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16 AUGUST 1989



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# ***JPRS Report***

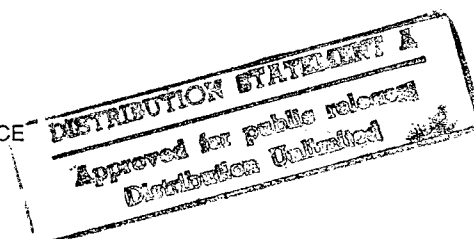
# **Science & Technology**

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

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# Science & Technology

## USSR: Science & Technology Policy

JPRS-UST-89-010

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16 AUGUST 1989

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## Marchuk Interviewed on Changes in Academy of Sciences

18140270 Moscow PRAVITELSTVENNYY VESTNIK  
in Russian No 11, May 89 pp 8, 9

[Interview with President of the USSR Academy of Sciences Academician Guriy Ivanovich Marchuk, by L. Chernenko under the rubric "In the Leading Directions of Progress": "From the Standpoint of the Future"; date and place not given; first paragraph is PRAVITELSTVENNYY VESTNIK introduction]

[Text] We began the discussion on the state of affairs in the scientific and technical sphere in No 10 of PRAVITELSTVENNYY VESTNIK with an interview with Deputy Chairman of the USSR Council of Ministers and Chairman of the USSR State Committee for Science and Technology B.L. Tolstykh. Today the editorial board is continuing this theme by turning to the problems of academic science and the questions of the organization of basic research and its effectiveness. The subject of our interview is USSR People's Deputy and President of the USSR Academy of Sciences Academician G.I. Marchuk.

**PRAVITELSTVENNYY VESTNIK:** Guriy Ivanovich! Fewer and fewer vivid priority achievements are now being entered in the world register of discoveries of Soviet science. To what is this due? What now is the state of affairs in our basic science?

**G. I. Marchuk:** I will begin with the fact that I do not know "the world register of discoveries." Apparently, this is simply a figurative expression. Have more or fewer basic discoveries begun to be made in our country than there were, say, 20 years ago? I think that not fewer have. It is a matter of another thing: society as a whole and, what is more, the mass media during the period of stagnation devoted considerably less attention to the promotion and popularization of scientific achievements. This is having an effect today as well. To date science is still frequently depicted as the cause of the serious ecological situation in the country and some mistakes or others in economic activity. It has become fashionable to criticize science, to some extent its negative image has taken shape.

Meanwhile, Soviet basic science for all the shortcomings, about which I will speak later, continues to constantly bear new important results, many of which are receiving a high rating of the world scientific community. They are reported at the annual general assemblies of the USSR Academy of Sciences.

A broad survey by questionnaire of members of the academy on the estimation of the level of Soviet research in the most important, priority directions, the total number of which exceeds 400, showed the following. In approximately 40 percent of these directions we either are in the lead or are at the level of world achievements, in the others we lag. This 40 percent is, of course, insufficient. And the general assembly of the USSR Academy of

Sciences posed the task during restructuring to strive for the attainment of a leading level in all the priority directions.

I would like immediately to direct attention to one aspect: often even world-class results scarcely attract the attention of the press, radio, and television and, thus, do not become accessible to the public at large. I will cite an example. Our scientists obtained new chemical substances, which have an intensified action against the AIDS virus, and developed strains of such agricultural plants, which, while being absolutely beneficial for the diet of man, are toxic to insect pests. Nevertheless, these works have remained practically unnoticed. Species of fast-growing fish were obtained by the methods of genetic engineering. I am not talking about many results of basic research, which are in the front line of world science, especially in such fields as the theoretical divisions of mathematics and physics, astronomy, and cosmology, which, of course, it is more difficult to report to laymen.

**PRAVITELSTVENNYY VESTNIK:** And still 40 percent also does not suit you. What steps are being taken to make up what has been missed? Are there now reserves which can lead to breakthroughs in some directions or others of science and technology?

**G. I. Marchuk:** In order to make up for what has been missed, and in recent decades we have missed a lot, the restructuring of the work at the USSR Academy of Sciences is being carried out. The entire range of scientific themes is being revised, the formulation of new research goals and programs is under way, personnel policy is being sharply stepped up, and the attention to urgent social problems, which for many years have not found solution, is being increased. At the end of this year it is planned to hold an all-union conference of scientific personnel, at which the entire set of measures, which are aimed at the further restructuring of basic science of our country, will be discussed.

Where is it possible to expect breakthroughs? We are doing everything so that they would appear in the sphere of ecology. A new major program of basic research in this area has been formulated. We are forecasting the appearance of fundamentally new results in biotechnology. A new scientific direction—extracellular biotechnology—is being developed at the Institute of Protein of the USSR Academy of Sciences under the supervision of Academician A.S. Spirin. It proved to be possible to force a "chemical plant," which was derived from a living cell and was placed in a special reaction vessel, to work in isolation and in a highly productive manner. Scientific directions, which are similar in importance, are also represented at our physical, chemical, and other institutes.

**PRAVITELSTVENNYY VESTNIK:** Is the restructuring of the work at the academy being accompanied by changes in the organization of scientific activity and in the system of its management? What is being done to

bring the organizational structure in line with the very logic of the development of sciences?

**G. I. Marchuk:** The restructuring of the system of the management of scientific activity is proceeding in the direction of decentralization and the broadening of the rights of departments of the academy, institutes, and, what is especially important, primary organizational units—scientific laboratories and divisions, where, strictly speaking, science happens. It is important to stress that the changes in organization are backed by increasing investments in basic science. The USSR Council of Ministers, starting this year, increased significantly for the Academy of Sciences the amount of financing, which will make it possible to improve the material and technical supply of institutes and to provide them with advanced equipment.

Starting in 1989 the system of the financing of research has been changed radically: a transition has been made from the allocation of assets to institutes as a whole to the financing of individual themes and scientific projects on a competitive basis. The restructuring of the system of management is aimed at gradually making the scientific laboratory and division the basic self-managed organizational unit. It is important to increase the mobility of scientific collectives and to activate the human factor in scientific work. Logic and the specific nature of scientific labor, in which along with collectivism the individuality and talent of the scientist are of exceptionally great importance, also require precisely this.

**PRAVITELSTVENNNYY VESTNIK:** From year to year we talk about the weakness of the pilot experimental base of research and about the fact that our scientists are extremely poorly furnished with modern instruments and equipment. How, in your opinion, is this problem to be solved?

**G. I. Marchuk:** First of all for this the principle of the remainder approach to the planning of the material base of science should be eliminated at all levels of management. We expect that the new economic mechanism will also have a positive effect on this process, because scientific results are needed where they are interested in new technology and the achievement of high product quality, and not where the simple increase of the volume of commodity production is stimulated. Precisely these phenomena also gave rise to "unclaimed science," which was discussed at the 19th All-Union Party Conference. And, of course, it is necessary to clear out of the way of the rapid retooling of our technical base the "long construction period" of facilities of science and scientific service.

Along with this in the country it is necessary to change the attitude of departments and, what is more, enterprises toward the increase of the production of scientific instruments, reagents, and products of small-tonnage chemistry, which both science and production need so

much. For a number of decrees of the party and government on the development of scientific instrument making, which were adopted in the last 15-20 years, turned out not to be fulfilled.

The USSR Academy of Sciences and the academies of sciences of the union republics are themselves also producing several types of instruments, but this cannot completely solve the problem. The development of scientific instrument making is a task of a statewide scale. Now we are also striving to further expand scientific cooperation with the academies of sciences of the socialist countries and with other foreign scientific institutions in the area of scientific instrument making up to the establishment of joint ventures and firms. However, to date a certain portion of the unique instruments has to be purchased on the western market.

**PRAVITELSTVENNNYY VESTNIK:** It is no secret that in recent times the prestige of scientific activity has decreased. What steps must both the academy and society take to increase the authority of a scientist?

**G. I. Marchuk:** For the Academy of Sciences the main means of settling this question is more glasnost and most active participation of scientists in the elaboration of scientific principles and recommendations on the most topical and urgent problems of the development of society, on economic, political, and social questions, and on major national economic projects. Of course, it is also necessary to inform the public better about the work of scientists and about the achievements of science.

If we talk about society as a whole, it seems to me that the tendency for the social prestige of scientists to increase had already emerged. The election campaign of USSR people's deputies, for example, showed this. As a result 79 scientists of the USSR Academy of Sciences were elected people's deputies.

**PRAVITELSTVENNNYY VESTNIK:** The question of the stimulation of scientific activity is connected with the prestige of a scientist. Much has been said about the low wage rates of junior scientific associates, about the excessively high salaries of academicians, and about whether the benefits, which accompany this title for life, are needed. What is your position on this question? What should be done to effectively stimulate the labor of a scientist? What is the experience abroad on this level? What are the boundaries of the use of cost accounting in the sphere of academic science?

**G. I. Marchuk:** Indeed, the very low salaries of starting scientific personnel has undermined the prestige of scientific labor. The average level of the remuneration of the labor of scientists during the 20 years prior to the start of the radical economic reform slipped from first place among the sectors of the national economy to sixth or seventh place. Now, when the remuneration of labor at enterprises, in cooperatives, on a lease contract, and so forth has increased, the level of the remuneration of

labor in science has become entirely unenviable. It is obviously inadequate, especially for young scientific personnel.

I absolutely cannot agree with the opinion that the remuneration of the labor of academicians is excessive. Is the sum, which is received by a full member of the academy a month—900-1,000 rubles together with a supplementary payment for a title—really excessive today? Several categories of personnel of industry and so on receive today the same and even greater sums. I am not saying that each of the academicians by his contribution to the development of science, technology, and culture and to the training of personnel has "covered" all these expenditures many times over. And the number of academicians—about 300—for such a vast country as ours is extremely small. Abroad, in all the developed countries highly skilled scientists earn incomparably more.

In order to stimulate the labor of scientists more effectively, it is necessary, so it seems to us, not only to revise the system of salaries. It is necessary to pay for all scientifically and socially significant "orders" which are fulfilled in large quantity by scientific personnel. I have in mind the numerous expert conclusions, reviews, consultations, and lectures, which now are often carried out as a voluntary service.

We should proceed from the fact that science determines the intellectual potential of society and the level of culture and education of the people. While this—from the standpoint of the future—is not less, but rather more important than the introduction of a large number of scientific and technical developments which yield an economic impact in production.

As to the boundaries of the use of cost accounting in the sphere of academic science, they are drawn by life itself. In the system of the academy numerous organizations and enterprises—design bureaus, pilot plants, motor pools, construction and repair administrations, publishing houses, and so forth—operate on the principles of cost accounting. There are more than 100 such organizations. The main thing is that the results of their work would be able to be measured and evaluated in value terms. But, of course, no one will answer the question how much a new mathematical theorem and the discovery of a supernova or a new vaccine cost. Precisely these considerations also determine the framework of the use of cost accounting in academic science.

**PRAVITELSTVENNYY VESTNIK:** Now, when work in science is acquiring more and more an interdisciplinary, collective nature, the need to have along with "generators of ideas" talented organizers of scientific activity is becoming more urgent. It is well known that we have what are called "academician administrators." Is it necessary to strive for the combining of these functions? What is being done to train managers in the sphere of science? What qualities should they have?

**G. I. Marchuk:** In those areas of research, where the need to manage large collectives arises, the prominent scientist, who at the same time has great organizing abilities, is the best and only correct type of manager. M.V. Keldysh and S.P. Korolev were such managers. One should not contrast the qualities of a scientist and an organizer.

But at times it happens that organizational work "draws in" a scientist and begins to interfere with his own scientific work. Then, as a rule, the epithet "administrator" also appears. And, after all, organizational or, as it is customary to call it at our academy, scientific organizational work is also necessary and important, and, it seems to me, we should all know how to appreciate and respect it. In general in such an exceptionally diverse and complex sphere of activity as science various types of personnel are needed—dreamers "not of this world," "hard laborers," who know how to do excellently ordinary "routine" work, generators of brilliant ideas, and executors of ideas.

As to managers as such, about whom the question was asked, they work on the staff of the Presidium of the USSR Academy of Sciences and departments, in management subdivisions of institutes, and on the staffs of scientific councils and commissions. The main qualities of this category of personnel are great business skills, scientific erudition, the clarity of thinking, self-discipline and good organization, and the ability of interact with one's associates and to "switch" from some matters to others.

**PRAVITELSTVENNYY VESTNIK:** Under the conditions of the restructuring of society the role of the academy as a forecasting and analytical center is also objectively increasing? How is this most important function now being performed? What is it necessary to do to increase the effectiveness of forecasts?

**G. I. Marchuk:** Now the USSR Academy of Sciences is dealing actively and a great deal with forecasting and analytical work. One of the prominent examples is the draft of the Concept of the Development of the USSR National Economy for the Future, which was formulated jointly by scientists of the USSR State Planning Committee and the USSR Academy of Sciences. The draft has been considered in the USSR Council of Ministers and the Politburo of the CPSU Central Committee.

At the USSR Academy of Sciences in recent times forecasts of the development of power engineering have been formulated and a number of other forecasting and analytical materials, including on foreign policy issues, have been prepared. Much analytical work is being performed in the area of the further improvement of legislation, radical economic reform, and so on.

The attention to the recommendations of science and the aspiration of state and public organizations to use a scientific approach when elaborating decisions have now increased appreciably.

It seems to us that this process should undergo further development in the work of the new USSR Supreme Soviet. Perhaps, it would be advisable to think about the establishment in the future in the system of the USSR Academy of Sciences of a special forecasting and analytical center, which would coordinate this work and would maintain constant contact with organs of state management.

As to the effectiveness of forecasts, it depends first of all on the extent to which the organs making decisions base themselves on these forecasting data. I believe that it is also worthwhile to speak about another aspect of the problem. Sufficiently complete and reliable source information is needed so that the soundness of the forecast would be high. For the present this condition is not always being met. In particular, our economics scholars, historians, and other representatives of the social sciences complain of the lack of initial data and the difficulties in obtaining them.

**PRAVITELSTVENNIY VESTNIK:** The enlistment of science in the process of making government decisions and in the scientific examination of major state projects is a tool of the democratization and intellectualization of society. How is the scientific potential of the academy being used on this level?

**G. I. Marchuk:** In recent times scientists of the USSR Academy of Sciences have been enlisted significantly more often in the preparation of conclusions and suggestions on major state projects and in the discussion of drafts of decrees, which are being prepared. This, of course, is a positive fact. At the same time it should be noted that in many cases representatives of science are enlisted at the late stages, when one project or another is already being implemented and when assets have already been invested. Such was the case, for example, when considering the plans of the Volga-Chogray canal and the construction of the Crimean Nuclear Power Plant. The large scientific potential of academic science will be used more completely, if scientists are enlisted in such an examination from the very origination of the idea of a new major project.

The organizational aspect of this work is important. Apparently, it would be correct for any scientist to act as an expert in a personal capacity, bearing all the responsibility for the expressed suggestions and recommendations. In necessary cases scientific councils or departments of the USSR Academy of Sciences could also formulate their own points of view.

A serious question of the organization of a system of scientific examination and forecasting is the assurance of their extradepartmental nature and complete independence.

## New Organizations Support Scientific Research

### Medical Researchers Form Federation

18140271 Moscow *MEDITSINSKAYA GAZETA* in Russian 26 May 89 p 3

[Interview with Academician of the USSR Academy of Medical Sciences M. I. Perelman, president of the All-Union Scientific Medical Society, under the rubric "Fact and Commentary": "A Choice for Medical Scientists: The Federation or the Council"; date and place not given; first paragraph is *MEDITSINSKAYA GAZETA* introduction]

[Text] A new public organization—the All-Union Scientific Medical Association (VNMF)—has appeared in the country. The editorial board turned to Academician of the USSR Academy of Medical Sciences M. I. Perelman, its first president.

**MEDITSINSKAYA GAZETA:** The Council of Scientific Medical Societies exists under the USSR Ministry of Health. Why was the Federation established?

**M. I. Perelman:** Yes, the Council exists. But it is closely connected with the ministry and in essence is departmental. The Federation will be a creative public organization, which unites on the voluntary basis scientific societies and associations (organizations) of specialists of the medical and related fields of science and technology. Moreover, it is entirely optional that all scientific medical societies (NMO's) would join it.

**MEDITSINSKAYA GAZETA:** Will there not be rivalry with the Council of Scientific Medical Societies?

**M. I. Perelman:** There will not, we have already come to an agreement on cooperation. The Council will continue the financing of scientific congresses, conferences, symposiums, and business trips at the expense of the USSR Ministry of Health.

**MEDITSINSKAYA GAZETA:** From the response it is clear that the Federation does not have its own assets...

**M. I. Perelman:** Yes, for the present we are poor. But we want to learn to "earn" money by establishing temporary creative collectives on an economic contractual basis. For this we will need managers and talented organizers. So, I am confident, we will have money. But we are planning a small, yet highly skilled permanent staff.

**MEDITSINSKAYA GAZETA:** Will the Federation be completely independent and extradepartmental?

**M. I. Perelman:** That is precisely why we are establishing it.

**MEDITSINSKAYA GAZETA:** When will it be possible to consider the Federation authorized?

**M. I. Perelman:** We have submitted an application on its admission to the USSR Union of Scientific and Engineering Societies. After official admission by the plenum

of the Union and the registration of the charter the Federation will have the right of the admission of scientific medical societies, economic contractual activity, appearance on the foreign market, and the publication of its own bulletin. Admission will take place in the immediate future.

#### **National Software Association Formed**

18140271 Moscow SOTSIALISTICHESKAYA  
INDUSTRIYA in Russian 2 Jun 89 p 3

[Interview with B. Nesterenko, general director of the Algorithm SNPO, by SOTSIALISTICHESKAYA INDUSTRIYA special correspondent V. Lagovskiy under the rubric "Fact and Commentary": "Programs for Tomorrow"; date and place not given; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] A new association—the State Software System—is being established. Today the first congress of representatives of the member organizations is being held in Moscow at the Exhibition of USSR National Economic Achievements. The USSR State Committee for Computer Technology and Information Science is holding it. B. Nesterenko, general director of the Algorithm SNPO, tells about the goals and tasks of the association.

**B. Nesterenko:** The main goal is to unite on a voluntary basis state and cooperative enterprises of the country, which are developing software. And the earlier we do this, the more quickly we will find solutions to the problems, to which the informatization of society has given rise. Intellectual forces are now disconnected—some groups of programmers do not know what others are doing. As a result, various organizations are developing programs of the same type—it is no laughing matter to say that according to accounting alone there are already several tens of thousands of them. Many "are reinventing the bicycle," which, moreover, is not the best one.

Having united, we will avoid duplication and will increase the level of software of many enterprises, having extended to them the most advanced software. While we will familiarize developers with the latest information from the world of computers. For the present it is not getting to them. Organizations are closed on themselves and, hence, are marking time.

The association intends to coordinate the work of programmers. Complete confusion now exists in their corps—at times it is very difficult to decide to whom to assign one critical order or another. We will suggest and will find a worthy performer, inasmuch as we will know the potential of every organization. It is also possible to spare the state unnecessary spending—enterprises themselves are capable of paying for the development of the necessary programs. The association will find all those in need and will help to establish business contacts with developers. A bank is already being established for the financing of promising operations.

Incidentally, the establishment of well-defined commercial and legal relations is another goal, for the sake of

which programmers are uniting. For it is no secret that programs in our country are not protected by either copyright or even invention law. Moreover, they are anonymous, while their cost is very arbitrary. A program can be easily stolen. We want to specify at long last how to evaluate the results of intellectual labor and how to pay for it. The association will be able both to organize a kind of market and to protect the rights of the authors.

#### **Estonian Scientists Form Association**

18140271 Tallinn SOVETSKAYA ESTONIYA in  
Russian 16 May 89 p 3

[Article by the organizing group of the Union of Scientists of Estonia: "Let Us Unite for the Reorganization of the Scientific Sphere and the Stimulation of the Development of Science!"; first paragraph is SOVETSKAYA ESTONIYA introduction; passages in boldface as published]

[Text] The constituent congress of the Union of Scientists of Estonia will be held on 3 June of this year in the assembly hall of Tartu University.

In early April substantial changes occurred at the Estonian Academy of Sciences. The charter of the academy was adopted. The labor collective of Tartu University also drafted new basic documents. Is it possible to consider this sufficient for the reorganization of scientific life of the republic? We believe that this is not enough, only the first steps have been taken. For the science of Estonia is not only the Academy of Sciences and higher educational institutions. The network of scientific institutions of the republic is significantly broader and, moreover, is disunited, being subordinate to various departments (the 47 scientific institutions are subordinate to 18 ministries or departments).

The time has come for Estonian scientists in the homeland and abroad (in 1988 there were 7,230 science teachers in Estonia, including 352 doctors of sciences and 3,055 candidates of sciences) to think about what Estonia expects from them and what they will be able to achieve by joint efforts in the interests of progress. It is also necessary to consider thoroughly how science will behave and feel in cost accounting Estonia.

**For the settlement of these questions the time has come to establish the Union of Scientists of All Estonia—a creative and public organization that unites in its ranks the scientists of all Estonia.** For these purposes in January of this year organizing groups, which drew up and discussed drafts of the basic documents of the Union of Scientists of Estonia (SUE)—the program, charter, and regulations of the Union of Scientists of Estonia—began to work in Tartu and Tallinn.

In conformity with the program, the basic goal of the Union of Scientists of Estonia consists in the uniting of Estonian Scientists and in the harmonious integration of science in the socioeconomic life of the republic, in the increase of the responsibility for what is happening. The program supports the concept of the IME and stresses

the necessity of its development, directs attention to the necessity of formulating a balanced and effective scientific policy, and stresses the optimality of the development of science under the conditions of a sovereign Estonia.

The charter and regulations of the Union of Scientists of Estonia contain the foundations of the structure of the union and the procedure of its work. In conformity with the draft, scientists who work in Estonia, scientists of Estonian origin, or scientists, who are studying problems connected with Estonia and are guided by the principles of professional competence, democracy, and humanism, can belong to the union. Local and foreign members of the union, young people, and venerable scientists—everyone should have equal rights, while the union as a whole should be distinguished by unity.

Hypothetically the Union of Scientists of Estonia will be able to conclude economic contracts, to give stipends, and to pay allowances to its members. Ideally the Union of Scientists of Estonia should become a public system for the coordination, collective evaluation, and selection of the goals of Estonian science, the activity of which scientists themselves would supervise on a democratic basis.

On the other hand, the Union of Scientists of Estonia can and should as a public organization also have the opportunity to participate in the political life of Estonia. The union should obtain the opportunity to send its own representatives to the highest organ of power of the republic already during the forthcoming election to the Estonian SSR Supreme Soviet.

