is substantial. They can become the basis for the establishment of joint ventures with foreign firms. For the purpose of taking advantage of these opportunities it is necessary to perform at institutes serious work on the patenting of valuable inventions abroad. Insurmountable departmental barriers are the cause of the low percentage of applied work and the poor organization of introduction. There are no practicable means of influencing production enterprises. Even in those instances, when introduce does not require great efforts, the matter is progressing with incredible difficulties. The story of the introduction of the proposal on the processing of the dust of cement plants and the production of construction brick from it is a classic example of the irresponsibility of ministries and departments of the republic. This proposal was repeatedly submitted to the republic State Planning Committee and was discussed in the Council of Ministers. However, these discussions, which continued for long years, concluded with the innovation being introduced outside the republic—at the Novorossiysk Cement Plant.

Emphasizing the importance of perestroika in the area of science, the speaker said that the breakdown of science into academic, sectorial, and VUZ [higher educational institution] science and by categories of remuneration and many other obsolete principles of the organization of science are paralyzing its development. As is known, the Armenian Academy of Sciences is among the strongest scientific centers of the country, in spite of this it, in the same way as the academies of other republics, is begging finances from the USSR Academy of Sciences for the support of its wretched material existence. This testifies to the need to organize science in a new way both in the USSR and in the union republics. We believe that the transformation of the USSR Academy of Sciences into the RSFSR Academy of Sciences will be conducive to this, real equality among the republic academies will thereby be created.

Corresponding Members of the Armenian SSR Academy of Sciences K. Karagezyan, B. Karapetyan, and G. Ter-Stepanyan, Academician of the Armenian SSR Academy of Sciences A. Gabrielyan, and S. Oganesyanyan, director

of the Institute of Geophysics and Engineering Seismology, participated in the discussion of the report.

It was noted that based on present conditions and the democratic processes, which are occurring in the country, it is necessary to achieve a certain decentralization in science. Now one should not continue to remain in the position, which is dependent on the center, in such matters, which, for example, the Higher Certification Commission or the pharmacological committee of the country manage. It is possible to have institutions similar to them in Armenia itself. The same thing also holds true for the financing of science. Under the conditions of cost accounting and self-financing it would be proper for this problem to be solved in the republic, particularly by its government.

A discussion that aroused interest developed around the problems connected with the natural disaster. First of all the intolerable slowness, which is being displayed in the establishment of the seismic network in the republic, is arousing anxiety. But without the establishment of this network it is impossible to carry out at a high level work for the support of the forecasting of earthquakes and earthquakeproof construction. Attention should also be directed to the improvement of the condition of buildings outside the disaster zone, particularly Yerevan. Our foreign compatriots are giving assistance in the performance of such work. The task is to see to it that their efforts, the allocated assets, and equipment would be used properly. Another important question, which requires special attention, is the preparation of the population for an earthquake. This work is being performed at a high level in a number of foreign countries, particularly the United States, Japan, and other countries. We should borrow their know-how and at the same time rely on our own. Now such steps are being undertaken at the Armenian Academy of Sciences, the corresponding materials and publications are being prepared. The main thing in this matter is: The work being performed for this purpose, in which 10 organizations are involved, should be coordinated, while the allocated small amount of assets should be spent efficiently and wisely.

Scientific reports were discussed at the assembly. The report of Academician of the Armenian SSR Academy of Sciences R. Varshamov was devoted to questions of the development of applied mathematics; he analyzed the peculiarities of its methodological development as the theoretical basis of information science. The report of Academician of the Armenian SSR Academy of Sciences S. Grigoryan was devoted to the scientific bases of geochemical methods of the prospecting of hidden deposits.

The presentation of awards of the Armenian SSR Academy of Sciences was held. Academicians of the Armenian SSR Academy of Sciences G. Garibyan and G. Dzhaikyan were awarded the Metserman gir certificate. Corresponding Members of the Academy R. Stambolt-syan and S. Arevshatyan and Doctors of Sciences E.

Vartanyan, M. Zadoyan, G. Aprikyan, and M. Satian received the Vastakagir certificate, the Povestagir certificate was presented to a group of scientists.

The assembly discussed the question of making changes in the charter of the Armenian SSR Academy of Sciences, as well as the statute on the election of the presidium of the Academy of Sciences.

Secretary of the Armenian CP Central Committee G. Galoyan and Deputy Chairman of the Armenian SSR Council of Ministers Yu. Khodzhamiryan participated in the annual assembly of the Academy of Sciences.

### Report on GSSR AS General Meeting

907A0272A Tbilisi ZARYA VOSTOKA in Russian  
22 May 90 p 2

[Article (GRUZINFORM): "The Times Dictate the Tasks. From the General Assembly of the Georgian Academy of Sciences"; first paragraph is ZARYA VOSTOKA introduction]

[Text] Scientific and technical progress determines the socioeconomic status of society. Basic research, the improvement of the mechanism of the introduction of new scientific developments, the devising of efficient technologies, the extensive introduction of computer hardware and automation equipment, and the development of priority directions are a necessary condition of the achievement of the economic independence of the republic. The participants in the annual general assembly to hear reports of the Georgian SSR Academy of Sciences specified for themselves the priority tasks facing Georgian science.

In opening it, Academy President Albert Tavkheldidze, winner of the Lenin Prize and the USSR State Prize, noted that the past year was a year of difficult ordeals for the Georgian people. The tragedy of 9 April, the fatal blows of the elements, which took human lives in Adzharia, and the incited ethnic conflicts in Abkhazia and Shid Kartli will remain in one's memory as an unhealing wound. But, as has already happened more than once in the history of Georgia, these events united the people even more on the path to the achievement of the main goal—the genuine political and economic independence of Georgia. The formed situation highlighted in a new way the role of Georgian scientists in the accomplishment of vital national economic tasks. Immense work on the devising of new machines and mechanisms, the development and extensive use in the national economy of computers, and the preparation of effective economic programs lies ahead.

During the past period associates of the humanities departments and institutes of the Academy of Science did much work. The State Program of the Study, Development, and Improvement of the Georgian Language was formulated and, after national discussion, was approved. An editorial council for the speeding up of the compiling and publication of a historical etymological

dictionary of Georgian was established under the presidium of the republic Academy of Sciences. The new state program, which was formulated by specialists with allowance made for the present national movement, poses in a fundamentally new way the questions of scientific research and the teaching and popularization of the history of Georgia. Monographs, which are of great interest for the more in-depth study of the urgent issues of the Georgian humanities, were published.

The changes affected all the activity of the academy, which has changed over to new methods of the planning and financing of research. Republic basic research programs were established. In them basic attention is devoted to the development of the priority directions and fields, which will help to solve the vitally important problems of the economy of Georgia. Economists, demographers, and sociologists have much to do so that the emerging changes would not destabilize but, on the contrary, would consolidate even more the economy of the republic. The computerization of scientific institutions is necessary for the conducting of research at a modern level. During the past period more than 2,000 personal computers were acquired, but this, of course, is insufficient. Serious work on the strengthening of the material and technical base and the supply of academic institutes with the latest equipment lies ahead.

The structural changes in the system of the Academy of Sciences in connection with the broadening and specification of the themes of research led to the establishment of new scientific centers. At the present stage it is also necessary to develop the scientific potential in cities of the republic. An affiliate of the Georgian State Museum imeni S. Dzhnashvili and a subdivision of the Institute of Mathematics have already been established in Zugdidi. The activity of the Kutaisi Scientific Center will be expanded significantly, affiliates of individual institutes will be opened in Bogdanovka and Akhaltsikhe. It is necessary to give the utmost support to the centers of science in the rayons, where new scientific personnel, to whom the interests and problems of their region are close, are growing up.

Academician Secretary of the Georgian SSR Academy of Sciences Leo Gabuniya and Academy Vice Presidents Givi Sanadze, Andrey Apakidze, and Iveri Prangishvili submitted for discussion accountability reports on the basic scientific achievements during the past year and the tasks for next year and addressed the assembly.

The ecological situation, which has formed in the republic, cannot but cause alarm. An ecology council and sections, which took an active part in the formulation of an ecological research program, were established under the presidium of the Academy of Sciences. In the very near future it will be published, and specialists will be able to familiarize themselves with it. The commission for the comprehensive study of mountainous Georgia is fundamentally augmenting this work. At the demand of ecologists the implementation of several ill-considered departmental decisions was halted.

It is no secret that the republic does not have enough foreign currency. It is needed not only for the purchase of necessary equipment, but also so that our young personnel would do practical studies at well-known scientific centers abroad. Therefore, direct ties with these centers and firms and joint ventures will help in part to solve the problem. As never before the republic needs skilled scientific personnel precisely now, when it has to solve many serious problems on the path to the achievement of full economic sovereignty.

Democracy and glasnost, which are now characteristic of our entire life, also appeared clearly in the statements of the scientists who took part in the discussion. Many critical remarks and suggestions to eliminate several structures of the Academy of Sciences and bureaucratic obstacles, which are still occurring in science and are hindering sound work, and to improve publishing activity, the scientific certification of associates, and the work of the Higher Certification Commission were voiced. Nearly all the speakers devoted attention to ecological and socioeconomic problems. Their solution should become one of the chief tasks of the scientific community of the republic.

#### **Composition, Functions of RSFSR AS Founding Committee**

*907A0204A Moscow SOVETSKAYA ROSSIYA  
in Russian 13 Apr 90 Second Edition p 1*

[Interview with Vasily Georgiyevich Zakharov, deputy chairman, RSFSR Council of Ministers: "Our Academy"; first paragraph is SOVETSKAYA ROSSIYA introduction]

[Text] Scientists and workers in science, engineering and culture of the Russian Federation have long raised the question of the need to create a republic Academy of Sciences, which is especially topical today, on the threshold of the republic's economic sovereignty. As a result, as everyone knows, the RSFSR Supreme Soviet Presidium founded the RSFSR Academy of Sciences. As the next step, the RSFSR Council of Ministers Presidium passed a number of practical measures to form the Russian Academy. A member of the work group of the RSFSR Supreme Soviet Committee on Science and Technology, V. Zakharov, deputy chairman of the RSFSR Council of Ministers, discusses this:

**SOVETSKAYA ROSSIYA:** Vasily Georgiyevich, our newspaper has already explained in detail the tasks of the members and founders of the Academy. How is the formation of its staff proceeding now?

**V. G. Zakharov:** On the basis of the personal agreement of each person... Since it is assumed that the RSFSR AS [Academy of Sciences] now being created will rely in its activity primarily on the scientific potential of the regional departments and scientific centers of the USSR Academy of Sciences and the institutions of higher education and sectorial science, subordinate to the RSFSR Council of Ministers, members of the USSR

Academy of Sciences who are part of these structures and institutions are being invited to join the founders.

Moreover, in order to reinforce the humane orientation of work by the RSFSR AS, members of the USSR AS who belong to the USSR AS Presidium departments of history, literature and language and who have made a great contribution through their works to the study of history, culture, literature, and languages of the peoples of the Russian Federation are being invited to join the founding members. Suggestions concerning specific candidacies are coordinated with the leadership of the indicated departments.

