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# JPRS Report



# Science & Technology

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[Article by S. A. Volfson, doctor of chemical sciences, laboratory head, Institute of Chemical Physics, USSR Academy of Sciences, under the rubric "Organization of Science": "The Story of One Introduction"]

[Text] It's no secret that the scientific-technical revolution has quite painfully exposed the flaws in our system for managing scientific-technical progress. What's more, the ways to correct them are not entirely clear. Allowing enterprises greater freedom, promoting contacts with foreign companies, and developing joint ventures are supposed to ease and improve the situation. But is this enough to overcome backwardness?

There is still no critical analysis of how scientific-technical progress has been planned in recent years, or why money invested in the development of science and science-intensive production facilities has not produced the corresponding results.

Unless we understand the reasons for the lack of success of the specific comprehensive scientific-technical programs adopted by USSR Gosplan, the State Committee for Science and Technology, and the USSR Academy of Sciences' Presidium for 1980-1985, we cannot guarantee that the priorities just set will be effective. The situation is further aggravated by the fact that those who developed and made decisions in the so-called stagnant years are still at the helm. These people are in somewhat of a state of confusion, and many are convinced that scientific-technical progress has been properly planned.

Let us try to analyze one of the mandated programs related to the accelerated development of the country's production and consumption of composite (filled) polymer materials, and let us try to use this example to understand the reasons for the inefficiency of such programs.

### Choosing the Goal.

The first question to be answered is whether the problem was correctly stated. Was the focus on this problem economically justified, or was it the result of the political motives of individuals who were defending their own group interests?

Evaluating priorities in the development of the state economy is a very crucial task, since the risk of an improperly substantiated decision is extremely high, and the consequences are fraught with huge losses. Trial and error method, which is especially dangerous given the monopolistic organization of the economy, prevails. But where are the scientifically valid forecasting methods about which so much has been said in recent years? One must admit that in most cases they simply do not exist. One of the most complicated problems of modern times is to assess the economic prospects of scientific developments, but this unfortunately doesn't lend itself to precise mathematical calculation.

The situation is somewhat simplified if we are in a catch-up position, when the problem has already been solved somewhere and we can analyze the consequences. In this case the much ridiculed method of "comparison to the USA" (or Japan, or any other industrially developed power) becomes the primary tool for convincing the leadership and eliminates the need to find other arguments.

I must stress that synthetic polymer specialists are in a particularly "advantageous" position. Our lag behind economically developed countries in this area reached scandalous proportions long ago.

Before we go any farther, this situation must be explained. In the per capita production of synthetic polymers, we are behind not only all the developed capitalist countries, but all the CMEA countries and many developing countries, and we are continuing to slide backward.

### The Background of Our Backwardness

We compensate for the lag in plastics by a tremendous metal output. This is certainly a priority, and our industry has contrived to overtake the USA, West Germany, and Japan combined. But 10 or 12 years ago it became clear that this was a Pyrrhic victory[1]. The consequences of the over-development of metallurgy: huge energy expenditures, losses due to corrosion which ate up the gain in output, and the low efficiency and high labor input of machines, mechanisms, and structures escaped our planning agencies.

Why didn't plastics and composite materials get the green light in time? Because in a centrally controlled economy very crucial decisions had to be made—to throw money from metallurgy to chemistry and chemical machine building, and to overcome the natural resistance of the metallurgy and machine building managers who occupied key posts in planning agencies and the government.

One can speak as much as one wants about the irony of the fact that chemists here have for many years directed the culture, but it remains a fact that there was no one to direct the increased use of chemicals in the national economy, and even official recognition of this idea came late.

Plastics were too long considered only substitutes, surrogates. As early as the mid'60s the prevailing idea was that only **indispensable** polymers should be developed, since capital investments were scarce. An exception was

made only for synthetic rubber, which entered the ranks of indispensable materials after unsuccessful attempts to produce natural rubber from coke-sagyz.

Where were the specialists who were tracking the rates of worldwide development of synthetic polymer output looking? Information on this subject is regularly printed abroad.

But specialists systematically wrote "up the line" about this. However, for a long time people "up the line" did not take into account even references to worldwide trends. The prevailing idea was that the overwhelming percentage of polymers in the West were used in packaging, consumer goods, etc., not for anything important or serious.

It is also remarkable that for about 25 years the planning agencies had no confidence in all the calculations on the efficiency of replacing metals with plastics, since such efficiency (calculated by different rules and techniques-was never a deciding factor in our economy).

**Economic and Social Problems**

By the end of the 70's the skewing of industrial development had become obvious. One meeting of USSR Gosplan's Collegium, where the country's situation with pipe, steel pipe used for water supply, sewers, irrigation, oil and gas transport, and many other needs was discussed, is typical. Despite huge pipe production capacity, a growing scarcity was felt. The reason was that the rate at which pipes failed due to corrosion exceeded the metallurgical and tube mills' ability to manufacture and replace them.

At the same time, in worldwide practice, plastic pipe with a life of 50 years had long ago taken over low-pressure lines. They accounted for 90

of utility lines. They almost completely displaced not only steel, but asbestos cement and ceramic pipe as well. (In the last case, plastic's advantages in manufacturing efficiency and labor productivity were decisive.)

Another example. Despite the country's huge petroleum output, our chemical industry suffers from a constant scarcity of raw material—monomers and solvents. Because the petroleum refining and petrochemical industries are underdeveloped, we cannot leap ahead in polymer production. Invaluable raw materials—volatile fractions and casing head gas—were burned for decades and are still being burned in oil refinery flares. And since polymers must be further processed into products, there is a need for a powerful processing industry, stabilizers without which polymers quickly break down, dyes and pigments, special additives, fillers, etc. In other words, the money invested into metallurgy.

Plastics differ fundamentally from metals. Their behavior under specific operating conditions in most cases cannot be calculated from tables. Every time plastics are used in products, special experiments on test stands are required (i.e., new research is done). The army of designers working in the national economy has not been trained to designing with plastic. Vuzes train almost no specialists of this type. It turned out that industry cannot be restructured all at once. The need for huge capital investments in the raw material base, in polymer production facilities, and the processing industry caused despondency.

Searches for alternative approaches began. The planning agencies' attention fell on composites.

Mineral and organic fillers were introduced into the very first plastic, phenol formaldehyde resin, to improve its consumer properties and reducepits cost. Since then the outputs of filled (composites) and unfilled materials have grown in parallel.

However, with the beginning of the oil crisis in the West attention toward filled polymers grew significantly. This was primarily reflected in the rates at which filler production rose as compared to "pure" polymers. The number of companies producing fillers increased. Their variety, the number of patents, the number of journals and publications devoted to this topic grew extraordinarily. It was obviously a boom.

Many foreign publications emphasized that this was not just a matter of the economics of crude oil. The rapid development of science and technology and the expansion of applications encouraged the discovery of new fields of research.

In particular, plastics reinforced with short fibers, which were more expensive than "pure" polymers, turned out to be also more efficient, since they replaced metals in the manufacture of many parts for machines, devices, instruments, etc. The "composite boom" in the West had no direct effect on our economy. Prices for crude petroleum and energy on the domestic market did not change. We believed that this stability was an achievement. In fact, we had lost one more step in scientific-technical progress.

**The First Clash of Interests**

But still there were changes. The pressure of foreign information was too strong. Several USSR Academy of Science institutes began researching composites.

L. A. Kostandov, Minister of the Chemical Industry, tried by force of will (by issuing the appropriate order) to increase the output of filled polymers at his ministry's enterprises.

But the first discussions of this problem with Minkhimprom [Ministry of the Chemical Industry] personnel and associates of lead scientific research institutes, which monopolized plastics technology, showed that the resistance to the new ideas would be significant.

The opponents' arguments basically amounted to the fact that, in view of our overall backwardness, we should first correct the situation by increasing production of "pure" polymers, and then we could think of expanding the production of composites.

There was no argument—the overall situation had to be corrected (unfortunately, this was not done), but to shelve the new field meant to be behind in it as well. Our specialists in technology problems so often see only the most immediate goal. This is one of the unpleasant consequences of backwardness. While we strive for this goal, competitors don't sit with their hands folded, but move forward.

Complaints were heard about the fact that there was no industry to produce fillers, chemical additives, and special equipment. The very idea of a "universal" filler seemed senseless to many. The materials' density would increase, and so would product mass. Viscosity would increase, and this would make processing the materials difficult.

I must emphasize that the stability of prices for organic raw materialpdid not help change the Ministry's mood. What did our producers care about the dynamics of prices on the world market? Foreign prices for organic material would rise more quickly than for prices for minerals? That's their headache.

**The Scientific Input**

These arguments probably could have continued for a long time. The lack of economic incentive of course had a negative effect. Some kind of priming, a new scientific concept that would turn the tide, was needed.

This concept took the form of a so-called polymerization filler. In traditional technology, finished polymers float and are mechanically mixed with the filler. Special chemical additives are introduced to the mixture to improve the interaction between filler and matrix. Expensive and complicated equipment, extruders, heavy mixers, is used to produce mixtures. Energy expenditures to blend the highly viscous mass are also high.

The USSR Academy of Sciences' Institute for Chemical Physics developed a method to polymerize several monomers (ethylene, propylene, vinyl chloride, etc.) directly on filler particles to which a polymerization catalyst had already been applied. The process is carried out with low energy consumption (the reaction medium's viscosity is low) in the liquid or even the gaseous phase. No special mixing equipment is needed—an ordinary polymerization reactor is sufficient.[2]

Of course, as with any new idea, there were a multitude of scientific and technical questions. For example, to what extent do fillers have to be cleaned and dried so that the catalytic process will be normal; how does one ensure uniform distribution in the reactor space, etc.

Study of the properties of the composites produced by this method showed that they were less abrasive than those produced by mechanical mixing, since each particle was covered with a solid coat of polymer. It turned out that this method could be used to produce extremely complicated multi-layer structures, e.g. filler particles surrounded by several layers of different polymers, etc.

The capabilities of the new method were effectively demonstrated with an unpredictable brittle filler, perlite, which is a hard vitreous foam of volcanic origin. This material has an outstanding heat insulating capacity, but it crumbles when it is mechanically mixed with the polymer used as the binder.