Those who wish to can familiarize themselves with the drafts of the basic documents in Tallinn in the reading room of the library of the Academy of Sciences and in Tartu in the reading room of the Scientific Library of the university.

At recent meetings of the organizing groups temporary working organs of the Union of Scientists of Estonia were formed:

- for basic documents (headed by Member of the Academy of Sciences Peeter Saari and Candidate of Historical Sciences Yaan Laas);
- for membership and propaganda work (Ya. Laas in Tallinn and Candidate of Biological Sciences Andres Koppel in Tartu);
- for foreign relations (Docent Toyvo Kuldsepp, Candidate of Physical Mathematical Sciences Yaak Aaviksoo);
- for conferences (Doctors of Biological Sciences Ayn Raytviyr and Andres Piyrsou).

All the work was performed and henceforth will be performed on the basis of glasnost and voluntary participation; we welcome at any time the exponents of new ideas and the authors of practical proposals.

We await suggestions with respect to the constituent congress and the organization of work in the future, as well as opinions on the drafts of the basic documents. The temporary organs intend to take into account as far as possible all sensible suggestions and opinions.

**Dear colleagues! Scientists of Estonia, Estonian scientists in the Soviet Union and abroad, scientists who are studying the problems of Estonia!** We appeal to all of you to participate in the establishment of the Union of Scientists of Estonia and as its members in the further work of the union. Without delaying, fill out an application to join the Union of Scientists of Estonia and address it to the temporary committee for membership in Tartu or Tallinn. Indicate your data (surname, name, patronymic, year of birth, academic degree and specialty, direction of scientific work, position, address, work and home telephone numbers). We will get in touch with you for the establishment of contacts.

We ask that the application, personal data, and suggestions be sent to the address: 200001 Tallinn, Bulvard Estoniya, 7, the Institute of Economics of the Estonian Academy of Sciences, Yaan Laas.

Or: 202400 Tartu, Vabenuyze, 21, the Institute of Zoology and Botany of the Estonian SSR Academy of Sciences, Andres Koppel.

**Latvian Physicians Form Independent Society**  
*18140272 Moscow MEDITSINSKAYA GAZETA in Russian 16 Apr 89 p 2*

[Article by I. Krastynsh, president of the Society of Physicians of Latvia (Riga): "'All One Tribe....' The Society of Physicians of Latvia Has Been Established"; first paragraph is MEDITSINSKAYA GAZETA introduction]

[Text] For a long time they repeated to us tirelessly that here in Latvia the provision with physicians and the number of hospital beds are some of the highest in the country. However, this joyous fact did not worry a patient, who was waiting for a third hour to be seen at a polyclinic or was lying in the corridor in an overcrowded department of a hospital. Physicians, who, in addition to all else, were themselves socially unprotected, also knew the price of this "provision." Here the managers of health care for decades successfully pretended that everything was in order. All these factors also became a powerful stimulus for the reestablishment of the Society of Physicians of Latvia (OVL).

Its main goal is the restructuring of health care in the republic. For this it is necessary first of all to switch from a unified, centralized system to economically substantiated medical insurance.

It is necessary, first, to interest materially any citizen in taking care of his health, in giving up harmful habits, and in leading a healthy way of life. Second, to make the health of personnel advantageous for every enterprise and institution. Today, for example, in general it makes



no difference to the Latvbiofarm Association, which annually discharges into the air about 160 tons of harmful substances, how many people in the city of Olayne, where the association is located, suffer from bronchial asthma or allergic skin diseases. This also concerns the personnel themselves, because the outlays on hospital certificates come not from the profit of the enterprise. As a consequence of this the association is not interested in spending extra money on the improvement of working conditions.

And, finally, third, it is necessary to interest the physician in providing quick and high-quality treatment. In other words, to make the remuneration of the labor of a physician dependent on the amount and quality of work. The sense of duty and responsibility alone is obviously insufficient. More reliable stimuli are needed.

The Society of Physicians of Latvia believes that insurance medicine is the only system that resolves all these questions. However, only the complete economic independence of the republic can serve as a mandatory prerequisite for its introduction. All attempts to introduce this system in the form of a limited experiment in case of the present supercentralized management of medicine are doomed to failure and merely help the opponents of insurance medicine to discredit it. It is necessary to combine the maximum responsibility of every physician and manager with the maximum independence when making decisions. It is worth it to legalize private practice and to make it profitable both for the state and for the physician. Whether we like it or not, it is necessary to honestly admit: today many people do to a polyclinic only for a medical certificate. But in case of concern about one's health people all the same seek "a good physician."

Any manager of a medical institution also needs independence. Many questions, including how many physicians to hire and how much to pay them, should not interest anyone except the chief physician himself and his associates. There is one criterion here: Can the institution give the population high-quality medical assistance? If this is the case, the manager is working properly. Independence is also necessary for management at the level of the Ministry of Health, which should be subordinate only to the government of the republic, leaving for the union department only the functions of coordination and information exchange.

It would be wrong to believe that the most important thing in the struggle for changes in health care is to disband the ministry. They say, we will fire everyone, will keep 7-10 people, will change the minister, and will begin to live perfectly well. We will not begin to live, unfortunately. Because it is not at all a matter of the ministry as such. The struggle against manifestations of bureaucracy in medicine should include the electivity of administrators, the revision of all medical documentation with the sharp reduction of its amount to the optimum minimum, and the regular publication of statistical data. The ordinary physician should have the

opportunity to participate actively in the making of decisions and to express his own opinion freely on all questions.

The system of personnel training also needs fundamental change. Every higher educational institution should have the right to formulate its own syllabuses, which take into account the local needs and the traditions of the local school of medicine.

Ecological questions hold a special place among the problems, with which the Society of Physicians of Latvia is concerned. In comparison with them all the professional and organizational medical problems take a back seat, because it is a question today of survival at the level of the nation and republic. In Ventspils, for example, a rayon center on the seacoast, up to 500,000 tons of toxic, dangerously explosive, and combustible substances have accumulated on an area of only 2 square kilometers. They recommend to residents to always carry gas masks with them, in kindergartens they teach kids to use them, while a high ranking official from the rostrum of the All-Union Congress of Physicians keeps saying that in Latvia they have fanned ecological hysteria. The Latvbiofarm Production Association, which is located in Olayne, in addition to the already mentioned discharges into the air, annually releases sewage that contains about 5,500 tons of harmful substances. According to the conclusion of an expert commission, which worked in Olayne last year, the treatment facilities of the association are not capable of effectively rendering all the sewage harmless. A portion of it without any treatment at all is illegally dumped into the Misa River, a tributary of the Lielupe, which is aggravating the ecological situation in Yurmala, which is tense as it is.

But here is what is characteristic: neither the conclusions of experts nor public opinion are capable of swaying the positions of the management of the association. I. Penke, general director of the Latvbiofarm Association, continues to repeat: the main thing is to produce drugs for the country. But is it unimportant at what price?

The dilemma in its essence is immoral: the expansion of production or the preservation of the health of thousands of people. But it, however strange it is, continues to remain on the agenda. To some extent this is explained by inadequate information on ecological questions, especially when it comes to the medical aspects, and in part by the lack of in-depth scientific studies. But the main cause lies in the absence of effective steps which it would be possible to take against violators. The sanitary and epidemiological service is completely powerless and is even not attempting to influence the overall situation.

The Society of Physicians of Latvia can achieve success only if it is an independent organization. Here, of course, the closest cooperation with all public organizations is envisaged. And, of course, without any dictation. The only means is a dialog of the two interested parties without administrative pressure on one of them.

The observance of the principles of democracy and openness is a no less important condition. The work of our society is organized according to the principle "from the bottom up," that is, the members of the society in primary organizations discuss individual problems and make their own decision. All the views are generalized by the duma or board, which formulates general opinions and recommendations, after which it sends its suggestions to the appropriate institutions.

The society is called upon to protect the interests of the physician and to protect him against persecutions and pressure on the part of the bureaucratic machinery. The

establishment of a court of honor for the investigation of "physician against physician" and "administration against physician" conflicts is envisaged.

The tasks of education are also of no small importance. We intend, for example, to submit for discussion such important themes, which worry the representatives of all specialties, as euthanasia, antibacterial therapy, the prevention of AIDS, and others. But the main thing is to restore the status of the physician as a representative of culture. Any action of ours should be aimed at the revival of the lost sense of community—*gens una sumus* (we are all one tribe)!

### Problems With Setting Contract Prices

18140273 Moscow NTR: PROBLEMY I RESHENIYA  
in Russian No 10 (97), 1989 pp 1, 7

[Article by Yu. Romashov: "The Contract for Scientific and Technical Progress"; first paragraph is NTR: PROBLEMY I RESHENIYA introduction]

[Text] Economists admit that cost accounting in its present form is not full cost accounting, and the main reason for its limitedness is the preservation of the old system of prices. In this sense the new conditions of economic management in science are an enviable exception. Here the contractual procedure of pricing, which envisages the establishment of prices for scientific and technical products by agreement between the client and the performer, has been introduced in practice. Nevertheless, the experience of the work of sectorial scientific organizations in 1988 testifies that the advantages of the new conditions of economic management have not been completely realized.

### Why Are Contract Prices "Slipping"?

The largest number of critical remarks are being expressed with regard to the low profitability of work in accordance with contracts with ministries. Contracts with enterprises ensure on the average a 1.5- to 2-fold greater profitability. The reason is that the economic impact from the use of developments in practice is not taken into account in the prices in accordance with state orders. In connection with the fact that ministries use primarily the expenditure method of establishing prices, the shortening of the time of the performance of work is also not being stimulated. Why in practice has it not been possible to create on a contractual basis economic advantages of work in the most important directions of scientific and technical progress?

First, ministries did not ensure the exacting selection of projects financed by means of centralized funds, which makes it possible to concentrate assets on the implementation of priority scientific and technical programs. Moreover, often assets from centralized funds were allocated for the financial support of the scientific organizations which during the changeover to self-financing had not succeeded in accumulated the so-called scheduled amount of work (an accounting indicator that is used for determining economic standards). This led to the dispersal of assets and their diversion from promising developments which determine technical progress in the sectors.

Second, one should also note the causes of another order. The point is that developments of a high technical level are characterized by a long-term (intersectorial) impact that is often distributed among individual economic units. The contract price for such developments gravitates toward the expenditure basis to such an extent that the individual client is incapable of assimilating and, consequently, of paying the impact that is derived from introduction. It is obvious that contract prices, which have been squeezed into the departmental framework, will not get things moving here.

The extensive prevalence of instances of the establishment of contract prices, when the parties even do not attempt to estimate the increase of the cost accounting profit, which the use of the development yields the client, is also causing anxiety. On the one hand, clients have grown accustomed to proceeding in the old way with respect to science rather from general considerations and the experience of evaluating a situation as a whole, and not from strict quantitative calculations, the value of which is low in connection with the lack of reliable information. On the other, as the results of a sample survey testify, at present the level of the contract price for a development is determined first of all by the degree of its necessity to the client and by the amount of assets in the scientific and technical development fund of the enterprise.

As a consequence of this, in practice the stage-by-stage or one-time payment for scientific and technical products predominates. Contracts, in which deductions from the profit of the client, which is derived during the period of the efficient use of an innovation, are envisaged, are extremely rare. But only in case of the use of current deductions is it safe to say that the relations of the client and the performer are based on the profit, which is actually derived from the use of the scientific and technical products, and on the sharing of the risk, that is, the parties are mutually interested in the end result.

In the process of historical development science inherited strong departmental isolation, detachment from practical needs, and the low mobility of scientific and technical resources. Scientific research institutes and design bureaus grew into large hierarchically organized institutions with the bureaucratic ossification that is inherent in them.

Monopolism, which has taken root in the abundant soil of departmental science, often tears to shreds the contractual essence of prices. The information famine is aggravating the situation. According to the estimates of specialists, not more than 10 percent of the data on new industrial items and the scientific and technical know-how of enterprises and organizations of the country enter the information network.

It is also impossible to disregard the stereotypes of the expenditure approach, as well as the fear of sanctions on the part of superior organs. Thus, approximately 40 percent of the superior organizations when establishing contract prices to one extent or another attempt not to go beyond sectorial procedural recommendations, the following of which under the new conditions is an exclusively voluntary matter.

### Prices and Revenues

In spite of the noted expenses of the transition period, contract prices have radically changed the situation in applied science.

Under the new conditions sectorial science has begun to form about 60 percent of the budget through direct

contracts with enterprises. Contract prices have made it possible to ensure the real interest of scientific and specialists in increasing the technical level of operating production and an orientation toward its specific needs. The strengthening of the orientation toward the specific requirements of the client found expression in the increase of the quality of developments and the degree of their technical analysis and in the shortening (on the average by 30 percent) of the time of the performance of the work.

The number of comprehensive contracts, which include both the development of a scientific and technical product and the aiding of its introduction, has increased substantially. Clients have been afforded the opportunity to stimulate directly the participation of developers in the assimilation of new equipment, the provision of technical assistance, and other types of services, which make it possible to ensure in practice the achievement of the technical and economic parameters that are incorporated in one development or another.

Contract prices have freed the initiative of developers, have increased the responsibility of clients for the spending of cost accounting assets, and have contributed to the development of competition on the market of scientific and technical products. Thus, under the new conditions of economic management the share of the work performed in accordance with contracts with clients of other sectors, which came at a number of organizations to 15-20 percent of the total amount of work, increased.

Why does the guarded attitude toward contract prices remain? The supporters of regulated prices for technical products assert that contract prices led to the sharp increase of the revenues of scientific organizations. In reality, as the analysis shows, the increase of revenues is connected not with the "inflation" of prices, but with the increase of the amounts of work and the scale of duplication of developments. The number of contracts accepted for fulfillment has increased by 65 percent.

The increase of the cost of research and development is also due to the fact that the prices for developments have begun to be established not on an expenditure basis, but in conformity with their efficiency. This portion of the increase of the cost of research and development was under the direct control of clients, inasmuch as the share of the impact, which is included in the price of the scientific and technical product, was specified in accordance with an agreement of the contracting parties. The supplementary payments for the shortening of the time of the work, the high quality of developments, and the provision of assistance in introduction were also established in accordance with an understanding with the client.

It should, however, be admitted that the standard system of the regulation of revenues, which is characteristic of the first and second models of cost accounting, proved to be too inflexible for science. Scientific organizations by

means of contract prices began to react flexibly to the state of the market of scientific and technical products, while the standards of the distribution of revenues froze at the base level.

Therefore, it is necessary not to regulate prices, but to improve the obsolete system of the regulation of revenues. Apparently, in science the center of gravity of taxation should be shifted in the direction of the income of individual personnel, and not of the organization as a whole, inasmuch as the bulk of the received assets should go to the specific performers.

What, in our opinion, are the means of further improving the contractual pricing of scientific and technical products?

#### For the End Result

First of all it is necessary to sharply restrict the noncompetitive distribution of the assets of centralized funds. Moreover, the requirement of not worsening the financial status of cost accounting scientific organizations, which signifies the granting to them of the right to refuse the performance of jobs, with respect to which at least the average profitability for the given organization is not ensured, should act as one of the criteria of the choice of orders of ministries.

It is also necessary to extend commercial relations to the process of the transfer to production of scientific and technical products that have been developed in accordance with a state order. This would make it possible to link the formation of centralized funds with the results of the use owing to them of applied developments.

Other means of creating advantageous conditions for the devising of promising developments are also possible. One of them involves the formation of research associations of enterprises, which would act as a collective client of promising developments. Tax breaks with respect to the outlays on research and development, which are made through such associations, should be established for the stimulation of their formation.

As was noted, not the establishment of contract prices for developments as fixed amounts, which envisage a one-time payment, but their formation as proportionate deductions from the profit of the client is conducive to the fair distribution of the impact from the use of scientific and technical products. In this connection it would be advisable to look at the contracts, which include current deductions as promissory notes (bills of exchange), which are discounted by banks by a certain percentage. This would moderate the delayed nature of such payments and would afford scientific organizations the opportunity to maneuver.

Moreover, the current payments for scientific and technical products should either be ascribed to the expenditures of the client or be deducted from the profit before its distribution. This would signify as compared with the

prevailing procedure the establishment of tax breaks with respect to the outlays on research and development.

The mechanism of contract prices took effect without the appropriate legal support. Its absence thus far has not had a substantial influence on the establishment of contract prices. However, with the development of the market of scientific and technical products the significance of this factor is increasing sharply.

**Calculating Profitability, Prices for S&T Product**  
*18140279 Moscow PLANOVOYE KHOZYAYSTVO in Russian No 2, Feb 89 pp 89-42*

[Article by Doctor of Economic Sciences B. Zaytsev, professor of the Academy of the National Economic Attached to the USSR Council of Ministers, under the rubric "Scientific and Technical Progress": "The Scientific Potential and Its Use"]

[Text] In our country a mighty scientific potential, which makes it possible to solve the most difficult national economic problems, has been created. However, in a number of most important directions of scientific and technical progress a lag behind the world level has been allowed and the leading development of science and technology is not being ensured. In this connection the analysis of the factors of the increase of the effectiveness of the scientific potential is of interest. One of them is the changeover of scientific research and planning and design organizations to full cost accounting and self-financing, in case of which the result of scientific research and development acts as the object of the contract between the client and the user, while the contract price acts as the object of economic relations. It is possible to represent the price for the scientific and technical production as two parts: one reflects the cost, the other reflects the use value. The cost in practice is identified with the estimated cost of research and development, while it seems possible to reflect the use value in the price through their technical level and the economic impact from the use of the results in production.

In contrast to the estimated cost the price conforms to a greater extent to the cost accounting activity of scientific organizations. Whereas the estimated cost, in essence, signifies the summing up (expenditure) of the outlays and the obtaining of a total amount, the price presumes as the starting point the obtaining of a final amount—the payment for the result with subsequent differentiation in conformity with the made outlays. The assets for the remuneration of labor, as well as the profit are formed by the deduction of the material expenditures.

The scientific organization, by estimating the anticipated result of research or development in accordance with the estimated cost, the scientific level, and the economic impact, proposes its own price. The client has an idea, on the one hand, of the economic effectiveness of the innovation and, on the other, of his own ability to pay. This is also the basis for the establishment of the

contract price. However, in case of a shortage of scientific and technical services the scientific research institute has additional "advantages," in case of a shortage of demand the client does. In practice such advantages are limited to the maximum level of profitability in the price for research and development. In case of its exceeding the calculation of the price is reviewed in the ministry. The technical level, the economic impact, and the national economic significance of the results are taken into account in the final decision.

At the same time the introduction of the standard of profitability decreases the interest of scientific collectives in increasing the effectiveness of research and development. The standard "cuts" the price markup by a specific amount, regardless of the derived impact, which undermines the aspiration of the scientific research institute to economize on the estimated cost of work. Moreover, the establishment of a maximum level of profitability creates privileged conditions for the client and upsets the equality of the economic relations of the contracting parties.

Therefore, in our opinion, in order to boost the interest of institutes in the increase of the effectiveness of research and development and, as a consequence, the increase of the end national economic results, it is expedient to abolish the maximum level of profitability and to establish a standard of deductions from the annual economic impact, which is taken into account in the price and is differentiated subject to the technical level and national economic significance of the innovation.

Scientific organizations can use one of the two models of full cost accounting. But, in spite of all the differences between them, the cost accounting revenue of the scientific research institute in both cases depends directly on the results of its work. The greater they are and, consequently, the more efficiently the scientific potential is used, the more funds there are and the broader the opportunities are for the social development of the collective and the material stimulation of its members.

The cost accounting relations with the client, his demands to complete the research and development on time, as well as the need to save assets and resources objectively require an interest in the increase of the effectiveness of the results of all the basic and auxiliary subdivisions of the scientific research institute and each participant in the scientific process. The introduction of internal cost accounting, which is a set of economic relations of the structural subdivisions with the management of the scientific organization and with each other, is conducive to this. For example, a laboratory concludes a contract with the management for the performance of work in the corresponding time and with qualitative indicators. Its price is established and the responsibility of the contracting parties is specified. The laboratory can have its own revenue and funds and conclude an economic contract with another laboratory as a subcontractor for the performance of services with real payment for them.

At present Statutes on Internal Cost Accounting have been drafted and are in effect at a number of scientific organizations. The basic principles of the planning and financing of the activity of subdivisions, the procedure of forming and using their funds, as well as establishing the price for research, development, and services, and the economic liability of the contracting parties are reflected in them.

At the same time an analysis shows that not all aspects of the functioning of the subdivisions of a scientific research institute are being equally revealed. And it is a matter not of the specific sectorial nature or departmental organization, but of the subjective understanding of the essence of cost accounting. This shows in the effectiveness of the use of the scientific potential and in the work of the scientific institution.

Based on this, it seems expedient to produce a model scientifically substantiated statute. It is important to direct particular attention in it to the regulation of: the planning of the activity of the subdivisions in accordance with a limited group of indicators in conformity with the common plan assignments, which have been established by the scientific research organization; the material liability in case of the upsetting of contractual obligations and reciprocal claims on deficiencies with the assignment of the caused damage to the responsible subdivisions; the establishment of the price for research and development with allowance made for their effectiveness, as well as the procedure of stimulating the subdivisions and giving incentives to their personnel subject to the results; the consideration, identification, and systematic analysis of the results of the activity of the subdivisions and the possibility of the prompt elimination of the shortcomings and the mobilization of the reserves of the efficiency of science.

As we see, the drawing up and introduction of such a statute have a specific goal—the increase of the use of the scientific potential, the broadening of the initiative of staff members, and the development of effective forms of cost accounting. A substantial role is also being assigned to the system of the selection and substantiation of the priority directions of scientific and technical progress. The formulation of state scientific and technical goal programs of an intersectorial nature, which envisage the development of new technologies, equipment, and materials at the level of the best world analogs, is at its basis. The specification and reflection in the programs of the scientific and technical parameters of the models, which are planned for development, are possible with allowance made for scientific and technical forecasts, as well as information on the best current achievements of world science and technology.

It seems rational to establish a procedure, in conformity with which scientific research and development, which are conducted in accordance with the assignments of state programs, will not be financed, if the results upon their completion prove to be lower than the world level.

Such experience (and, moreover, successful experience) exists, for example, in the GDR.

Data on the leading achievements of science and technology are also necessary for the analysis of the scientific and technical level of the sectors of the national economy and the monitoring of the conformity of production to the world level. And at the same time the difficulty of determining the progressiveness of the equipment being developed and choosing an analog for comparison remains. For one model, for example, the indicator on capacity and metal content is better, for another the indicator on reliability, power consumption, and maintainability is better. Here it is important to avoid a subjective approach to its choice, which can have a great influence on the measurement of the technical level of the equipment being developed. It often happens that an "innovation" has a high technical level, but in reality is not competitive. Therefore, along with the corresponding information a scientifically substantiated method of evaluating the technical level is needed, which will make it possible already in the process of drafting scientific and technical programs and five-year plans to envisage in them the development of new equipment at the level of or higher than the level of best world models. This is an important prerequisite of the effective use of the scientific potential.