In order to ensure proper coordination of the scientific activity of the RSFSR AS with the USSR AS and the coordination of work related to the training of scientific cadres with higher skills, leaders of the USSR AS and scientists from a number of Union republics are being invited to join the founding members. Finally, in order to organize and conduct work to form the RSFSR AS, the staff of the Constituent Committee, headed by Academician V. Koptug, USSR AS vice-president and chairman of the Siberian Department of the USSR AS, has been approved.

**SOVETSKAYA ROSSIYA:** And its function is?

**V. G. Zakharov:** The RSFSR Academy of Sciences is being created on a new organizational basis with the extensive use of democratic principles. The Academy's Constituent Committee should also implement these principles and, based on social principles, should perform the functions of the Academy presidium in the period until the first elections in 1991. The RSFSR Council of Ministers has instructed this committee to form the staff of founding members and present it for approval, and to draw up proposals for the draft statutes of the RSFSR Academy of Sciences, resolutions on elections and on regional scientific coordinating councils and sections in the corresponding scientific fields and directions of the RSFSR Academy of Sciences Presidium, and other regulating documents.

Representatives of academic, VUZ [higher educational institution] and sectorial science, recommended by scientific collectives from the eleven economic regions of the Russian Federation, representatives of the USSR AS Presidium, leaders in a number of republic and Union departments, and leading scientists in the fields of culture, history, language and literature have joined the Constituent Committee itself. These include Academician N.D. Kuznetsov; S.P. Merkuryev, presidium chairman, Kuybyshev Scientific Center of the USSR AS, corresponding member; V.Ye. Alemasov, rector, Leningrad State University, corresponding member; A.A. Logunov, presidium chairman, Kazan Scientific Center of the USSR AS, academician; D.S. Likhachev, vice-president of the USSR AS, rector of Moscow State University, academician; and V.V. Piotrovskiy, V.A. Rybakov, N.P. Vekhtereva, and others. The committee has 27 members in all.

**SOVETSKAYA ROSSIYA:** At times, one hears the opinion that the Russian Academy will be yet another administrative structure similar to those already existing in terms of form, and that the broad scientific community will not be involved in its formation....

**V. G. Zakharov:** The Russian state does not plan to dictate any conditions whatsoever to the republic's scientific society concerning the structure and way to organize scientific work: This is a job, above all, for the scientific community itself. The process of forming the Academy is only beginning and will continue not from above, as some people imagine, but from below, coming from the scientific collectives to the regional structures and further on up to the scientific sections of the future RSFSR AS Presidium. At this stage, one of the tasks of the Constituent Committee is also to formulate the conditions for shaping the academy's regional councils, which would include the best representatives of academic, VUZ and sectorial science, located in one or another economic region. Consideration and analysis of proposals from below will enable the members of the Constituent Committee to prepare drafts of the necessary documents, the passing of which will be possible only after their broad discussion with the scientific community of Russia. Everything is being done so that the most talented scientists, concerned about the fate of Russia, will be part of the RSFSR AS.

**SOVETSKAYA ROSSIYA:** Incidentally, how many members will there be?

**V. G. Zakharov:** Proceeding from the available scientific potential in the territory of the Russian Federation, from comparative analysis of the number of members of Union and republic academies, it is deemed expedient to establish a membership in the RSFSR Academy of Sciences of 500 people. Elections to the republic Academy are to be held in three stages, starting in 1991, at two-year intervals. Not only the founding members will participate in making up the cadre of the Academy, but also doctors of sciences, delegated by regional councils. Only then will it be possible on a democratic basis to form the leadership of the RSFSR Academy of Sciences and elect its president, vice-presidents and chief scientific secretary on an alternative basis.

The RSFSR Academy of Sciences is being created not as an alternative to the existing order of academic science, but as a new organizational form for integrating the scientific potential of the Russian Federation, which will constantly coordinate its activity with the USSR Academy of Sciences. The academy that is being created will focus its efforts on solving the most important and urgent problems of state significance, which have accumulated in the republic, in both basic and applied research, as well as in economics, culture, history, language and ethnic relations. Naturally, the republic government will grant the RSFSR AS the necessary financial and material assistance.

**Report on Tajik Academy of Sciences 1990  
Annual Meeting**

907A0237A Dushanbe *KOMMUNIST*  
*TADZHIKISTANA* in Russian 11 Apr 90 p 2

[Article by T. Karatygina: "Science: In Search of Renovation"; passages in boldface as published]

[Text] Today, when society finds itself in a complex, strange situation demanding bold, urgent decisions, the natural question asked of scientists is: What is your place, your role in perestroika?

As never before, society needs a scientific analysis of the processes of perestroika, especially of the economic reform and its links to transformations in the political system, as well as the interpretation and reassessment of former concepts in the social sciences.

Production workers are making exacting demands of scientists, expecting effective developments from them, capable of raising the republic's economy to a qualitatively new level.

How effectively are republic scientists participating in solving the problems of perestroika and renovating society, and how is the chief scientific headquarters, the Academy of Sciences, operating under the new conditions? These questions were the topic of the annual general meeting of the Tajik SSR Academy of Sciences [AS].

The opening speech by S.Kh. Negmatullayev, TaSSR AS president, a report by M.R. Dzhalilov, chief scientific secretary of the academy presidium, and speeches by scientists answered these very topical questions, dictated by life.

The times have demanded the restructuring of science itself. Now, its image is being determined by the democratization of scientific and organizational life, new ways and mechanisms for organizing research, and conversion to a new system for financing and planning research. All this has also entered the life of the republic Academy of Sciences. The presidium was reorganized and its new members were elected. Instead of department academician-secretaries, department bureau chairmen were introduced, whose powers were transferred to the vice-presidents-managers, and the autonomy of the scientific subdivisions was increased.

The main concerns of the academy presidium included the concentration of efforts on the priority directions of scientific exploration; scientific support for key trends in developing the republic's economy; and raising the level and results of research.

Science can develop only through a struggle of ideas, through competition and cooperation among scientific programs, with the development of competitive principles in scientific research. The granting of autonomy to scientific subdivisions in solving problems and disposing of finances and material resources has had its results. Many talented scientists, authors of original ideas, were

brought to light. The participation of most scientific institutions in fulfilling the USSR Academy of Sciences priority basic research programs has become an important factor.

The scientists actively participated in working out the draft Concept for Development of the Republic Under Conditions of Self-Management and Self-Financing and other fundamental documents, as well as in substantiating the conversion of the economy of a manpower-rich region to a predominantly intensive path of development.

Their contribution to drafting the Law on Granting State Status to the Tajik Language and to measures for its optimum implementation is invaluable.

In meeting the needs of industry, the scientific collective proposed a number of valuable methods and developments. Last year, 154 economic contracts were fulfilled, amounting to 3.5 million rubles. Forty proposals were applied in the economy with a real economic effect of 4 million rubles, for which basic credit is due to scientists at the institutes for plant physiology and biophysics, zoology and parasitology, chemistry, and gastroenterology, and to the Department of Genetics.

Invention activity became more active. The State Committee on Inventions and Discoveries received 106 claims for proposed inventions. Fifty-four author's certificates and 77 positive decisions were issued, and 12 inventions were applied, the economic effect of which amounted to 550,000 rubles.

However, as noted at the meeting, the academy's basic task is to develop basic knowledge which determines the rate of scientific and technical progress. A pragmatic attitude toward science is fraught with the danger of its curtailment. Basic science, above all, needs financing.

However, financing and material and technical base of academy scientific institutions is a most vulnerable sore spot. The budget of the TaSSR AS is less than that of the Estonian or Armenian academies by a factor of 3 and 3.5, respectively. One comment at the meeting sounded like a bitter aphorism: "We have science according to funding."

Science's needs in the republic are not taken into account. The 1980 resolution by the Tajik CP Central Committee and TaSSR Council of Ministers on the further development of scientific research and the strengthening of the material and technical base for the Academy of Sciences called for the construction of buildings for the institutes of geology and of gastroenterology, a laboratory building with a greenhouse for the Institute of Plant Physiology and Biophysics, a building for model systems for the Institute of Chemistry, and other buildings. Yet, except for a building for the Institute of Geology, none of the projects at all have been put into commission.



In speaking of expanding ties between scientific institutions in the republic with those in the republics of Central Asia and Kazakhstan, the speakers noted a need to improve the coordination of scientific research. It is paradoxical: To this day, the Coordination Council essentially has no official status.

The high role of the natural and technical sciences and of the humanities in renovating society is unquestionable. However, the speakers emphasized, the process of renovation can be influenced only under the conditions of reviewing former concepts, reassessing values and eliminating stereotypes, especially in the social sciences, which are called on to reveal the objective laws of social life, with all its contradictions.

"We should consider to what extent that which we have achieved conforms to the parameters of a socialist society," said G.A. Ashurov, corresponding member, leading scientific associate at the AS Department of Philosophy. "National self-awareness, the historical memory of the people and ethnic interests are concepts that were consigned to oblivion, that did not receive rights of citizenship. The present requires an emancipation from dogma and scholasticism, a rejection of mindless quoting from the classics, of the superficial commenting of party documents. We should aim at concentrating efforts to understand the laws of society's development.

"While sharing thoughts on the need for decisive renovation of methodology, I would like, in addition, to emphasize the importance of a cautious attitude toward the Leninist legacy," said B.I. Iskandarov, republic AS member. "We must not allow defamation of the Leninist teachings, the use of quotations for purposes of spreading darkness. In raising the cultural level of our people and the role of the native language, we should not forget, in addition, the role and significance of the Russian language, which has opened access to the treasury of world culture.

"The course of perestroika," in the opinion of Sh.R. Rustamov, head of the linguistics department, Institute of Language and Literature, "is determined in many ways by the condition of a society's culture, for which the intelligentsia acts as the medium, the propagandist. Today, a lofty mission, related to implementing the law to grant state status to the Tajik language, has been set on the intelligentsia. For now, the first steps have been made in this direction. We should promote the work of the committee on terminology, called on to guard the purity of the native language."

Continuing this thought, K.S. Ayni, head of the Department for Study of Manuscripts, AS Institute of Eastern Studies, suggested making the Terminkom (Committee on Terminology) a state committee on terminology, whose decisions would be mandatory for everyone. This would rule out distortions of the language, which are allowed rather often in the press. "The scientist stressed the need for urgent improvement of the storage of

unique Eastern manuscripts, which are now in catastrophic condition at the Library imeni Firdousi.

Many of the speakers were concerned about the question raised by Sh.R. Rustamov and supported by K.S. Ayni, G.A. Ashurov and other scientists, regarding the intelligentsia's damaged position in society. Ignorance, a lack of desire to consider its opinion, and underestimation of its role as the barometer of social climate, in the speakers' opinions, in many ways provide a key to understanding the causes of February's events in Dushanbe.

How could it be, the question was asked, that there are no representatives of the intelligentsia in the republic's Supreme Soviet: no economists, jurists, sociologists, and legal or political scientists? How will legislative creativity be implemented? The question has been raised. There is no answer for the time being.

Kh.Kh. Karimov, director of the Institute for Plant Physiology and Biophysics, devoted his speech to ecological problems. The ecological situation in the republic borders on the extreme, but the academy does not have a thorough analysis of the ecological condition in all zones of the republic at its disposal. The scientist suggested devoting a special session of the academy to ecological problems, where the views of specialists from all sectors could be considered and effective measures to improve the land, water and atmosphere could be drafted.