When this method was used for polymerization in a fluidized bed, a thin layer of the polymer could be applied to the perlite's surface, while its structure was to a great extent preserved.

The work was highly valued as a new principle in the development of filled polymers. It was further studied at several academic and industry scientific research institutes, particularly Moscow State University, the Institute of Catalysis of the USSR Academy of Sciences' Siberian Branch, and elsewhere. In particular, methods were developed to attach radical polymerization initiators to the fillers' surface, which greatly expanded the range of monomers which could be used.

Of course, the activism of N. S. Yenikolopov, who directed the work, in promoting the new scientific idea played a certain role.

pNaturally, it was not assumed that the polymerization filler method would completely replace simpler, "cruder" mechanical mixing methods. But the great possibilities were obvious. Let me emphasize one more feature of the new method. The traditional technology lay in the hands of polymer processing specialists. The synthetic chemists' role in it amounted only to developing new chemical modifiers (silanes and other compounds which determined the interaction on the filler-polymer interface). The new method offered great opportunities for the synthetic chemists, since its encompassed the entire polymer synthesis process.

Skeptics believed that it was precisely for this reason that it would be extremely difficult to use the new processes in industry.

Those who are used to putting more faith in the experience and business acumen of foreign companies and who greet any report about a domestic invention with the question, does this exist in America (there are more than

a few in the offices where the fate of science is decided), could relax. The renowned American company DuPont patented a similar method at almost the same time we did.[3]

**The Process of Policy-Making**

Now the proponents of the accelerated development of polymer composites found powerful support in academic science. Several managers on various levels became familiar with the results of the work and approved it. The argument about saving hard currency by cutting purchases of expensive extrusion equipment (we produce almost none, but buy it abroad from one year to the next) unfailingly had its effect on Gosplan management. Direct actions were required to speed the advancement of the new scientific idea.

It would seem that the normal way to develop a scientific technical idea would include the following necessary stages:

1. Formulation of the idea and exploratory work to support it.
2. Basic research.
3. Simultaneous technological research and experimental verification.
4. Development of pilot production, broad acceptance of the new materials in the national economy, required work on raw material, equipment, processing and applications.
5. Full-scale commercial application.In chemical engineering in this country this process usually drags on for many years, while companies abroad manage to accomplish things in 2-4 years. Our backwardness is basically related to the independence of these stages, the lack of a unified program to cover the problem from start to finish. Here it is typical for the search for places to set up pilot production (not to mention quantity production) to take several years.

With rare exception the first two stages are farmed out to academic institutes. The second stage usually drags out several years and ends with the defense of dissertations. The third stage is not natural to academic institutes. Industry scientific research institutes, which have the right specialists and a division of labor foreign to academicpscience, know best how to decide this. The fourth stage is absolutely foreign to academies; it is the prerogative of industry science.

This process originated when its creators were convinced that industry science would be nourished entirely by ideas gotten from academic science and would give them practical form. But in reality most industry scientific research institutes with a monopoly on technology have long preferred to develop scientific projects independently or use foreign processes and materials as a base. In any case the number of polymer chemistry processes originated by the Academy and brought to industry through industry science is negligible.

However, of the four lead industry scientific research institutes which were enlisted to develop polymerization filler technology, three responded with a categorical refusal and presented a mass of arguments in opposition.

Exceptional measures had to be taken—to take on the third and fourth stages ourselves or, more precisely, to attempt to organize the further development of these stages at the appropriate location.

But where to find the location? The USSR Academy of Sciences' Institute for Chemical Physics has a technological department conceived by N. N. Semenov as an alternative technological base for refining processes not accepted by industry scientific research institutes. However, the capabilities of this base had already been exhausted. Create a new one from scratch? Experience shows that this takes 10-15 years.

The only alternative was to convert a small existing chemical plant which had personnel, equipment, energy, and room for growth into a pilot plant. For several reasons the Kuskovsk Chemical Plant, founded 100 years ago and now surrounded by city blocks, was chosen. In any case it needed to be re-oriented.

The plant's long-standing ties with the Academy, a joint experiment on developing production of organo-silicon polymer facilities (supervised by K. A. Andrianov), polyformaldehyde and impact-resistant polystyrene (N. S. Yenikolopov), and polyvinyl trisilane membrane (N. S. Nametkin), made it possible to anticipate future successful collaboration.

The managers of industry science came out decisively against the idea, which was a logical one from the standpoint of academic science. Their main argument (repeated later) was that work on an ephemeral idea diverts manpower and money from solving tangible problems, which the industry science managers saw as reproducing technology and materials proven abroad and lacking in our country. They believed that the following factors were definitive in the choice of these areas:

- confidence in the value of these processes and materials to the national economy, based on analysis of foreign experience;
- the potential to save manpower in exploratory work, marketing, optimization of properties, etc., since all these problems had already been addressed and published;
- the possibility of obtaining and analyzing material samples;

- the possibility of varying the parameters and using different raw material and equipment to obtain patentable approaches to the technology and thereby enter the world market.

It was impossible to refute these arguments and strategy because it is used all over the world. But it was also impossible to count only on such a strategy! It automatically condemns us to backwardness, to second-class status, and, despite the opinion of its supporters, does not bridge the gap between us and the leading industrial powers.

The position defended by the USSR Academy of Sciences was in this case fully supported by Gosplan and GKNT [State Committee for Science and Technology], but a compromise still had to be worked out to finally resolve the issue of creating a pilot site. It involved gradually re*orienting the Kuskovsk Plant for the new field and creating a technological center there which would develop not only fundamentally new processes, but traditional ones as well, and also develop new fillers and modifiers.

Thus, instead of the original idea (to do experimental verification of two or three specific projects devised by the USSR Academy of Sciences' Institute for Chemical Physics), an essentially new one developed—to create a new industry institute with a wide range of problems to solve. The management of resources and finances, the final approval of plans, and the evaluation of their effectiveness would remain in the hands of Minkhimprom. The Academy of Sciences had to provide overall scientific management, train personnel, and analyze the results. Legally, it was impossible to protect the academy's primacy. It was assumed that the scientific director of the project had to protect the Academy's interests. A time bomb was thus planted in the very foundation of the interdepartmental pilot facility which was to be created.

**Economic Relationships in Planning**

Both the Academy and industry science suffer from the lack of pilot facilities. With a capacity to produce 1 million tons of polyethylene a year, our chemical industry does not have one pilot plant.[4] Chemists from East Germany, which produces many times less but has such plants, come to the rescue.

In the 70's and 80's, despite numerous purchases of entire plants abroad, our finance specialists inexorably crossed pilot plants off the purchase orders. No one cared how technology would develop further. The main thing was immediate gain.

Pilot plants in principle lose money, and the longer they operate the greater the losses to the owner. Costs to maintain them are 10-100 times higher than for laboratory research. But how are they financed abroad? By deductions from future profit. New processes and materials are so highly profitable that companies don't skimp on investing money in experimental work, even if these expenditures take several years to pay back.

We have no such financial mechanism. The losses of pilot sites must be covered by funds on hand. Hence there is no desire to have these sites. Hence the desire, if they do exist, to begin commercial production as soon as possible.

To conquer the market, companies in capitalist countries often start by selling goods at a reduced price. Then these losses are compensated bythe increase in sales and the reduction in production costs. We cannot use this policy. Our financial experts always prefer a bird in the hand.

There couldn't even be a thought of encouraging future users of composites. But in East Germany they began to pay special bonuses for saving imported materials by using domestic ones.

Gosplan not only rejects the idea of rewarding producers and users of new materials, it tries to strike a "counterblow." The ones who began to use composites instead of "pure" polymers immediately had their funds for crude polymer cut off! So what was the sense of introducing these composites? You see, consumers counted on increasing production by saving raw material.

The absurdity of all these financial measures is particularly obvious at the Vladimir Chemical Plant, which produces electric cable sheathing. The introduction of chalk-filled polyvinyl chloride made it possible to save polymer, reduce net cost, improve consumer properties, and the plant was without a bonus for several years. The fact is that the gross cost of goods produced dropped. The plant stopped fulfilling the plan.

When, a little later, the "Norplast" Scientific Production Association established at the Kuskovsk Chemical Plant developed a technology which allowed part of the synthetic rubber in rubber products production to be replaced with ground up wastes, planners again hurried to announce that they would reclaim the rubber saved. Need I add that after every expression of "gratitude" like this, producers are eager to find any excuse to reject new technologies?

When it had already been decided to re-orient the Kuskovsk Plant, it turned out that all the plant's manpower had been diverted to solving another problem, internally financed construction of a pilot facility for producing polybutylene terephthalate. Because its mechanical department was inadequate to develop pilot plants, the plant turned for help to its neighbor, a mechanical plant. The neighbors were ready to help (for an appropriate fee), but the management of the Ministry of Chemical and Petroleum Machine Building, to which this plant is subordinate, categorically opposed it.

**Approval**

As we know, a draft decree has to be approved by all interested departments. This burdensome process usually takes at least 3 years. Endless compromises pervert the initial intent of the document, since each department tries to secure its own position. It is especially difficult to overcome the conservatism of the Ministry of Finance, the Ministry of Justice, and the State Committee for Labor and Wages. Attempts to escape the rigid boundaries of the structure, tariff rates, and the systems of bonuses, financing, and deductions to the budget are, as they say, cut off at the root. Memos on the coordination and conduct of laboratory developments, which commit no one to anything, are easiest to approve.

Our attempts to interest builders and to attract them to the Kuskovsk Plant site were completely unsuccessful. The reconstruction and newpconstruction plans remained on paper, and no one even wanted to discuss proposals for social and service projects. As a result, over the 6 years of existence of the "Norplast" Scientific Production Association, only 6 percent of the capacities of the basic Kuskovsk Chemical Plant could be reoriented. That's a sad result.

Various proposals on building facilities to produce the new products which were to have been developed also remained just good intentions. We couldn't get the consent of the builders or designers.

Finally, the program's scientific managers received neither the funds nor the financing. They had only the "right" to petition, plead, and complain.

**Results**

What could this program hope for? With all optimism its creators could hope only to attract the attention of the scientific and engineering community, a splash of publications, applications for invention. They had all that. Scientific-technical conferences were held and dissertations defended. Scientific-technical projects appeared, experience was gained. Several new technologies were developed. Three licenses were later sold. Users' interest in the new classes of materials increased.