State orders for the conducting of scientific research and development act as another prerequisite. The assignments of state scientific and technical goal programs, the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000, as well as the plans of interbranch scientific technical complexes are reflected in them. It is important that the assignments would envisage the development of new equipment with such a level of the quality characteristics, which at the stage of introduction and production will ensure its competitive ability.

In conformity with the USSR Law on the State Enterprise state orders are mandatory for the performer and the client, who bear responsibility for them. Thus, a high technical level of the results of scientific research and development, on the one hand, is becoming directive and, on the other, is being backed by the mutual material liability of the parties.

The increase of the effectiveness of the use of the scientific potential, as well as all types of resources, first of all manpower resources, in many respects depends on the development of scientific and technical cooperation with the socialist countries. Based on a common interest in the division of labor with national and cost accounting interests and the consideration of the differences in the level of economic and technical development and the specific peculiarities of the building of socialism in some countries or others, it affords great opportunities for the partners. First of all such cooperation makes it possible to solve more efficiently and in a shorter time the problems of increasing the technical level of products and production, to save manpower and material

resources, and to concentrate the efforts of scientific and engineering personnel on the elaboration of the priority directions of the development of science and technology and the most important national economic tasks. Moreover, the time of the conducting of research and development is shortened significantly and their technical level increases. Cooperation is organized so that the portion of the operations, which has been completed by one performer, is merged fundamentally with the overall set of operations, without repeating the ones that the other is carrying out. Here the partners contribute half of the necessary physical assets and manpower resources, but receive the results as in case of the making of allocations for all the operations when performing them only on their own.

The many years of practical experience in scientific and technical cooperation of the socialist countries showed the advisability of its development on the basis of direct ties by the establishment of joint scientific production associations, scientific organizations, and joint collectives, as well as the conclusion of contracts, agreements, and economic contracts. The Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 became confirmation of this.

Soviet scientific research institutes and planning and design bureaus are developing various forms of cooperation with all the CEMA member countries. In 1986 an agreement on the establishment of a joint laboratory for the development of technological processes of the finishing treatment of hydraulic units was concluded between the NIItaktorselkhoz mash Scientific Production Association and Bulgarian organizations. The goal of its operation is to develop equipment of a high technical level on the basis of the expansion and intensification of research in the area of the technology of producing precision surfaces, which should lead to the discontinuation of its purchase.

In 1987, 17 joint laboratories, design bureaus, and groups were established with Hungarian organizations. Another 16 will begin operating in the immediate future.

During the current five-year plan 210 types of new machines and instruments, 30 samples of materials, and more than 80 advanced technological processes are being developed on a bilateral basis. The amount of joint work on the basis of contracts has increased—more than 70 percent as compared with 34 percent during 1981-1985.

Designers of the Voronezhzernomash Production Association and the Petkus enterprise (the GDR) jointly developed, while production workers assimilated the output of a grain cleaning and drying line which consists of 15 machines. During its operation the labor expenditures are reduced to one-fourth and the annual economic impact comes to 150,000 rubles. Less than 3 years were spent on the development and production of the line instead of 6 years without direct ties. The cooperation of the Moldavian Floare Association with the GDR Intra enterprise made it possible to assimilate the production of the best wool rugs in density in the USSR with the lowest production cost.

In the immediate future more than 100 scientific research institutes and about 50 higher educational institutions of the USSR and Poland (on each side) are switching to direct ties. The Experimental Scientific Research Institute of Metal-Cutting Machine Tools (the USSR) and the Scientific Research Institute of Metal Working Machine Tools (the CSSR) formed in 1985 a scientific and technical association for robotics. Here by 1991, 5 types of automated equipment, 12 types of industrial robots and manipulators, and 26 types of robotized sections will be developed at the level of world models and will be produced.

The implementation of the examined reserves of the increase of the effectiveness of the scientific potential in many respects depends on scientific research institutes, as well as central economic organs and ministries and their taking of the appropriate steps. This is within their competence, and it is a matter of promptness. Any delay turns into a loss of the end national economic results.

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### Plan to Reform Degree Certification Process Criticized

18140278 Moscow IZVESTIYA in Russian 4 Jul 89 p 3

[Article by D. Leskov: "The Document Is New, But the Ideas Are Old. The Draft of the New Statute on the Procedure of Awarding Academic Degrees Does Not Reduce the Danger of Administrative Arbitrariness"]

[Text] Who does not know the words of the satirist that we have surpassed everyone in the number of physicians — now if only we would lag in the number of patients? While pursuing the gross to the detriment of quality, the extensive means of development—the common scourge for our entire economy—also did not spare science. We have armies of candidates and doctors of sciences, but what is the point? The Higher Certification Commission has submitted a draft of the new Statute on the Procedure of Awarding Academic Degrees and Conferring Scientific Titles. Academician Ye. Shemyakin, chairman of the Higher Certification Commission, commented on it in IZVESTIYA (No 137 of this year). He stressed that restructuring gave rise to the draft and that its supreme task is to create the conditions of most favored treatment for talented people.

In order to find out to what extent the authors of the draft succeeded in what was contemplated, we decided to turn to those who work directly with talented people—to well-known scientists who are well acquainted with the specific nature of the activity of the Higher Certification Commission.

#### Academician V. Platonov:

"I believe that for the settlement of the urgent questions, which for a long time now have faced the system of certification, it is necessary to establish at the Academy of Sciences a public commission made up of the most competent scientists. It seems that the two main misfortunes of the Higher Certification Commission are excessive bureaucratization in case of the defense of dissertations and the lack of responsibility of specialized councils for sloppy work that has been passed. The submitted draft, as far as I understand, will not change the situation fundamentally."

Let us supplement what was said by Academician V. Platonov: in the Higher Certification Commission, apparently, they also understand the necessity of changes. For all the amendments, which in recent years, including this time, have been made in the documents concerning the Higher Certification Commission, have been aimed precisely in two directions—decentralization and the simplification of the procedure of defending dissertations. However, you would not call the steps being taken even half-hearted. And how is one to hope for cardinal changes, when the staff of the Higher Certification Commission is taking an active part in all the amendments? Might it push the chair out from under itself? Might it voluntarily agree to the reduction of its unlimited power?

#### Academician V. Avduyevskiy:

"We have surpassed everyone in the world in the number of scientists with degrees, it is possible to count our Nobel Prize winners on our fingers. Everything depends on what goals scientists are oriented toward. The discoveries, for which Nobel Prizes are awarded, are made on the average at the age of 35. Our scientist during this most fruitful years for science is absorbed in the preparation of often fruitless dissertations. It is necessary to change the system of certification without delay, for it is weighing on our science and is aggravating the lag behind the world scientific vanguard. During the preliminary discussion of the Statute I voiced the suggestion on the expedience of the introduction of a single-stage threshold of certification in interdepartmental councils, in which the most skilled specialists are brought together. Here it is not necessary to write long dissertations, it is sufficient to make a report—colleagues know the real worth of a scientist not from documents and certificates. In this case scientists make the final decision on the fate of the dissertation, and the Higher Certification Commission in its present form is to be eliminated as superfluous.

"At times one has occasion to hear the conclusions: the Higher Certification Commission is needed in order to hold back weak dissertations which have been passed by local specialized councils. Such a phenomenon, of course, is being observed. But it is naive to assume that the Higher Certification Commission is an insurmountable barrier for excessively go-getting figures. There are cases of the conferring of degrees entirely without discussion by a skilled council of scientists. I had occasion to head for three terms one of the expert councils of the Higher Certification Commission (this is a public position), and how many requests of different kinds I heard from the management of the staff! I believe that under the pretext of the democratic discussion of dissertations the Higher Certification Commission is disposed to secrecy in decisions and, according to my observations, is striving for the preservation of a certain 10-percent quota of the number of all works, which it is possible to 'pocket.'

"Both my colleagues I and have repeatedly criticized the system, on which the Higher Certification Commission is based. But its tenacity is understandable: a blow against it is a blow against bureaucracy."

Simple arithmetic confirms the views of V. Avduyevskiy. In both the old and new statutes it is indicated that the meeting of a sectorial specialized council is considered competent, if not less than three doctors of sciences in the specialty of the dissertation being defended take part in its work. The nomenclature of scientific specialties today contains 514 items, the Presidium of the Higher Certification Commission, which consists of 25 people, makes the final decision on the awarding of a doctoral degree. An elementary school pupil will easily calculate that for the observance of a quorum there should participate in the work of the



presidium at least...1,542 people. There is one conclusion: even regardless of the assortment and personal qualities of its members the Presidium of the Higher Certification Commission cannot lay claim to any competence. Moreover, it is clear that most often it is also impossible to ensure a quorum in the expert councils of the Higher Certification Commission, which consist of 25 doctors of sciences and examine dissertations in 15-20 specialties. Incidentally, V. Avduyevskiy also told about this: in 3 hours the 16-17 people, who came to the meeting of the expert council, look over several tens of doctoral dissertations—it is absurd to talk in such a situation about any monitoring.

**Academician V. Mishin:**

"The approval of dissertations in the expert councils and in the Presidium of the Higher Certification Commission is unnecessary bureaucratic steps. Not science, but administrators need them, in order to shelve one dissertation and to give another a chance. In scientific surroundings there is the steadfast conviction that the Higher Certification Commission had already turned long ago into a sinecure."

**Academician Yu. Pozhela:**

"I am convinced that the management of science from the center is ineffective. If local specialized councils were granted more rights, this would increase the element of competitiveness in science and, without a doubt, would do it good. The Higher Certification Commission, in my opinion, is an absolutely superfluous organ. The diploma on a scientific degree is impersonal, it must be seen to that not the Higher Certification Commission, but the specific institute, at which the defense took place, would issue this diploma. With this diploma the scientist should appear on the scientific market and compete for a position. Then dissertation writers themselves will seek 'hard' specialized councils, inasmuch as material prosperity depends on their prestige. The weak specialized councils, which turn out sham dissertation writers, will fall apart in a natural manner."

**Academician Yu. Ryzhov:**

"Scientists in our country are oriented not toward science, but toward the writing first of a candidate dissertation, then, when their spiritual and physical strength are running out, a doctoral dissertation. It would be more intelligent to limit the certification torments of a scientist to one dissertation, which confirms his skill, and to allow him to work under 'the conditions of a free enthusiast.'"

"I agree with the suggestion of V. Avduyevskiy on interdepartmental councils and with his observation about the interest of the staff in certain works. I remember that important petitioners also came to me, hinting transparently that from me they were going to the management 'to have tea.'"

"What will force the specialized councils, which have acquired independence, to work in a high quality manner? It is possible to settle such questions only economically, and they will be settled precisely that way without any pressure from above. There is just one condition: the enterprise should have the opportunity to fix the salary for the 'degreed' scientist, on the basis of how much the specialized council, in which the defense took place, is valued in the scientific world."

It is difficult not to agree with the opinion of Yu. Ryzhov: the authors of the draft conducted the search for something new on old territory.

The modest 10-year period of the appeal of dissertations, which is indicated in the draft, does not, therefore, seem strange. Why not look farther? Or will it then be difficult to shovel aside the entire load of just claims against the Higher Certification Commission, which indulged sham dissertation writers? Honest personnel, who strove to halt waste, were always on the Higher Certification Commission. But often this waste, which had strong rear units and shelters, crossed all the obstacles and emerged in another council, even though not in the specialty, while the scientist of principle, as happened, for example, with Rear Admiral Professor N. Severtsev, chief of one of the certification divisions of the Higher Certification Commission, was forced with much trouble to change his place of work. They attempted to expel N. Severtsev even from the party. No, terms of prescription are inappropriate in science. And not only because the hack with a degree has the habit of acquiring accomplices and followers. It is also necessary to restore the truth with respect to those who were persecuted for an honest stand.

**Doctor of Juridical Sciences A. Yakovlev:**

"In the USSR in the 1920's, there was no likeness of the Higher Certification Commission, but precisely at that time we achieved major breakthroughs in biology, physics, and economics. However, the real achievements of young Soviet science paled in comparison with the sterile ideals of the administrative command system, which is based on timid obedience, total control, and the indisputable authority of the highest dignitaries from science. The Higher Certification Commission was established, although this is far from the only reason that we began to lag in science. The cosmetic overhaul of the system of certification, which was carried out in the middle of the 1970's, in order 'to make the good better,' did not improve the situation.

"From a legal standpoint the tower of certification, which consists of three tiers—specialized councils, expert councils, and the Presidium of the Higher Certification Commission—is unprecedented and absurd. Is it possible to imagine a court, which, when considering a case in the presence of the defendant and all the interested parties, merely intercedes with respect to it, but then the same case is discussed behind closed doors and in a second court and, at last, is finally decided in a third one? Such a certification system bears the mark of the

times when it was established and during the 4th year of restructuring is seen as an anachronism."

The scientists stated a unanimous opinion. The draft of the new Statute does not touch in the least on the most sensitive points of the certification system. The structure of the Higher Certification Commission, which is like a Cretan labyrinth—the expert groups and expert councils, the collegium and the group of members of the presidium, the departments and the presidium itself—is completely intact. Moreover, another element—the section of members of the plenum—is being added. There was also preserved the paradox that was elevated by the administrative command system to an indefeasible law: when ascending the tiers of certification the powers of the instances increase rapidly, while their competence in the given problem decreases, as a result of which arguments of by no means a practical nature often prove to be decisive.

The main flaws of the obsolete system of scientific certification were carefully transplanted into the new

draft. Was the work of its compilers not evaluated by the scientific community because they could not bring themselves to encroach upon the power of the dignitaries from the Higher Certification Commission?

In the editorial mail there are also many letters which assert that the published document leaves inviolable the very spirit of the old statute. The policy: all important questions as before are settled not by the scientific community, but by the staff of the Higher Certification Commission, runs in an unobtrusive and latent manner through the draft. Scientists are convinced: the proposed draft cannot be corrected, an alternative draft is needed.

To summarize, it is possible to express a general opinion: just as our science now lacks fresh, out of the ordinary ideas, so the authors of the published draft lacked courage. Minor amendments to the prevailing statute, even ones that do not lack a rational kernel, will hardly help science to produce prolific shoots.

**Computer Cooperative Union Expands Operations**  
*18140274 Moscow NTR: PROBLEMY I RESHENIYA*  
*in Russian No 10 (97), 1989 p 2*

[Article by Ye. Fedorovskiy under the rubric "Panorama": "Cooperation: A New Scale"; first paragraph is NTR: PROBLEMY I RESHENIYA introduction]

[Text] The second congress of the Informatika Cooperative Union has been held in Moscow. The first one, the constituent congress, was convened at the end of last year. What induced the cooperative members after such a short time to meet again?

"It has already become an axiom as if for everyone: the revival of our economy is being checked by the lag in the area of computer technology and information science," Deputy Chairman of the USSR State Committee for Computer Technology and Information Science V. Korchagin, president of the cooperative union, explained. "We have issued many good decrees and decisions, but, unfortunately, all of them thus far have broken against the inaction of ministries and departments."

On the other hand, the cooperative movement proved to be marvellously dynamic. The members of the Informatika Cooperative Union in just half a year established commercial information centers in Moscow, Khabarovsk, and Vladivostok. A exhibition of available domestic foreign computer hardware and programs was displayed at each one. Skilled specialists will familiarize one with the computer hardware, will help one to select a purchase, and will teach one to use the new items.

The cooperative members intend to open similar centers in Kiev, Kharkov, the Crimea, Kishinev, Yakutsk.... Soon there will be about 100 of them. It seems that in precisely this way it is possible to establish most rapidly of all in the country a market of machine information.

But a question immediately arises: Why do we need it, this market, if up to now we managed without it? The point is that not only do we have few computers, but they are also operating wretchedly precisely due to the lack of programs. In nearly every plant yard and at nearly every institute they are contriving to acquire their own staff of programmers and to write their own programs. But one will not find in a month of Sundays good programmers and, thus, good programs. Especially in regions, where it

is necessary to develop industry more quickly, for example, in Siberia and the rayons of the Far North and the Far East. The solution suggests itself: it is necessary to bring in not programmers, but ready-made programs and to trade in them. It turns out that one cannot do without a market of programs.

Information exchange throughout the civilized world is carried out now according to the laws of the electronic age—not with couriers, not by mail, indeed, to send superrapid computer messages. But our ministries are in no hurry to make us happy with the discovery of electronic mail. Therefore, the members of the Informatika Cooperative Union put into pilot operation the first section of their "Uzhgorod—Moscow—Sverdlovsk—Komsomolsk-na-Amure" intercomputer communication network. Soon the commercial centers will begin to exchange with each other advertising messages over wires. Subsequently this network will encompass the country from the western borders to the eastern borders, will become "denser," will switch to more advanced equipment, and will be merged with foreign data banks.

There has also appeared in the Informatika Cooperative Union its own credit and financial organ with authorized capital stock of 1 million rubles—Eleksbank. Now the cooperative members can at their own discretion channel earned monetary assets into the development of priority directions—be it the building of new program making enterprises or the establishment of promising information systems, the expansion of the market of programs or the training of personnel. Credit and settlement service is being organized in an "electronic rhythm," which is strange for the domestic client—through the bank computer. The introduction of credit cards is being planned for the making of noncash transactions of the population and economic organizations.

The central office of Eleksbank is located in Moscow. Departments of it are being opened in other cities. A cooperative banking network, which stimulates economically the fundamental development of information science in all regions, will soon emerge.

And a last thing. Whereas last year 11 cooperatives became a part of the Informatika Union, in half a year their number has increased by more than twofold. Today they represent nearly all the republics and regions of the country.

### Youth Collectives Further East Bloc Technology Transfer

18140244 Kiev MOLOD UKRAYINY in Ukrainian  
28 Mar 89 p 3

[Article by Aleksandr Boychenko under the "'Cooperation' Program" rubric: "Ideas Are Always in Demand"; first paragraph is MOLOD UKRAYINY introduction]

[Text] The first Soviet-Yugoslav creative collective of young scientists has begun its work in the capital of the Ukraine. It is comprised of representatives of the Electric Welding Institute imeni Ye.O. Paton, AN USSR [UKSSR Academy of Sciences], Theoretical Physics Institute, AN USSR, and Belgrade Physics Institute.

When a group of Soviet young people was traveling Yugoslavia last summer within the framework of the KMO USSR [UKSSR Committee of Youth Organizations] program, Kievite Igor Krivtsun "dropped behind" the delegation in Belgrade: in the local Physics Institute he had negotiated prospects for business contacts between young scientists of the two countries.

Igor, a member of the staff of the Electric Welding Institute and Candidate of Physical Mathematical Sciences, had a special assignment for the trip - on the mission from the management, he had to coordinate the final draft of an agreement on joint research. After the agreement had been discussed by all interested partners, it was signed, first in Belgrade, and then in Kiev.

"The agreement on creative scientific cooperation is a practical implementation of the 'Cooperation' program developed by the Central Committee of the All-Union Leninist Communist Youth League and youth leagues of the fraternal countries", says Igor Krivtsun. "We conduct theoretical research in the field of electromagnetic radiation interaction with plasma and metals. In order to fulfill the program, a temporary international creative youth collective (TICC) has been organized. As it is not a juridical person, the institutes act as guarantors in relations governed by law. They also help in the material and technical support of the work. The TICC is managed by the council of representatives. It is envisaged to exchange information, participate in international conferences and conduct reciprocal field work in the process of cooperation."

This is not the first international creative collective working in the Electric Welding Institute within the framework of the "Cooperation" program. Prior to this, young Patonovites concluded an agreement with the Cuban Central Metallurgical Research Institute (CMRI) for joint development of a flux-cored wire. At present, serious discussions are under way on organizing TICC's with scientists from Bulgaria, Hungary and the GDR.

"Of course, our professionals are capable of solving a lot of problems by themselves," says Vitaliy Romanenko, the Komsomol Committee Secretary. "But time goes by. It is our generation of scientists and engineers who must

make a breakthrough towards the most advanced technologies. And this is only possible if broad international cooperation is developed and researchers from various countries join their efforts."

What are the prospects for developing contacts between young scientists of the CEMA member countries? On the request of a RATAU [Ukrainian Radio and Telegraph Agency] reporter, Director-General of the Interbranch S&T Complex "Institut elektrosvarki imeni Ye.O. Paton", AN USSR, Academician B.Ye. Paton answers the question:

We are placing great hopes on our youth. Therefore, I think the organization of international youth collectives is the right trend. Granted, the fact in itself is not yet an occasion for a nice talk - there are a lot of problems along the way, and first of all legal and commercial ones.

As is generally known, the CEMA member countries are developing an integrated program of S&T progress up to the year 2000. There are five priority directions - electrification, automation and robotics, nuclear power, biotechnology, and new materials and technologies.

Academies of Sciences of the socialist countries are also joining their effort in these areas. For instance, late last January we signed in Bulgaria an agreement on cooperation between the NRB [the People's Republic of Bulgaria] and Ukrainian SSR Academies of Sciences. The agreement opens up opportunities for developing direct ties between individual institutes and laboratories. There are also favorable conditions for organizing international creative collectives of young scientists and professionals. A characteristic feature is that the document pays special attention to basic research, as without it one cannot develop revolutionary technologies that can bring radical changes to entire industries. This is an important factor. If we are only keen on applied research, and even if due to this we get slightly ahead of the pack, some time later we will inevitably "eat up" our basic backlog.

When developing scientific projects within the CEMA framework, we must think of where and how to implement them in order to get the maximum return on investment. Whether it is a machine, a mechanism, a technology or a new material, it must be done at the world level, which makes it possible to improve and enrich national economies of our countries and engage third countries with which we can conduct trade.

We need entirely new and original solutions and, of course, joint creative work. In this, there are no trifles. But for instance, so far one absolutely inadequately utilizes the opportunities of field work by young scientists, and exchange of interesting publications is insignificant.

One more thing. Nowadays, no task is more important than to form a young scientist's ecological culture. All research must result in ecologically clean, waste-free and energy-saving technologies. This will guarantee a dynamic development of the national economy and in the end will ensure the success of perestroika.

**Progress of New Financing Methods in UkSSR Academy of Sciences**

18140256 Kiev VISNYK AKADEMIYI NAUK  
UKRAYINSKOYI RSR in Ukrainian  
No 4, Apr 89 pp 3-6

[Report by AN USSR [UkSSR Academy of Sciences] President Academician B. Ye. Paton at a meeting of the UkSSR Academy of Sciences Presidium]

[Text] On October 15, 1988, the USSR Council of Ministers adopted a decision "On Switching Over Scientific Organizations of the USSR Academy of Sciences, Academies of Sciences of Union Republics and the State Committee for Public Education to New Financing and Economic Methods".