Chemical problems in the ecology were reflected in the speech by P.M. Solozhenkin, department head, Institute of Chemistry imeni V.I. Nikitin, and academy member, who gave specific examples of the profitability of waste-free technologies which, unfortunately, are not being fully utilized. Chemists are ready to provide the economy with the necessary adsorbents for purifying water, which is of first-priority significance under the republic's present conditions. P.M. Solozhenkin cautioned against hasty, ill-considered decisions to build a number of water pipelines, especially the Siaminskiy, which are fraught with serious ecological consequences.

The importance of the most extensive use of information science and the computerization of scientific research was emphasized by corresponding member D.Kh. Karimov. In studying the February events, he said, computer equipment helped forecast the political situation in the republic. There is an pressing need to create a scientific association on information science. Speaking from the position of a party leader, D.Kh. Karimov, Dushanbe Party Gorkom first secretary, expressed his ideas on the more active use of new forms of work by the academy's party organization. In certain enterprises in the city, councils of secretaries of the primary party organizations were created instead of the traditional party committees. Possibly, such a structural form would be acceptable to the academy communists as well.



Many speakers raised the question of training scientific cadres, who are science's tomorrow. In 1989, ten doctoral and 50 candidate dissertations were defended. However, the plan for accepting graduate students was fulfilled only by 70 percent. Essentially, only one person in five successfully finishes graduate school. This attests to poor supervision of the graduate students' work and to the scientific leaders' lack of attention to their students.

The question of the social welfare of scientists, of unsubstantiated differences in earnings for associates of scientific institutions in the TaSSR and for those in other republics, was prominent at the annual meeting. This situation is an anachronism and should be eliminated.

In connection with expanding international scientific ties and increasing the number of trips to international conferences and symposia, it was suggested, on the example of other Union republics, to create a republic Council of Ministers hard-currency fund for financing scientists' trips abroad.

K. Tashripov, a graduate student at the Mathematical Institute with a VTs [computer center], dormitory council chairman, spoke of the difficult living conditions for graduate students. His speech evoked responses from the meeting presidium, the essence of which is as follows: Why did the young scientists speak out in the youth newspaper, claiming that money was found for repair of the AS Presidium building, but not for improving the dormitories.

Naturally, a question arises: Is the graduate students' appeal in the newspaper really cause for reproach? Or are conditions at the dormitories better? No, little good can be said about them.

The graduate students' lack of information and the fact that they did not know that the repairs to the AS Presidium building were done by the gorispolkom with its own funds, and that, at the president's insistence, a 75-apartment building had recently been put at the disposal of young scientists, or that yet another is being built, is another matter. Apparently, one of the notes sent to the presidium was no accident: "What kind of glasnost is there in the work of the Academy of Sciences Presidium?"

These are different problems, but they speak of one thing: the scientific collectives' insufficient level of information about the academy's life. Yet, now is no time for such omissions.

The meeting approved the report on the academy's work over the past year and passed the 1990 plan for scientific research work. A noteworthy feature of the plan is the fact that basic research will be financed on a competitive basis by a council of experts under the republic Council of Ministers, made up of a number of presidium members and leading scientists of the republic. The creation of new institutes for manuscripts, ecology, philosophy and law was suggested.

The presentation of diplomas and medals to scientists who had earned the title of winners of the TaSSR State Prize imeni Abuali ibn Sino, as well as Academy of Sciences diplomas for young scientists and students for the best scientific works in 1989 was held.

A.D. Dadabayev, Tajik CP Central Committee secretary, and O. Latifi, deputy chairman, TaSSR Council of Ministers, spoke at the meeting.

### Increased Democracy Seen in UkSSR AS Elections

907A0271A Kiev PRAVDA UKRAINY in Russian  
19 May 90 p 3

[Article by RATAU correspondent A. Chirva: "The Difficult Path to the Title"]

[Text] It appears that the Ukrainian Academy of Sciences is changing from a kind of private club, the members of which themselves previously elected each other, into a public club for the eyes of the scientific and technical community at large. Having adopted the concept of infrastructural transformations, it has taken the next step: The election of full members and corresponding members was conducted in a new way. Candidates were nominated not only by the scientific councils of institutions of the Academy and higher educational institutions, but also by state and public organizations. On the average four people sought one position of academician. For future corresponding members the situation was more complicated than that: eight candidates per vacancy. In short, it worked out with the figures. But how is it with genuine democracy and objectivity?

The beginning of the meeting of the Physical and Technical Problems of Materials Science of the Ukrainian SSR Academy of Sciences, which was being conducted, like all others, in public, did not promise the existence of an alternative. Academician Secretary I.K. Pokhodnya had only to announce the first vacancy for the title of full member of the academy and to name just one candidate for it—Corresponding Member of the Ukrainian SSR Academy of Sciences M.I. Gasik, when two men waved their hand and left the hall. Competitors were also not found for the only candidate for another vacancy—V.V. Skorokhod, deputy director of the Institute of Problems of Material Science of the Ukrainian SSR Academy of Sciences.

From the uproar of the "free audience" it became clear: Explanations that are not importunate are required. The person presenting the candidates and those, who wanted to express their opinion on the candidates, emphasized that the scientists who remained had gone through a very tough competitive struggle. For this year several institutes had nominated nine to 10 people each, who were worthy of the lofty title. The competitors were "road tested" in the expanded scientific councils of not only their own, but also other institutes and in the presidiums of the scientific councils of both the republic and the

union academies. An expert commission, of which representatives of organizations, which are independent of each other, became members this year, worked actively. And it turned out that as a result of extensive discussions on each of the two named vacancies one scientist each came out the winner.

Incidentally, the situation with the third vacancy dispelled the last doubts. Four corresponding members of the Ukrainian SSR Academy of Sciences simultaneously sought it. To whom is preference to be given? Neither the preliminary discussions among the scientific community nor the expert commission gave an answer to this question. They decided: Let voting clarify everything.

But before this it is necessary to do everything so that there would form among everyone present a definite opinion about the candidates. Each speaker, so that his liking would win, spared no epithets and lists of services of scientists. The situation is indeed a complicated one.

Is everything, perhaps, explained by the promise, the freshness of the scientific direction? All the candidates—V.I. Makhnenko, O.N. Romaniv, A.F. Aksenov, K.D. Tovstyuk—in material science and the strength of materials each expressed their opinion. There are many works, monographs, certificates for inventions, and practical results. Would international recognition, perhaps, distinguish someone?

The conference participants decided to take a vote. Vladimir Ivanovich Makhnenko, director of a division of the Institute of Electric Welding imeni Ye.O. Paton of the Ukrainian SSR Academy of Sciences, gained the victory on the long path with many difficulties to the title of academician.

The same day at the meeting of the department, eight new corresponding members of the Ukrainian SSR Academy of Sciences were also elected. Incidentally, 48 scientists fought for this title.

**Marchuk, Academicians Field Questions on Major S&T Issues**

907A0273A Moscow PRAVDA in Russian 8 Jun 90  
2nd edition p 3

[Report by I. Mosin and S. Soldatenkova on meeting of a group of scientists headed by President of the USSR Academy of Sciences Academician G. Marchuk with PRAVDA readers at the Atomic Energy Pavilion of the Exhibition of USSR National Economic Achievements during the PRAVDA Festival, under the rubric "This Was Spoken About at the PRAVDA Festival": "Scientists Dream"; date not given; first paragraph is PRAVDA introduction]

[Text] The Atomic Energy Pavilion, which the science department of the editorial board "seized," was one of the points of intellectual attraction of the PRAVDA festival at the Exhibition of USSR National Economic Achievements. A "team" of leading scientists of the country headed by President of the USSR Academy of Sciences Academician G. Marchuk came to a meeting with readers of the newspaper. The discussion about the most topical problems of modern science turned out to be exceptionally pointed, frank, and constructive. Precisely for this reason we are offering a short verbatim report of it. PRAVDA science department editor V. Gubarev and Academician G. Marchuk conducted the meeting.

**G. Marchuk:** We made an expert evaluation of the scientific potential of the large academy, the President of the USSR Academy of Sciences began the discussion. Approximately 45-50 percent of our research is at the world level, 20-25 percent exceeds the international level. These for the most part are theoretical directions, which do not require large experimental expenditures.

Most regrettably, in approximately 30 percent of our research we actually lag terribly. For the most part these are directions which are connected with experimental work. The real, comprehensive, but not sporadic, remainder retooling of our institutes for a long time has been an idealized dream of the Academy of Sciences. True, if we are to be fair, it must be said that the government recently allocated an additional 500 million rubles for basic research. This is a substantial material base for many initiatives of large-scale science.

I believe that the logic of the development of modern science also suggests that it is impossible to embrace the boundless. We should choose the directions in which we are capable of leading. Wherever we cannot, we should cooperate with colleagues from other countries and mutually enrich each other.

If we talk about our sore spots, one of the perpetual themes is the problem of introduction. Just think: 50 percent of our results, which have come from laboratories and have a good future, are not claimed. This is a major problem, which under the new conditions of

management we should solve without fail. One of the means is the establishment of joint ventures.

**Question from the hall:** Tell us about the situation, which is forming with the republic academies, particularly with Lithuania.

**G. Marchuk:** There happened with Lithuania what should not, in my opinion, have happened. The Academy of Sciences in Lithuania in its intellectual potential and material supply is a very good one. Many efforts and assets have been invested in it. During the period of the present political transformations Lithuanian scientists came to the conclusion that they need to raise science and at the same time to be independent of society.

I will recall that in bourgeois Lithuania there was no Academy of Sciences: Its establishment is the service of the Soviet state. How will it go on living? Frankly speaking, I do not know. The situation is complicated and hard to predict. Recently the presidents of the Baltic academies were here with me and spoke about the fact that we must continue to cooperate in any situation on the basis of contracts.

**Question from the hall:** How will the sectorial academies develop in the context of the general changes that are occurring in the country?

**G. Marchuk:** The sectorial academies are, let us say frankly, in a very serious state. I believe that it is possible to give them a stimulus for development by the integration of various scientific forces. Now, for example, they have come to an understanding with the chairman of the State Committee for Science and Technology that for the next five-year plan joint programs will be developed. The USSR Academy of Sciences, all the sectorial academies, VUZ scientific forces, and representatives of sectorial science will be included in them on equal terms. I believe that it is necessary to cooperate in material resources. That is, to solve the problems, for which specific finances, limits, and equipment are being given. But, I believe, we must settle in a more basic manner the question of the cooperation and interrelations of our academies.

**Question from the hall:** What does the academy think about biofields, the unusual capabilities of people?

**G. Marchuk:** I believe that in this problem there are grains of sense, on which it is necessary to work. Take the same Dzhuna Davitashvili. We organized at one of the first-class institutes experiments, which helped to reveal the phenomenon of Dzhuna, Kulagina, and Kuleshova. On the basis of the experiments physicists showed that practically any person can do everything that they do. Specific capabilities are incorporated in each of us. One person has more, another has less.

So-called biofields are ordinary physical fields. Under certain conditions they have an effect on the body. It is necessary to work on these phenomena, to study their

mechanisms. But among the present phenomena there are many fraudulent things, which they are trying to present to society under the guise of science and a scientific appearance. Here it is necessary to separate very precisely the wheat from the chaff.