But still it was impossible to use the polymerization filler technology on a significant scale, despite several outstanding results and the users' interest and even enthusiasm. We struggled with the indifference of machine builders and the doubts of different departments. Who should finance these efforts? How to interest all participants?

And what about policies? They don't take into account the actual economic interests of all (and let me emphasize all!) parties involved in creating new technologies. There are always breaks in the chain of organizations and departments, and things begins to slip.

We need a different, economic, basis for developing such scientific*technical programs. They must be based on the actual economic interest and, therefore, economic responsibility of all participants: developers producers, and users.

The fate of the pilot site was dramatic. After many, not always correct, statements in the press, Yu. S. Bespalov, Minister of the Chemical Industry, considered breaking up the "Norplast" NPO [Scientific Production Association]. The interests of two parties suffered: the national economy, which had not received adequate return on its investments in science, and the USSR Academy of Sciences, which had invested a lot in the creation of "Norplast" NPO, including hard currency, and had gotten nothing in return. But that deserves another article all to itself.

The burden of unsolved problems weighs increasingly heavily. We need to develop polymer composites. The interests of many departments cross in this task, as in most other current problems.

So once again projects are being written and approved, a site is beingpsought to build pilot facilities, and matters of efficiency and price formation are being discussed.

Can't we learn something useful from the errors of the past?

**Footnotes**

1. Volfson, S. A., Yenikolopov, N. S., "Reflections on the Benefit and Harm of Chemistry," Priroda, 1988, No. 7, pp. 4-13

2. Dyachkovskiy, F. S., Novokshonova, L. A., Usp. khimii, 1984, No. 2, p. 200.

3. Yenikolopov, N. S., et al., Author's Certificate No. 763379, 1976; No. 787394, 1976; Lipscomb, R. D., US Patent No. 3950303, 1976.

4. A pilot plant is one at which the data required to design large-scale commercial production can be obtained.

## Organizational, Funding Conflicts Between Ministry of Health, Academy of Medical Sciences

*18140150 Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 13 Dec 88 p 2*

[Article by President of the USSR Academy of Medical Sciences V. Pokrovskiy: "Ideas on the Scales of Evaluation"; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] Today the General Assembly of the USSR Academy of Medical Sciences is beginning its work in Moscow. Not everyone who should attend it will be able to: many leading medical personnel of the country are now

working in Armenia, giving assistance to the victims. Precisely, they are probably feeling most keenly today their helplessness in those cases, where science has not managed to provide them with more advanced methods and means of fighting for the life of a person.

We will be fair: our medical science has to its credit many important, basic discoveries. But today we have the right to cite them only in order to recall: our scientists are capable of solving the most difficult problems. Unfortunately, this powerful intellectual potential for many years did not receive proper development and use. Owing to this, to this day our lag behind the leading countries in the area of genetics, biotechnology, immunology, transplantation, pharmacology, and virology and in a number of other directions remains or is even increasing. More than a third of the research being conducted today essentially repeats foreign research. While the level of developments is such that only 5 percent of them are patentable.

What is the cause of such an alarming state of affairs? I am afraid that executives of planning and financial organs at some stage blindly began to believe in the popular assertion that "you cannot buy health for money." But this assertion, which is correct with respect to one person, loses indisputability when it is a question of millions of people. The present health care system requires enormous expenditures. Moreover, it has developed into one of the most science-intensive sectors, in which successes in the healing of patients directly depend on the depth, scope, and pace of basic research. While considerable assets are also needed for it.

We understand: today the country is allocating for the needs of medicine the most of what it can give. It is all the more important to skillfully manage these assets and resources and to use them with the maximum efficiency. For this it is first of all necessary to put an end to the distortions, and at times simply the confusion, which have taken firm root in the organization, planning, and financing of research. In other words, the radical restructuring of the entire system of management of medical science is needed.

Strictly speaking, precisely this task has been posed in decisions of the party and government, in which it is emphasized that "the USSR Academy of Medical Sciences should become the real headquarters for the management and planning of all medical science in the country." But here a question suggests itself: Is the academy in its present situation capable of assuming this role?

Within it there are about 60 institutes, which, of course, are incapable of encompassing the entire front of medical science. But then about 500 scientific collectives are subordinate to the union and republic ministries of health. Among them are institutes, to which the functions of the head institutes in the most important directions of medical science have been assigned. By the logic of things, they should have been transferred a long time ago to the system of the USSR Academy of Medical Sciences. But the personnel of the ministry are evading in every way the settlement of this question.

In our opinion, one of the main reserves consists precisely in distinctly dividing the duties between the academy and the USSR Ministry of Health. However, how is this to be accomplished in practice? When the academy was being established, it was stipulated that it is directly subordinate to the USSR Minister of Health. This condition guaranteed it certain autonomy. But then there appeared in its charter the thesis that it "is attached to the USSR Ministry of Health." In essence, it turned the academy into a main administration of the ministry, which enabled its staff to interfere in its affairs, giving rise to a large amount of squabbling.

Today many scientists insist on placing the medical academy under the USSR Council of Ministers, the State Committee for Science and Technology, or the USSR Academy of Sciences. In such suggestions there is probably also an element of extremism. But, on the other hand, in order to rid science of bureaucratic "tutelage," it is necessary to return to the original "formula"—on subordination to the ministry alone. There has become equally urgent, in our opinion, the question of the special-purpose financing of the USSR Academy of Medical Sciences. Or, as it is customary to say, by a separate line.

Objective factors prompt us to such a formulation of the questions. Our institutes were faced with the need to master the new conditions of management without a preliminary experiment, learning from their own experience and mistakes. In such a situation there is the real danger that basic research, which does not provide an immediate outlet to the market, will again be under the threat of neglect. Hence, the academy should have the opportunity to prevent such a development of events.

We also have purely pragmatic reasons. The comparative analysis of domestic and foreign equipment, which was made last year, showed that for the present we cannot count on our industry. At any rate, in the next few years it will not be able to provide equipment which is capable of ensuring a high level of research. In order to maintain the equipment of scientific research institutes at the proper level, we must spend on purchases, as calculations show, not less than 20-25 million foreign currency rubles a year. We have thus far received at best about 3 million rubles. While during the past 2 year the Ministry of Health also deprived the academy of these modest allocations. And thereby it laid the "base" for regular lags of our science.

Under the new conditions of economic management financing is becoming one of the main levers of management. But it would be a mistake to undertake the distribution of assets and resources without having an idea of where they should be channeled first of all. There

is only one way to reduce miscalculations to a minimum and to avoid subjectivism and the dictation of established scientific schools—the extensive use of competitive principles in the selection of the most promising proposals and projects.

Thus far no one has yet succeeded in developing an instrument, which is capable of evaluating obtained research results and the opportunities afforded by them. Therefore, in the sphere of the management of science the "technology," which is based on the so-called principle of competent evaluation, has received the most extensive dissemination in world practice. In this case competent specialists—experts—whose evaluations also serve as the basis for decision making, perform the role of a kind of "instrument."

The USSR Academy of Medical Sciences, in striving to shift from the principle of the maintenance of scientific research institutes to the financing of specific themes and projects, was one of the first to adopt this approach. In all 25 expert councils for the most important problems of medicine were established under its presidium and were approved by the USSR Ministry of Health.

The competitive selection of works for this year and the next 2 years, which was made by these councils, showed that the expert commission is a sufficiently exacting tool. In particular, of the nearly 2,500 proposals and projects considered by it 86 percent were rejected. As for the accepted ones, among them only 10.7 percent of the applications received the highest evaluation—"a theme of exceptional importance."

Unfortunately, this large amount of work, in essence, was an experiment, a kind of test of strength. The point is that, when holding the competitions, the expert councils did not know what assets they had. And, consequently, they could not coordinate the real possibilities with the cost of the proposed projects. Worse than that, with respect to financing for the coming year serious complications arose: about 250 million rubles are required for the works which underwent evaluation, while the allocations for all medical science barely exceed 300 million rubles.

In spite of such costs, the first experience showed that expert councils are capable of becoming the main and most democratic unit in the system of management of medical science. Not only the basic research being conducted by the USSR Academy of Medical Sciences can be financed through their channels. Having placed the necessary assets at the disposal of the councils, the USSR Ministry of Health will also be able to stimulate applied work, which is the logical continuation of basic work. For this it is necessary to give the expert councils the right to transfer the corresponding sum to the winner of the competition, no matter to what department he belongs—be it a laboratory in the system of the Ministry of the Medical and Microbiological Industry, a VUZ chair, or a scientific and technical cooperative.

We are also linking with the expert councils the hopes for the simplification of the organizational structure. If they receive the necessary rights, the need for numerous scientific councils and problem commissions and for the participation of the head scientific research institutes and base VUZ chairs in the planning, coordination, and methods supervision of scientific research and in the implementation of many other involved and contradictory functions will disappear. As for the springboard for professional discussions, our all-union scientific societies can successfully make it available.

At the same time it is impossible not to note that the specialists enlisted in the evaluation, having performed immense work, in practice did not receive any reward—we do not have such an article in financial legislation. The entire world came to the conclusion long ago that one must not settle questions, which govern success or failure in entire scientific directions, "on a voluntary basis."

In the United States, for example, about 800 specialists participate in the evaluation of the 25,000 applications which on the average are received in a year by national health centers. All of them regard the work in expert groups as very prestigeous: after all, it testifies not only to the great scientific authority of a person, but also to the great confidence in him on the part of colleagues and administrative organs. Here they usually conclude a 4-year contract with the expert. While the pay comes on the average to about $30,000 a year. The total spending on the evaluation of applications in the field of medicine in the United States comes to $25 million a year. There is something to ponder over!

One of the most urgent problems of our academy is personnel. Medical science needs an influx of fresh young forces. Today its management personnel are rapidly aging: the average age of full members of the USSR Academy of Medical Sciences exceeds 67, that of corresponding members exceed 63. Who will carry on for them? In order to decrease the age of the personnel of the academy, a number of scientists proposed not to elect people over 65 as its members. But these proposals did not receive support from the medical community. Apparently, it is not by chance. There are no similar restrictions either at the All-Union Academy of Agricultural Sciences imeni V.I. Lenin or at the USSR Academy of Sciences.