The document had been in the development stage for over a year, because as early as September 30, 1987, a decision of the CPSU Central Committee and USSR Council of Ministers was published that dealt with the need to develop proposals on gradual switch-over of Academic scientific institutions and organizations to new financing and economic methods, with consideration given to specific aspects of their activities.

The decision draft was redrafted many times. Unfortunately, the provision that the State budget appropriations for basic research will increase twice as fast as the national income disappeared in the approved version. Neither does the document contain specific numbers on financing of the academic science in 1989-1990.

Be it as it may, the decision has been adopted, and it delineates a number of principle aspects of switching our institutions over to new financing and economic methods. We must now decide how we shall organize its fulfillment in our Academy.

I must stress that certain work has already been performed along these lines. The Ukrainian SSR Council of Ministers agreed in the summer of 1987 with our proposals on developing Republican programs of basic research on the most important scientific problems and approved a list of the problems. It was decided to discontinue the use of five-year and annual Republican plans in the field of natural and social sciences.

The proposed changes in the system of planning and financing of scientific research were widely discussed in AN USSR Sections and Departments and in several leading Institutes. Remarks and suggested amendments were for the most part taken into account in the draft of the Presidium of the UkSSR Academy of Sciences decision we are discussing today.

I shall now dwell on key aspects of the new decision of our Government. First of all, the decision has to a certain degree put to rest discussions on switching academic science over to full cost accounting and self-financing. The State budget will allocate resources for basic and applied research and development on the

assignment of State S&T programs, the Integrated Program of S&T Progress of CEMA Member Countries (KP NTP SEV), plans of interbranch S&T complexes (MNTK) on the most important scientific and S&T problems, and basic research programs of the AN SSSR [USSR Academy of Sciences] and Academies of Sciences of Union Republics.

A new in principle aspect is that funds will be appropriated from the State budget for initiative basic research: the research subject areas will be independently determined by scientific institutions themselves. This research should be conducted in order to create advance scientific backlog and search for "growth points" and new directions scientists' attention should be concentrated on.

It has also been allowed to create reserve funds, allocated from the State budget, for financing of the most important research if the need arises in the middle of a year. These funds can also be used for accelerating work performed in accordance with basic research programs.

A determining aspect of the adopted decision is the repeal of financing for simple and direct upkeep of scientific organizations and switching over to specific-purpose financing of specific programs, subjects and initiative basic research on a competitive basis.

I should note that this approach is not exactly new for our Academy, because we have been conducting subject-oriented research planning, and basic financing of scientific institutions is clearly tied to all subjects an Institute is working on.

The new aspect in institute financing is the creation of profit, both by savings of State budget funds according to scientific research budgets and cost-accounting activity in accordance with customer contracts.

Central planning and financing bodies will determine for AN SSSR and Academies of Sciences of Union Republics standards for creating the payroll fund, and the standard, the same for all scientific organizations, of payments from profit to the State (and particularly to the local) budget, as well as profit distribution procedures.

I would like to bring to your attention the fact that the decision provides for switching over to new economic and financing methods as of January 1, 1989. In other words, all new aspects of distributing financing among programs and subjects, formation of basic research subjects in institutes and the competitive basis for distribution of funds are being introduced as of January 1, 1989.

What kind of changes must happen here?

First of all, we must change the procedure of forming research subject plans.

We have known all along that the division into the most important and agency-type and to a certain extent into nature-social and S&T subject areas is rather conventional, as there are no clear criteria in this respect. It was

mainly a formal division that did not reflect the real-life situation. From now on the degree of importance of research subjects will only be determined by their inclusion into programs or plans at the respective level. One will treat as the most important assignments of State and Republican specific-purpose S&T programs and basic research programs, KP NTP SEV, MNTK plans, and individual assignments by directive bodies.

Another essential aspect is the formation of basic research subjects. The USSR Academy of Sciences has already decided on the distribution of funds for basic research among its Departments. On the average, their share is equal to 14% of the total volume of budget financing for 1989, although it varies among Departments, from 10% for the Nuclear Physics Department to 41-44% for the Departments of the Social Sciences Section.

It is my opinion that such ratio of standards for basic research subjects is fully justified. It is well known that the share of basic research subjects for arts institutes and theoretical profile institutions must be higher. However, I think that for our Academy as a whole the share of appropriations for basic research must be much higher than it is now in the AN SSSR. We know that even for branch S&T institutes this standard is about 20%.

In our Academy, the switch-over to standard-based planning of basic research subjects will be somewhat more complicated than in the AN SSSR. This is first of all due to the fact that we already conduct subject-oriented planning, the subjects have been approved, and the work is being conducted. Therefore one should form basic research subjects by freeing up funds as S&T works are being completed (in 1988 it was approximately equal to R20 million), and by reviewing subject areas at institutes.

However, the Science Organization Department of the AN UkSSR Presidium in cooperation with AN UkSSR Sections and Departments must in the shortest time possible submit proposals on standards for allocating funds for scientific institutions for conducting basic research, so that the institutions can review in 1989 their subject areas according to the AN UkSSR agency plan and form basic research subject areas on the standard basis.

Formation of basic research programs by Academies of Sciences of Union Republics must become a fairly important aspect in the research planning system. As a matter of fact, this is an agency's order for conducting S&T work. Proposals of scientific institutions will be examined and funds will be distributed on a competitive basis.

As far as this latter statement is concerned, there are different opinions. One might argue that we have been deprived of the right to give our own orders to institutions under our jurisdiction. However, all Ministries and agencies have centralized funds for the development of science and technology and they do distribute them on a

competitive basis, so we can also use this analogy. On the other hand, situations can happen when even good works that have passed the scientific research stage do not make it for some (not always objective) reason to Union-level programs. What is one to do in such a case? Curtail the research? This is where we must provide for forming our own programs or individual subject areas that would be part of an agency order.

I would also like to bring to your attention the fact that budget allocations along the lines of State orders will be mostly appropriated for the USSR State Committee for Science and Technology and AN SSSR programs. However, even now one is going overboard as far as the number of these programs is concerned. I think that in the future their number will decline. Under these conditions agency orders will make it possible for our science Departments to work out a certain "guarantor" system. So far we look like blind kitten in this area.

However, I do not want anybody to get an impression that an agency order will be kind of an umbrella for non-promising or non-topical subject areas. A competitive character of including all levels of plans in S&T work envisages both their competitive character and severe competition. As the competitive selection system and the objectivity of expert evaluations improve, cases when scientific divisions that do not provide the required research level will be disbanded are not out of the question. Of course, this is not the most pleasant exercise, but we must look a situation in the eye and not be afraid of such eventualities. The lack of initiative and competence of certain scientific collectives and their long-term parasitic existence due to being able to give pseudo-scientific explanations of their creative insolvency cost the State and science too much. Another outcome could be changing the profile of such institutions, and they should be ready for this.

After switching over to new working conditions the independence of Science Departments and Institutes and their rights in areas of research planning and financing will increase considerably. Here, they must display initiative and show their responsibility.

Of course, we have virtually no experience in solving the new problems, for instance, in competitive selection of works and resource distribution. To a certain extent, one can view as the first steps our participation in the high-temperature superconductivity program being developed now and in the formation of State basic research programs by the AN SSSR. But even these first steps confirm convincingly that one must work actively. For instance, there are data already that indicate that active participation of representatives of the Ukrainian Academy of Sciences in Scientific Councils on AN SSSR programs and persistent stands taken by some Academician Secretaries of our Departments have made it possible to substantially increase the AN USSR share in additional budget financing allocated per these programs.

I would like to emphasize that the draft under our consideration is but the first response to the Government's decision. This is the beginning of restructuring of the financing and economic system in the academic science. We will discuss this problem during the coming Session of the General Meeting of the Ukrainian SSR Academy of Sciences. The transition to new methods will be rather protracted, and all members of the AN USSR Presidium, staff divisions and of course scientists and employees of Academic Institutes must work seriously on this problem.

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### **Achievements of Latvian Engineering-Technical Center**

18140277 Riga IZVESTIYA AKADEMII NAUK  
LATVIYSKOY SSR in Russian No 4, Apr 89 pp 71-75

[Article by Yu. S. Urzhumtsev under the rubric "Scientific Surveys": "The Engineering and Technological Center of the Latvian SSR Academy of Sciences: Achievements and Prospects"]

[Text] In recent years a quite great scientific potential has been developed at the Latvian SSR Academy of Sciences. In such priority directions as magnetohydrodynamics, the plasma chemistry of inorganic compounds, biotechnology, the development and use of new materials, robotics, instrument making, and a number of others our Academy of Sciences holds leading places in the country.

The experimental design and pilot production base plays the main role in the practical implementation of this potential. However, today this base does not conform to the increased scientific and technical potential of the academy and to the needs of the national economy of the republic. The experimental base of the Academy of Sciences was developed in the middle of the 1960's, by now it has become obsolete and needs substantial technical modernization.

To get out of such a situation, to strengthen the experimental production base, and to ensure the direct contact of scientists with the national economy of the republic in 1986 the Engineering and Technological Center was established on the initiative of the Presidium of the Latvian SSR Academy of Sciences. The task of the center is: on the basis of basic research of the Academy of Sciences and higher educational institutions of the republic to carry out the development and production of new technological processes, means of mechanization and automation, devices, instruments, and construction materials for the national economy of the republic, which conform to the world level, and to duplicate the experimental design developments of institutes.

With allowance made for the diversity of the needs of the national economy of the republic for innovations and the

versatility of the reserve of Latvian scientists the Engineering and Technological Center was given a polytechnical structure, which conforms to the solution of introduction problems of different directions, but ones that are limited to the framework of the technical specialization as applied to the needs of the machine building and instrument making complex. Following this idea, the center was formed as an integrated introduction firm, which unites design and research, technological, pilot production, and cooperative commercial organizations. For the integration of scientific research with the sphere of physical production highly skilled specialists: candidate and doctors of sciences, are being included on the staff of the center. Their task is to take in a scientific idea from developers, to implement it in an item or technological process, and to transfer it to production workers, carrying out their instruction or advanced training on their own. For this a special staff of scientists—production workers, designers, and process engineers—who are capable of working basic research up to engineering developments, is being formed at the center. The department of engineering research, the basic duty of which reduces to the assimilation and the gearing to specific local conditions of the scientific achievements of regional science and other scientific centers of the country, is envisaged for this contingent in the structure of the Engineering and Technological Center. The activity of this subdivision is based on full cost accounting. The amount of work is established by the Presidium of the Academy of Sciences, but is limited by a ceiling—not more than 20 percent of the total amount of work of the center.

The structure of the Engineering and Technological Center should be formed on the basis of the peculiarities of the scientific reserve of the Academy of Sciences and the needs of the national economy of the republic; therefore, its specific form should have a certain flexibility. At present the Engineering and Technological Center includes:

- the Special Design Bureau of Experimental Equipment and Instrument Making with a pilot works (SKB OOP);
- the Design and Technological Bureau of New Technologies and Construction Materials (KTB NT i KM);
- the Republic Center of Laser Technology (RTsLT); the Central Intersectorial Design and Technological Bureau of Robotics with a pilot works (Tsentrobo-totekhniki);
- the Zinatne Scientific and Technical Cooperative.

The Special Design Bureau of Experimental Equipment and Instrument Making has an advanced production base, which makes it possible both to carry out the duplication of its own developments in small series and to fill outside orders. The following creative groups are a part of the special design bureau:

- the division of electronics and computer technology;
- the sector of problems of low-temperature soldering;

- the sector of metal working with the use of blade tools made of superhard materials;
- the sector of plastic metal working with the use of elastic media.

In the division of electronics and computer technology prototypes of means of mechanization, automation, monitoring, and diagnosis in the area of machine building, geophysics, biotechnology, and medicine are being developed on the basis of microprocessor devices. It is planned to begin work on the development of hybrid analog-digital computers and on the problem of pattern recognition.

The division has a base both for the production of prototypes and small series of items and instruments in accordance with the orders of organizations and for the manufacture of consumer goods.

In the sector of low-temperature soldering new technological processes and experimental equipment, which ensure the reduction of the oxide losses (to less than one-half) of tin-lead solders with the simultaneous reduction of the consumption of solder to one-half and less, are being developed.

In the sector of advanced tools new technologies of the machining of parts of machines on the basis of the use of tools made of superhard materials (STM's) are undergoing further development. The sector is giving technical and procedural assistance in the introduction of tools made of superhard materials in industry, which is ensuring superhigh speeds of the cutting of cast iron and hardened steels: in case of milling—up to 3,000 meters a minute, in case of turning—up to 1,000 meters a minute. All this is making it possible to increase the capacity and quality of machining, to release workers and production areas, to eliminate grinding, and to increase the wear resistance of parts.

Cold sheet stamping by elastic media (polyurethane) is making it possible to perform all types of stamping operations. Here instead of traditional dies it is sufficient to produce only a template (for shearing operations) or a punch (for molding operations). Polyurethane of special brands, which withstands a pressure of up to 10,000 atmospheres and has a high wear resistance, serves as the matrix (or punch). Such stamping is most advantageous in small-series and pilot experimental production, in which it makes it possible to decrease the expenditures on the production of attachments to one-tenth to one-twentieth and to shorten the time of the preparation of production to one-fifteenth to one-thirtieth.

The basic directions of the work of the Design and Technological Bureau of New Technologies and Construction Materials reduce to the following:

- the optimum designing of laminated components and coatings;
- the optimization design of components made of composites;

- the development and introduction in the national economy of new technologies of the production of components and items made of composites and polymer materials;
- the development of a computer-aided design system of surface acoustic wave filters for radio electronic equipment;
- the development of highly sensitive positioning sensors, static switches, and controls of electronic equipment;
- the development of methods of forecasting and the selection of integrated circuits with increased resistance to factors of external action.

The following structural subdivisions were formed for the implementation of these directions:

- the division of the optimization of laminated systems and coatings;
- the sector of the optimization of components made of composites;
- the laboratory of crystallization and microelectronics;
- the sector of forecasting.

In the division of optimization research is being conducted on the optimum designing of laminated systems, materials, and coatings, which are exposed to the transient actions of physical processes of any nature (thermal, electromagnetic, or mechanical). The effect of the sequence of the alternation and the thickness of the layers on the properties of the optimum laminated component in case of given restrictions on the characteristics of the physical process is being studied. The thickness, weight, or cost of the laminated system can be the optimality criterion. Here it is also possible to accomplish another task—to formulate the demands on the materials which should form the optimum component.

The practical applications of these developments are diverse. These are laminated bases, which damp the vibrations of mechanisms, heat-resistant enclosing components, which suppress outdoor temperature fluctuations, soundproof partitions and laminated glasses, interference coatings, diffusion systems, protective shieldings, and a large number of casings, systems, and coatings, which are synthesized from various layers.

The sector of the optimization of composite components is conducting research on the mathematical simulation of the strain and strength characteristics of laminated and spatially reinforced composites of a new generation and the processes of the loss of the resistance and the destruction of components made of them when exposed to various types of static and dynamic mechanical and heat loads. As a result optimization methods of the analysis of the stress-strain state and supporting capacity of core and casing components made of modern composites are being developed.



The methods of the structural mechanics of composites and finite elements and the methods of linear programming, random searching, and optimum control are the theoretical basis of optimization analyses, the methods of analysis of specific components made of composites, computer programs, and recommendations on the development of optimum laminated items of systems are the end result of the developments.

The work in the laboratory of crystallization and microelectronics is being performed at a good scientific level. Here computer-aided design systems of surface acoustic wave devices of the multifunctional processing of information are being developed, microwave devices based on Schottky-gate field-effect transistors (amplifiers, adders of capacities, and so forth) are being designed, the interactive analysis and correction of the topology of the layout of the elements of microcircuits based on Schottky-gate field-effect transistors are being ensured, and surface acoustic wave filters for radio electronic equipment are being developed.

Primary transducers for industrial robots, for NC machine tools, for automated control systems, and for a wide range of electronic devices constitute a special group of developments.

The Republic Center of Laser Technology is a typical structural subdivision of the Engineering and Technological Center, at which scientific research, experimental design, and technological problems, which are seen through to introduction at specific works, are worked on jointly. The center is carrying out the development and introduction of laser units for the laying out of patterns on materials (cutting, marking out, engraving), welding, and the broaching of holes on the basis of pulsed yttrium-aluminum garnet lasers, laser units for the removal from wires of enamel, fabric, or polymer insulation on the basis of CO<sub>2</sub> lasers, laser units for soldering based on continuous AIT lasers, as well as microprocessor systems for the checking of the parameters of laser technological units. A wide range of operations is being performed in technological directions, such as:

- the surface heat treatment (hardening, alloying, cladding, glazing) of various parts, dies, and tools;
- the seam and spot microwelding, miniwelding, and macrowelding of similar and dissimilar metals and nonmetals;
- laser laying out;
- the laser drilling of small-diameter holes with high precision;
- reconditioning by hard facing, the repair of various parts, and the cleaning of surfaces.

The laser center is carrying out scientific research studies on the use of lasers both in medicine and in chemical technology, on the geometric inspection of the dimensions of parts, on the optical recording of information, and in other areas of microelectronics.

An especially important direction of work belongs to the Central Intersectorial Design and Technological Bureau of Robotics.

The center is implementing an entire set of questions, which are connected with the automation and robotization of production: it is coordinating the introduction of robotics at enterprises of the republic, is designing technological processes of automation on the basis of industrial robots, is developing and introducing accessories of robotic complexes (RTK's)—feeding and orienting devices, assembly, monitoring, and control systems, and so forth. The Central Intersectorial Design and Technological Bureau of Robotics unites a number of design and research divisions, the specialists of which know perfectly the questions of the parametric checking and oriented feeding of bin-stored parts and are familiar with the principles of the interaction of a magnetic field with separate parts, with the methods of designing vortex current sensors, and with the problems of machine vision.

The Zinatne Scientific and Technical Cooperative, which was organized under the center, has also been included in the general chain of design and technological studies of the Engineering and Technological Center and its introduction section. The duplication of technologically assimilated developments of the Engineering and Technological Center, first of all technical developments, which are of interest for broad national consumption and the technical service of the population, is its main tasks.

The list of the scientific and technical activity of the Engineering and Technological Center is not limited to the brief information cited above. The center accepts orders for the introduction of design and technological developments of other scientific centers of the country as well, if these developments are of interest for republic clients.

In conclusion it should be added that the Engineering and Technological Center, while engaging in production and technical experimentation, also undertook an economic experiment. Starting in 1989 the center has changed over to full cost accounting and is operating in accordance with the second model (the remainder principle) on the conditions of a collective contract with the Presidium of the Latvian SSR Academy of Sciences. All the structural subdivisions of the center are also operating on the conditions of intraproduction cost accounting, have economic sovereignty, and have an independent personal account, while the Central Intersectorial Design and Technological Bureau of Robotics and the Zinatne Scientific and Technical Cooperative have current accounts.

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**Latvian Scientists' Conference Proposes New Financing, Science Commission**

*18080062 Riga CINA in Latvian 8 Jun 89 p 4*

[Interview with Professor Elmars Grens, secretary of the Latvian Scientists' Union Board, on 7 June at Riga conference of the Latvian Scientists' Union, by CINA correspondent Maris Klishans; first paragraph is CINA introduction]

[Text] Today in Riga in the Latvian SSR Academy of Sciences Building a two-day conference of the Latvian Scientists' Union entitled "Latvian Science—Problems and Perspectives" is beginning. Yesterday morning the secretary of the union's board, Professor Elmars Grens, corresponding member of the USSR Academy of Sciences, gladly agreed to inform us about the proceedings and tasks of this forum.

**E.Grens:** Since the union's constituent congress last 27 November half a year has passed, and this conference is practically the first great event in the time of our union's activity. But this conference will not be an account of what has been accomplished. In truth, during these months it will be impossible to realize everything that was hoped for. In this scientists' forum we will discuss the concept of the organization and financing of Latvian science. That is therefore the main task of our conference.

**CINA:** The conference will take place for two days. Therefore there will be lectures and reports that will be discussed and debated afterward?

**E. Grens:** Yes, there will be lectures. For an idea I will mention a few speakers—C. Shkinkis, J. Lielpeters, J. Stradinsh, E. Lavendels, J. Kristapsons, J. Porietis, J. Freimanis, and others. But the reports of these authoritative scientists will contain the setting up of problems and analysis of establishment conditions in individual branches of science.

The second day of the conference will be of more relevance, when in free discussion form the already-mentioned concept of the organization and financing of science will be discussed. The discussion will be opened by the commission directors J. Kalninsh, J. Vaivads, and I. Vitols, but thereafter any conference participant will be able to get involved, because already on the first day all participants will receive a prospectus of the developed concept.

**CINA:** Please familiarize us with the, in your opinion, most essential theses of this conception's project!

**E. Grens:** Our intellectual and economic potential is sufficient so that science in Latvia could develop independently and join world science as its organic component. But a radical transformation of the organization and financing of scientific work is necessary.

Therefore the aim of this conception is to guarantee the intellectual sovereignty of Latvia, to optimally develop

the scientific potential of the republic, as well as economically to involve science in the economy and the solution of problems essential to society. Just as meaningful is the creation of high quality scientific production and the strengthening of the principle of the intellectual scientific conference.

**CINA:** Interestingly, how do you hope to change the scientific financing system?

**E.Grens:** The Latvian scientific budget should be determined right here in the republic, concretely this would be done by the Supreme Soviet. Therefore Latvian science would be financed by these sources: the Latvian state budget, the funds created from the economic branch and enterprise [goal?] taxes for the realization of scientific programs important for the republic or a region, as well as various funds that are formed by the resources of branches, enterprises, cooperatives and private persons, and various bank credits. Moreover, the republic's deduction in the Union budget, from which science is to be financed, is not being made.

**CINA:** Will anything else just as radical be discussed at the conference?

**E. Grens:** In my opinion, of importance is the scheme of creating a science commission at the Latvian Supreme Soviet. This commission would then be the highest scientific legislative body, to which scientists themselves would elect qualified, active, authoritative scientific workers.

This science commission would develop the conceptions of the development of Latvian science, and the budget drafts for the national program and science. Additionally, under its jurisdiction would be the creation of councils of experts working in various directions of science as well as other tasks.

**CINA:** Thank you for the information and may the conference work be creative and fruitful!

**Kazakhstan Reorganizes Agricultural Research Institutes**

*18140262 Alma-Ata PARTIYNAYA ZHIZN  
KAZAKHSTANA in Russian No 4, Apr 89 pp 15-20*

[Article by K. Medeubekov, chairman, VASKhNIL Eastern Department Presidium, academician: "Agrarian Science in the New Stage"]

[Text] Today science is becoming the main productive force in all sectors of the national economy. It is hard to overestimate its significance in the agrarian sector as well. Only by putting all of its achievements into practice is it possible, for example, to solve the problems of food supply for the population within optimal time periods. That is why the Party Central Committee devotes strong attention to further developing science and raising its role in intensifying agroindustrial production.