**Question from the hall:** Can scientists answer how our society is to proceed and in what direction?

**Academician V. Kudryavtsev:** It is a difficult question—in what direction to proceed. It is necessary to seek an answer to it, I believe, not only from scientists, but also from politicians and all of society. If we speak more specifically, this is a task, in particular, of the social sciences. Unfortunately, it must be admitted that economists have not been able thus far to formulate an optimum program of what direction to develop in now and how. If we talk, in particular, about sociology, without which it is also impossible to make forecasts, for a long time it was considered all but a crime to devote oneself to this science.

The development of all these directions: sociology, psychology, political science, economic science, and jurisprudence, is needed in order to proceed. Unfortunately, dogmatism, excessive ideologization, and the inadequate financing of these sciences have led to a certain stagnation, a certain lack of development of social thought of the country. Precisely you and I are reaping the fruits of all this. I hope that in the future scientists will be able to meet better the needs of society for social forecasts. The main thing is that today many obstacles in the way of the development of the social sciences have been eliminated.

**Question from the hall:** When will academicians under the age of 30 appear at the large academy?

**Academician A. Migdal:** I want to talk about one very widespread misconception which is connected with the age of a scientist. What is basic science? It is the science that forms the basis of knowledge. For example, in the field of physics it studies the profound questions of the natural science of the development of the universe, how the world is constructed, and what happens at extremely small distances. Such a science does not have a direct projection onto everyday life.

So then, basic science is made, as a rule, by young people. For example, let us take the area of extremely small distances. Now we have come to the conclusion that our space at its basis is ten-dimensional, not four-dimensional, as it seemed previously. See what profound changes are occurring. And this science is being made mainly by young people. A 40-year-old person is considered here not to be young. We need to seek talented people. The main hope that the large academy will not remain without a future, lies in them.

**Question from the hall:** How do you intend to combat the brain drain?

**G. Marchuk:** It has already begun in our country. Talented young people who are approximately 30 years

old—this is the most active age for a scientist—are now actively leaving for some time on invitation for the West. There they work, as you are aware, in very good laboratories and under very good conditions, enriching our foreign colleagues with their ideas.

But in recent times the opposite trend has emerged. In recent years the influx of scientists from other countries to our country has increased from 2.5-fold. In short, on the one hand, a portion of the brains “is flowing out,” but a portion also “is flowing in.”

Such contacts are of great benefit. As I have already said, we cannot be in the lead in all directions. Therefore, contact with colleagues, who have forged ahead, is doubly valuable. Now the time has come to unite and cooperate. It is impossible for one country to be in the lead in all directions, however powerful it is. And is it necessary to? The exchange of scientists, in addition to everything else, is helping us gradually to get used to the world community.

**Question from the hall:** The Law on the Income Tax has been published—Is it not a new blow, particularly to scientists? I have in mind the part which talks about the collection of the tax from the aggregate income.

**V. Kudryavtsev:** This is a problem of the entire population of the country. It is necessary to sacrifice something, and scientists cannot be left out, cannot be in some special position. We are citizens and should obey the legislation which applies to the worker, the kolkhoz farmer, the employee, and the engineer. I believe that it is not worth starting again the discussion about any privileges.

I am certain that at the same time it is necessary to increase the wage of scientists. Now a junior scientific associate receives less than a bus driver. The problem lies here, not in the principle of taxation.

**Question from the hall:** We are heading toward an ecological catastrophe. Why are scientists keeping silent?

**Academician B. Laskorin:** It surprised me somewhat that a question of ecology did not come up immediately. Usually during meetings such disputes begin at first. Priority in basic questions of ecology and in the posing of the problem of the survival of mankind belongs to our domestic science. V.I. Vernadskiy, the founder of the doctrine of the biosphere, more than 70 years ago drew attention to the fact that if we want to develop normally further, we should think in earnest about the interaction of the biosphere and the technosphere. If the technosphere is not developed on intelligent principles, the death of everything living on earth is inevitable. It is now clear to everyone that the primary problem of world science is the problem of the elimination of the antagonistic conflict between nature and man.

Often they consider the Academy of Sciences to blame for the fact that at one time it allowed the implementation of a number of ecologically harmful projects. Even

during the most difficult times, when glasnost was in disgrace, 17 members of the Academy of Sciences came out against the construction of the Baykal Pulp and Paper Combine. However, at that time, unfortunately, they did not listen to the opinion of the scientists. A similar incident occurred with the hare-brained plans of the diverse of northern and Siberian rivers. A large group of scientists of the Academy of Sciences came out against them with the substantiation of the unsoundness and ecological harmfulness of these plans. But this demarche was also ignored. Under the pressure of several former Politburo members on central organs what was called "the project of the century" began to be implemented.

With the participation of the current president there was established at the Academy of Sciences a large ecology commission, which as a result of a persistent struggle achieved the repeal of this decree. But the administrative command system has incredible forms of tenacity, survival, and the pushing through of its methods and ideas. In spite of the fact that there was a general decree, a portion of this project, I have in mind the construction of the Volga-Chogray and Volga-Don canals, continued to be implemented.

**G. Marchuk:** Many people do not know a dramatic event from the life of the Academy of Sciences. In 1964 the plan of the Nizhneobskaya GES, which should have flooded practically all of Western Siberia, was completed. Scientists, as they say, fought to the last ditch against this plan. And Kosygin was forced to cancel it, although 1.5 million rubles had already been spent on design work. This was, perhaps, the greatest battle for the environment after Baykal.

**Question from the hall:** Does there exist in our country such a sector as scientific instrument making?

**G. Marchuk:** We lived in a society, in which the plan was a law. Previously in the plan there was a column—instrument making, including scientific instrument making—such and such an amount. In some incomprehensible manner scientific instrument making disappeared, and only a line on instrument making remained. The academy began to receive an enormous quantity of unnecessary instruments. While the production of those, which were actually necessary: electron microscopes, paramagnetic resonances—was cut back. So one line wiped out all scientific instrument making.

We were forced several years ago at the Academy of Sciences to establish plants for the production of scientific instruments of the highest level of complexity. Now the products of these plants have also begun to be in demand on the world market. The instruments are sold for foreign currency, for which it is possible to buy the lacking equipment. But in the long run this is not the solution. A state approach is needed in the settlement of this question.

**Academician V. Kabanov:** Returning to the theme of the brain drain, I believe that the impossibility to conduct

here experiments at the level, at which in general experimental science should exist and operate today, is becoming for many scientists the basic stimulus to leave.

Allow me to share several observations. However strange, there is no brain drain from well-equipped laboratories. My subdivision, fortunately, is among precisely such ones at Moscow University. And I have before me a living example. One of my young associates, who should now complete his doctoral work, worked for two weeks at the Pasteur Institute in France. A prestigious offer was made to him—to remain for a year in France and to engage in interesting work. But he declined and came back. For me this would be a waste of time, he gave as reasons for his rejection. You would be better off sending there even younger scientists. This would be useful for them. While I will merely lose speed. In short, I am certain that the supply of our experimental laboratories with advanced experimental equipment might actually be one of the basic counteractions against the brain drain.

We often curse our science. I would like to draw attention to the fact that a brain drain cannot occur in a country which has poorly developed science. A brain drain occurs wherever they cannot properly finance science, wherever scientific research does not find proper recognition, appreciation, and support. As is known, a similar process occurred in Europe after the war. But many scientists later returned to their homeland. Our society, unfortunately, today is also not in the mood for science for many reasons. But I hope that sooner or later we will still turn to face it, otherwise we will not enter the next century in a fitting manner.

**Academician A. Migdal:** I want to add a little with regard to this question. The brain drain is also a result of the change of our policy of contact. The people, whom they ask and who are needed, go there. As a result the prestige of our science increases. Recently I spent 2.5 months in America and experienced this. There even simply affiliation with some good domestic institute is already a good sign.

Now the nature of scientific contact has changed appreciably. It has become more extensive. Our scientists, who go abroad, all the same remain Soviet scientists. They send from there for their colleagues, establish contacts, and increase their skills. In short, one of the new elements of global cooperation emerges and, it seems to me, this is not that bad.

**Question from the hall:** Does it not seem to you that in our country a system for seeking talented people is lacking? And large-scale science will become depopulated.

**Academician L. Keldysh:** In speaking about the problems, which have been touched upon here, I would like to note: We have a very significant shortcoming in the entire organization of our scientific activity. This is the discontinuity of basic science and the higher school. In

the world science of the highest class is made at universities. In our country it turned out historically that the system of higher education is one thing, while basic science is another. In developed countries the typical research unit, which advances science, is a professor and a group of five or six students. In our country students are in one place, professors are in another. Therefore, for the Academy of Sciences, in my opinion, the roots in replenishment with young people have essentially been cut off.

It is well known that universities, as a rule, strive to retain the best graduates. The academy far from always obtains talented reinforcements. This, incidentally, also applies to the question of when an academician under the age of 30 will appear here. So that 30-year-old academicians would be obtained, they should engage in real scientific work, not in preparation for it, and as early as possible, already in the second and third years. Here the situation is completely different.

For a long time scientists were prohibited to teach at higher educational institutions through the combining of jobs. It is a quite absurd thing: They combated the combining of jobs as nonlabor income. In reality these were bans on the contact of active scientists with young people. Now, it seems, the bans have been lifted, but the positions of instructors are filled. Therefore, in my opinion, the basic problem, which no decrees can solve, is the integration of basic science and higher education.

**Question from the hall:** Academician Marchuk said that 50 percent of the ideas turned out by the academy are not being introduced. Is there a way out of this situation?

**Academician V. Osiko:** Joint ventures are being established, bilateral cooperation is being expanded, scientific cooperatives have appeared. But it seems to me that these forms are as if also promoting the use of inventions and developments mainly in foreign countries, not in our country.

The situation is changing little by little in connection with conversion. Many enterprises and design bureaus of defense sectors have begun to take our developments more willingly. But here many problems are again arising. For example, an enterprise takes some development of the academy and poses the question: Either turn this development over to us or pay money in order to take part in moral and material sharing. It seems to me that as long as the state monopoly system is retained for the implementation of industrial developments, we will not get out of this situation. The way out lies in competition and the interest of enterprises in new ideas.

Academicians N. Lyakishev and V. Subbotin and Corresponding Member A. Makarov also took an active part in the discussion.

### Cooperative Workers Answer Questions on Movement

907A0259A Moscow *TEKHNIKA I NAUKA* in Russian No 4, Apr 90 pp 39-40

[Article by S. Bykova, candidate of philosophical sciences: "Social Portrait of an Engineer. In Freedom—To Refuse?"; passages in boldface as published]

[Text] There are many emotions on the subject of cooperative workers. Yet there are no scientific, impartial data. To make up for this, there are many arbitrary decisions. For instance, there is the recent temporary resolution "On the Procedure for Organizing Cooperative Activity in Moscow," passed in December by the city soviet of people's deputies. Regardless of the fact that it resembles a demand for immediate action, we hope that reason will prevail. We are publishing the results of one of the first sociological studies, conducted in 80 scientific cooperatives at various institutes in Moscow.

### What Can the State Sector Do?

Scientific cooperatives play a unique social role. Essentially, this is simultaneously both a consequence and a confirmation of the disadvantages of the state organization of labor in science. Cooperatives were created as alternatives to it, because in the state framework it is impossible, first, to handle many economic, scientific-production and service jobs and, second, to hold back the flow of talented engineers, designers, scientists and specialists, ready for independent, initiative-minded work, that has flooded into the detached cooperatives.