Incidentally, is it worth worrying about the election to the academy, if young people in general are not rushing very much into science? In spite of the fact that from year to year we are reducing the number of places in academic graduate studies and clinical studies, institutes are experiencing difficulties with recruitment. There are practically no competitions. The graduates of higher educational institutions are giving preference to practical medicine. As a result casual people, without aptitudes for scientific work, often get into graduate studies. If the situation is not changed radically, the young scientific associate will soon become here a relic.

We need to establish a qualitatively new system of the selection and training of young personnel for medical science. It should be based on the principles of social justice, be free of protectionism and subjectivism, and guarantee creative growth. We see one of the important steps in this direction in the establishment at the 1st Moscow Medical Institute of a scientific educational faculty. Upperclassmen of medical higher educational institutions will be enrolled in it as a result of competitive selection. Moreover, not only of Moscow medical higher educational institutions. For 2 years they will undergo training on the basis of academic institutes, at which they will not only study, but also perform scientific work.

Indeed, the group of problems, which are checking the development of medical science, is so broad and diverse that one cannot get by here with cosmetic steps. Radical restructuring is needed. Only it is capable of ridding health science of stagnant diseases. While democratization and glasnost should become the best medicines in this matter.

## Medical Research Founders on Responsibility, Authority Issues

*18140151 Moscow IZVESTIYA in Russian*
*12 Jan 89 p 2*

[Letter to IZVESTIYA by Candidate of Medical Sciences V. Pereverzev, associate of the Institute of Chemical Physics of the USSR Academy of Sciences, reply by S. Tutorskaya under the rubric "Science and Restructuring": "A Headquarters of Scientists or a Club of Directors"]

[Text] I ask you to publish my letter, which I would call a cry of the soul. I want to draw attention to the necessity of restructuring medical science and first of all the USSR Academy of Medical Sciences.

This academy was established at the end of the war. Its appearance was due to the understandable aspiration to increase the professional level of medicine. However, such a step led to the ideological and organizational autonomy of medical science from what we call basic science, from the USSR Academy of Sciences. I am convinced that this played a considerable role in the profound crisis phenomena of our health care. And it is a matter not only of the economic weakness of medicine. We will not be able to solve by any financial injections the problem of increasing the quality of medical help, if basic research in the field of medicine remains at the same level as now, if talented people do not develop science. Now the departmental parochialism of medical science and its subordination to the USSR Ministry of Health are playing the role of an obstacle.

It is impossible to shut one's eyes to the fact that the age of physical chemical medicine has come, that computerization is knocking on the door. The correct policy, in our opinion, should be aimed at erasing the boundaries between medicine and the basic sciences. The basis here, of course, lies in the change of the education of physicians and in the return of medicine to the lap of university education—at least during the first years of school.

Changes are also necessary at the highest levels of the medical hierarchy, first of all at the USSR Academy of Medical Sciences itself. One would like to know: How can a new opinion in science make its way in the world, if it is at variance with the convictions of the management of the academy? The exponents of old ideas were never the allies of progress. It is no use, for example, to seek in the Presidium of the USSR Academy of Medical Sciences those whom the problems, in particular, of the automation of cytological research would worry—the group of tasks being worked on here is large: from the diagnosis of cancer and routine analyses of blood cells to means of monitoring the ecological state of the environment. But this means that movement in this direction once again will proceed due to enthusiasts and their path will be covered by no means with roses. The picture is a familiar one.

The path to becoming a member of the USSR Academy of Medical Sciences is difficult and long. And it is no secret that the laurels fall not always to the best representatives of science. The task of rejuvenating the academy is now urgent. But what will the change of power give, if the ideological platform of the managers of medical science remains, in essence, unshakeable? Radical changes are needed. Is the inclusion of the USSR Academy of Medical Sciences in the USSR Academy of Sciences with the rights of one of its departments perhaps advisable? The sense of such a step is certain: more competent scientists will come to management, their role will increase, and the share of public figures of the bureaucracy will decrease. The USSR Ministry of Health will be deprived of a "domestic" academy, but the authority of both the ministry itself and medical science will increase because of this.

[Signed] Candidate of Medical Sciences V. Pereverzev, associate of the Institute of Chemical Physics of the USSR Academy of Sciences

We received the letter of Comrade Pereverzev during the days, when the session of the USSR Academy of Medical Sciences was at work. It was devoted to the state of basic research in medical science and to the drawing up of a new charter of the academy. Much has been said in the press about the fact that in basic research we have fallen far behind the leading foreign countries and that this is a result of the profoundly erroneous policy of the management of the academy. The discussion of the charter was the second item.

It would seem that the charter, and what is more a temporary one, is the internal affair of the academy. But with respect to the first item—what the academy is—the

controversy flared up in the press back before the session. It also continued at the general assembly. The definition of the academy as an assembly of scientists, who have made a prominent contribution to science and health care, Academician of the USSR Academy of Medical Sciences V. Burakovskiy said, is not specific and is not binding in any way. If this is only an association, he asked, then where is the center of the management of medical science?

The academician is raising this question not for the first time. Back in 1986 he published in the press the suggestion to review and change the organization of the management of science. Namely, the USSR Academy of Medical Sciences should undertake the systems management of science—goal planning and special-purpose financing. This evoked the sharp negative reaction of Academician N. Blokhin, at that time the president of the USSR Academy of Medical Sciences, and Academician Secretary D. Sarkisov and the lack of understanding of many colleagues.

Now, having politely listened to the statement, the general assembly adopted the paragraph of the charter in the proposed, nonbinding wording.

Here are the section and appendix on expert councils. Let us say immediately: these councils are a new matter. They are being set up after the pattern of foreign countries and are taking the first steps—some successfully, others not so successfully. How does the charter define their status? It is stated that the expert councils should select the most important, priority jobs for the purpose of their further financing. But who will finance them? It should be understood that the president of the academy will. And further, the allocations for science are approved by the USSR Minister of Health.

Thus, again there is the model of the departmental management of science. Instances are still being established between the decision of the expert councils and the financing of the selected jobs. The matter is being prolonged and is becoming complicated. But the main thing is: Then why is there a special and, one must think, an objective commission of experts?

It is incredible, but it is a fact: they adopted the statute, which placed the councils in the role of auxiliary prompters, after the information which required, it would seem, completely different decisions. Vice President of the USSR Academy of Medical Sciences L. Ilin told about the first experience of the work of the expert councils. In all 26 of them were established in various fields of medical science. They announced a competition of proposals of institutes and individual scientists. For the first time not the academic degree and not the position, but the value of the scientific idea and its novelty were rated according to a five-point system.

The results of the intense work of the experts force one to be worried. Only 10 percent of the research programs, which were sent in for the competition, received the highest rating. This corresponds to other objective evaluations: only 5 percent of the scientific discoveries in the field of medicine are patentable; more than a third of the works are a repetition of what has been done abroad; the introduction of something new in medicine proceeds tens of fold worse than in other sectors. In several expert councils up to 70 percent of all the applications were rejected.

Thus, the low quality of scientific works, their secondary nature, and, why hide it, often the complete irresponsibility of the authors. Under the conditions of the lack of goal planning and genuine control, in case of the financing not of a specific theme and not for a period, but simply according to the position and for ever, the loss of the sense of responsibility among many scientists is inevitable. As was stated at the session, not only for the fate of their own work, but also for the fate of national science.

True, still as a result about 50 percent of the applications, which were discussed by the councils, are completely viable research. In science there are healthy forces which must be supported first of all.

But how is this to be done, first, under the conditions, when in the Presidium of the USSR Academy of Medical Sciences there is no understanding of the fact that everything begins with goal planning? And another thing. Assume that the experts—thanks to them for the work on a voluntary basis, one must also pay for it—distinguished the worthy programs and formulated plans. What next? For the present, Vice President of the USSR Academy of Medical Sciences L. Ilin said, only two councils have the right of financing. Only the council for molecular biology and biotechnology and another council, for AIDS, have been given the right of financing. And this immediately increased their prestige and the authoritativeness of decisions. This right, L. Ilin stressed, must also be given to other councils which are working well. Without this the management of science becomes an illusion, while the work of experts becomes a profanation.

And what of it? Having heard this "cry of the soul" of the vice president, the general assembly voted for the charter, in accordance with which the expert council has purely consultative rights.

There probably also lies here the answer to the question of many participants in the discussion: What is the present USSR Academy of Medical Sciences? In order to be the headquarters of scientific research, it is necessary to have a "combat" arsenal. But what is there without it? The academy, said one of the discussion participants, is an elite club of medical scientists. The club will get together and talk. The expert councils will also talk. While others will give money for science and, consequently, make decisions.

The conscience of the scientist is a concept which, fortunately, has not yet completely disappeared from our life. I fancied this when Academicians G. Sidorenko and A. Vorobyev and Corresponding Member N. Misyuk spoke. Corresponding Member of the USSR Academy of Medical Sciences V. Shapot, a well-known oncologist, fervently defended the independence of the academy. It was he who recalled that we had in the recent past considerable sad experience with a minister managing science. A sense of reality distinguished the report of President of the USSR Academy of Medical Sciences V. Pokrovskiy on the state of medical science. Having noted the sharp decrease of the level of basic research in medicine (which in many respect is a result of the changeover to clinical research), the president spoke about another especially alarming phenomenon. The influx of young people into science has decreased, many places in graduate studies are vacant.

But it would also be a deception to ignore the other statements. For example, those in which the necessity of subordinating the academy to the USSR Minister of Health was fervently demonstrated. Comparatively young champions of such subordination were also found. It is paradoxical that former Minister of Health B. Petrovskiy spoke out against this. The same one whose strong-willed methods of managing science are having a regrettable effect to this day. While the "replacement" advocated subordination to the USSR Ministry of Health. The inertia of the reluctance to assume difficult and exacting duties again found its reflection in this.

Life seethed far more vigorously in the lobby—the election to the academy was being prepared. As before, the principle: scientists elect to the academy a new fellow in their own "narrow" specialty, dominated. It is logical, it would seem. But closer to the end of the election voices began to be heard: comrades, just what is going on! Again real scientists, who had stated a new opinion in science, were not elected. But we are electing chiefs!