Noticeable changes in the state of agrarian science are occurring in our republic as well. Above all, the creation of the republic Center for Scientific Support of Agroindustry should be considered an important step forward. The VASKhNIL Eastern Department is its head organization. The center includes 37 scientific institutions from various ministries and departments and 6 VUZs.

What has this brought? The center began to coordinate studies on the most topical problems of the republic's agroindustrial complex. And not only the center's scientific institutions are conducting them: 78 different collectives are working on these studies.

It is also noteworthy that the scientific research institutes, included in the Eastern Department, have become head organizations for scientific support of individual sectors of the agroindustry. Through their efforts, 14 goal-oriented comprehensive republic scientific and technical programs to intensify industry have been developed, in the formation of which all irrelevant and petty subjects were excluded from the plans. As a result, the number of them was reduced from 438 to 129.

This reorganization enables the concentration of basic forces on priority areas, such as "Zerno" [Grain], "Korma i Belok" [Fodder and Protein], "Zhivotnovodstvo" [Animal Husbandry] and others. Moreover, the program and goal-oriented planning of research and development work makes it possible to comprehensively solve the problems of scientific support for sectors, to avoid redundancy, to increase the responsibility of the head institute and its leading scientists for the quality and efficiency of work done within the framework of the program, and to improve control over their implementation.

As of this year, the nature of financing for scientific research is changing in many ways. It is being given a program and goal-oriented direction. Thus, the head institutes, which receive all finances for fulfilling republic programs, will determine their partners on a competitive basis, the main point being that they have a powerful economic lever for influencing the co-executors in their hands. Under these conditions, it will become economically unprofitable for leading institutes to develop irrelevant, petty topics: nobody will pay for them. The situation in peripheral scientific institutions is improving. Firstly, they will start earning for the finished scientific product, and secondly, scientific and methodological leadership on the part of the head institute is being strengthened.

The tie between science and industry is also becoming more solid. Scientific support centers (TsNO) have been created in all oblast agroindustrial committees in the republic, in order to more extensively apply its achievements in practice. Their task is to direct the activity of the region's agricultural scientists, regardless of their departmental subordination, toward solving the problems of the agroindustrial complex. It should also be noted that definite results have already been achieved in

areas where party and soviet agencies have given proper significance to the work of these centers. The Kustanay TsNO, headed by A.A. Obraz, director of the Kustanay SRI for Agriculture, serves as an example. Along with scientists, its staff includes leaders and responsible employees of the oblast agroindustry and APK farms and enterprises. A subdivision for the propaganda of scientific and technical achievements was created. Eleven comprehensive goal-oriented scientific and technical programs for developing Kustanay Oblast in the current 5-year period and in the period until the year 2000 has been drafted. They are coordinated with union-wide sectorial and republic programs and are supported by orders for doing research, engineering, technological and design work.

Positive experience has also accumulated in the Kokchetavskiy and North Kazakhstan centers. However, the leaders of certain oblasts are not giving proper significance to their activity. Therefore, many of them are gathering the necessary pace slowly and poorly utilize the scientific potential which exists locally.

The application of existing developments in industry is an acute problem in the science sphere. During the stagnant period, so many obstacles were placed in the path from laboratories and institutes to the fields and farms, that some of the finished research has remained only on paper, has collected dust on the shelves of storehouses for years. It should be noted that even now inertia in this matter is preserved, and a substantial breakthrough in application practice has not occurred. Although there are many farms in the republic that have armed themselves with valuable scientific achievements and are attaining convincing increase in production, their experience continues to remain "unknown" even to their closest neighbors. A great deal has been done, for example, by the administration and party organization at the Cattle-Breeding Sovkhoz imeni P.F. Tomarovskiy, led by V.T. Boyko, candidate of agricultural sciences, to apply scientific recommendations in all sectors of agricultural production. Hence, the constant increase in the productivity of the fields and farms. The sovkhoz set up effective cooperation with the Kazakh Scientific Farming Research Institute. In particular, a high-yield variety of soy, Evrika-357, was bred through the joint efforts of scientists and practical workers. Under the conditions in Southeastern Kazakhstan, its crop yield reaches 30-40 centners per hectare. Last year, the farm harvested about 34.2 centners of soy beans from an area of 250 hectares. Yet the nearby sovkhozes and kolkhozes located scarcely grow about 10 centners per hectare.

Other examples can be given. Using scientific recommendations, the "Kaskelenskiy" Sovkhoz in Alma-Ata Oblast obtained about 27.3 centners of grain per hectare last year, but the nearby Sovkhoz imeni 60th Anniversary of the USSR only had 6.6 centners. Or consider the Ruzayevskiy Experimental Station: in the third year of this 5-year period, about 40.9 centners of grain per hectare were grown here, yet Kokchetav Oblast obtained about 9.6 centners on the average. This variance is

explained by the fact that specialists are working poorly to improve the structure of planted areas, to improve seed-growing, and to apply the best farming systems, and primary organizations are not placing the appropriate demand on them.

Recently, the situation is beginning to change somewhat. In local areas, organizational and economic conditions are being created for the large-scale use of the achievements of science and technology. Scientific production systems are becoming the carrier of this process. Each of these is a group of kolkhozes, sovkhozes, inter-farm and scientific organizations, which have joined it voluntarily on a contract basis, that coordinates efforts to produce certain types of output under the organizational and technological leadership of a head scientific enterprise. Forty such systems have been created under the scientific research institutes of the VASKhNIL Eastern Department alone. They unite 656 kolkhozes and sovkhozes which produce grain, vegetables, potatoes, sugar beets and animal husbandry products.

The efficiency of these associations can be judged by the results of the work of the "Soy" Scientific Production System—one of four created under the Kazakh Scientific Farming Research Institute. The system coordinates the activity of 20 farms. They cultivate the valuable protein crop on 5,000 hectares. Last year, the crop yield here was higher than the oblast average by almost 5 centners. This made it possible for the partners to receive about 1 million rubles in additional income. Yu.G. Karyagin, department chief at the institute, who is working to arrange the efficient operation of the system, made a great contribution to this first success.

Raising the intensiveness of animal husbandry and stability of grain farming contributes to a significant extent to creating a guaranteed corn production zone in the republic. The kolkhozes and sovkhozes have been assigned the task of increasing the grain yield of corn plantings by a factor of 1.5. The scientific production system of the "Gibrid" Farming Institute is called upon to help solve it. It includes 28 farms. Their seed-growing crops comprised 26.5 thousand hectares and about 48.6 centners were obtained from each, instead of the planned 43. It should be added that the Kazakh SRI for Corn was created on the basis of the "40 Years of October" Agrocompany in Taldy-Kurgan Oblast. It should provide scientific support for creating and applying highly productive varieties and hybrids of this crop, and for developing intensive technologies for cultivating it. More than 70 percent of the scientific research will be done in the company's fields. This concentration of research should ensure a high economic effect.

Some positive shifts are also observed in the work of the 13 scientific production systems in animal husbandry. There are things to apply here as well. Recently, a new species of Ayrshire big-horn cattle was bred and progressive fodder preparation technologies have been developed. In addition, the scientists are offering comprehensive assistance to the farms and are working on the

instruction of cadres in progressive work methods and on propaganda for the achievements of science, technology and advanced experience. Jointly with specialists from kolkhozes, sovkhozes, and the RAPO, they are studying the state of affairs in agroindustrial production and outlining steps to eliminate existing shortcomings. In short, the laborers of fields and farms are entering science through the institute—scientific organizer—kolkhoz (sovkhoz) chain and becoming participants in the process of scientific and technical progress in the countryside.

Along with this, the year's operation of the scientific production systems has also revealed considerable shortcomings in the work of scientific institutions. Individual leaders of institutes turned out to be unprepared when a real opportunity for entry into practice presented itself. These include the veterinary, plant protection, agricultural economics and organization, and mechanization institutes, and others. The systems of the "Almaly" NPO, the "Korma i Pastbishcha," the "Tselinselkhozmeckhanizatsiya," and the Rice SRI have been working beneath their capabilities.

That is why special attention must still be paid to these systems. Recently, foundations have been laid through the efforts of party and agricultural agencies in the republic for improving the population's food supply. However, positive tendencies have been achieved basically due to the establishment of elementary order in production and the involvement of private backyard plots. Yet, the number of unprofitable and low-profit farms over this period did not decrease in practice. Meanwhile, the possibilities for producing output from fields and farms on the basis of old, outdated forms of labor organization are being exhausted. New approaches and new forms of labor organization are needed in the countryside. And, more and more, they are beating a path for themselves. These include the collective contract and lease relations. They were highly rated in the report by CPSU Central Committee General Secretary M.S. Gorbachev at the 19th All-Union Party Conference, which emphasized: "the shortest, reliable path to food sufficiency is the extensive, daily application of leases and other effective forms for organizing and encouraging labor." In lease and contract collectives, labor productivity, agricultural crop yields, herd productivity, and production preservation are somewhat higher. However, they are achieved on the basis of the level of production equipment and technology that has already taken shape, which will presently no longer be able to meet the demands of collectives for intensive labor. Therefore, progressive energy- and resource-conserving technologies, highly productive varieties of plants and breeds of cattle, and improved equipment are needed.

We do have these components of scientific and technical progress. Unfortunately, however, the administrative system for managing the national economy has not been receptive to science, and many proposals by scientists were underestimated and not properly received. The

radical reform is fundamentally changing the situation—industry has started to establish ties with science, to listen to the opinion of scientists, and to use their developments more. Scientific production systems lie at the source at this movement. The components of scientific and technical progress can be brought into the fields and farms in the shortest period of time only through them. In this regard, we have the right to expect the utmost support from the leaders of agricultural agencies at all levels, from kolkhozes, sovkhozes, and from other enterprises in the agroindustrial complex, for scientific production systems and the use of their possibilities in work to raise the production of agricultural output.

In recent years, other measures to restructure the activity of scientific institutions have been implemented. The structure of institutes and scientific production associations was revised in order to concentrate scientific forces and material resources on fulfilling priority research directions. The certification of scientific employees is being performed in all scientific research institutes (and is completed in some). The administrative apparatus, both in scientific institutions, as well as in the VASKhNIL Eastern Department Presidium itself, was significantly reduced. Since the beginning of 1988, about 50 percent of scientific institutions and organizations of the Eastern Department have converted to full cost-accounting and self-financing. These measures sometimes caused unnecessary disputes, and mistakes were made in planning and financing assignments. This is all being gradually overcome. Summing up the preliminary results of work on self-financing, it can be said that the scientists' desire to act at full force and be of great use has been revealed. However, cost-accounting work is not going the way it should. Individual institutes are operating in the old way, have done only a plastic operation, instead of a cardinal restructuring of the research process—they changed the name of a scientific subdivision, reshuffled assignments, reassigned cadres, and results have not increased because of this. Belief in the center is still strong: anything, so long as people are not left without wages. However, there is no need to look to the center: work should be organized by oneself in such a way so as to earn funds not only for science, but also for developing a material and technical base and for improving social and domestic conditions.

In 1989, the department's entire system is working under full cost-accounting. The institutes have begun to convert to the next stage of work under the new conditions—*intra-institute cost-accounting*. Thus, the scientific subdivisions at the farming institute are concluding a contract with the leadership to create scientific and technical production. Cost-accounting entirely excludes the equalization of labor by scientific employees. Each will receive as much as he has earned, and the efficiency of research will increase—the institute leadership will not pay for an unconscientiously fulfilled scientific product.

Great significance is attached to developing creative cooperation with the institutes of the Kazakh SSR

Academy of Sciences. It should be noted that the academy's scientific institutions are making a noticeable contribution to improving the population's food supply. They are actively participating in 9 out of 14 republic scientific and technical programs. In the "Zerno" program, the botany and the molecular biology institutes are cooperating with us, and in the "Zemledeliye" [Farming] program—the Soil Sciences Institute. The republic academy of sciences institutes are fulfilling 54 assignments, independently and in a complex with the department's SRIs.

Cooperation is also being done through the Kazakh Agricultural Biotechnological Center, created in 1987. Along with Kazakh SSR Academy of Sciences scientific institutions, it includes the VASKhNIL Eastern Department farming, potato and vegetable farming, and fruit-growing and viticulture institutes. The significance of biotechnology in agriculture is well-known. It is the accelerated creation of new varieties of agricultural crops, the mass preparation of virus-free planting material, and many other things. The Kazakh Farming SRI (O.Sh. Shegebayev, chief of the biotechnology department), in close contact with scientists from the molecular biology and the biotechnology institutes, have obtained a large number of regenerant lines of promising and special-zone varieties and hybrids of grass crops for use in selection work. These institutions have established creative ties with the Bulgarian Academy of Sciences and have coordinated cooperation in corn and soft wheat biotechnology with Hungary. Priority in the studies is given to creating fast-ripening corn varieties and hybrids.

The Kazakh SRI for Potato and Vegetable Farming also has definite successes in biotechnology. Here, the production of potato test plants has been developed, which accelerates the conversion of seed-growing for this crop to a reduced 3-year system, instead of 6-year. The Kazakh SRI for Fruit-growing and Viticulture, using the method of thermotherapy and the culture of isolated meristems, has cultivated a large number of fruit and berry crop seedlings.

Very promising research to develop different methods for the chemical and chemical-agrotechnical reclamation of solonets [strongly alkaline] soil is being done by the republic Academy of Science's Institute of Soil Sciences, along with the farming, fodder production and pastures, and agricultural mechanization and electrification institutes. The individual botany, microbiology and virology, experimental biology, organic synthesis and carbon chemistry, zoology, and economics institutes are cooperating fruitfully with scientific institutions. However, many unsolved problems remain, and the existing contacts must be rid of formalistic ways and given a higher activeness.

The following circumstance should also be noted: in order to become a catalyst for the development of the agroindustrial complex, agrarian science itself should be

intensively developed. However, the material and technical base existing in science far from corresponds to this important task. Individual obkoms and oblispolkoms are not paying the proper attention to strengthening it. Thus, assignments for the construction of scientific projects are chronically unfulfilled. There is an insufficient quantity of chemical preparations, particularly for conducting scientific research on biotechnology. Our scientific research institutions have a very poor set of domestically produced, small equipment, and laboratory equipment has not been renovated for many years. The question of first-priority supply of computer hardware for scientific institutions remains open. All of this considerably restrains the development of highly efficient, profoundly scientific methods and recommendations, which ensure the scientist's labor and accelerate the research process by a factor of tens and hundreds.

The material and technical base is also weak in experimental farms, where research and development work should be done at the most contemporary level. Moreover, party and agricultural agencies in local areas are assigning them plans for the production of commodity output. For this reason, the experimental farms are not fully performing their basic purpose—producing young breeding animals and seed of the highest reproduction for agricultural crops. Add to this the fact that recently the key positions of scientific and technical progress—seed-growing for agricultural crops and breeding work in animal husbandry—have ended up beyond the influence of science due to voluntaristic decisions, and one can imagine the damage done to agriculture. The department presidium presented a well-founded proposal to the higher agencies about restoring the status of experimental farms as scientific research institutions and state oblast agricultural experimental stations. Proper understanding in support of science in this matter, it seems, will give a powerful impetus to the development of seed-growing and breeding work.

In concluding the article, I would like to say a few words on the future of science. The VASKhNIL Eastern Department Presidium, jointly with the KaSSR Gosplan and Gosagroprom, is currently working on the concept for developing the republic's APK up to the year 2010. Its basis is a course toward raising the effectiveness of economic management methods, converting the sectors of the APK to the intensive path of development, and improving the utilization of the entire resource potential. In conformity with it, scientific support for the APK will be improved and the network of republic scientific institutions will be revised, such that their influence will encompass each region, each kolkhoz and sovkhoz. Our basic task is the utmost development of fundamental and applied research, the achievement of large-scales and dynamism in applying in scientific achievements in practice, and to thereby promote the full provision of the republic's population with all types of food, and of industry, with agricultural raw materials.

The efforts of scientific research institutions and other organizations in agrarian science will be aimed at solving

the following problems. Above all, this includes developing comprehensive measures that will ensure the extensive reproduction of soil fertility and its protection from erosion, the preservation of the surrounding environment, and an increase in the productivity and stability of farming, particularly of grain farming and fodder production. Research to improve intensive technologies for the production of plant-growing and animal husbandry output, taking zonal features into account, is being expanded.

Work to create new, highly productive varieties of agricultural crops, resistant to unfavorable factors in the external environment, will take priority. We see the resolution of this task in the intensification and expansion of research on biotechnology, towards which great financial, material and technical resources, as well as cadres, will be directed.

In upcoming years, scientists will be faced with the responsible task of significantly raising the production of meat and milk by breeding highly productive types of animals. Developments to decrease the loss of agricultural output during the processes of production, storage and processing should become a significant contribution to the Food Program.

There are many unsolved problems in other sectors of science. The VASKhNIL Eastern Department Presidium and the agricultural scientific institutions are faced with taking steps to fully, in conformity with the requirements of the times, restructure the process of research and the application of developments in industry, and to increase the contribution of scientific institutions to raising the well-being of the Soviet people, as defined by the 27th CPSU Congress and 19th All-Union Party Conference.

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### **Earthquake Issues Absorb Meeting of Armenian Academy of Sciences**

*18140267b Yerevan KOMMUNIST in Russian  
19 May 89 pp 1, 2*

[Article (ARMENPRESS): "In Step With the Demands of Society. The Annual General Assembly of the Armenian SSR Academy of Sciences"]

[Text] The annual General Assembly of the Armenian Academy of Sciences, which was held on 17-18 May in Yerevan, was imbued with the awareness of great responsibility to society and the necessity of a thorough and comprehensive approach to the solution of uncommon problems and tasks. The results of the activity of academic institutions during the past year, which brought the people harsh ordeals, were discussed at the assembly.

President of the Armenian SSR Academy of Sciences Academician V. Ambartsumyan opened the assembly with an opening speech.

"The year 1988," he said, "was a year that was filled with disturbing events and at the same time with hopes. Our country took a new step in the direction of the modernization of Soviet society. The peoples of the Soviet Union received the opportunity to state their opinion not only about their successes, but also about their concerns, urgent problems, and pressing demands. Owing to restructuring and glasnost the Karabakh movement emerged—a national struggle against the violation of the national and social rights of the Karabakh, in the name of the right of the people of Artsakh to national self-determination. Our academy categorically voiced its point of view on this issue, having supported unconditionally the demand of the people of Artsakh."

While speaking about the consequences of the destructive earthquake, the president of the academy noted that its collectives vigorously participated in the saving of victims and the giving of diverse assistance to them. But, he stressed, what was done is insufficient, the concerns of the victims should be constantly at the center of our attention. The corresponding scientific subdivisions, institutes, and numerous scientists and specialists, who work at them, should vigorously participate in the study of the scientific problems that are connected with the destructive earthquake. In this connection V. Ambartsumyan expressed satisfaction with and gratitude for the contribution and assistance of the USSR Academy of Sciences, its leaders, many Soviet scientists, as well as foreign seismologists.

Then the president dwelt briefly on the results that had been achieved during the year under review in individual fields of science. He, in particular, touched upon the research of Armenian scientists, which is of great applied importance, and spoke about the restructuring of individual areas of academic work. For example, having noted the successes of physical science in Armenia, he stressed the significant achievements in the development of scientific equipment, which is extremely important for the further development of scientific thought. Having dwelt on the chemical sciences, the president noted that the academy at one time had indicated the necessity of developing small-tonnage chemistry in Armenia. Unfortunately, it subsequently did not undergo development. And today it is absolutely essential to develop this direction, inasmuch as it will be very profitable for Armenia from both the economic and the ecological standpoint. Biologists and geologists also have significant achievements to their credit.

The president of the academy also dwelt on the shortcomings in the activity of scientific institutions. He noted that in our times the use of means of automation in scientific research remains a priority task. Unfortunately, today only individual institutes are able to operate under such conditions. Computer hardware is still being introduced slowly in scientific research.

V. Ambartsumyan directed the attention of the leadership of the republic to the question of improving the planning of the supply of scientific equipment and tools.

Immense tasks face social scientists. Historians and lawyers should rid themselves of the painful legacy of the years of stagnation, when many phenomena, key questions of history, and legal norms were presented in a distorted form.

First Secretary of the Armenian CP Central Committee S. Arutyunyan took part in and addressed the general assembly of the academy.

In analyzing the situation, which had formed in the republic, and its causes, he noted that the socioeconomic problems, which had built up over the decades, and the discontent of people, the rapid awakening of national self-consciousness and the dramatic complication of the problem of Nagornyy Karabakh, the destructive earthquake and the dire straits of hundreds of thousands of people had created an exceptionally complicated situation. Under such conditions the maximum exertion of efforts and potentials, circumspection, a wise and strictly weighed mode of actions, unity, and cohesion are required. At this critical historical stage in the question of the existence of the Armenian people and the revival of the republic the effective assistance and support of the Academy of Sciences should be significant. The December earthquake made serious corrections in the process of the accomplishment of the program tasks on bringing the republic out of deep stagnation and improving all spheres of social life.

In describing the destructive consequences of the disaster and the steps being taken to overcome them and having stressed the importance and significance of the charitable assistance and support of all mankind and all the Soviet people, the speaker directed particular attention to the still unresolved problems and tasks and stressed the necessity of the more efficient use of the scientific potential of the republic for their solution. It was noted that on 12 May of this year in Moscow a commission of the Politburo of the CPSU Central Committee and the Presidium of the USSR Council of Ministers, after analyzing in an objective and exacting manner the progress of eliminating the consequences of the earthquake, stipulated a number of basic steps on the correction of the situation and the lending of new scope to the restoration and construction operations.

As to the events that have been occurring in the republic since the first months of 1988, S.G. Arutyunyan directed attention to the fact that restructuring, democracy, and glasnost had made possible the open analysis and discussion of the especially painful, most urgent problems and the search for means of their solution. It was noted that every discussion and every practical step, which is connected with the national question, should be carried out on the basis of an in-depth and scientific evaluation of the situation, the thorough revelation of the cause-effect relations, and unbiased historical reasoning. At the same time it is necessary that the active manifestation of the hopes of the people, which have accumulated over the centuries and years, and the liberation owing to restructuring of national self-consciousness would be clearly



delimited from individual unhealthy manifestations that are incompatible with the true interests of the people.

During the radical restructuring of the political system of the country the appropriate mechanisms of the solution of national problems should be found and democratic forms of the settlement of controversial questions in interethnic relations should be developed. The present situation in Nagorny Karabakh requires the creation under the conditions of the activity of the Committee of Special Government of real prerequisites for the assurance of the actual independence of the oblast.