### Who Joined the Cooperatives?

These are highly skilled people. The overwhelming majority have a higher education, and one-fourth hold the degree of doctor or candidate of sciences. Their average age is 43 years, somewhat higher than in science on the whole. A significant share are employees of pre-pension age and pensioners. Thus, the cooperatives are solving one of the most difficult social problems: using the intellectual and creative labor potential of senior scientists.

### Cadre Policy

Cooperatives are experiencing no shortages of people desiring to work. Here, a specialist has the opportunity to legally provide his family and himself with a respectable standard of living through his own knowledge, abilities and skill. People are inquiring at cooperatives for all positions.

**Virtually all prefer temporary work based on labor agreements. They accept permanent positions less willingly, from the fear that the cooperative will be closed down.**

Dismissals are rare, and their basic cause is transfer to a different cooperative. Nobody noted any disillusioned people in this type of activity. Only one-fourth named an inability to keep up with the pace of work as a reason for

leaving. Difficulties with the replacement of those who left, if any arise, are related to the fact that it is not always easy to select a good specialist.

The leaders of cooperatives are themselves striving to create a cadre reserve, giving one assignment to two or three employees immediately. They think that, regardless of the additional outlays, this is economically profitable since, on the one hand, it enables them to test a specialist by his work and, on the other, the competition promotes the more effective and qualitative fulfillment of the job.

### Psychological Climate

In the opinion of cooperative workers—scientists, engineers and designers—an important reason for their effective work is that a democratic style of leadership predominates here.

Labor conflicts in cooperatives are rare. If they do occur, they are basically between regular cooperative members—both between temporary and permanent members, as well as within each of these groups. Only one-third of those surveyed noted the existence of conflicts between leaders and regular members. As a rule, such conflicts are due to the distribution of monetary compensation, poor quality of the work performed, or disparate work loads.

Interrelations in cooperatives are based on completely different principles, than in state enterprises or in institutes.

First, a specialist, having joined a cooperative, knows that his rear—his job at the institute—is secure. The certainty that he will not end up without means of support and the feeling of protection to a significant extent remove psychological stress and decrease dependency on the leadership.

Second, a person working at a cooperative knows that the material well-being of other employees depends on his labor, and the amount of his pay—on them. In an institute, payment depends on ratings made by the leadership and the collective.

Third, scientific associates in cooperatives are freed of the scourge of science—certification. This artificial mechanism for cadre selection, based on the leadership's "taste," is replaced with a natural mechanism based on common sense: It is simply unprofitable to keep a bad employee and, really, the labor collective will not permit it.

### How and How Much Do Cooperative Members Work?

The labor conditions in cooperatives, in the opinion of their members, are basically either better or the same as in an institute. The organization of labor, discipline, use of work time, and level of leadership are significantly higher. Precisely these, in combination with broader possibilities for creativity, enable them to achieve higher

labor productivity, since the problem with our science—the weakness of its material and technical base—is telling here as well.

**Cooperative members, if this is their basic place of work, are not required to perform agricultural, construction or other such work, which has become an unavoidable evil in state institutions.**

There are no endless tests, no meaningless conferences and meetings. The attendance or absence of employees is not taken. Production discipline is maintained naturally, through personal interest and responsibility. If an associate is ill, he does his job later or it is transferred to someone else along with the corresponding payment. In science, such a principle for organization of labor, in which the employee is faced with a task and the time periods for doing it are defined, is the most sensible.

Concepts such as a work day or work week do not exist in cooperatives—they work as much as they have to. On the one hand, labor resources are thus used more effectively and production tasks are resolved more rapidly. On the other, however, the extensive nature of labor may cause, at the very least, three consequences: over-stressing the employee, thus worsening his physical and mental health in a fairly brief span of time; reduction in the quality of work in the state enterprise, its formal fulfillment or the fulfillment of cooperative jobs instead of it; and high cadre turnover in the cooperative and, consequently, the reduction of its professional potential.

### The Psychological Climate Surrounding Cooperatives

Surveys have shown that information on the activity of cooperatives is clearly insufficient in the sponsor institutes. Among those surveyed who are not employed in cooperatives, 26 percent did not know that such cooperatives existed, and 20 percent were sure that they did not. This "closing off" of cooperatives conceals the seeds of conflict. Only 18 percent noted conflicts between people who work in scientific cooperatives and their colleagues at the institute. In the opinion of the latter, the basic motive was envy, yet objective reasons were named: the distribution of monetary compensation, the poor quality of work at the institute and violation of the time periods for performing it on the part of cooperative members, or the use of work time to do cooperative assignments.

On the whole, 70 percent of the institute associates surveyed regarded scientific cooperatives positively, although their opinions often depend on whether said associates have an opportunity to join the cooperatives or not. However, virtually all suggest that cooperative members not combine this work with work in state institutions.

### Easy Money?

Under cost-accounting conditions, the fair evaluation of an employee's labor contribution is becoming a sharper and more important problem, especially in science,

where the possibility of comparing the labor results of individual people or subdivisions is extremely slight. Hence, subjectivism and arbitrariness on the part of some, and the dissatisfaction of others. Cooperatives have the very same problems and the same standard solutions: salaries plus bonuses for a specific task. The salary range is great, even within one cooperative. According to research data, the ratio of minimum to maximum salary for employees may comprise 1:25.

**Before joining a cooperative, one-half the specialists rated their family income as low. Only seven percent considered it high. After joining, the picture changed. Only five percent consider their family income low, while one-third considers it high.**

Today, it cannot be said that the labor contribution in scientific cooperatives corresponds to high payment for labor. True, they have less such lack of correspondence, than cooperative workers in other areas of the economy. However, it nonetheless exists and is related, first, to an absence of criteria for evaluating creative labor and, second, to an all-round ignorance and misunderstanding of how much the labor of a specialist is worth (if it really is labor, and not simply being "at" or "away from" a place of work).

Meanwhile, not only labor is evaluated in rubles, but also its scarcity under conditions of absence of competition. "Once a customer pays, it means he needs this work at such a price."

The high, spontaneously formed incomes of cooperative workers have caused extremely negative phenomena. One of them is the legal concealment of bribery. Scientific cooperatives are forced to retain non-working people, but are capable of influencing the conditions of their existence. They say we must struggle against this, which is true, but it will be useless so long as scientific cooperatives depend on external organizations and do not have their own material and technical base.

We must recognize that exploitation is an inalienable feature of scientific cooperatives, since they appropriate the surplus product created by hired employees. The ratio of cooperative members to those working according to labor agreements confirms its existence. It comprises roughly 1:10, and often significantly more. As a rule, permanent members of a cooperative hold management posts, while people who have concluded a labor contract with the cooperative are employed directly in production. The division into "cooperative members" and "non-members" leads to the appearance of group interests and undermines the bases of collective creativity. All cooperative leaders noted this natural tendency. However, "shadow" exploitation also exists in enterprises, for instance, if a scientific associate writes a dissertation for his manager and a whole series of associates prepares it for publication.

There is another element that can be considered negative. This is the destabilizing correlation of the earnings of cooperative members in the cooperatives and in the

institute. It is one thing to know that in a certain organization people receive high and even super-high earnings. It is another, when the person next to you, often working the same or, maybe, even less and worse than you (since his forces are needed for the cooperative), has said high earnings.

The consequences are job dissatisfaction, aggressiveness toward cooperative workers, and passivity in labor and public life.

### Cooperatives and Society

The leaders of scientific cooperatives believe that public opinion of them is just as bad, as of other cooperatives. It does not make distinctions, considering all cooperative workers greedy. Financial agencies also regard scientific cooperatives the same. The bank takes a tax from the cooperative in addition to the state tax, and it is impossible to refuse to pay. It is also impossible to switch to a different bank, since then one's own, rayon bank "will make life worse." Here is an example of the cooperatives' lack of rights and the arbitrariness of financial agencies, cited by one of the chairmen. A bank withdrew several tens of thousands of rubles from a cooperative's account by mistake, having confused its account number with that of another, bankrupt cooperative. It returned a large share of the money to the cooperative, but has still refused to return all of it, and the chairman has little hope that his cooperative will receive the rest. It is impossible to speak of relations built on the interests of business.

Of those surveyed, 87 percent of scientific associates expect the effective application of scientific developments and inventions from cooperatives, and 54 percent expect an increase in the effectiveness of science. Obviously, not without grounds, since the interrelations of cooperatives and their sponsors are taking shape sufficiently favorably. However, there are problems which must be worked out here. For example, cooperation with a sponsor should be structured on a completely voluntary basis for the cooperative. In turn, the institute associates believe that, since the cooperatives are using the sponsor's scientific research reserve, they should pay for this at contract prices. Moreover, it is necessary to raise the legal protection for institutes and their development work and to increase glasnost in the activity of cooperative workers.

Scientific cooperatives and institutes should have their own cadres and possess identical rights. Scientists and engineers should have the opportunity to choose what is dearer and more important to them—research work or the implementation of ideas in practice. However, so that the choice will be free and science will not lose talented personnel, the material support in both the state sector and cooperatives should be equal. They are fully able to complement each other.

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### Conflict Erupts at Medical Institute Over Director's Election

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Morning edition p 4

[Article by A. Illarionov and I. Ognev: "Double Defense Helped Institute Director Regulate the Measure of Democracy in Science"]

[Text] Recently, one hears ever more persistently: Is it really necessary to elect the directors of scientific research institutes? What good are such elections? How many people become leaders merely because they were unconsciously over-kind, from which business only suffers? Even worse, cleverly disguised cliquishness has played its role in some places.

To elect or to appoint is a fairly subtle question, the answer to which should be specific to each specific case. In this regard, however, there are still fundamental considerations of a general nature. If it is a question of a mature collective, who better than it itself to judge who is best capable of heading exploration?

However, a socially mature collective is a great rarity. The administrative system has done its job wonderfully well. Yet, we are trying to destroy it, to replace it with an improved one, introducing innovations only in individual elements while not touching the foundations. Our history, which has continued entirely logically, well shows what comes of this.

Until recently, the Institute for Circulatory Pathology [NIIPK] in Novosibirsk was headed for almost 30 years by Academician Ye.N. Meshalkin, Hero of Socialist Labor, winner of the Lenin Prize, USSR people's deputy for nearly a year, and a surgeon.

However, the director's merits and regalia still do not insure against mistakes. Familiarity with the scientific research institute [SRI], which one of the authors of this article visited because of letters from its associates, showed that the collective itself is afflicted with a serious ailment. This was noted in the article "A Diagnosis is Needed" (IZVESTIYA, 15 Apr 89). Conflicts have troubled the institute for years. As a result, according to the old-timers, it has been deprived of hundreds of talented scientists and surgeons. Yet its powerful director has held the leader's chair four years beyond the established age limit. Yevgeniy Nikolayevich did not, so to speak, blink an eye after the IZVESTIYA article. We, as well as the readers, asked the natural question: why? We can only guess at the reasons, reading the official response to IZVESTIYA from V. Mukha, first secretary of the Novosibirsk Party Obkom, and V. Bokoviy, the oblispolkom chairmen. The document is based on conclusions made by a joint commission of the RSFSR Minzdrav and local agencies. The text abounds with classic formulations: "The institute is making a substantial contribution...."