The analysis of the scientific activity of all those newly elected to the academy is not a part of the task of these brief notes. Let us repeat the more so: worthy scientists, who are respected by everyone, were also elected. Let us confine ourselves to just one sad example. A. Yefimov, now a Kiev endocrinologist, was elected an academician of medicine. A year ago a group of Leningrad scientists headed by Academician of the USSR Academy of Medical Sciences V. Baranov, a well-known endocrinologist, wrote a letter to President of the USSR Academy of Medical Sciences V. Pokrovskiy. The matter was that in a textbook on endocrinology for practical physicians A. Yefimov had made more than 100 (!) gross mistakes. If physicians follow the textbook literally, they can do harm to patients. The Leningraders never received a response, there was no discussion of the textbook. Is it obviously possible to regard the present election as a response to their serious complaints about the textbook?

The situation, when, to use the expression of one of the discussion participants, more worthy scientists are overboard the academy than in it itself, is not improving—on the contrary, it is intensifying.

The session also answered another question of the scientist B. Pereverzev. He writes: the age of computerization has come, precise methods of measurements are knocking on the door. At the session it was proposed to establish a new department of the academy—a medical equipment department. Academy President V. Pokrovskiy responded to this as follows: we will not open it, because a sufficient number of members will not be recruited for such a department.

At the academy itself they will probably not be recruited. But, if the problem is not solved, they will also not be—for they elect people to the academy in a specific specialty which is already ingrained at it. That is how frivolously they treated the most important requirement of the times.

How do the sharp criticism of the existing situation, the declarations on the necessity of changes, and practice of this kind agree with each other? Or is the criticism for the record, while real life proceeds according to its own laws?

## Marchuk Criticized for Policy on Funding Basic Research

*18140168 Moscow NTR: PROBLEMY I RESHENIYA in Russian No 20, 18 Oct-7 Nov 88 p 6*

[Article by Doctor of Physical Mathematical Sciences G. Norman, chief scientific associate of the Moscow Radio Engineering Institute of the USSR Academy of Sciences, under the rubric "Points of View" (Moscow): "The Scientist Is a Merchant"]

[Text] Today scientists and specialists are debating whether cost accounting is needed in science, particularly academic science. What opinions are being voiced? For example, Candidate of Geographical Sciences S. Govorushko at the round table in LITERATURNAYA GAZETA (see "How Is One to Create While at 'Attention'?", LITERATURNAYA GAZETA, 22 June 1988) was categorical: "The introduction of cost accounting in the system of the USSR Academy of Sciences is sabotage." The problem is so important that they also discussed it at the 19th party conference. The scientific community waited impatiently for the statement of President of the USSR Academy of Sciences G. Marchuk—What will he say on this question? I must admit, his response was not original: "The state budget was, is, and will be the basic source of financing of basic research." And in order to overcoming the lag behind western science, Guriy Ivanovich insisted on the increase of financing.

The president substantiated his idea with the fact that, he said, 10-15 years pass from the obtaining of a basic result to the practical return of science. Who, he said, will finance such long-term projects? Moreover, such a time frame is presented as an objective factor.

That is why, I believe, the hall supported V. Kabaidze with applause, when he expressed disenchantment with the speech of Guriy Ivanovich and said: "I believe that we should also change science over to self-financing, that is enough with feeding off the central budget." But for some reason no one asked the question: Is the established system of work of the USSR Academy of Sciences, perhaps, simply incompatible with cost accounting?

I believe that full cost accounting will solve the problem of not only expensive projects, but also self-financing.

Let us begin with mass science. For an example I will demonstrate what full cost accounting could be like in the field of applied and basic physics, which is close to me. My work experience makes it possible to draw the conclusion that the physical notions and theoretical and experimental approaches, which are required for the solution of various applied problems, to a significant degree are repetitive. But this means that the expenditures on applied developments are governed only by their specific aspect, the cost of which, as a rule, is relatively small. That is, given the proper organization of work it is possible to solve with quite small forces, quickly, inexpensively, and at a high technical level a wide range of practical problems. But such organization of research is within the power of only those who own "shares" of the basic results. What idea does this suggest? Basic and applied research should be conducted jointly—in one collective. And then, having a reserve with respect to basic research, it conducts applied research for specific clients. By means of the derived income the collective not only recovers its expenses, but also invests a portion of the profit in new basic developments, in order to ensure the high level of future applied solutions. As the experience of western science shows, the time of the circulation of capital in such a cycle is quite short.

The work on the bases of quantum mechanics and statistical physics, the search for differences of living and nonliving matter, and others also fits entirely within the framework of the examined structure. Let us recall that the attempts to establish for such research "reservations" of pure science, for example, in the United States (Princeton), in the opinion of R. Feynman, proved to be fruitless.

I would propose to form such scientific collectives on the basis of the scientific school of a prominent scientist. Indeed, a scientific school, as a rule, has a large produced scientific reserve and a potential for further research. Specialists of various narrow fields—both theorists and experimenters—belong to the scientific school, but here there has already been developed among them a broad integral view of the entire spectrum of scientific problems and methods, beginning with the basic laws of nature and ending with the appearance of the latter in various applied problems.

For the assurance of the changeover of science to intensive methods it would be very useful to lift the restrictions on the transfers and migration of scientific personnel, such as the "reinforced concrete" manning tables, the bans on residence registration, and others. The scientific school can be expanded geographically in several oblasts or republics of our country and become international. Let us recall the "golden age" of the development of quantum mechanics and the school of the Dane Nils Bohr.

Difficulties in the changeover of the work of scientific collectives to cost accounting, of course, do exist: they are the same ones that arise in case of attempts at the introduction of a market economy and the lease contract in agriculture and industry.

But how is one to finance basic research of the cognitive level (in astronomy, archeology, and others)? Higher educational institutions could make a significant contribution here, having changed over, of course, to cost accounting. They could use a portion of the assets received from enterprises of the national economy for the training of personnel for them. Taking into account the broad interest of society in the cognitive sciences,

other sources of financing are also possible: assets from the publication of popular scientific literature, motion pictures and television movies, advertising, collective patronage, and others. Abroad mountain climber Meissner, researcher of the underwater world J.-Y. Cousteau, and well-known traveler T. Heyerdahl, about whom television tells us so well, can finance themselves. As we see, mass science is quite capable of feeding itself.

Let us talk now about the financing of expensive research. Let us note at once that not every expensive study is a basic one: thus, flights to planets, the building of unique wind tunnels, and so forth are completely or for the most part applied developments. In the USSR there is the strong tendency to pass off such work as fundamental work, to obtain in secrecy state budget financing, and to use these assets for preparing dissertations and getting elected as corresponding members and academicians. In many cases such research is useless, as, for example, the work on the Central Institute of Economics and Mathematics of the USSR Academy of Sciences and its partners on optimum planning (see NTR, No 13, 1988). I am certain that a client will always be found for the building of wind tunnels and the completion of other unique projects, if they are needed.

The question of making allocations for truly expensive basic research, for example, on elementary particle physics, which is conducted on enormous accelerators, or applied research on thermonuclear power engineering is more complex. But, first, there should not be many expensive projects, their level, as a rule, is national or international. Second, the financing should be discussed in a legislative manner. For example, in the United States in January 1987 President R. Reagan approved the project for a superconducting supercollider (an elementary particle accelerator) with a cost of $4.4 billion. However, this does not mean that such an amount will be specifically appropriated from the U.S. federal budget. It is assumed that a portion of the assets at the initial stage will be received through the Fermi Laboratory and the Stanford Accelerator Center, the budgets of states will also be enlisted. The sources of financing were discussed pointedly at hearings in Congress. And the question for the present has still not only not been settled, but has even been postponed in connection with the discovery of high-temperature superconductivity.

A similar mechanism of financing must also be developed in the USSR. It is possible to attract contributions of the scientific schools which initiate the projects. While it is possible to distribute the state budget only in accordance with the decision of the USSR Supreme Soviet, the supreme soviets of the republics, or local soviets (within their budgets). For the enlistment of the state budget is nothing but the enlistment of the assets of taxpayers. The Soviet people should know on what their money is being spent and should take part in the distribution of assets (through their deputies and the press). And if Soviet taxpayers do not want, say, to pay for a flight to Mars, the flight must be postponed, while the finances must be allocated for more vital needs. It is necessary for science to be under the control of society. The cancellation of the diversion of northern rivers occurred owing to a public movement that emerged spontaneously, but a regular legal mechanism is needed. Thus far Ye. Velikhov, chairman of the Energy Commission of the USSR Supreme Soviet, has been able to cite only one case, when the Supreme Soviet actually succeeded in influencing the budget and redistributing about 500 million rubles between electric power engineering and other sectors.

And a last thing. The mechanism of full cost accounting in science will begin to work efficiently only if specific scientists and directors of projects or scientific schools are financed. They are also accountable for the work. Now money is distributed among ministries and departments, they, in turn, distribute it among main administrations or associations, then among institutes, and, finally, among laboratories. The names of the scientists, who will actually spent it, are not recorded anywhere. This situation is ideal for the flourishing of irresponsibility and is fatal for science.

True, many officials doubt that among the figures of science today it is possible to find a sufficient number of scientists with organizing and commercial abilities. For example, they cite the fact that the experience of the Mikrokhirurgiya glaza Interbranch Scientific Technical Complex of the fine physician and organizer S. Fedorov is not being developed in the union republics: the ministers there merely gesture helplessly—they say, they have no one to organize similar centers, there are no leaders. I believe that they did not find them only because they sought them among the scientists who would fit in well with the administrative command system. In our country there are enough gifted people.

## Gosplan Official On Technology Lag, Funding Problems

*18140149 Moscow IZVESTIYA in Russian*
*6 Feb 89 p 2*

[Interview with V. D. Kazakov, chief specialist, USSR Gosplan Consolidated Scientific and Technical Progress Department, conducted by B. Konovalov, IZVESTIYA scientific commentator: "Science and Measure of Truth"]

[Text] Of late there have been increasing claims that Soviet science is obtaining insufficient funds for its development. It is falling behind, which raises the threat of many serious consequences. The loudest and most concerned among these voices are those of the Academy of Sciences: inadequate funding for basic research. Is this the case? And is this the main difficulty of our science? Let us calmly consider this and listen to the viewpoint not only of scientists but also those who deal with the allocation of state funds. That is why we turned to V. D. Kazakov, chief specialist, USSR Gosplan Consolidated Scientific and Technical Progress Department.