As to the tasks of the more efficient and purposeful use of the scientific potential of the republic, the current problems of the rapid and dynamic development of science, and the scientific achievements of the academy, the speaker stressed that changes, none the less, are occurring very slowly and the results cannot give satisfaction. The reality is that in the republic an integral mechanism for the assurance of the fundamental link of science with production and the management of regional scientific and technical progress has not yet been developed. The lack of efficient coordination of scientific work, the slow introduction of developments, the low return from them, and the limitedness of completed works in the leading directions of scientific and technical progress testify to this.

The task was posed to devote particular attention to the increase of the real return of the basic and applied sciences with allowance made for the formed complex situation in the socioeconomic life of the Armenian SSR. The exceptional importance of scientific efforts on the radical improvement of the ecological situation in the republic and on the establishment of a serious seismological service, the formulation of a thoroughly substantiated energy program, and the rapid development of a number of applied sciences, including medicine, was stressed.

The active development of basic economic research was recognized as an urgent question. It is necessary to undertake in earnest the formulation of a scientific concept of the introduction of territorial cost accounting in the republic.

The consequences of the earthquake, the mass migration of the population, the demographic and socioeconomic problems, which have not yet been completely revealed, and the new tasks on the development and distribution of productive forces require in addition to traditional solutions the search for new ways and means. In this connection attention was directed in the statement to the necessity of the scientific elaboration of the idea of forming a free economic zone in the republic.

The organization of the extensive and in-depth study of social psychology and public opinion is of great importance.

Serious tasks were posed for historical science, which is called upon to reinterpret many pages of the past and to

free them of various accretions and distortions. For this purpose historians of the republic were commissioned to present their own well-founded opinion on the restoration of Armenian statehood on 28 May 1918, on the evaluation of the place and role of the tricolor flag, on national liberation movements, and on the elimination of the "blank spots" in our history of the beginning of the century and the 1930's.

S.G. Arutyunyan commended the work, which the Armenian CP Central Committee is performing on the formulation of a new approach to national thinking, the regulation of the use of the Armenian language, and the broadening of the contacts of Soviet Armenia with the Diaspora.

In the statement an important place was assigned to the questions of the training of scientific personnel and work with them, the strengthening of the material and technical base of science, and the improvement of the social conditions of scientific personnel.

Corresponding Member of the Armenian SSR Academy of Sciences D. Sedrakyan, academician secretary of the Academy of Sciences, delivered the report on the basic results of its scientific organizational activity during the year under review. "Restructuring," he said, "has made it possible for the first time to raise painful problems, including in national relations. Not only the long-standing national hopes of our people, but also the increased political activity of the working people of the republic, their broad movement for radical changes, and their discontent with the existence of numerous unsolved economic problems were reflected in the events of 1988 in the republic."

The Karabakh movement originated, in particular, on the basis of the campaign, which was launched in the country, against Stalin's distortions of various spheres of life. At the decisive stage of the formation of the Armenian Soviet Republic, contrary to logic and constitutional principles, in 1921 the territory of Artsakh with an absolute majority of the Armenian population, which historically was an integral part of Armenia, was seized from Armenia.

The campaign under the banner of the righting of this gross injustice, which was launched in 1988, was so well-founded in its nature that it involved the broadest masses of the people both in our country and in the Diaspora.

At the very beginning of the Karabakh movement the Presidium of the Armenian SSR Academy of Sciences discussed the situation, which had formed in the republic, and gave a correct political evaluation of both the movement and the atrocities in Sumgait. The Presidium sent its opinion in this regard to the CPSU Central Committee. Under the supervision of Academician G. Galoyan the pamphlet "Nagorny Karabakh," in which the historical foundations of the Karabakh problem were presented, was prepared, discussed, and published. Round-table meetings with the participation



of historians were held at the USSR Academy of Sciences. Measures on the strengthening of contacts with Karabakh in the area of science, culture, and education were elaborated and are being implemented, although with difficulty. In particular, a council for the coordination of this work was established. On 27 September of last year, a special General Assembly, which examined the situation in the republic in connection with the Karabakh movement, was held. The destructive earthquake of 7 December aggravated the situation in the republic. About 500,000 people were deprived of shelter. It is necessary to do everything in order to accommodate them on the territory of Armenia, by using the available possibilities and deserted villages.

The tragedy also did not pass over the Armenian Academy of Sciences. There are human victims, the buildings of our institutions in Leninakan were destroyed. The losses of the scientific institutions in Leninakan are estimated at more than 6 million rubles.

During these difficult days many of our Soviet and foreign colleagues were at our side. President of the USSR Academy of Sciences Academician G.I. Marchuk, who arrived in Yerevan during the days of the earthquake, declared the willingness of the USSR Academy of Sciences to give assistance in the recovery of the material losses and the strengthening of the material and technical base of the Armenian SSR Academy of Sciences. Various Soviet and foreign scientific groups jointly with scientists of our republic, under the supervision and with the direct participation of Vice Presidents of the USSR Academy of Sciences Ye.P. Velikhov and N.P. Laverov, performed important work on the analysis of the seismic state of the republic, the study of the seismic safety of the Armenian Nuclear Power Plant, and the preparation of maps of the seismic microzoning in the zone of the disaster.

Scientists of Armenia made their contribution to the preparation of the shutdown of the Armenian Nuclear Power Plant.

The speaker said that three general assemblies of the Academy of Sciences were held during the year under review.

Chairman of the USSR Council of Ministers N.I. Ryzhkov took part in and addressed the assembly, which was held in December of last year and was devoted to questions connected with the destructive earthquake. This General Assembly was of program importance for the subsequent activity of Armenian scientists. Three basic problems, on which academic science should focus its attention, were indicated.

It was emphasized, in particular, that when formulating scientific policy the necessary attention was not devoted to the development of seismology, the pace of restructuring in the area of the social sciences was slow, and the study of the problems of environmental protection is not at the proper organizational level. Based on this, it was decided to recognize as a priority task of the Academy of

Sciences the further rapid development of seismology, which it is necessary to carry out by the establishment of a vast network of seismic stations.

As to the social sciences, their representatives during the present period of restructuring should actively participate in ideological work. More meetings of scientists with working people, young people, and collectives of institutions of the republic should be held, their statements via television and other mass media for the purpose of clarifying the causes of arisen problems and indicating the means of overcoming them should be made frequent.

The ecological situation is causing serious anxiety. The results in this area are negligible. One of the basic causes is the complete lack of coordination of activity. The sad experience of Lake Sevan, the nuclear plant, the unprecedented growth of large-scale chemistry, and many other examples require the complete realization by our scientists of their responsibility for the future of the republic. At the same time it should be noted that for the assurance of the great effectiveness of the outlined programs it is necessary to improve their financing and material and technical supply.

The Presidium of the Academy of Sciences last year devoted much attention to the questions of the development of primary scientific research, new specific production associations were established. At the same time the scales of the use of basic research do not give satisfaction, the pace of introduction is quite slow. Enterprises and institutions of the republic are lagging far behind the Academy and are not interested in questions of the introduction of new scientific technologies, their orders to our institutes are negligible.

In spite of the very difficult year and a number of interruptions in work, the speaker said further, the scientific institutions of the republic Academy as a whole coped with the plan assignments. During the year under review research was conducted on 387 themes, 135 of which were included in all-union, republic, regional, and sectorial programs. In all 23 themes were completed, 133 assignments of the State Plan of Economic and Social Development of the Armenian SSR for 1988 were fulfilled. About 100 economic contractual jobs, the results of which were accepted by clients, were completed. Four scientific and technical developments were offered by interdepartmental commissions. The total amount of contractual work came to 14 million rubles. In all 140 inventor's proposals were submitted. Of them 17 were introduced and 8 were submitted for patenting abroad. A number of basic and applied scientific results, which were obtained at the Byurakan Observatory, the institutes of mathematics and applied problems of physics, and many other institutions and scientific centers, were analyzed in detail in the report. The academician secretary especially emphasized the new, complex tasks, which face scientific institutions and are due to restructuring, which has been launched throughout the country, to the introduction of new thinking, to the sociopolitical

changes occurring in our republic, and to the consequences of the earthquake. It seems to us, he said, that these realities have still not been properly analyzed and interpreted by specialists. Apparently, in this connection it is necessary to revise the Comprehensive Program of Scientific and Technical Progress of Armenia for 1991-2010.

The in-depth and comprehensive interpretation of the modern historical process, the elimination of the consequences of the personality cult, the promotion of the strengthening of interethnic relations, the scientific evaluation of the history of the national liberation struggle, and the reexamination of erroneous points of view are among the urgent problems of the social sciences.

Concerning the scientific relations of the Academy, D. Sedrakyan noted that they are being successfully developed both within the country and outside it. The results of the scientific research of the Academy of Sciences were reported at 252 symposiums and various scientific measures abroad and in the Soviet Union, moreover, a portion of them were held in the republic.

Today the replacement of the management personnel of a number of academic institutions is an urgent task, the speaker said in conclusion. In spite of definite gains, significant shortcomings exist in the training of young scientific personnel. The annual certification of graduate students at many institutes is of a formal nature. Proper attention is not being devoted to the submission and defense by graduate students of dissertations in the set time. Last year 80 people, of whom only 1 defended a dissertation, completed graduate studies. The Academy is training specialists for the republic in accordance with the control figures of the State Planning Committee, but the breakdown of specialists is not planned by it. In recent years the demand to increase the training of specialists in the physical mathematical sciences and mechanics has been made, while the Academy does not need such personnel. On the other hand, now, when steps on the further improvement of the use of the Armenian language and the development of Armenian studies are being elaborated, the republic State Planning Committee has reduced the plan of admission to graduate studies in 1989 in the specialties of the Armenian language, history, and literature, having increased in return the number of spaces in the area of the technical sciences.

Academician of the Armenian SSR Academy of Sciences V. Kazaryan, Corresponding Member of the USSR Academy of Sciences S. Mergelyan, Corresponding Member of the republic Academy of Sciences V. Khodzhabekyan, Academician A. Petrosyants, S. Karakhanyan, director of the Institute of General and Inorganic Chemistry of the Academy of Sciences, Corresponding Member of the Armenian SSR Academy of Sciences Yu. Aleksanyan, Academician A. Babayan, Armenian SSR Deputy Procurator G. Bagdasaryan, Academician of the Armenian SSR Academy of Sciences M. Nersesyan, and V. Sarukhanyan, chairman of the Art-sakh Amaras Philanthropic Society, took part in the

discussion of the report. A number of problems connected with the 1988 Spitak earthquake were discussed extensively at the assembly.

The studies of the earthquake tectonics of the Armenian uplands and adjacent regions, the results of seismological research, and the mechanics of earthquakes were analyzed scientifically in the reports devoted to this theme.

The assembly participants also heard scientific report on the problems of the pollution of Lake Sevan, its causes, and the means of elimination, and considered several questions of the history of the Armenian people.

The participants in the annual General Assembly adopted an appeal to General Secretary of the CPSU Central Committee and Chairman of the Presidium of the USSR Supreme Soviet Comrade M.S. Gorbachev and to Chairman of the USSR Council of Minister Comrade N.I. Ryzhkov in connection with the aggravation of the situation in the Nagorno-Karabakh Autonomous Oblast and around it.

As is known, it is stated in the letter, the just settlement of the demands of the working people of Nagorny Karabakh is one of the manifestations of the policy of restructuring and democratization, which has been inaugurated in the country. It is aimed at the elimination of a historical injustice. For decades the legal national rights of the Armenian population were trampled here, the purposeful policy of the Azerbaijanization of the oblast was pursued.

The situation was sharply aggravated after the massacre of Armenians, which was committed in Sumgait. This massacre, which evoked universal outrage, unfortunately, has not yet been evaluated politically.

The Armenian population of Nagorny Karabakh and all the Armenian people, it is stated further in the letter, received with understanding the decision of the Presidium of the USSR Supreme Soviet on the introduction in the Nagorno-Karabakh Autonomous Republic of a special form of government. This decision was justly regarded as the first step aimed at the final solution of the problem of Nagorny Karabakh.

Unfortunately, the experience of past months has shown that the Committee of Special Government, regardless of the will of its leadership, has been unable to fulfill the task assigned to it. Under the formed conditions, when in the oblast party and soviet organs have actually been eliminated, in Azerbaijan the anti-Armenian campaign is not ceasing, the policy of national discrimination is continuing. The letter of a number of figures of Azerbaijan to M.S. Gorbachev of 14 May of this year, which is based on the falsification of the facts, is a typical manifestation of this.

Guided by Lenin's principle of the right of nations to self-determination, it is necessary to remove Nagorny Karabakh immediately from the administrative subordination of Azerbaijan.

The assembly of the Academy considered organizational questions. First Secretary of the Armenian CP Central Committee S.G. Arutyunyan spoke in this connection.

In connection with the expiration of the presidential term of V. Ambartsumyan the assembly decided to extend his presidential powers for 1 year.

The assembly elected Academician of the Armenian SSR Academy of Sciences G.Kh. Sarkisyan as vice president of the Academy. The presentation of awards of the Armenian SSR Academy of Sciences was held. The Metsarman Gir certificate was presented to Academician of the Armenian SSR Academy of Sciences A. Oganessian. Corresponding Member of the Armenian SSR Academy of Sciences K. Karagezyan, Doctor of Philosophical Sciences Professor S. Tovmasyan, Doctor of Historical Sciences G. Bartikyan, Doctor of Geological Mineralogical Sciences S. Grigoryan, and Candidate of Physical Mathematical Sciences A. Gulyan received the Vastakagir certificates. Govestagir certificates were presented to a number of scientists.

Deputy Chairman of the USSR Council of Ministers and Chairman of the USSR State Committee for Science and Technology B. Tolstykh, Chairman of the Presidium of the Armenian SSR Supreme Soviet G. Voskanyan, Chairman of the Armenian SSR Council of Ministers V. Markaryants, Secretary of the Armenian CP Central Committee G. Galoyan, First Secretary of the Yerevan City Committee of the Armenian Communist Party M. Minasbekyan, Deputy Chairman of the Armenian SSR Council of Ministers Yu. Khodzhamiryan, and G. Asatryan, chief of the Ideology Department of the Armenian CP Central Committee, took part in the annual assembly of the Academy of Sciences.

**Cadre Problem in Georgian Academy of Sciences**  
*18140267a Tbilisi ZARYA VOSTOKA in Russian*  
*12 May 89 p 1*

[Article: "The Personnel Potential of Science"]

[Text] Yes, the situation is actually serious. There is a lag. And this is at the time, when the present stage of economic and social development is characterized by the increase of the role of science in all spheres of life. It is understandable that in connection with this systematic and goal-oriented work on the training and use of highly skilled personnel, first of all in the new, priority specialties, to which scientific and technical progress is giving rise and which, at the same time, govern its acceleration, is acquiring particular urgency. Such work is also being performed in the republic. But how?

It can be said that a significant scientific potential has been created. The number of scientific personnel has exceeded 28,000, of them nearly 1,500 are doctors of sciences and 11,000 are candidates of sciences. In the number of doctors of sciences the Georgian SSR holds third place in the country after the RSFSR and the

Ukraine, in the number of candidates of sciences it holds sixth place. In Georgia there are more doctors of sciences than in five union republics taken together—the Moldavian SSR, the Kirghiz SSR, the Tajik SSR, the Turkmen SSR, and the Estonian SSR. True, the number of doctors of sciences during the 9th Five-Year Plan increased on the average by 48 a year. During the 10th Five-Year Plan its increase came to 21, while during the 11th Five-Year Plan it came to 10, which is half as much as during the 10th Five-Year Plan and one-fifth as much as during the 9th Five-Year Plan.

A disproportion in the structural composition of the scientific personnel is being observed. In the total number of scientific personnel 27.8 percent are employed in the area of the technical sciences, 11.7 percent conducted research in the area of the physical mathematical sciences, 20.1 percent—in the area of the social sciences, 10.4 percent—in the area of the medical sciences, 12.1 percent—in the area of the chemical and biological sciences, and 6 percent—in the area of agricultural sciences.

The fact that only 56 doctors are employed in economic science does not accord at all with the requirements of economic reform.

The fact that the personnel potential of science of the republic is gradually "aging" and the share of young doctors of sciences is decreasing, also attracts attention. At the beginning of the year the share of doctors of sciences up to the age of 45 came to 3.7 percent, while the share of doctors of sciences 61 years old and older, on the contrary, increased significantly—from 48.7 to 57.6 percent. At present in the republic there is just a single doctor of sciences under the age of 35.

And all the same given such a powerful personnel potential the efficiency of its use is inadequate. Nearly half of the doctors of sciences out of their total number were not engaged in the scientific supervision of graduate students: one doctor of sciences in three had not trained one candidate of sciences during the entire period of his scientific pedagogical activity. The efficiency of the use of the scientific potential of the republic in the area of invention and efficiency promotion work is low. Thus, for example, in previous years the Georgian SSR was in 11th place among the union republics in the number of received decisions on the issuing of author's certificates for inventions and also lagged behind the Caucasian republics. For example, in the Georgian SSR the number of scientific personnel is twofold greater than in the Latvian SSR, while the number of received decisions on the issuing of author's certificates for inventions is 25.7 percent less than for Latvia. This points to the extremely inadequate use of the scientific innovative reserves of the republic.

The conclusions are extremely distressing for us. For it is clear that quantity in practice does not turn into quality. As a result the picture turns out to be extremely impartial: there are scientists, there are also themes, but the necessary impact does not exist.

### **International Commission Visits Lithuanian AES**

*18140275b Vilnius SOVETSKAYA LITVA in Russian  
9 Jun 89 p 4*

[Article (ELTA): "The Nuclear Power Plant Prepares to Receive an International Commission"]

[Text] On 8 June representatives of the International Atomic Energy Agency completed their work at the Ignalinskaya Nuclear Power Plant. Bernard Thomas, coordinator of the IAEA mission for the investigation of incidents connected with the safety of nuclear power plants, and Garcia Gonzales, director of the nuclear power plant of Trillo (Spain), familiarized themselves with the power plant, the history of its construction and operation, and the documents. For 3 days the specialists investigated the emergencies, which had occurred at the Ignalinskaya Nuclear Power Plant and could have affected the safety of the operation of the power plant. Specialists of the appropriate fields, whom the IAEA will appoint, will carefully study a portion of them. The expert commission intends to come to Snechkus in November of this year.

### **AES Director Responds to Public Concern on Repairs**

*18140275a Leningrad LENINGRADSKAYA PRAVDA  
in Russian 8 Jun 89 p 4*

[Article by A. Yeperin, director of the Leningradskaya Nuclear Power Plant, under the rubric "A Letter to the Issue": "There Are No Grounds for Panic"]

[Text] In recent times questions of the performance of the planned preventive maintenance of the first power-generating union of the Leningradskaya Nuclear Power Plant have been repeatedly covered on the pages of newspapers, detailed information was given by the management of the plant at the press center of the oblast committee of the CPSU with broadcasting over Leningrad Television.

Nevertheless, party and soviet organs continue to receive questions from residents of Leningrad Oblast, in which anxiety in connection with the work forthcoming here is expressed. Alarmist rumors, which distort the state of affairs at the Leningradskaya Nuclear Power Plant, are occurring. In particular, in Lomonosovskiy Rayon, in the city of Petrodvorets the residents are groundlessly raising questions about the necessity of taking children away and are purchasing iodine at drugstores.

The residents of Krasnoselskiy Rayon addressed to USSR People's Deputy Aleksandr Illarionovich Demidov the request to obtain explanations on the forthcoming preventive maintenance at the Ministry of Atomic Power.

Understanding that the attitude of people toward atomic power engineering as a whole and toward the Leningradskaya Nuclear Power Plant, in particular, depends first of all on us, it is necessary to stress that work, which could have an adverse effect on the environment and the

population of the rayon, was never performed before and will never be performed in the future at our nuclear power plant. We understand the measure of responsibility, which rests on our collective, which is operating the nuclear power plant that is located 100 kilometers from Leningrad. Safety is the main principle of our activity.

As to the forthcoming planned preventive maintenance on the first unit, which will begin in June and will continue for 6 months, it is necessary to note the following.

This work is envisaged by the plan, has been repeatedly performed here, and is of no danger for the environment and the population.

Before the start of the work a special commission made up of representatives of the Ministry of Atomic Power and the State Committee for Safety in the Atomic Power Industry will analyze our readiness and only after a careful check of the conditions of performance and the elaborated safety steps will permission to start the work be given.

A public initiative group, which will carry out the public monitoring of the operation of the nuclear power plant and will inform the population, was established on the suggestion of the Sosnovyy Bor Zelenyy mir Association.

Starting in June the state of the radiation situation in the region of the Leningradskaya Nuclear Power Plant is being covered daily on the broadcast "600 Seconds." We plan to relay the same information weekly to LENINGRADSKAYA PRAVDA.

Dear Leningraders, do not remain captive to conjectures and rumors. You have every opportunity to examine objectively the actual state of affairs at the Leningradskaya Nuclear Power Plant. You can call Sosnovyy Bor round the clock and obtain information via the telephone numbers: 6-50-72. 6-25-18. Via these telephone numbers you can book a meeting with specialists of the nuclear power plant, who will give you answers to questions that interest you.

### **Social Dynamics of Academy of Sciences Hierarchy Described**

*18140269 Moscow ZNANIYE-SILA in Russian  
No 4, Apr 89 pp 1-6*

[Article by Candidate of Geological Mineralogical Sciences V. Legler under the rubric "The Discussion Club of ZNANIYE-SILA": "Is '...the Truth More Costly?"; first paragraph is ZNANIYE-SILA introduction]

[Text] Soviet science in many fields has lost the position of the leader. Why? Today we are publishing an article for discussion with one of the points of view on this problem. The journal will continue this discussion.

In the 1960's a most important scientific revolution occurred in the earth sciences: the concept of plate

tectonics, which soon became the theoretical basis of all geological sciences, appeared. However, the majority of Soviet geologists for more than 15 years refused to recognize this theory, regarding it as incorrect.<sup>1</sup> During 1948-1964 Soviet biologists, as is known, disclaimed genetics; in the 1950's they disclaimed cybernetics, or information science as it is now called. Alas, in our science there are many such incidents. Several years ago the author completed a comprehensive study that was devoted to these phenomena.

### Why Is Domestic Science Lagging?

In all the cases known to me the opposition of Soviet and world science ended with our science recognizing its mistakes and shifting to world positions. A variant: it recognized its mistakes and shifted to new opposition. But I do not know of a case, when the point of view of world science proved to be mistaken. Consequently, it is necessary to seek the key not around oneself, but within oneself, to seek the culture medium of our "quasi-sciences," that is, "as if sciences." A quasiscience is a certain scientific teaching which disclaims the analogous world science. Such an opposition is not the essence of the phenomenon (for an analogous world science might also not exist), but a typical diagnostic feature.