"The successes of the heart surgery school founded by Meshalkin are not only recognized in the USSR, but also abroad... Meshalkin has unquestionable authority in performing operations under hypothermia... as far as the individual scientists mentioned in the article are concerned, it is hard to consider their dismissal an act of discrimination...."

In order to hear a better-reasoned substantiation of the ministry's position, one of us met with A.I. Potapov, republic minister of health care.

"Meshalkin is a positive person and scientist," Anatoliy Ivanovich declared and continued, "We also have a clear opinion on the conflict at this scientific research institute: Many of the positions in the newspaper were distorted."

Naturally, a journalist cannot help but be curious: which ones?

"Well, I do not remember specifically. I have so many institutes, my dear... However, no articles whatsoever will change my opinion of Meshalkin.

In the course of an hour and a half's discussion, the minister made the following assessment of the commission's conclusions:

"The recommendation was sharply positive and objective. I agree with the overall tone and position, but I am dissatisfied with the depth.

You would probably agree: One cannot consider the minister's position clear or explanatory.

Here the commission, headed by E. Khalfen, was more interested in the sound of the formulations, rather than the essence of what had happened in the collective. The commission handled this delicate task excellently. They listened to those to whom they wished to listen at the research institute. They did not even discuss the article in the collective.

Are we living under illusions? Do we not hope in vain that the command-administrative system of management in science will be democratized by itself, like Baron von Munchausen, who pulled himself out of a swamp by the hair? Otherwise, it is hard to explain the hope that we put on commissions, which travel along the traces of our articles on autocratic directors. The story of the NIIPK and, really, many others, about which IZVESTIYA has written recently, show that the game is becoming subtler and stricter. The administrative system, to use military terms, has taken the defensive and will not overlook opportunities to take revenge. V.N. Shabalin, chief of the main administration for scientific research, attended the interview at the RSFSR Minzdrav. He asked the journalist what he meant by administrative science. On the basis of what facts did he claim that this has made a nest under the roof of their charitable sector? And, in general, who is he to judge on the subject?

Your correspondent would have been in a spot, had not the minister come to his aid. He reminded his associate that they had recently written a work together on... administrative science. They then restated the theses to the journalist. You know, it all looked very enticing, even revolutionary. However, their theses concerned science in general. So, how did the interlocutors intend to democratize Minzdrav science? Here, it was revealed that miniscule doses of liberty had been determined for it... These liberties consisted only of elections of directors and some innovations in financing. However, even these timid attempts were mercilessly emasculated as soon as matters came to practice. The NIIPK, under society's pressure, nonetheless arranged the election of its director. How? The announcement of this long-awaited event was made only in the local newspaper, as though the institute were not the head institution of its profile in Russia. Only after interference were people notified of this in *MEDITSINSKAYA GAZETA*.

The election was held between two contenders: Ye.Ye. Litasova, USSR Academy of Medical Sciences [AMS] corresponding member, and V.S. Shchukin, doctor of medical sciences. They both worked in the same collective. Some might happily remark:

"There, you see, alternative elections! And they said it would not happen." However, happiness was premature. After giving the retiring director his due, V.S. Shchukin announced that he was withdrawing from the campaign.

They say that Shchukin is a talented scientist, a brilliant surgeon and capable organizer. However, civic courage is a talent too. It is unfortunate that Vladimir Stepanovich hastily withdrew his candidacy, thus giving people the opportunity to talk about the performance, played out according to a previously written script: On the one hand, a seemingly alternative election, and on the other, quite obvious efforts to do everything such that this alternative nature itself does not become a real threat to the main contender. Incidentally, the predetermined nature of this far from literary script was no surprise to anyone at the institute. After all, everybody there knows that Yelena Yevgeniyevna is the wife of the leader who is retiring. Most of the participants of the expanded scientific council (as they call it here) elected Litasova as the new leader. It did not embarrass the scientists that they preferred such a procedure, at a time when the whole country is talking about electing the president through universal vote. However, maybe the candidate director is so good that it is worth closing our eyes to this delicate circumstance? The letters force us to question this.

"Excessive emotionality, a great lack of organization, the absence of self-criticism and objectivity, and an undemocratic nature," in the opinion of pathologist and anatomist V.N. Illarionov, are Litasova's shortcomings, which ought to prevent her from being director.

"The director should be the institute's conscience," added G.N. Bushmanov, senior scientific associate and

veteran of the collective. "Yet, Litasova does not take the merits of associates into account."

V.N. Illarionov demanded a rejection of this bureaucratic profanation of the election and appealed to Litasova to withdraw her candidacy.

P.M. Sidorov, chairman of the election commission, alluded to the fact that the situation had been reviewed by Minzdrav's cadre department. Yet, the representative of this department tried to put the responsibility higher, claiming that the minister himself approved the situation. Let us consider what Minzdrav is for its scientific research institutes. The department, it would seem, is pre-ordained to guard the people's health and create various conditions for the free competition of different ideas and scientific schools and for an atmosphere of genuine democracy. Only thus will the best ideas and creative people prove themselves: The people will be the winners.

However, this is hypothetical. What about in practice? V.I. Burakovskiy, a well-known cardiologist and USSR AMS academician, directed our attention to a single detail: The institute's associates have written absolutely no articles on the long-term consequences of operations performed under hypothermia, especially intensified hypothermia, when the heart and brain are cut off from the flow of blood for 30 minutes or more. Why? In the academician's opinion, simply because one would hardly boast of the long-term results. Many people have been writing to the editors about this.

V.I. Burakovskiy suggested thinking about the following facts. The NIIPK is responsible for the status of heart surgery in Siberia and the Far East. In this large territory, they do not perform operations which prevent myocardial infarction, such as coronary bypasses. They absolutely do not operate on newborns or infants. They are not working on surgery for complex hereditary defects. Why? Really, V.I. Burakovskiy thinks, it is because these delicate operations require about 2 to 2.5 hours with the heart immobilized, which is only possible with the help of AIK (artificial blood-circulating equipment). However, they are by no means possible under hypothermia, for which Meshalkin has such enthusiasm. That is why nobody in the country is following his path, although he strongly promotes this method, which has strict limits to its application. Even its inexpensiveness leads one to delusion.

Possibly, having read these lines, some people will be thinking: So, this man is no longer involved, but these journalists keep on writing and writing...

Yes, we write, but only because we are trying to show how the monopolism cultivated by the administrative system expresses itself, concretely, under very real and acute situations. First, one director has left. However, we are far from the illusion that this fact alone somehow changes things for the better at the much-suffering NIIPK. After all, as before, its associates will personally

experience the daily influence of corrupting anti-incentives. Their creative growth still depends directly on advancement along the hierarchical ladder, with all the moral flaws inherent in this way of existence... In short, the muscles of the old system have not weakened at all. It fences off zones where a regime of great favor is created for its own specially honored representatives, and it faithfully protects them under its powerful wings from excessively curious eyes and overly importunate democratic innovations. Indeed, has the former director really been removed from the post, if the institute's helm remains in the hands of his wife?

Everything is clear, it seems, about Minzdrav's desire to create a democratic atmosphere at the NIIPK. Just as it is also clear that it is too risky to leave the SRI in its power, both for our health, as well as for the scientists themselves. The minister praised the former director for his initiative, but the facts that we have already mentioned indicate that heart surgery in Russia is not developing in accordance with the demands of our day. However, after all, representatives of local bodies of power, party gorkom official V. Losev, in particular, were on the commission. Valeriy Aleksandrovich, in his own words, first visited the institute under profound impressions made by the letters from slighted associates. However, later he changed his opinion of the situation.

"My eyes were finally opened," he shared his impressions, having realized how much the people there respect Litasova. "I attended during her operations, I saw an open heart: She is the very measure of responsibility. This is the important thing."

Of course, one can understand the emotions of the party official, who is, incidentally, a physicist by education. Alas, we must admit, something else is harder to explain. While wandering about the institute, how could one fail to notice that small children have been lying there for three to four months, waiting for operations: There is no one to do them, since Yevgeniy Nikolayevich and his wife drove away surgeons who had distinguished themselves somewhat from the overall mass. How could one fail to see that the department for aorta pathology was closed for yet another year, for the same reason? How could one not notice that, under the screen of introducing of cost-accounting, they essentially eliminated the department for treating ischemic disease? Or that surgical activity is incommensurately bloated with figure-padding, or that mortality is higher by a factor of two to three, compared to other heart surgery clinics in the country?..

The party gorkom official did not notice (or maybe he did not want to notice?) this and put his conclusions on the party obkom secretary's desk. This time, Losev not only vindicated Litasova's candidacy for the director's post, but also the election procedure itself.

Perhaps, the situation with Losev is the only one? Alas, for as long as the NIIPK has existed, letters from the scientists have been sent to the Novosibirsk party authorities. The director has always encountered and encounters support and understanding there.

For many years, we have had to investigate a number of similar conflicts. Somehow, we cannot remember any cases when party interference was fruitful. Really, it is not a matter of statistics. It is simply that these communities—party and scientific—are shaped from different molds; they bow to different gods. The scientist is a scientist because he questions everything. As the process of learning comes to a halt, it becomes worthwhile for him to be a conformist. The principle of democratic centralism, a distorted one, moreover, has hovered over the party committees for years. According to it, all those who question are soon counted among the enemies. We know what comes of this.

So it is that the current bosses-dictators are reliably protected from the infringements of democracy by a powerful double barrier: the ministerial hierarchy and the local party committees. Moreover, if we recall that the KZoT by no means safeguards any scientist who has taken it into his head to "rock the boat," the picture can be considered complete. That is why the newspaper writes and the scientists complain.

What is the solution? Instead of moralizing, it would be better to discuss the exceptions to the rules falsifying democratic processes. In Novosibirsk, the director of the Institute for Automation and Electric Measurement, a great and authoritative scientist, recently had to leave his post. The conflict began with a struggle of opinions and passions at the institute. The USSR Academy of Sciences Siberian Department Presidium suggested that the collective elect a director itself.

Here, they treated this responsible step scientifically, like a kind of broad study. It had an unexpected result: The majority preferred a young, less well-known scientist. The arguments in his favor were convincing. However, so as to avoid a hasty mistake, they decided to appoint the contender a temporarily acting director. Several months of his work in the new post confirmed the best assumptions. Only then was a final election held—by the entire collective, including workers and technical personnel.

True, in accordance with conservative academic traditions, they elected the director again, over highly respected academicians and corresponding members. However, this was a confirmation of the collective's choice. To this day, P. Tverdokhleb, doctor of technical sciences, successfully directs the institute. Appetite comes with eating: Having realized the advantages of democratic management, the collective at this scientific research institute also formed a new scientific council in the same manner.

Although the Academy of Sciences is sometimes called a scientific ministry, and not without grounds, the degree of freedom in its institutions, compared to Minzdrav's, is far broader. Although this difference is slight, this fact itself suggests that neither God, nor a king, nor a hero can free our scientific research institutions, no matter to what they may be subordinate. The scientific community itself, like the Phoenix bird, must rise from the ashes of the administrative system. Only supervision by a free

community and equal responsibility before the court, regardless of posts and titles, only this will free scientists from the humiliating position in which the administrative system has placed them. Meanwhile, various commissions, which shove each person through a number of filters, are feeding the leadership doses of information about what allegedly is happening in the collectives.