IZVESTIYA: Valentin Dmitriyevich, can you make a comparison between the funds invested in Soviet and American science and the number of scientists in the two countries?

**V. D. Kazakov:** In 1987 overall expenditures on science in the United States reached a figure which is, in our terms, fantastic: $123 billion. Our expenditures did not exceed 33 billion rubles. Obviously, we are spending less on science. But how can we compare dollars with rubles? The conversion of dollars into rubles is quite complex. The USSR State Statistical Committee has developed a special method with which to compare Soviet with American expenditures on science, which takes into consideration the relatively lower pay of scientists in the USSR as well as other factors. According to that method, roughly speaking, the amount of work done in our country for 33 billion rubles is equivalent to what the United States would spend in excess of $70 billion. Consequently, research and experimental design work accomplished in our country is approximately one-half the U.S. volume.

The reverse situation prevails in terms of the number of scientists. According to the USSR State Statistical Committee, in 1987 there were 1,518,000 Soviet scientists and engineers engaged in scientific research and experimental design (excluding those who combine jobs). The widespread American practice is to recruit people for scientific work on a contractual basis, for which reason they estimate the number of scientific workers in terms of "fully employed." The U.S. National Science Foundation assesses the number of American scientists and engineers engaged in science in terms of "full employment" as not exceeding 525,000 people, or nearly half the number in the USSR.

Therefore, according to rough estimates, on an average the efficiency of a Soviet scientist is one-quarter that of an American one.

There are objective reasons for this situation. The availability of instruments, equipment and computers (modern in particular) to Soviet scientists is several hundred percent below that of the American. Furthermore, no comparison is possible between Soviet and American wages. As a whole, however, the low efficiency is largely the consequence of the poor organization of scientific research and the absence of a system of economic incentives for efficient work.

IZVESTIYA: What is the overall condition of our science compared to the developed capitalist countries?

**V. D. Kazakov:** We must point out that the United States is spending on its science approximately as much as the rest of the capitalist world put together. Western Europe and Japan are much more economical, although scientific and technical standards there are frequently not lower and, may even be higher than in the United States. Naturally, it would make sense to compare our own funds with their economically invested funds and not with those of the United States. Unfortunately, in this case as well the comparison is not in our favor. We spend more on science than all Western European countries combined, and 50 percent more than does Japan. It could be said that we should take into consideration the scale of the economy. Let us consider what portion of the national income we spend on science. According to Western estimates, the share of science in the gross national product is 3.7 percent in our country, compared with 2.7 percent in Japan and 2.2 percent in Great Britain. In this respect we have even outstripped the United States, with its 2.7 percent.

Consequently, we are appropriating for science the highest percentage of the product of our entire society. Nonetheless, our science is lagging. In 1986 scientific consultants for the authoritative American journal FORTUNE provided an expert evaluation of the level of work done in the United States, Japan, Western Europe and the United States in the areas of computers, biotechnology, new materials and optical electronics (based on a 10-point rating system). The respective indicators were as follows: computers: 9.9, 7.3, 4.4 and 1.5; biotechnology: 8.9, 5.7, 4.9 and 1.3; new materials: 7.7, 6.3, 8.0 and 3.8; optical electronics: 9.5, 7.8, 5.7 and 3.6. Naturally, we should not trust excessively the American specialists, for they may not know absolutely everything. It is clear, however, that in these leading areas of scientific research the USSR is behind not only the United States but also Japan and Western Europe.

An indirect confirmation of this is the number of Nobel Prizes awarded. Of 380 Nobel Prizes awarded in physics, chemistry and medicine until 1987, 143 went to American scientists, 68 to British and only 10 to Russian and Soviet.

The American Science Information Institute claims that more than one- third of scientific and technical publications in the fields of medicine, biology, chemistry, physics, mathematics, natural studies and space, published in the world, are authored by American scientists. A comparison between the frequency with which Soviet and American scientists are quoted also indicates that we are several hundred percent behind the latter.

IZVESTIYA: USSR Academy of Sciences specialists believe that the situation in basic research is particularly alarming. This threatens to widen the gap. G.I. Marchuk, USSR Academy of Sciences president, stated at the 19th Party Conference that in the United States expenditures for basic research amounts to $15 billion annually, compared with 2 billion rubles in our country.

**V. D. Kazakov:** With all due respect to Academician G.I. Marchuk, I must correct him: 2 billion is the budget of the USSR Academy of Sciences and not the amount spent on basic research. The most expensive (and many other) studies, such as space and high energy physics, are essentially funded not out of the budget of the Academy

of Sciences. For example, the "Energiya-Vuran" Project or the construction of the largest charged particles accelerator in Protvino cost several billion rubles. These projects are for basic research. One would hardly dispute such figures. Unfortunately, Academician G.I. Marchuk assumes a purely departmental position by classifying as basic research only the one conducted within the system of the Academy of Sciences.

In the United States exploratory work is considered basic research. In our country such work is done in the sectorial sciences as well, including the defense departments, universities, the All-Union Agricultural Academy and the Academy of Medical Sciences. American basic science includes research conducted by NASA, the Department of Defense, the Department of Agriculture and Health and Human Services. Incidentally, 41 percent ($3.7 billion) of all U.S. federal budget appropriations for basic research is in the field of medicine. If we were to invest all of our expenditures on basic research in the individual sectors, corresponding to the American, the result would be about 5 billion rubles. Naturally, this is less than the Americans spent but the overall expenditures for science in our country and in the United States are different. The share of expenditures on basic research in the overall scientific expenditures amounts to 12.2 percent in the United States compared to 16 percent in our country. Therefore, it is not basic research that destroys the balance in the development of our science and technology.

Let us note another aspect of the matter. According to their National Science Foundation, in 1987 Americans spent $14,550,000,000 on basic science. State funds, contributed by the federal budget, were significantly lesser: $9.67 billion. The balance is what is known in our country as "economic contract" funds which come not from the state budget but from private industrial corporations, universities and various foundations.

IZVESTIYA: Our society is more concerned with something else: "Will the horse be fed?" Will research outlays, even if we increase them, be justified? The biggest telescope in the world was built for astronomers but the country did not obtain any outstanding results. As a whole, "returns" from our science are quite small. Obviously, before raising the question of drastically increasing appropriations, there should be perestroyka in science.

**V. D. Kazakov:** That is absolutely accurate. The United States is not investing such huge sums in science for no purpose. Although no precise assessment has been made of the economic effect of expenditures on science, everything seems to indicate that returns on such expenditures are high. The situation in our country is different. This is indirectly confirmed by USSR State Statistical Committee data, according to which the annual economic results of the installation of new equipment in industry in the USSR are no more than slightly over 6 billion rubles. Let us remember that expenditures on science total 33 billion rubles. It is quite doubtful that Americans would tolerate a science which would not justify outlays.

We must point out that in terms of our concept, the United States does not have an Academy of Sciences. In that country it is not a powerful system of institutes, additional payments for titles, and so on, but simply a voluntary organization which does not have a single institute or laboratory and not even a budget. There is a National Scientific Foundation, which is a governmental organization somewhat similar to our USSR State Committee for Science and Technology, as well as several federal laboratories subsidized by the federal budget. The funds invested in basic research come essentially from universities, colleges and private industrial companies. The Americans believe that what makes the most sense is to direct basic research toward specific tasks facing industry, the participation in such research of universities, and undergraduate and graduate student involvement in scientific work.

Clearly, the present state of affairs prevailing in Soviet science is unacceptable to our society. Everyone clearly realizes that the independent existence of academic, sectorial and VUZ science and the very complex system of managing their development, and their alienation from production requirements are unjustified. Science needs a radical perestroyka. I believe that the ways of such perestroyka deserve extensive debate. It is not a matter of a simple conversion to cost accounting, for the diseases from which our science is suffering are much more serious and deeper.

As to rivalry with the West, everything is extremely clear: we must compete against the developed capitalist countries above all not in terms of expenditures for science but the efficiency with which the appropriated funds are used.

## Improvements in Financing Biotechnology Research

*18140125a Moscow IZVESTIYA in Russian 17 Jan 89 p 2*

[Report by S. Tutorskaya under the rubric "Program 'Experience'": "Money for Science"; first paragraph is source introduction]

[Text] How can we increase the return of our science and eliminate its lag behind the world level? First of all, this would require selecting from everything that scientists are engaged in —that which is most important for the development of science, for practical needs, and for society. And then to fairly and without bias to choose the best—not on the basis of ranks or labels but on the basis of real value. In other words, society's money should not go into the maintenance of scientific institutions but into financing good science. The need of purposeful planning, competition and examination of ideas prior to beginning financing of scientific work urgently knocks at the door.

This is how scientists work in most of the world's developed countries. IZVESTIYA wrote about this (No 315, 1987). And now one of the first expert councils is no longer a wish but a reality. Specialization in molecular biology and biotechnology. Today we shall talk about the work experience of this council.

First a list was published in MEDITSINSKAYA GAZETA of very important scientific themes and problems whose solution is urgently needed for the progress of science and is vitally important for society. It was proposed to scientists to send applications—concrete proposals and to take part in this work.

Very many applications were received. Four months of intense work by the experts were required to examine all this thoroughly and to select the most interesting.

At today's meeting the question is raised among others: should the director of one of the institutes be allotted foreign exchange for payment of apparatus? It turns out that this apparatus was received earlier as an "advance" and obviously has no connection with the fulfillment of the resolution on biotechnology. Following a discussion, a decision is made: to decline the request for foreign exchange. Such a turn of affairs is obviously to no one's liking. But all the members of the council are gradually inclining toward this direction: let us save foreign exchange for use where it is directly specified.

During a break I chat with members of the council. Its chairman Vice President of the USSR Academy of Medical Sciences A. Chuchalin states:

"The main thing in my opinion is that a viable and competent organ has been created that includes leading scientists from institutes of the USSR Acadaemy of Medical Sciences, the USSR Ministry of Health, the USSR Ministry of Medical and Microbiological Industry and the USSR Academy of Sciences.

"The council has formulated priority fields of research. An open competition for proposals was announced. Scientists very actively participated in it. And after careful selection, it was determined by secret voting for the first time in the history of medical science in our country what additional financing would be needed in each concrete case. Very pointed discussions took place, and it was necessary to return several times to some questions. We are happy that it was possible to create an atmosphere of principle, good will and open discussion of all acute factors."