Here some quasisciences immediately emerge as teachings, to which nothing in objective reality corresponds. Others are "former" sciences, which have been preserved at some stage of scientific development. So today it would not occur to anyone to call an astronomer, who adheres to the Ptolemaic picture of the universe, a scientist.

### Why Do Such Events Systematically Recur?

Often people talk about a "lagging behind": they say, under Lysenko Soviet biology lagged behind. But a quasiscience is not the passive failure to find the truth, a lagging behind, and failure in its search. This is an active struggle against an already found truth, a lively, energetic, creative process. The founders and leaders are often brilliant, talented, energetic people. Therefore, it is pointless to plead a lack of money, instruments, people, abilities, professional knowledge, and so on. Indeed, there might not be enough of something, yet why, then, do Soviet scientists not take the easy and, in case of backwardness, natural path of adopting the achievements of world science, but again and again turn onto the difficult, unrewarding paths of quasisciences, which are fraught with failure?

Another explanation is also popular: the direct interference of the state or other outside forces in the affairs of science is to blame. In some cases this, indeed, is so: historical quasiscience, which is based on "Kratkiy kurs" [The Short Course], was introduced by directive; in linguistics the quasiscience based on the works of I.V. Stalin was "prescribed." However, the minority of them formed this way. And there were no indications of state assistance to fixism in geology in the 1950's and 1960's,

to "materialistic" physics in the 1950's, to antiplate geology in the 1970's and 1980's, and to many others.

In the majority of cases a quasiscience is developed by scientists themselves. At times as a new teaching, which is defended by a group of energetic people like Lysenko the Present, and as a result of the struggle it can either take a dominant position, like Michurin biology or fixism, or suffer defeat, like "materialistic" physics. Antiplate geology has a different history: it was initially a universally accepted world paradigm in geology. Then world science switched to the paradigm of plate tectonics, Soviet geologists refused to do this. But, having emerged in different ways, subsequently all quasisciences appear similar and develop similarly, and it is possible to regard them as a single phenomenon.

It is also said that a science develops into a quasiscience under the influence of state ideology. Many quasisciences explained their origin in precisely this way, declaring that they are correct, inasmuch as they are in accord with Marxism, while the scientific theories opposing them are erroneous, inasmuch as they are at variance with it. Take the following, for example: "The conclusions with an infinitely expanding and pulsing universe are false and absolutely untenable speculations, which are far from real science. They are completely unacceptable and contrary to dialectical materialism, since they either lead to the necessity of recognizing the act of creation, that is, the origination of the universe from nothing, or presume the appearance of new material bodies and new space. It is clear that both suppositions are nonscientistic and antidialectic and lead to undisguised clericalism." Many foreign observers of an anticommunist disposition accept this stereotyped pattern. For example, as applied to plate tectonics it sounds as follows: "Russian scientists are disposed against the idea of continental drift, inasmuch as it probably contradicts their ideology."

However, weak points are also visible in this stereotyped pattern. Today ideology has submissively accepted a large number of theories, which at one time were repudiated by its name, and has not suffered any harm in so doing: such was the case both with molecular genetics and with cybernetics. It turns out that a well-defined procedure of "ideological examination" does not exist. The political condemnation or justification of a scientific theory for the most part shaped the results of the struggle that took place in some other spheres.

Thus, by narrowing the sphere of the search, I arrive at the factor that I consider basic—the organizational structure of our science.

The traditional scientific community is an informal, open system. Newton and Leibnitz, who keep up a private correspondence. Several people, who like to discuss natural marvel and declare themselves the Geological Society of Scotland. A group of friends, who gather once a year at the same holiday hotel in Göttingen. And everything that we imagine today in case of the

word "science"—enormous institutes, accelerators, intercontinental missiles, experiments costing millions of dollars, advanced machines and technologies—all these are merely consequences of independent reflections. Today world science has become rich and populous, but it has preserved the initial free spirit.

To us such a free structure seemed insufficiently effective. We did otherwise. Nature, which is subject to study, with military precision was divided among academies, departments, institutes, divisions, laboratories, and so on. They appointed to each subdivision the corresponding managers, who were united into a hierarchical system, from the head of the laboratory to the president of the academy. A whole scientific army, which is closed to outsiders, resulted.

The traditional scientific community unites those interested in a given science regardless of where they studied, what they do, and on what assets they live. In our country only the associates of institutes, which have been specially designated for this, for planned themes can and at the same time are obliged to deal with science. The community unites professionals, and in order deal with science, it is necessary first to enter it officially. And it is not that high skills and an education are required for scientific work. In the newspaper it is possible to read how specialists warded off all the attempts of an outsider, that is, a person who does not work at the given institute, to get a work published in a scientific journal, although he had an education and skills.

When establishing the scientific army one question arose: According to what principle are its officers to be appointed? At first they appointed to the position of manager of some science the most prominent scientist in this field. And, in general, a system, which operates efficiently enough, resulted. But time marched on. The academicians, who were appointed to manage institutes, grew old. The problem of the succession of generations arose. And inevitably when selecting candidates for managers basic attention began to be directed to their aptitude for administrative and management activity within the given social system. People, who had proven themselves by the management of laboratories, divisions, and a party or trade union organization, and, at times, former ministers, chiefs of main administrations, and directors of plants became the directors of institutes and the managers of scientific fields. It was possible to become a chief over thousands of scientists and to consider oneself a prominent scientist, without having completed a single independent study.

The managers of scientific fields were given very significant power in their own subdivisions. With time they were able to increase this power further, by holding additional scientific and administrative posts. Director and head of a laboratory, professor and head of a chair, deputy, member of a bureau, member of a collegium, chairman of programs, committees, commissions, conferences, societies, and scientific councils, editor of journals, monographs, and collectives, member of delegations, author of books,

articles, critiques, reviews.... The power of the director at his own institutes is nearly absolute.

In traditional science the personal success of a scientist is the success of his work. Among the incentives the holding of an administrative position is rarely encountered, while the positions themselves after the completion of the research program are usually eliminated, and a rigid hierarchical structure does not emerge in the community. On the other hand, in our country an integral indicator of the success of a scientist is the position in the hierarchical structure, which also automatically entails other incentives. The greatest success is penetration of the narrow group of members of the academy, who crown the hierarchy. It completely controls the scientific community in all important matters, from the selection of the direction of research to the content of publications. The reverse control of the community over this group in practice is absent. Here the academic title often merely "sanctions scientifically" the already held position of the director of an institute, who becomes an academician almost automatically.

We say and think that our academicians are the most prominent scientists, resembling Darwin or Einstein, and they themselves also think this way about themselves. But from the typical academic career, which I have just examined, it follows that they are not at all such without fail and often are not such. If only because the most productive age in science for academicians was over long ago. And because the more management work a person engages in, the less time he inevitably has left for scientific work.

It is here that the basic contradiction of our organized science also lies: between the actual status of its "officers," especially the "generals," and the generally accepted notion of it. Much results from the attempts to resolve this contradiction.

### Simulators

The management personnel in science first of all painstakingly create the impression that they are also prominent scientists in the old sense of this word. It is possible to call the actions, which are aimed at this, "the simulation of science."

The simplest example of simulation is coauthorship with subordinates. Condemned a thousand times, it has not become less widespread because of this, inasmuch as the merciless objective state of affairs forces scientific chiefs to do this. There are most complex cases of simulation: subordinates specially prepare a book or article, which the director alone signs. At an even higher stage of simulation special research programs, which are ascribed to the director, are carried out.

Here not only the number, but also the themes of scientific publications are important. It is not becoming of the manager of a scientific field to publish "simply good" ordinary works. His works should be milestones of

science. Books with high-sounding titles like "The Fundamentals of....," "The Problems of...." and "The Theory of....," in which there is not one new word, appear in this way. Simulation works should fit the formula "a prominent scientific result," that is, seem large and labor-consuming, and make an impression on the commission for State Prizes, for which it is basically intended.

This has its own professional ethics, which are based on the law: the rank of a study (the breadth and importance of the problem being studied) corresponds to the hierarchical position of the research. The junior scientific associate is instructed to study particular phenomena, while the academician is instructed to deal with general theory. If a rank and file associate sets to work on a problem of a higher rank than he is supposed to, this is perceived as a pretension to a position a little higher and as an unethical act. In a quasiscience individual, truly scientific works get lost in the stream of simulation publications or are even perceived as something inappropriate.

A typical example: an optical engineer invents a method that makes it possible to successfully treat myopia in children. But the managers of the corresponding field of medicine stand like a wall in his way. For 25 years they successfully prohibit the use of the method. Our press is crammed with descriptions of similar cases in various fields of science. In my card file there are hundreds of such cases. Their plot, as a rule, is identical. The people, who head a certain field of science, categorically reject a discovery (method, invention) made by someone. If the author insists on having it his own way, trouble is in store for him, up to dismissal, while his discovery is officially banned. The advantages of the new invention are clearly visible even to laymen, and state organizations, the press, and the public come to the aid of the author. Yet the managers of the scientific community do not give up, but continue the struggle. Why? This question puts journalists on the spot every time.

We now know enough about the scientific hierarchy and scientific simulation to answer it. The managers of the scientific community regard themselves as the most prominent scientists, who, consequently, make the most prominent discoveries. A scientific achievement of a high rank, that is, an important discovery or invention, which was made not by them, is regarded as a disturbance of the status quo that has formed in the community and as a claim of the author of the discovery to leadership to the detriment of its present leaders. If an ordinary physician had guessed how to combat myopia, according to the logic of hierarchical science he should manage this struggle. The managers of the community perceive such a situation as a threat both to themselves personally and to the entire established order of the hierarchy and simulation. And their reaction is entirely adequate. A threat and the reaction to a threat—such is the classic conflict of organized science.

Innumerable examples show that the reaction to a threat is an exceptionally powerful factor, which nothing within

the community can oppose. This is not surprising, if we recall how great the power and might of the managers of organized science are and how strong their motivation is. Chairmanships in presidiums, state prizes, trips abroad, academy dachas.... All this is threatened. Thus scientific disputes are filled with life, passions, and emotions, which are capable of sweeping away any invention together with its author and of providing the forces to resist for decades any pressure on the community from outside.

Can a scientific revolution occur in a scientific community that is organized in such a manner, as is described in the classic theory of American scientistologist T. Kuhn? According to this theory, a revolution is accompanied without fail by a struggle of the old and new paradigms (theories)—by an intellectual process, which occurs within the scientific community, is hard to formalize, complex, subtle, and delicate. Here I cannot describe this process in greater detail. The result of the arguments of Kuhn is the following: in the struggle of the two paradigms, strictly speaking, there is no right and wrong side. This discussion cannot be formalized logically. "Both in political revolutions and in the choice of paradigms there is no higher instance that the agreement of the corresponding community."

Let us image that someone in the hierarchical scientific community made a discovery or proposed a theory, which could be the basis for a scientific revolution. The development of a new paradigm is a study of the highest rank, hence, its author, according to the principle of threat, lays claim to the highest position in the hierarchy. But who is he, according to Kuhn? As a rule, a young person or a person new to the given field of science, who is inclined to taking professional risks and to an esthetic vision of the world. There is no doubt that in the hierarchical community such a scientist has influence that is close to nothing. The result of the subsequent "discussion" is entirely obvious: on the one hand, there is all the might of the organized community, which is multiplied by the strongest reason for the reaction to a threat and, on the other, there is the person without influence, who is moved, according to Kuhn, "by something personal, indefinite, and esthetic." This is a struggle of incommensurable forces. They will grind the idea of a new paradigm into dust immediately after it is recognized as representing a danger. Hardly anyone will also notice that the community has suppressed the possibility of a scientific revolution. And it is a pity. For at this moment science has turned into quasiscience.

It would be the greatest mistake here to accuse some academicians of ignorance or immorality, and then to seek a way out in the reshuffling of personnel. For the managers of organized science are not aware of the contradiction between a real and an imaginary role. It remains in their subconscious, freeing them from the painful sensation of the opposition of their own, personal interests to the interests of science. Availing themselves of the lack of a formal logical procedure of selection, they consciously direct attention to the



numerous weaknesses of the new paradigm. They sincerely defend not themselves, but science against hasty, ill-considered hypotheses. However poorly journalists write about them, inwardly they are not villains and differ in no way from famous scientists of past centuries, who to the end of their lives did not agree with the scientific revolutions of their times. The difference is merely that scientists of the past did not have in their hands means, which make it possible to effectively curb new discoveries, while our scientists have such means.

If we do not allow a scientific revolution in our country, hence, it will occur somewhere and will come to us from outside. The managers of the scientific community will hardly become its first defenders. These are elderly people, who are engaged more in simulation than in science and are little inclined to learn all over again. Then someone else will be the first to accept it, and the principle of the reaction to a threat will apply to him with the same validity as if he were its author. The new paradigm is categorically rejected, but it is impossible to halt its development abroad. Stronger and stronger versions of it, which acquire more and more supporters, come from there. The increase of the threat also increases the reaction to it, and the struggle against world science becomes an essential part of the activity of our scientific community. Vast quasisciences, which have gone too far and can be seen well from the side, thus emerge.

In communities of the traditional, open type they do not emerge not because the scientists there are more intelligent and more moral, but because there is nothing there to seize. Neither "commanding heights," which it is possible to win, nor a "pie" exist there.

To retain their power the managers resort to what are called "administrative" methods. The colorful description of the "Arakcheyev regime" in linguistics is widely known. The followers of Lysenko brought genuine mass repressions down on their scientific opponents. But the most prevalent and least noticeable form of coercion is incorporated directly in the structure of the community, when, for example, a scientific supervisor gives an assignment to a subordinate. In innumerable situations of scientific daily life, such as the defense of a dissertation, every scientist is convinced of precisely what it is most advantageous to support. In the constant selection the active supporters of the quasiscience are nominated as leaders, while the opponents are kept in the lower strata of the hierarchy. Such is the quite simple mechanism of its self-reproduction.

This can lead to scientific ambiguity—when a scientist in his heart recognizes the veritability of one scientific theory, but formally uses and defends another one. I had occasion to observe this repeatedly in various forms among geologists during the years, when to support plate tectonics meant to greatly retard one's scientific career. It is possible to estimate the scale of scientific ambiguity by observing how quickly the number of supporters of a quasiscience decreases with the decrease of its punitive possibilities.

Having emerged, a quasiscience usually continues to develop "in an ascending line," becoming more and more radical. And not only because the scientific theory opposing it becomes more and more attractive and more and more rigorous steps are required to combat it. This has its own internal logic. The quasiscience wants to look like a science, that is, not to repeat the same thing, but to develop creatively. Quasiscientists was to look like scientists, that is, to do scientific work and to make discoveries. As a result a mass of experiments, articles, dissertations, instructed students, and interested scientists and heaps of nonexistent "facts," which subsequent generations of scientists will have to rake aside, accumulate.

The struggle against opposing scientific theories is waged not only on the pages of dissertations. The supporters of Lysenko in all laboratories destroyed the fruit flies—the classical subject of genetic research. In history and archeology solitary, unique subjects of research were destroyed. A milder form of the struggle is the classification, for example, of archive materials, foreign journals, or undesirable natural phenomena.

### The Crisis

However, at this time world science is continuing to develop and is going ahead by entire ages. It is entering textbooks, is being used in practice, and is becoming comprehensible to nonspecialists. A quasiscience cannot avail itself of the practical applications of the science that it disclaims. The advantages of the opponents become obvious, while the true motives of its leaders become hard to disguise. Especially as their own practical recommendations prove to be useless or harmful.

And "creative development" also creates difficulties for them. With time the facts, with which every specialist is inevitably faced in his work, begin to be disclaimed or pseudofacts, the falsity of which is also easily verified, begin to be invented. The weakening of all self-control gives rise to statements that are vulnerable to criticism on the part of other sciences and simply common sense. Today, for example, hydraulic engineers and reclamation workers have found themselves in such a position. By formulating more and more imposing and more and more destructive projects, they raised the role of their quasiscience to the scale of a national disaster, after which their actions were halted in part. Here the "scientific opposition"—people who continued to engage in genuine science under the most adverse conditions for this—also reveals itself.

At first they appeal mainly to colleague scientists, using scientific arguments. But they become convinced soon and with surprise that only the bitterness and consolidation of the opponents follow in response. All their actions are blocked, and they themselves turn out to be isolated within the community, becoming, in point of fact, a part of world science. But usually it is also impossible to completely destroy the opposition, because its foreign roots are inaccessible.



Having become convinced of the fruitlessness of its efforts within the community, the opposition quickly masters the method of struggle, which I would call "the principle of evasion": to carry the struggle for the world scientific paradigm over to a broader system, to which the community belongs as a component. The point is that it is all the same to the state and society who personally manages a given science, but it is not all the same to them what its practical, applied results are.

All this is reminiscent of a dam that blocks a channel, through which the development of science should flow, and the rising water spreads, forcing its way in streams around the dam. Chromosome genetics, which was banished from biological institutions, developed in the system of the Committee for Atomic Energy and the Physics Department of the Academy of Sciences. Plate tectonics, which was not recognized at geological scientific institutes, found refuge at the Institute of Oceanology, the Museum of Physical Geography, and production organizations. Cybernetics developed under the protection of the Ministry of Defense.

Scientists appeal to the mass press and to leading state organs, explain the essence of the scientific debate, and show what practical advantages their approach can provide.

If the evasion succeeded, the general political and popular scientific press goes over to the side of world science, while the professional scientific press remains in its former positions. During such a period it is possible to obtain from the nonprofessional press more reliable and accurate scientific information than from the professional press.

Having gained superiority in the external system, the opposition can finally switch the community over to the new paradigm and carry out a scientific revolution. If the leaders opposing it intend to stand their ground to the end, this happens suddenly. The new paradigm is officially proclaimed outside the community and falls on it like snow on one's head—such was the case with Michurin biology. In other cases the managers are capable of foreseeing their defeat, and then the new paradigm comes into the community without an order from outside. That is what is happening with plate tectonics, the positions of which among geologists are slowly but steadily growing stronger.

At the moment of collapse, when the former hierarchy crumbles, it is possible to observe a large number of tragicomic plots and changes. Quite a few figures of the compromised direction usually have time to go over to the side of the victor. In striving to vindicate themselves and to acquire new deserts, they inundate the victorious science with their scientific simulation works, as well as exert enormous efforts so that everyone would forget the past as quickly as possible. They usually succeed in this, and the lessons, which it is possible to learn from the past, remain unlearned, which increases the likelihood of the appearance of new quasisciences.

Major scientific revolutions occur rarely in a single science—once in decades and even centuries. But this does not mean that during the intervals between revolutions organized science can develop just as successfully as science of the traditional type can. Each science consists of a large number of small problems, in each of which its own small revolutions are possible. They take place in accordance with exactly the same laws as major ones, but affect significantly smaller groups of specialists. Any important innovation in science actually occurs in accordance with the laws of a scientific revolution. Hence, in small organized communities their own small quasisciences should emerge. That is how it does happen, of which there are abundant examples.

Thus, organized science in its activity sooner or later comes up against impasses, large or small. A necessary condition for getting out of them is the existence of world science. Organized science develops by borrowing the achievements of others. In relatively favorable cases this assumes the form of a negligible, but systematic lag behind world science. Our technology, which lags not far behind world technology, but never comes out ahead, is developing this way. In less favorable cases major quasisciences emerge, and for a long time. In all cases scientific progress would occur more rapidly, if we had only "translators," while we had many fold fewer scientists. The enormous state outlays on science today are mainly outlays on simulation and quasisciences. The present enormous scientific apparatus is not required for the borrowing of achievements of others, while in its present form it is incapable of producing its own and is merely hindering borrowing.

Deviations from the rules presented here also occur: for example, if the manager of a scientific community is actually a most prominent scientist, but it is more efficient to solve a scientific problem by the forces of the centralized organization. The success of S.P. Korolev and his collective in the development of space was such an exception. But such cases, in my opinion, cannot become the rule, inasmuch as the statistical law can be overcome in a part of the system, but not in the entire system.

A rigid hierarchical organization, apparently, is not suitable for the development of science. I will explain once again why. Whereas scientists as a whole usually think correctly, each individual scientist always makes a mistake in something. The hierarchical organization, which enables one person to impose his opinion on the others, spreads an individual mistake to the entire community. Today it is universally recognized that the development of science is governed by debates and rivalry among scientists and that competition within the scientific community is the only effective mechanism of its advance. In a hierarchical "scientific army," in which a debate between a general and a private is impossible, there will also be no movement.

It is necessary to take this into account, if we want to improve the state of affairs. For example, it would be

worth it to eliminate the cause of simulations, having completely separated an administrative career from a scientific career. The Academy of Sciences could become a purely scientific, consultative public organization, while the state can manage science through a system of orders and contracts. For publication the works of scientists should not need anyone's authorizations, and so on. One thing is clear: it is pointless to strive to improve matters in science by increasing the degree of its organization, by combating "duplication and the focus on petty topics," and by introducing recertification, which increases the dependence of subordinates on chiefs. Only by having reduced its level of organization and hierarchical nature and having made it a system, which is opened from outside and lacks group barriers from within, can we have science not as an aggregate of people, who have degrees and titles, but as an active social mechanism which yields new knowledge about the world.

#### Footnote

1. For more detail on this see the article of the author, which was published in the journal VOPROSY ISTORIY YESTESTVOZANIYA I TEKHNIKI, No 3, 1988.

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#### **Soviets Claim 20-Year Delay in Registering Electrolytic Cold Fusion Process**

18140268 Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 25 May 89 p 6

[Interview with Candidate of Chemical Sciences Viktor Pavlovich Alikin, Perm State University, and V. Lytkin, deputy chief of the subdivision of discoveries of the State Committee for Inventions and Discoveries, by SOTSIALISTICHESKAYA INDUSTRIYA special correspondent V. Lagovskiy (Perm-Moscow): "The Tub...of Cold Thermonuclear. Reflections After One Discovery"; date not given; first five paragraphs are SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] Nuclear fusion at room temperature! The sensational news about it came from the American continent on the occasion of the Day of Science and upset the scientists of our country. They promptly reproduced the effect.

"Were we prepared for cold nuclear fusion? Or is this an absolute surprise?" Journalists were interested in finding out from Academician Yu. Osipyan.

"A surprise," the scientist replied. "Moreover, for everyone. Both for us and for those who did this for the first time. The result is unpredictable."

So, if one considers the present events a scientific sensation, how is one to appraise those which happened nearly 20 years ago? A scientific tragedy?

In the early 1970's Candidate of Chemical Sciences V. Alikin, a scientist from Perm State University, obtained this very "unpredictable result."