We will not even try to guess when science will be truly democratized. The obstacle is not that nobody knows how to do this. World experience has been described in

detail. The problem lies elsewhere. Academician D.S. Likhachev has repeatedly stated, including in IZVESTIYA, that our scientific community has suffered from lies and other moral afflictions, as though from a fungus. Many collectives, like the NIIPK, are like a timid crow that is afraid of the bushes. The farce of electing the director has shown this clearly once again. Fear settles into the genes and is passed from parents to offspring. And this fear is often substantiated. Still, not everyone can remove the slave from himself....

### Controversy Over Awarding of State Prizes in S&T Detailed

907A0248A Moscow IZVESTIYA in Russian  
15 May 90 Morning edition p 3

[Article by IZVESTIYA correspondent V. Nevelskiy (Leningrad-Moscow): "A Supplementary Report. How Old Morals Are Appearing in the New Times"]

[Text] On 31 March of this year a terse TASS note entitled "A Supplementary Report" appeared in the central newspapers. Here is its text: "In addition to the decree of the CPSU Central Committee and the USSR Council of Ministers 'On the Awarding of the 1989 USSR State Prizes in Science and Technology,' which was published on 7 November 1989, the USSR State Prize for the development and introduction in practice of new methods of the diagnosis, prevention, and treatment of pseudotuberculosis was awarded to Doctor of Medical Sciences Aleksandr Mikhaylovich Korolyuk, head of a chair of the Leningrad Pediatric Medicine Institute."

Before us is a truly unprecedented event in the activity of the Committee for Lenin and USSR State Prizes.

The incident, which happened to Professor Aleksandr Mikhaylovich Korolyuk, could have concluded in different ways. Those, on whom its ending depended, had an extensive choice of variants. For example, the sympathizing variant: to try to drag out the matter, to wait for the appropriate moment, and, having hypocritically felt sympathy, to throw up their hands: "We tried to do everything possible, but the train, alas, had already left." The second is the moralizing variant: to find at all costs some compromise for the seeker of the truth, who had gone too far. The third one is how decent people should act in such cases: to admit their fault to him publicly and to restore violated justice.

The first two variants failed—democracy and glasnost, blast them, upset all the plans. To admit honestly and publicly its fault is not in the rules of the organization which got itself in trouble. The ending turned out to be a compromise ending.

The Siberian Department of the USSR Academy of Medical Sciences nominated the scientific work, of which it is a question, for the 1989 State Prize. I will not set forth the essence of what was done by the Far Eastern medical scholars. I will only say that they became trailblazers. The priority of their basic and applied research in this area is recognized throughout the world.

When at the Vladivostok Institute of Epidemiology and Microbiology (NIEM) they determined the complement of seekers of the prize, of the 29 candidates after a secret vote 11 were included in the collective of authors. Aleksandr Mikhaylovich Korolyuk was among those whose coauthorship did not raise a shadow of doubt. For precisely he at one time proposed the original methods of the early diagnosis of the disease, developed an effective

diagnostic preparation, and with the assistance of associates of the Leningrad Institute of Vaccines and Sera achieved its introduction in medical practice throughout the country. True, Aleksandr Mikhaylovich had already left Vladivostok long ago, having become an instructor, then the chief of a chair of the Military Medical Academy. But not for a day did he break off cooperation with his former service colleagues in the Pacific Fleet.

All this gave the scientific council of the Military Medical Academy groups to support the decision of the institute.

The collective of authors with its full complement completed without complications the difficult trip up Mount Olympus. On 6 October Natalya Nikolayevna Besednova, director of the NIEM, called Korolyuk from Moscow: "Sasha, everything is in order. Today there was a plenum of the committee. Our work was approved." A call of Academician of the USSR Academy of Medical Sciences Georgiy Pavlovich Somov, who headed the group of competitors, came immediately after: "Do not hurry to rejoice. The Central Committee is still ahead. Anything can happen."

He must have had second sight.

In the morning, on 7 November, Aleksandr Mikhaylovich got PRAVDA from the mailbox, unfolded it, and to the loud marches, which were heard over the radio, scanned the published lists of winners. Here are the familiar names: Somov, Besednova, Dzadziyeva, Znamenskiy.... Stop. For some reason Serov came after Znamenskiy. But where is he, Korolyuk?

Aleksandr Mikhaylovich forced himself again, now no longer hurrying, to read the list of names. So it is—10. One, his own, had disappeared. Apparently, out of carelessness of the editorial proofreaders, the vexed Korolyuk decided. No other explanation could come to mind. For the composition of the collective of authors had already been published twice, had gone through all the examinations, and had been approved at the final plenum of the committee.

And here he recalled the words of Somov: "Do not hurry to rejoice...." which now seemed significant to him. It is necessary to get in touch immediately with Vladivostok....

Georgiy Pavlovich Somov was not about to be vague: "Sasha, they told us in the committee that they crossed out your name in the Central Committee, they were absolutely not involved in this last stage and do not know what happened. They say, in such cases the Central Committee does not give any explanations. Try to find out what they are accusing you of. Was the leadership of the academy, perhaps, displeased with your decision to resign, to leave for the pediatric institute, and took some actions?"

Immediately after the November holidays Korolyuk called on Lieutenant General German Mikhaylovich

Yakovlev, chief of the Military Medical Academy. No, no one from the Central Committee had turned to the academy, there were also no inquiries from the Central Military Medical Directorate of the Ministry of Defense, they had not sent to Moscow any documents discussing the resignation of the former chief of a chair. "We," Yakovlev said, "at any time, if required, will confirm the excellent references which were given after your resignation application."

Aleksandr Mikhaylovich also heard these assurances from the chief of the political section of the academy, who was utterly outraged by what had happened. He suggested that the professor go immediately to Moscow.

Thus Korolyuk came into contact with Vyacheslav Nikolayevich Namestnikov, an instructor of the State and Legal Department of the CPSU Central Committee.

"From the telephone conversation with him I understood that he was prepared for my appearance," Aleksandr Mikhaylovich told me. "Nevertheless, he asked me to recall the essence of the matter. Having heard me out, he noted: 'Here you left the academy, while a blunder might have occurred with the change of address. But do not worry. We will look into it.... And in general, we are not obliged to report the reasons for one decision or another of the Central Committee.' To which I said: 'Vyacheslav Nikolayevich, I do not have offenses behind me. How can I now look people in the eyes? What will thousands of my students think about me? What will I say to colleagues and relatives?' 'I have not seen the file,' Namestnikov replied. 'Call back in about 20 minutes.' I waited, dialed the number again, and heard: 'You were excluded from the list on the recommendation of the Ministry of Defense. Doubts about the scientific value of your contribution to the work appeared....' Believe me, after these words I felt a sense of enormous relief. Like a load off my mind. I thought that they would actually show foul play, but here...."

It is possible to understand the reaction of Korolyuk. After all, following discussion in the scientific council of the Military Medical Academy his documents were sent to Vladivostok, and from there together with all the materials of the coauthors directly to the Committee for Lenin and State Prizes. The most prominent microbiologists, epidemiologists, and contagious disease experts of the country evaluated—and not once—the scientific significance of each author. Of what sort was the recommendation of the Ministry of Defense, the personnel of the central staff of which did not participate at any of the stages in the examination of the scientific materials of Professor Korolyuk, and why did they take only it into account at the Old Square? However.... But was there such a recommendation? I judge how Aleksandr Mikhaylovich attempted to find out the truth from his diary entries:

"On 10 November I left a statement in the waiting room of the Central Committee. I learned two weeks later that it has gotten to the State and Legal Department (GPO) to

Comrade Namestnikov, with whom I was already acquainted. In a telephone conversation he encouraged me: 'We will deal with your question.'

"On 1 December I verified by telephone the fate of the letters and documents, which I had left at the Party Control Committee attached to the CPSU Central Committee, at the Committee of People's Control, and in the waiting rooms of the Minister of Defense and the president of the USSR Academy of Medical Sciences, as well as a second letter with materials, which was addressed to Comrade Namestnikov at his request. In the Committee of People's Control they responded to me that they were still working with the letter. In the USSR Ministry of Defense they could not provide information due to the disconnection of the computer. At the Party Control Committee attached to the CPSU Central Committee after repeated attempts I succeeded in finding out that the letter had been turned over to the State and Legal Department, that is, again to Namestnikov. To my bewilderment in this regard (in the cover note I asked the Party Control Committee to check the State and Legal Department, where they were delaying the investigation) it was said with irritation that the departments of the Central Committee are not under the control of the Party Control Committee, that it is not 'above,' but 'attached' to the Central Committee. In a quite harsh manner the people I spoke with specified: That is how it was set up since the times of Stalin. 'But still to whom are the departments subordinate?' I insisted. 'Probably only to the Politburo,' I heard in response.

"Having thought over what I heard, as well as having weighed the content and tone of the conversation with Comrade Namestnikov (about this below), I decided that my letters should get to both M.S. Gorbachev and N.I. Ryzhkov. There is no other way to get the truth. USSR People's Deputy Yu.P. Sychev, who had already sent a deputy inquiry addressed to the president of the USSR Academy of Sciences—the chairman of the Committee for Lenin and State Prizes in Science and Technology—agreed to help me. On 5 December Sychev left for Moscow, having taken letters to the General Secretary and the Chairman of the Council of Ministers.

"In the State and Legal Department of the Central Committee I had a talk with Comrade Namestnikov. To my question, how things are going, he replied: The mechanisms have been turned on, it is necessary to find patience and to wait for the results. To this I said that the operation of the turned on mechanisms for some reason was not making itself felt: there had not yet been one appeal to the supervisor of the scientific work, to the coauthors, to the leaders of the Military Medical Academy, and, finally, to the Committee for Prizes. For the basic reason for the rejection of the candidacy is doubt about the scientific value of my contribution.... To which there again followed advice not to hurry events and to be patient. And the rest in the same spirit, which was said indifferently and reluctantly. I asked how much time would be required to look into everything. The response: usually a month, but in such complicated cases

they add some more. To the question, why do none of the personnel of the Central Committee wish to meet with me, I heard the evasive 'For the present there is no need.' By way of a farewell Namestnikov warned that I should stop the attempts to exert pressure on the investigation process.... I believe that responsible officials of the Central Committee are in no hurry at all to establish the truth and to correct the committed mistake. In a conversation with me President of the USSR Academy of Medical Sciences V.I. Pokrovskiy hypothesized that there they intended to delay until the moment of the presentation of the prizes, then to express regret."

Thus, Yuriy Petrovich Sychev submitted at the Kremlin his deputy inquiries and the letters of Professor Korolyuk to the General Secretary and the Chairman of the Council of Ministers. I spoke on the telephone with the coauthors in order to hear their point of view. I will cite in brief the words of Natalya Nikolayevna Besednova, director of the NIEM, and Georgiy Pavlovich Somov, supervisor of the collective of authors.

"I am outraged that they did not consult us. If anyone deserves the prize it is Aleksandr Mikhaylovich. His disappearance from the list is an extraordinary event, a tremendous injustice."