A. Kondrusev, deputy minister of USSR Health and member of the expert council, joined the discussion:

"Problems of biotechnology were recently quite keenly discussed at the collegium of the USSR Ministry of Health. At that time two important decisions in my opinion were adopted. The first: to create biotechnology centers at three existing institutes. The second: to abolish the practice that has existed for many years of adopting decisions on financing of institutes in premises of the ministry. To introduce in its place obligatory preliminary examination of all proposals in the field of medical biotechnology.

"We are told that we made a decision limiting and putting into a certain framework the ministry's financial activity, which means our own as well. We are for this because it is for the good of the matter.

"Working in examination of plans, we found that long-range concrete programs do not justify themselves in biotechnology. If we were to describe the tasks in detail it would be found that they become obsolete in 2 years—so precipitously does the development of science proceed.

"The expert council has formulated a number of most important directions of research. They include the creation of new diagnostica, the production of medical preparations against the most severe viral diseases, for example, hepatitis, the creation of synthetic vaccines and other important developments.

"The scientists who got through the competition were allotted foreign exchange. Provision was also made to open new biotechnology laboratories and to bolster them in such scientific centers of the country as Minsk, Novosibirsk, Frunze and others.

"Now on the incorporation of what was accomplished by Soviet scientists that was valuable despite the general lag.

"People are not waiting for reports on 'particular achievements' but for the new medicines, diagnostica and vaccines that are needed. Their mass production is required. This means that we need to create modern production capacities. And it is time to replace the present unduly centralized mechanism of placing new items into production with the creation of a faster, more effective and decentalized one. This work should be done together with the USSR Ministry of Medical and Microbiological Industry."

**The Nature of Experience and Its Effect.**

For the first time the question has been raised whether an institute or laboratory is operating at a modern level. Is there adequate provision of personnel and equipment for it to solve an assigned problem and to put it up for open democratic discussion by experienced experts? It is no secret that equipment and allocations are often not received by those who can best solve a problem but by those who have the highest go-getting abilities. The new procedure of expert examination and selection makes it possible to properly expend money on science, including

foreign exchange, which formerly was spent uncontrolled. The creation of new biotechnology centers naturally brings up new important problems. For example, accelerated training of cadres of scientists and laboratory workers.

**Incorporation**

How are things proceeding at the experimental enterprise that was recently opened at the All-Union Cardiologcial Center? This enterprise has to put out complex diagnostica, laboratory reagents and other products needed for science and medical products.

"Now a favorable situation has developed at the VKNTs [All-Union Cardiological Scientific Center (?)]," V. Smirnov, correspondent member of the USSR Academy, states, "for a rapid transition from scientific developments in the laboratory to the production of experimental batches of preparations. These batches are intended for experimental and clinical testing. It has already been reported that our enterprise will produce modern selections for specific blood groups and an experimental batch of diagnostica for SPID [expansion not available]. Together with scientists of the Institute of Organic Synthesis of the Latvian Academy of Sciences and Leningrad University, the experimental All-Union Cardiological Scientific Center will began production of yeast recombinant interkleykin-2, a potential antitumor preparation. There are also other new items: the peptide preparation dalergin and others.

"Initially, when the production of the new preparation is getting underway, the participation of its authors and their work at the enterprise will be vitally important. Our specialists bear this burden without complaint. It is more difficult for them to write mountains of paper that will be of no use to any one. The time spent in filling out and drawing them up is no less then on the development of medicine. It is time to do away with unnecessary writing.

"I want to stress that when we became cost accounting, our enterprise did not take the route of putting out expensive products. We went at it differently. Our entire assortment was examined by the expert council. USSR Deputy Minister A. Kondrusev especially saw to it that the requirements of practical medicine were taken into account. And now the USSR Academy of Medical Sciences finances our enterprises strictly in accordance with the decision of the expert council. And this is fair.

"But alas petty guardianship remains. The directors of the institute, for example, cannot buy any equipment needed for production for an amount that is in excess of 100 rubles without the agreement of the USSR Academy of Medical Sciences.

"We shall try to enter the international market.

"This is not a simple matter. If you wish to sell a preparation, it is necessary to spend money first and foremost on the repetition of clinical tests in the country where it is to be sold. This money, and it is quite sizable, involves tens of millions of dollars. Here it is as yet difficult for us to compete with the pharmaceutical giants of Switzerland, the United States, the Federal Republic of Germany and others. That is why we often restrict ourselves to getting a patent, putting out medicines for the domestic market or selling a license.

"However, we are making attempts to introduce ourselves into the international biotechnological market. Biokard, a foreign-trade firm, has been created. Soon a catalog of products will make its appearance which we will be able to propose for export—basically diagnostica and laboratory reagents. Talks are proceeding on the creation of a mixed enterprise involving foreign firms at our plant. In other words, we shall assume a 'place in the sun' on a level that is not only scientific but also commercial."

**Concluding Remarks on the Experiment Thus, a successful attempt is being made to change the very principles of operating science and to introduce into the work of scientists a spirit of competitiveness, enterprise and honesty. Appearing at one of the meetings of the expert council, Academician Ye. Chazov said that these are the first real steps toward restructuring of operation of science. He also noted that quite a few expert councils have been created for today. But, unfortunately, in some the spirit of mutual concessions and laxness prevails. They are experts only on paper.**

As for the council that we have discussed, its work, Academician Ye. Chazov pointed out, is proceeding along its necessary course. The products of biotechnology are so needed by sick people and they are so looked forward to by medical personnel. Right now the chief thing is not to break pace.

## Medical Research Retarded by Poor Leadership

*18140152a Moscow IZVESTIYA in Russian*
*14 Dec 88 p 3*

[Letter to IZVESTIYA by Doctor of Medical Sciences Professor V. Bukov under the rubric "Science and Restructuring" (Moscow): "Why We Have Fallen Behind"; first two paragraphs are IZVESTIYA introduction]

[Text] The regular session of the General Assembly of the USSR Academy of Medical Sciences has opened in Moscow. During these days physicians are working in Armenia round the clock, without rest, saving those whom it is still possible to save. The people appreciate the heroism and dedication of medical personnel, which have fully manifested themselves during this difficult time.

But how effective the efforts of rank and file workers of mercy will be henceforth, depends on whether a real improvement of medical science will occur and whether the discoveries of scientists will have a timely appearance in practice. Today we are publishing two letters on these themes.

I want to share with the readers some thoughts on our Academy of Medical Sciences. Why has this academy, which was established after the war in order to substantially advance medical science, for the most part not coped with its task?

Why is the sick rate increasing? Why, parents ask, can our child become an invalid for his entire life, but we do not know how to protect him? What is one to do so that he would not get bronchial asthma and diabetes? How are we to protect ourselves against sudden death (the stopping of the heart in case of "full health") and from cancer? And for what is medical science needed, if not to give clear and correct answers?

A knowledge of something fundamentally new about the origin and development of a disease is possible in an experiment. The history of domestic and foreign medicine is confirmation of this. The experimental, physiological direction originated in our country back during the last century. I. Pavlov, I. Sechenev, S. Botkin, N. Vvedenskiy, A. Speranskiy, and others were its "prophets." Back at the beginning of the century in tsarist Russia three major institutes of experimental medicine were built—in Petrograd, Saratov, and Odessa. Only the institute in Leningrad has been preserved to this day and is operating successfully under Academician N. Bekhterova. Domestic experimental science has many services to practical medicine. And during the difficult prewar years the country found the opportunity to establish another two institutes of experimental medicine—in Moscow and in Kiev. The prominent scientists A. Speranskiy and A. Bogomolets were in charge of them. But after the war they transformed the Moscow institute into a small institution of the second category, while they reoriented the Kiev institute.

In the early 1960's B. Petrovskiy, a well-known surgeon who did not have experience in the organization of health care and the management of science, became minister of health. Under him the mass curtailment of experimental research was begun. They began to build clinical scientific research institutes and scientific centers, mainly of the surgical type. If it had been a question of establishing centers for such prominent medical scientists as A. Vishnevskiy, A. Bakulev, A. Myasnikov.

However, there were no genuine scientific leaders similar to them. While the new established clinical scientific research institutes and centers were essentially hospitals of an improved type. In all 250 such institutes were established. They engaged mainly in therapeutic work. Numerous associates described the results. For the most part the publications and monographs were not of serious importance. However, it was necessary to report on the results—considerable money (including currency) was spent on the establishment and equipment of the scientific research institutes. Hence, too, the exaggerated evaluations of the results. Under the conditions of isolation from world science it is easy to pass off what is desirable as what is real.

In our country there were as many holders of high academic titles and degrees as in several developed countries taken together. The authors of works "became respectable"; later election as a corresponding member, and then as a full member of the USSR Academy of Medical Sciences followed for many. And this is not only esteem, but also material benefits. And to tell the truth, it is time to abolish these supplementary payments.

Inasmuch as the demands on the scientific level gradually decreased, other qualities began to appear in first place. The public post, the position, and being well received in "high" offices became in a number of cases more important than the actual contribution to science. Formally the statute on the academy required such a contribution. But if a rule prevented the achievement of a goal, they simply ignored it. They began to admit to the academy directors of institutes, chief specialists of ministries, directors of publishing houses and editors in chief, and heads of chairs, primarily surgical chairs. Of course, they also admitted during those years (more often with much delay) genuine enthusiasts and workers of science. But their share at the academy, alas, is not great, their influence is also not great. This made itself fully felt when the academicians did not elect to the USSR Academy of Medical Sciences the prominent traumatologist G. Ilizarov.

Now, when the experimental direction in medicine has been thoroughly driven into the corner, which you would not call an accident (let us recall if only the public statement of former President of the USSR Academy of

Medical Sciences Academician N. Blokhin that experimental research is not needed for the solution of the most urgent problems of medicine), now it has "suddenly" turned out that of the present clinical institutes not less than 100 (and in reality far more!) must be closed. Minister of Health Academician Ye. Chazov declared this.