"I had neither heavy water nor palladium electrodes," Viktor Pavlovich relates. "I could not get them. I conducted the experiments with a sulfuric acid solution and steel plates. Electrolysis proceeded, the metal was saturated with hydrogen and emitted neutrons. Instruments recorded them. At the same time the solution heated. But the Americans also detected similar effects."

Recently Minsk physicists—and they were among the first to reproduce the experiments of Fleischmann and Pons—explained: "Hundreds of scientists throughout the world, we included, back about 20 years ago, when conducting experiments with the electrolysis of heavy water, were a step from the discovery, but did not suspect this. It did not occur to anyone to place a neutron counter next to the vessel."

Alikin had the sense to do this.

True, he worked with hydrogen, while now they are experimenting with deuterium—its isotope. There is, of course, a difference. Thus far there are no explanations of either effect. In short, it is still necessary to figure out whether the scientists carried out cold nuclear fusion or discovered another mysterious phenomenon and who was first. Specialists are to judge this. I was interested in why no one knew about the works of Alikin. It turned out that many knew, but dismissed them.

The scientist wrote to various organizations, while in 1971 he submitted to the State Committee for Inventions and Discoveries several applications, in which he set forth the essence of the phenomenon. He also reported other surprising effects—about them later. At the Academy of Sciences and the USSR Ministry of Higher and Secondary Specialized Education the appeals of Alikin were ignored. While he received on the applications the conclusion of Academician L. Artsimovich—a polite rejection. The argument was "this cannot be."

Incidentally, they initially treated the reports of Fleischmann and Pons in approximately the same way—with distrust. With just one difference—the American news soon evoked among our scientists a stir and the aspiration to repeat the experiment. The news from Perm did not arouse even curiosity.

Why do our own ideas fairly often come up against a blank wall of indifference? Is there no prophet in our homeland? To say that is to err from the truth. After all, it is well known: at the Academy of Sciences there are enough of them. It is another matter that hardly anyone likes to share such roles with his countrymen. While as a result many authors prove to be deprived of the elementary right to an evaluation—no one wants to listen to them. And now it is far from by chance being said more and more often that the Academy of Sciences exists for anything except for the search for and support of everything new and unusual.

Well, if only they had verified the research of Alikin, even if for the sake of scientific interest, or had thoroughly refuted it. There would not be the bitter aftertaste

that we had lost something. For it would not have been necessary to build a new synchrotron or something that is similar, bulky, and expensive. A beaker of heavy water and two electrodes—that is all the scientists needed in the present experiments. Even less was needed for the evaluation of the effect that was noted by Alikin. They did not condescend.

So is it worth it after this to be amazed at our losses? And it is quite possible that "cold fusion" is not the most important one of them. After all, having "covered" it, at the Academy of Sciences they also automatically crossed out the other ideas of Alikin. On the basis of the discovered phenomenon the scientist proposed to develop a...proton engine.

"I studied the diffusion of hydrogen in metal," Viktor Pavlovich says, "and noticed: the thicker the plate is, the higher the rate of displacement of metal in it is. The metal as if sucked in its nuclei. I became interested: But what happens with it then? I began to check whether there was not radiation behind the plate. And it turned out that neutrons and, in addition to them, protons, the energy of which is hundreds of thousandfold greater than the initial energy of the proton in the plate, were flying."

**SOTSIALISTICHESKAYA INDUSTRIYA:** "Viktor Pavlovich," I try to object, "any physicist would say then and there that you quite possibly registered particles that arrive from space—they have precisely such an energy."

**V.P. Alikin:** "Before taking measurements, I registered the natural background for 2 hours. And then I compared the results with it. They all differed."

The results were really unexpected. The scientist understood this. And in order to keep on the safe side, he commissioned undergraduates of the upper classes to check them. For many this research became graduation projects. The experiments were conducted for several years, various groups participated in them—one group checked another. And each one recorded radiation. It is what Alikin also proposed to use for the development of thrust. The fuel is ionized hydrogen. The scientist gave assurance that it is possible to increase by many fold the effect discovered by him, while the energy of the protons escaping from the plate would be enough to accelerate a 100-ton object to 200 kilometers a second. Less large craft would be able to fly at nearly...the speed of light.

A naive person, he believed that it would of course interest specialists, that they would help him to continue the research. It did not interest them.

"...The assertion contradicts known physical laws,...research in this area for the purpose of obtaining particles of great energies is pointless." Alikin received this response, which was formulated in accordance with the conclusion of the Institute of Nuclear Research of the USSR Academy of Sciences, from the State Committee for Science and Technology 20 years ago. There was also a similar reaction at the Ural Department of the USSR

Academy of Sciences: "...hydrogen-charged metals cannot emit protons of the indicated energies."

Recently, while analyzing the American experiments and talking about the program of subsequent work, Academician Yu. Osipyan noted: "...Particular attention will be devoted first of all to research in the area of electrochemistry, as well as in related fields, which are connected with the behavior of metals that are highly saturated with hydrogen or deuterium." But is this really not what Alikin asked for?

Laboratories of NATO and NASA have now taken up similar research. Is it surprising that at the end of last year, disturbed in earnest by publications in the foreign press, the scientist reported on the "rivals" to the Academy of Sciences? He wrote to Academician R. Sagdeyev at the Institute of Space Research. But he did not receive a reply. So where is the guarantee that another scientific sensation will not come from abroad and we will not again repeat the experiments of others? Does "cold fusion" teach us anything?

Incidentally, when telling about this phenomenon, people often recall the sensation of 2 years ago—the discovery of high-temperature superconductivity. They complain that our scientists synthesized the same ceramic long ago, but did not have the sense to study it at low temperatures. The specimens simply lay idle on a desk. While the discoverers, Bednorz and Muller, were lucky—people believed them. And the conclusion: they say, for everything there is the will of chance. There is no one here to blame.

It is a sad event, but, in my opinion, it would also not hurt to recall another one. Not that long ago scientists from Cambridge received the Nobel Prize for the discovery of a new type of radioactive decay. An article on this phenomenon was published in the prestigious journal NATURE. And, of course, it aroused the intense interest of our physicists. They began to reproduce the work of the Englishmen. But no one remembered either the fact that back in 1970 the "new" type of radioactive decay was described in the book "Deleniye yader urana v prirode" [The Fission of Uranium Nuclei in Nature] by Professor Yu. Shukolyukov and his colleague or the reports of these scientists at the Institute of Atomic Energy imeni I.V. Kurchatov. I do not know whether chance controls the development of science, but I am certain that indifference impedes it.

Such situations evoke reasonable questions—What is our system of the protection of priority worth, who evaluates applications for discoveries and how? I addressed them to V. Lytkin, deputy chief of the subdivision of inventions of the State Committee for Inventions and Discoveries.

**V. Lytkin:** "First the applications go to the All-Union Scientific Research Institute of State Patent Examination. We send the works, which have undergone preliminary examination there, to scientific organizations of the appropriate time—mainly, of course, to the

Academy of Sciences. Then an expert council of our committee gives an evaluation, after it the academy does again, this time the bureau of the department which is engaged in research in the field that has been touched upon. Only after this does the Collegium of the State Committee for Inventions and Discoveries register the discovery.

"Annually more than 1,000 applications are received by the All-Union Scientific Research Institute of State Patent Examination, about 200 undergo preliminary examination. While as a result 15-17 works a year are awarded certificates for discoveries."

**SOTSIALISTICHESKAYA INDUSTRIYA:** "Our newspaper regularly tells readers about discoveries. I admit that each time I learn with amazement that the authors completed their works at best 15-20 years ago. What, in your opinion, is the cause of such a delay?"

**V. Lytkin:** "Many people do not hurry to submit applications, sincerely believing that they have not made any discovery. There were instances, when the authors were convinced of the importance of their work through foreign sources. But the main cause is the numerous 'filters.' Works, which no longer cause anyone doubts, are capable of passing through them. While these are mainly old studies which they have had time to test from all angles."

**SOTSIALISTICHESKAYA INDUSTRIYA:** "In the chain cited by you the Academy of Sciences is encountered twice. The last 'filter' in the form of the bureau of the department is especially strong. But no department tolerates encroachments from outside. Monopolism is a widespread phenomenon, science, alas, is no exception. Authors from outside deliberately get into a difficult situation. Can anyone's arrogance get in the way of a discovery?"

**V. Lytkin:** "Unfortunately, it can. We are incapable of conducting research and verifying the results ourselves. We do not have the right to demand anything from the Academy of Sciences or other organizations—we can only request. But I, for example, do not remember anyone having been denied such a request. Scientists provide conclusions mainly in a speculative manner. One has to believe them, although disputes do arise. Sometimes, when defending an application, the committee has to endure a genuine battle. It sometimes happens that we lose it."

**SOTSIALISTICHESKAYA INDUSTRIYA:** "It is a strange situation: it is possible to register an old discovery quite easily and it is nearly impossible to register the latest one. As a rule, they are already using the results of aged research, but it is difficult to use new ones, because no one believes them. A question automatically arises: Are the results of your work economically justified? Might it be worth it indeed to act as Academicians V. Ginzburg, Yu. Osipyan, R. Sagdeyev, and several others suggest? To close your subdivision and no longer issue certificates for discoveries. And to transfer the

assets, which were allotted for the rewards of certificate holders, to the Academy of Sciences for the establishment of new prizes."

**V. Lytkin:** "It is difficult for me to answer this question—I am a person with interests at stake. But let us try to make an impartial examination. Republic subdivisions and sectorial and VUZ science came out against the suggestion which was received from the union academy. I support one of their conclusions: the State Committee for Inventions and Discoveries is opposed at least somehow to departmental arrogance. We are defending the interests of authors. While for many of them the registration of a discovery is the only chance to achieve recognition."

"It is another matter that it is necessary to improve the procedure itself—to make it more democratic and open. We are working on this. We are proposing, for example, to discuss applications in the presence of the authors at all stages. To establish an authoritative and independent expert council—a kind of jury. Perhaps, it is also worthwhile to offer foreign scientists a place on it. We intend to publish all the applications for discoveries, which have been received by the State Committee for Inventions and Discoveries. This, very likely, will become serious support for authors. For it is no secret how difficult it is to report on one's own work in prestigious scientific publications—the Academy of Sciences also screens these sources. We are suggesting an alternative."

"But the main thing is that one must not, I believe, separate the problem of discoveries from the overall economic situation in the country. The present economic mechanism is not creating thus far the need to use the latest achievements, including discoveries. It is necessary to change everything simultaneously."

#### **Academician Scandalizes Academy of Medical Sciences**

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[Letter to the editor of PRAVDA by Academician of the USSR Academy of Medical Sciences M. Kuzin, member of the Presidium of the USSR Academy of Medical Sciences and Hero of Socialist Labor, and Academician of the USSR Academy of Medical Sciences D. Sarkisov, chief scientific secretary of the Presidium of the USSR Academy of Medical Sciences, with a commentary by the Science Department of PRAVDA, under the rubric "After Our Statements": "'It Is More Difficult Than Flights to the Moon'"; first paragraph is PRAVDA introduction]

[Text] We are publishing with some abridgments a letter from the USSR Academy of Medical Sciences, which was received in response to the interview with Academician of the USSR Academy of Medical Sciences V. Burakovskiy, a well-known heart surgeon, director of the Institute of Cardiovascular Surgery imeni A.N. Bakulev, and Hero of Socialist Labor.

The interview of A. Tarasov with V.I. Burakovskiy, which was published on 17 March 1989 in the newspaper PRAVDA, contains a number of gross distortions of the actual state of affairs.

This is not the first instance, when V. Burakovskiy has attempted to conceal serious blunders in his own work with attacks on the Presidium of the USSR Academy of Medical Sciences and its members, while using the central press: it is expected that after these statements any actions of the presidium on the correction of the defects at the institute supervised by it will be perceived as "persecution for criticism."

What were the circumstances, as a result of which, to use the expression of V. Burakovskiy, he "barely held on to the director's chair"? His by no means critical article, which was meant for the Presidium of the USSR Academy of Medical Sciences and was published in PRAVDA in 1986, was a reason for this. The repeated warnings about the disgraceful things that were happening at the institute, which is supervised by V. Burakovskiy, were a reason for the check of the institute, which was made significantly later than the appearance of the mentioned article. This concerns the serious and at the same time outrageous case, which caused a stir in Moscow, when at the Institute imeni A.N. Bakulev, which is supervised by him, a still living child was sent to the morgue after an operation. The orderlies of the morgue saw that the child was alive and returned him to the resuscitation department, where after a while he died. A heart autotransplantation operation, which was not indicated and was senseless in its essence and after which he soon died, was performed on another patient.

These facts were discussed both by the members of a special commission and by the presidium. Availing himself of lofty patronage, permissiveness, and the impunity of his actions, V.I. Burakovskiy as an honorary citizen of Tbilisi without evidence hospitalized former Secretary of the Georgian CP Central Committee S. Khabeishvili, who was under investigation for large bribes. S. Khabeishvili after his discovery at the institute was arrested and sentenced to 15 years. Moreover, at the institute during a regular check gross violations of staff and financial discipline and so on were exposed. In the press attention was also directed to the fact that the institute was poorly coping with its own functions as the head institute with respect to the training of personnel. V. Burakovskiy had never been able to organize heart surgery in Georgia, Moscow surgeons came to Georgia, did operations there themselves for a year, but then left, thus not having taught their Georgian colleagues anything.

All these facts were the object of an investigation in very authoritative commissions, which were established both under the Presidium of the USSR Academy of Medical Sciences (the chairman is Academician B. Petrovskiy) and in the USSR Ministry of Health, as a result of which USSR Ministry of Health Ye.I. Chazon issued an order

and V. Burakovskiy was given a severe reprimand for serious shortcomings in the supervision of the institute.

The check of the fulfillment of the mentioned order of the minister showed that as before gross violations of financial and staff discipline and labor legislation and cases of mismanagement in the storage, accounting, and use of physical and material assets and monetary assets are occurring at the institute. In connection with this on 27 January 1989 V.I. Burakovskiy, director of the Institute imeni A.N. Bakulev, by an order of the president of the USSR Academy of Medical Sciences was given a reprimand and was ordered to take immediate steps on the elimination of the noted shortcomings. Instead of this a letter of V.I. Burakovskiy with the demand to repeal the reprimand was received by the Presidium of the USSR Academy of Medical Sciences. V.I. Burakovskiy and A. Tarasov in the relaxed interview make fun of all these most gross violations (in particular, it is a matter of several thousand rubles that were illegally spent at the institute) as trivial things, to which it is not the business of either the academy or the director of the institute to direct attention.

By its importance the question of the principles of the planning medical science holds the central place in the article. V.I. Burakovskiy repeatedly expressed his opinion on this question, particularly in the newspaper PRAVDA (1986, 1987), at sessions of the USSR Academy of Medical Sciences, and in journals. Characteristic of these statements is the fact that under cover of the generally accepted assumption about goal program planning V.I. Burakovskiy is promoting assumptions, which are harmful for medical science and supposedly follow from this principle. He does not see a significant difference between the principles of the goal program planning of theoretical research and applied research. V.I. Burakovskiy believes that basic research is conducted at theoretical institutes, while applied research is conducted at clinical institutes. As a consequence of this he is "fighting" against basic research, proposing to remove the paragraph on basic research as the most important task of the academy from the new charter of the academy. And this is at the time, when in all the decrees of the CPSU Central Committee and the USSR Council of Ministers on the development of science, in the repeated statements of M.S. Gorbachev, and in the long article of President of the USSR Academy of Sciences G.I. Marchuk, which was recently published in PRAVDA, primary importance in the progress of all the sectors of the national economy and the role of the main lever in the accomplishment of the restructuring of industry and agriculture and in the campaign for the health of man are attached to the development of basic research. It is natural that suggestions of this sort of V.I. Burakovskiy are regarded by scientists of the academy as trivial and are not taken into account.

One of us (D.S. Sarkisov) sharply criticized the views of V.I. Burakovskiy in newspapers and journals from precisely this standpoint. The point of this criticism is aimed against the attempts of V.I. Burakovskiy to

belittle the main role of the academy as an institution, which is called upon to conduct priority basic theoretical research, and thereby to transform it from a high scientific institution, which is promoting the development of practical health care, into a system of well-equipped hospitals. The views, which are being promoted by V.I. Burakovskiy, are an example of how the formal bureaucratic approach to the correct idea of goal program planning emasculates its content and reduces it to so-called creeping empiricism and narrow practicality.

The following case is very typical: V.I. Burakovskiy appears in the press and on television screens, as a rule, at those moments, when violations, which threaten him with another penalty or discrediting in the eyes of the public, are revealed in the work of his institute. The incident with the heart transplant is indicative in this respect. V.I. Burakovskiy advocated it all the time and even attempted to perform it (unsuccessfully) without the appropriate documents of the USSR Ministry of Health, which permit such an operation, for which he was penalized. When a commission of the Presidium of the USSR Academy of Medical Sciences drew up the appropriate documents, which were approved by the USSR Ministry of Health, while Academician of the USSR Academy of Medical Sciences V.I. Shumakov performed the first successful heart transplants in our country, V.I. Burakovskiy hurried to make on television attacks on the presidium and morally and ethically despicable attacks against his colleagues, having accused them of incompetence and the inability to draw up scientifically substantiated documents, which regulate the transplanting of a heart and other organs, and of the lack of a service for the taking of donor organs and their tissue typing.

The above-mentioned regular reprimand for continuing disorders at the institute had not had time to threaten V.I. Burakovskiy, when he appeared before television viewers and as the leader of heart surgery pontificated about this and that and, in particular, about his institute, then a long article appeared in PRAVDA with his "guiding instructions" on medicine, among which there were hopelessly inaccurate ones, which are excusable for the incompetent A. Tarasov and inexcusable for V.I. Burakovskiy. Thus, he regrets that "not one neuropathologist of the Soviet Union auscultates the neck," that is, attempts to diagnose disease of the vessels in the neck in case of atherosclerosis, although he as a specialist should have known that this test was proposed precisely by neuropathologists, who "auscultate the neck" constantly and elaborated criteria of the risk of a stroke and steps to prevent it (N.S. Misyuk) long before V.I. Burakovskiy took up this question. What forms of self-exaltation and the evasion of responsibility there are!

And a last thing. How was it possible to permit the irresponsible words of V.I. Burakovskiy that two people ruined the planning of medical science in the entire country? Not two people are responsible for the planning of medical science, but we were able to actively speak out against the belittling by V.I. Burakovskiy of the role of basic theoretical research, this we did and will do henceforth.

Today, during the period of glasnost, we have the right to expect a detailed response to our letter.

[Signed] Academician of the USSR Academy of Medical Sciences M. Kuzin, member of the Presidium of the USSR Academy of Medical Sciences and Hero of Socialist Labor

Academician of the USSR Academy of Medical Sciences D. Sarkisov, chief scientific secretary of the Presidium of the USSR Academy of Medical Sciences

#### Commentary of the Science Department

It is difficult to say whether the members of the Presidium of the USSR Academy of Medical Sciences were counting on the publication of their letter in the newspaper or had as a goal private correspondence on the personality of their incompatible colleague. But a fact is a fact: such is the "individual" style of the response to criticism, which still frequently occurs during the discussion of vital and urgent problems that require the real conflict of opinions and the identification of who is right.

The editorial board has a number of documents which testify that the cases, which were cited by Academicians of the USSR Academy of Medical Sciences M. Kuzin and D. Sarkisov, were presented, to put it mildly, in the form of gossip. It is a matter of truly dramatic situations in the most difficult surgical work and of the death of terminally ill patients during the attempt to save them. But in these documents, which were prepared by highly competent commissions, we did not find anything similar to the delivery to the morgue of a "still living child" or the performance of an operation that was "not indicated" and senseless.

It is possible to say the same thing about the accusation of concealment of a criminal, which shows clearly in the case with the hospitalization of S. Khabeishvili. They knew both in the Georgian CP Central Committee and in the USSR Procuracy about the stay of this truly sick patient at the clinic.

The rest of the arguments of this letter are also sustained in such a manner. About what "self-exaltation" and "evasion of responsibility" can one speak, if the first department in the country for children with congenital heart defects was established at the institute? If on the initiative of the institute Hospital No 15 of Moscow has a department, where neurosurgeons, neuropathologists, and vascular surgeons are together saving people? We are not talking about several USSR State Prizes and prizes of the USSR Council of Ministers and the Leninist Komsomol, which have been awarded to personnel of the institute in recent years—they speak for themselves.

Why was the method of labels and "picking to pieces" needed instead of a straight answer? Of course, to evade the main and disturbing questions that were posed by V. Burakovskiy in the interview. In the letter not a word is said about how academic medical science intends to

emerge from the crisis and from the lag that entails the premature death of people from cardiovascular diseases.

Having haughtily accused their opponent of "creeping empiricism and narrow practicality" and having ascribed to him the "fight" against basic research and heart transplanting, M. Kuzin and D. Sarkisov insist on the irreproachability of the statement of these questions at the USSR Academy of Medical Sciences, which, apparently, needs neither any criticism nor any improvement. At the same time there is a casual reference to other scientists, by whom supposedly "the suggestions of V.I. Burakovskiy...are regarded as trivial and are not taken into account." Do not the authors lay claim too easily to the right to express the opinion of tens of colleagues? Here, for example, is the opposite point of view of Academician of the USSR Academy of Medical Sciences N. Paleyev, who believes that V. Burakovskiy is deeply worried by the relationship of the progress of medicine and basic research, which should originate from the demands of practice; to plan in isolation of clinical medicine means to divert one's attention from vital problems. "For decades in medical science planning was carried out not in terms of the ultimate goal, but with respect to institutes and laboratories; therefore, the plans and financing acquired a chaotic nature. V.I. Burakovskiy studied all these questions thoroughly and devoted more than a page to them in his book ('Pervyye

shagi, zapiski kardiokhirurga' [The First Steps, Notes of a Heart Surgeon], Moscow, Znaniye, 1988). Such an analysis, clearly, will be valuable for the organizers of medical science and health care and for the supervisors of scientific work."

What, all the same, does the Academy of Medical Sciences intend to do to reduce the death rate from cardiovascular diseases and to improve the management of all medical science? Having concerned themselves with cleaning their own academic uniform and making the "uniform" of their opponent dirty, the two members of the presidium somehow forgot about this vital task.

Indeed, the criticism, which issued from the mouth of V.I. Burakovskiy, is pointed and not very pleasant. Indeed, he talks about the necessity of electing as leaders of the scientific community truly talented scientists and organizers, who in their field know how to achieve an appreciable result. But it is necessary to know how to respond to criticism in a fitting and productive manner, without losing face in a heated argument. Remembering that the science and practice of medicine are still in enormous debt to millions of people and the health of the people.

This is what we consider it necessary to say in response to the authors of the letter at their own request.