Somov: "We are extremely surprised by this unseemly incident. We sent a telegram of protest to all instances, demanding that what happened be looked into from a legal standpoint. The entire country diagnoses pseudotuberculosis by means of the preparation of Korolyuk. This is the ideal example, when a scientific achievement has become a part of medical practice everywhere.... What happened is for me a mystery shrouded in darkness. Neither our institute nor the Military Medical Academy nor the experts of the Committee for Prizes have complaints about the level and quality of the work performed by Korolyuk. It is clear that the injustice could have been committed only in a department of the Central Committee. But mark my words: Once they have done such a thing there, they will persist to the last.... Although what right do the personnel of the party Central Committee have to assume the role of supreme arbiters when evaluating an exclusively medical theme?"

And, indeed, what right? I asked this question to Vladimir Nikolayevich Chetverikov, scientific secretary of the committee. He referred to a paragraph of the Statute, in which it is stated that the decision on the awarding of USSR State Prizes comes into force after approval by the CPSU Central Committee and the USSR Council of Ministers ("We send the prepared documents to the CPSU Central Committee," Chetverikov told me. "To whom do they get? I do not know. We simply write on the envelopes: 'To the CPSU Central Committee.' If they make any amendments there, they do not notify us of this. Of course, it is discourteous. But what can you do—such is the practice.") But why, strictly speaking, should the committee wait submissively for the approval of its decisions by a party organ? Why cannot a medical scholar become a

winner without the official stamp of the Central Committee? Why does his fate depend on the will or whim of some bureaucrat of the apparatus, who in the end is not answerable for anything and does not report to anyone on his actions?

A characteristic detail: After two months to the telegram of protest from Vladivostok, which was sent to the Central Committee, the Academy of Sciences, and the Ministry of Defense, there arrived the incomprehensible reply that in 1989 the question of the nomination of Comrade Korolyuk for the USSR State Prize had not been examined. Other explanations to what had happened were not given. And they were not required. Inasmuch as it is customary to believe: There, above, they exclude one for no special reason.

The practice of presenting very, very much on behalf of the first persons of the party and government has been established in the country for a long time. Apparently, in order to give particular weight to the fact of the awarding of the prizes, the decision is given over their signature. The opportunity is created for the apparatus to manipulate the names of the highest leaders.

A responsible official at some stage of the work on a document becomes Gorbachev himself, inasmuch as his, the official's, opinion proves to be decisive. The General Secretary will not analyze the composition of the collective of authors and will not give his own appraisal to the scientific work. The final word, thus, always belongs to the members of the apparatus, to invisible people. To the very last minute it interested me: Will someone assume responsibility for what was committed? Will he say: "Yes, I did this. I am to blame"? Or will I again hear the impersonal "the Central Committee"?

I heard precisely this. In spite of all my attempts to ascertain who took a hand in "putting in order" the list of scientists, I never got a clear answer either in the central staff of the Ministry of Defense, where everyone disowned the mysterious "recommendation," or in the offices of the Central Committee, where, as one worker told me confidentially, no secret service of the world will ever find the ends.

And now I can say with certainty only the following: The two people, whose signatures were on the November decree on the winners of the USSR State Prizes—Mikhail Sergeyevich Gorbachev and Nikolay Ivanovich Ryzhkov—have nothing to do with the backstage game of the apparatus, the goal of which remains unclear.

Consider: The slight movement of the hand of a nameless official was sufficient for an injustice to be committed, while the intervention both of Ryzhkov and of Gorbachev, on whose instructions three departments of the Central Committee—the Ideological Department, the State and Legal Department, and the Socioeconomic Department, the Committee for Prizes, the Academy of Medical Sciences, the Central Military Medical Directorate of the USSR Ministry of Defense, and other instances worked by the sweat of their brow, was

required to repair the harm done by him. Is the cost of the "mistake" not too expensive ("They excluded Korolyuk from the list by mistake," an instructor of the Central Committee assured me in the end)? And would it not be better for everyone if the party organ dealt with party affairs? If the Committee for Prizes not only determined the candidate winners, but also gave the final—and so that no one could dispute it!—decision? While the head of state, the President of the USSR, could present—and only present—these state awards.

P.S. I hasten to make happy the thousands of students of the professor, who are working in all corners of the country, his colleagues and friends: At a meeting of the scientific council of the Military Medical Academy the chairman of the committee presented the USSR State Prize to Aleksandr Mikhaylovich Korolyuk.

### Georgian SSR Awards State Prizes for Science, Technology

907A0233A Tbilisi ZARYA VOSTOKA in Russian  
17 Apr 90 p 1

[Resolution signed by G. Gumbaridze, Georgian CP Central Committee secretary, and N. Chitanava, GSSR Council of Ministers chairman: "Georgian SSR CP Central Committee and Council of Ministers Resolution: 'On Awarding the 1990 GSSR State Prizes'"; passages in boldface as published]

[Text] Having examined the recommendations of the Committee on State Prizes in Science and Technology under the GSSR Council of Ministers, the Georgian CP Central Committee and the GSSR Council of Ministers resolve:

#### To award the GSSR 1990 State Prizes:

##### In Science:

1. Mariya Semenovna Machabeli, doctor of medical sciences, professor, consultant, "Emergency Aid" Scientific Research Institute imeni N. Sklifosofskiy (leader); Otar Irodionovich Burdzhadze (posthumously); Georgiy Sergeyevich Daneliya, doctor of medical sciences, professor, leader of the Pathomorphological Laboratory for Perinatal Medicine, Obstetrics and Gynecology imeni Academician K. Chachav, GSSR Ministry of Health Care; Nina Mikhaylovna Makhviladze, candidate of medical sciences, assistant, department for infectious diseases, Tbilisi State Institute for Improving the Skills of Doctors, USSR Ministry of Health Care; Irakli Shalvovich Nadiradze, candidate of medical sciences, senior scientific associate, surgical department of the GSSR Oncological Scientific Center, GSSR Ministry of Health Care; Iosif Vladimirovich Samkharadze, graduate student, department of pediatric surgery, Tbilisi State Medical Institute, GSSR Ministry of Health Care; Zurab Aleksandrovich Chiladze, doctor of medical sciences, professor, head of the department of obstetrics and gynecology, Tbilisi State Institute for Improving the Skills of Doctors, USSR Ministry of Health Care,

—For a series of works, published in 1962-1988, "Sozdaniye Teorii Trombogemorrhagicheskoy Sindroma, Razrabotka i Vnedreniye v Klinicheskuyu Praktiku, Metodov ego Profilaktiki, Diagnostiki i Lecheniya" [Creation of a Theory for Thrombo-Hemorrhagic Syndrome, Development and Application in Clinical Practice of Methods for its Prevention, Diagnosis and Treatment].

2. Petr Pavlovich Naskidashvili, doctor of agricultural sciences, professor, honored worker in science of the GSSR, proctor of the Georgian Agricultural Institute and head of the department for genetics, selection and seed-growing (leader); Aleksandra Davidovna Gorgidze (posthumously); Guram Georgiyevich Iashagashvili, candidate of agricultural sciences, senior scientific associate, head of laboratory for wheat selection and seed-growing, Mtskheta Selection Station, Scientific Research Institute for Farming imeni I. Lomoura; Vladimir Levanovich Menabde (posthumously); Mariya Alekseyevna Sikharulidze, doctor of agricultural sciences, professor, honored worker in science of the GSSR, professor of the department of genetics, selection and seed-growing, Georgian Agricultural Institute; Yevgeniya Semenovna Chernysh, docent of the same institute and department; Georgiy Aleksandrovich Khutishvili, candidate of agricultural sciences, scientific associate, Scientific Research Institute for Farming imeni I. Lomoura,

—For works published in 1970-1989: "Genetika, Seleksiya i Semenovodstvo Pshenitsy v Gruzii i Vnedreniye Sortov v Proizvodstvo." [Wheat Genetics, Selection and Seed-Growing in Georgia and the Introduction of Varieties to Production].

3. Arnold Stepanovich Chikobava (posthumously); Dzhuansher Levanovich Vateishvili, doctor of historical sciences, director of the Scientific Research Institute of the Museum for the History of Georgian Settlement in Russia (Moscow),

—For a monograph published in 1983 by the "Khe-lovneba" Publishing House: "Pervyye Gruzinskiye Pechatnyye Izdaniya" [The First Georgian Printed Publications].

##### In Technology:

1. Zaur Georgiyevich Balamtsarashvili, mechanical engineer, candidate of technical sciences, chief of department for mechanization and automation of production processes, Tbilisi Scientific Research Design and Construction Institute for the Forest Industry (leader); Sergey Antonovich Antonyan, engineering technician, senior scientific associate at the same institute and department; Petr Vissarionovich Dundua, forest industry engineer, honored engineer of the GSSR, director of the same institute; Viktor Mikhaylovich Yakushev, mechanical engineer, senior scientific associate at the same institute and department; Gedevan Grigoryevich Kokaya, mechanical engineer, candidate of technical sciences, senior scientific associate, deputy



director at the same institute in the scientific unit; Nodar Valerianovich Latariya, metallurgical engineer, candidate of technical sciences, senior scientific associate at the same institute and department; Anzor Valerianovich Tskhovrebashvili, engineering technician, chief engineer at the same institute,

—For work done in 1978-1989: "Development, Creation and Introduction of Automated Machine Tools and Installations for Artistic Wood Cutting."

2. Zurab Akakiyevich Gumberidze, electrical engineer, candidate of technical sciences, docent, director of the Tbilisi City Center for Scientific and Technical Youth Creativity; Yuriy Semenovich Meishvili, mechanical engineer, general director of the "Oriona" Production Association; Archil Iveriyevich Prangishvili, technical systems engineer, candidate of technical sciences, sector chief of the problem laboratory for automation and computer equipment, Georgian Technical University; Aleksandr Georgiyevich Kevkhishvili, candidate of technical sciences, docent, cybernetics department, Tbilisi State University imeni I. Dzhavakhishvili; David Tsotneyevich Keniya, electromechanical engineer, chief of the computer shop, Tbilisi "Oriona" Production Association; Zurab Irakliyevich Chkhaidze, electrical engineer, deputy director, Main Information Science Center, GSSR Ministry of National Education; Murman Grigoryevich Tsuladze, candidate of physical and mathematical sciences, deputy director for the scientific unit,

Institute for Computer Mathematics imeni N. Muskhelishvili, GSSR Academy of Sciences,

—For work performed in 1988-1989: "The 'Aliona' Microcomputer System With the Georgian Alphabet and Interaction in the Georgian Language. Development and Application."

**For Textbooks and Textual Aids:**

1. Etera Shalvovna Botsvadze, doctor of medical sciences, professor, honored worker in science of the GSSR, head of department for infectious diseases, Tbilisi State Medical Institute, GSSR Ministry of Health Care, chief infection specialist for the GSSR Minzdrav, head of the republic Center for Viral Hepatitis,

—For a textbook, published in 1987 by the "Ganatleba" Publishing House: "*Infektsionnyye Zabolevaniya*" [Infectious Diseases].

2. Zurab Irakliyevich Katsitadze, doctor of medical sciences, professor, head of the human anatomy department, Tbilisi State Medical Institute, Georgian SSR Ministry of Health Care,

—For a textbook, published in 1986-1988 by the "Ganatleba" Publishing House in two volumes, "*Anatomiya Cheloveka*" [Human Anatomy].

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