It is possible to recall how N. Blokhin closed the pathophysiological laboratories at many oncological institutes. Or how Minister B. Petrovskiy under the threat of punishments prohibited medical scientists to experiment on animals without anesthesia. This, he said, is inhumane. But inasmuch as a model of a disease is still being created in the animal, while in any disease the role of the central nervous system is large, it is impossible to reproduce a disease, having "switched off" in so doing the brain. I dare assert: Academician B. Petrovskiy and the management of the USSR Academy of Medical Sciences did considerable harm to experimental medicine and health care.

Academician of the USSR Academy of Medical Sciences M. Krasnov wrote to IZVESTIYA about the large gaps in the area of basic, experimental research in medicine.

Let us imagine for a minute that as many beds as needed have been put into use and all of them should be properly equipped. That we have mastered advanced methods of transplanting organs. That some progress will be achieved in the treatment of a number of diseases and the necessary number of diagnostic centers will appear.

In the absence of leading, intensive experimental scientific research the situation will be reminiscent of the situation, when water gushes into a basement from a damaged pipe, while we increase the capacity of the pump, instead of attempting to cut off or if only reduce the flow. For the sick rate is not decreasing, but is increasing.

And another thing: megalomania. The suggestion to predict tumor diseases by means of a comparatively simple study of the blood, which is astonishingly important for medicine, came not from "great" scientific centers, but from the modest, poorly equipped laboratory of immunology of the Central Scientific Research Institute of Traumatology and Orthopedics. It is possible that this is only an approach to the solution of the problem. But it reminds us: discoveries are made not by walls, but by talented people, for whom a place is often not found at large centers.

A turn toward works, which will make revolutionary changes in medicine, is necessary. For this one must create normal working conditions for talented collectives. On the basis of an independent and accurate expert evaluation, about the role of which IZVESTIYA has already written, it is necessary to establish even if small experimental institutes and laboratories, but with direct special-purpose financing for the accomplishment of the posed urgent task. With a report on the performed work and, depending on the results, the continuation or halt of financing.

But where is one to get people? One could, for example, take from the 200 existing chairs of normal and pathological physiology the viable ones, which have valuable scientific ideas. Young scientists and students will group around the best collectives.

The method of concentrating intellectual forces and equipment on the most important directions of science has been known for a long time. The most daring tasks, when the very fate of the state depended on this, have been accomplished by means of it. While a "breakthrough" in medical science is necessary now as never before.

## New Leadership Needed in Academy of Medical Sciences

*18140152b Moscow IZVESTIYA in Russian*
*14 Dec 88 p 3*

[Letter to IZVESTIYA by Corresponding Member of the USSR Academy of Medical Sciences N. Misyuk under the rubric "Science and Restructuring" (Minsk): "Make Way for Gifted People"]

[Text] We medical personnel are conservative people and treat all innovations extremely cautiously. The principle "do not harm!" is one of the dominant ones for us. It makes it incumbent to carefully test for years the latest methods of diagnosis and treatment of patients.

However, it is impossible to explain our miscalculations and failures in science (and they, of course, do exist) by traditional conservatism alone.

We do not have a unified management of medical science. Some scientific institutions are under the jurisdiction of the USSR Ministry of Health, others are under the jurisdiction of the USSR Academy of Sciences, still others are under the jurisdiction of republic ministries. While no one at all manages many scientific collectives of higher educational institutions.

It has now been decided to close a number of unproductive scientific research institutes. But, when merging small institutes, one must remember: the effectiveness of activity to a significant extent depends not so much on the size of the scientific collective as on the person who is in charge of it.

Life shows that large scientific research institutes, which have been supplied well with modern equipment and are in a privileged position, at times also prove to be unproductive. Thus, the Institute of Preventive Cardiology, which was a part of the All-Union Cardiological Scientific Center of the USSR Academy of Medical Sciences, during the time of its existence was not able to

suggest anything substantial for the prevention of acute myocardial infarctions. Now this institute has been removed from the All-Union Cardiological Scientific Center of the USSR Academy of Medical Sciences and, having united it with two others, the USSR Ministry of Health established the All-Union Center of Preventive Treatment, as the head of which it again appointed R. Oganov, director of the indicated institute.

Henceforth the center headed by him, in his words, will deal with the promotion of a healthy way of life and the combating of smoking. Of course, it is necessary to deal with this, but three institutes should hardly be combined for this.

The efficiency of small collectives and scientific research groups at times surpasses markedly the "yield" of large scientific research institutes. But the equipment of these groups, the spending on science, and the staff are far smaller than those of scientific research institutes.

The USSR Academy of Medical Sciences should manage medical science, this is indisputable. And more precisely, its presidium should. But precisely this, management, is exactly what does not exist. The present staff of the presidium is not coping with the duties assigned to it.

I have already written in IZVESTIYA that many head institutes are not performing their role. I believe that in such cases the institute can aspire only to the role of a coordinator of work.

Monopolism, which thus far has not been eliminated, is intolerable in medical science. The impression is being created that the USSR Ministry of Health is continuing to foster it. How else is one to comprehend that, for example, N. Vereshchagin, director of the Institute of Neurology of the USSR Academy of Medical Sciences, simultaneously holds about 15 key positions (director of a scientific research institute, chairman of a problem council, deputy chairman of a special scientific council and, at the same time, a member of an expert council of the Higher Certification Commission, chief specialist of the USSR Ministry of Health, first deputy academician secretary of the Clinical Medicine Department of the USSR Academy of Medical Sciences, chairman of the All-Union Scientific Society of Neuropathologists, and so forth). I. Antonov, director of the Belorussian Institute of Neurology, Neurosurgery, and Physiotherapy, also has no fewer positions. When do they have time to manage their own scientific research institutes?

The USSR Academy of Medical Sciences so far has not fulfilled several decrees of directive organs. Thus, in 1986 a decree on the stepping up of the development of applied mathematics and electronic computer technology and on their introduction in all spheres of scientific activity and the national economy was adopted. The USSR Academy of Medical Sciences made the decision to introduce all this in medical science as well. Unfortunately, this was not accomplished.

In recent years there have turned out to be among the members of the USSR Academy of Medical Sciences many people, who are less worthy of being in its ranks than those who were rejected in the election. Such a situation arose not without the participation of the USSR Ministry of Health, party organs, and the Presidium of the USSR Academy of Medical Sciences, which Academician N. Blokhin headed. The following "games" also happen. For example, two directors of head institutes make arrangements to "nominate" each other. One recommends his colleague as a full member of the academy, although his scientific output is significantly more modest than that of the competitors. While the other as a sign of gratitude nominates his benefactor for a lofty title. True, in the case about which I am speaking the optimistic plans were not fated to come true. But there are many examples of how such a conspiracy succeeds! At the USSR Academy of Medical Sciences genuine adherence to principle should be revived. The principle "you for me, I for you" should be eliminated at the USSR Academy of Medical Sciences.

It is necessary to put a resolute stop to misinformation in science, deception, and attempts to ascribe to oneself successes which belong to others. Well, how, for example, is it possible to assert that we carefully developed the methodology of computer tomography in case of brain tumors and disorders of brain blood circulation, when this was done before us abroad?

It is necessary to strictly limit the tenure of scientists in elected positions at the academy. This first of all applies to the president, the members of the presidium, and the academician secretaries, who, in our opinion, should be elected not more than twice and without any exceptions more times. Time has shown that longer tenure in these posts does not benefit science. Up to now several members of the presidium have been on it for nearly 20 years.

One should hardly agree with the regulation which envisages the mandatory presence on the presidium of representatives of the Ukraine and Belorussia. For the USSR Academy of Medical Sciences is not the United Nations and not the Council of Nationalities. Moreover, do scientists of the other republics really not have the right to this? Why, for example, cannot the representative of Lithuania, Academician of the USSR Academy of Medical Sciences Yu. Bredikis—the only representative of medical electronics at the academy—be a member of the presidium? His presence there would surely attract more attention of the management of the academy to the study of the possibility of establishing a medical equipment department.

The lack of glasnost is a great flaw in the activity of the Presidium of the USSR Academy of Medical Sciences. The members of the academy know hardly anything about the meetings of the presidium (what questions are discussed there, what decisions are made). The fact that

the members of the presidium say hardly anything about this is also distressing. Thus, V. Votyakov, the representative of Belorussia, has never informed us about the work of the presidium.

It would be possible to continue the list of potentialities of the restructuring of medical science for the purpose of increasing its effectiveness. We need it, and the more quickly we accomplish it, the more successful we will be in the development of medicine and health care. Especially as the changeover to self-financing and self-support [samookupayemost] lies ahead.

## Establishment of Scientific Instrument Centers

*18140115 Novosibirsk EKO: EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 12, 1988 pp 145-150*

[Article by V.F. Veyngardt, candidate of physical and mathematical sciences, TsNII [All-Union Scientific Research Institute], USSR Ministry of Non-Ferrous Metallurgy, and G.A. Untura, candidate of economic sciences, USSR Academy of Sciences Siberian Department Institute of Economics and Organization of Industrial Production, Novosibirsk: "Scientific Instrument Centers"]

[Text] Researchers know that an experiment's hardware often determines the success of scientific work. Indeed, the level of research being carried out in the country on the whole and the novelty of the obtained results are closely related to the science's technical base, to the structure and condition of the active part of its resources. Meanwhile, according to estimates by specialists, today science's need for research instruments is being met by only 35 percent on the average.[1]

The poor equipment of research laboratories is having a particularly negative effect on sectorial science, which has been guided for many years by the principle "maximum effect with minimum funds invested in science." Following this principle, at the pleasure of the current requirements of industry, the leaders of many sectors have maintained the experimental base of science on starvation rations. Today, the capital equipment of domestic sectorial scientific research institutes has turned out to be somewhat less, than that of research subdivisions of companies of the industrially development countries.

The development rates for domestic instrument building have declined by a factor of 2 from 1971 to 1985.[2] In terms of individual types of production, the situation has become so complicated that scientific organizations have been forced to begin manufacturing certain types of instruments independently, in single copies. The cost price of such home-made items exceeds the value of those produced in series many times over. A deceptive picture was created: according to the bookkeeping balances, a large amount of funds are being spent to develop a technical base for research, yet in fact they are going into a forced independence, into hole-patching due to the shortage of instruments.

The sharp scarcity of technical facilities for all NIOKR [scientific research and experimental design work] and the lag it causes behind industrially developed countries in a number of fields of science and technology are hard to overcome only by increasing the output of instruments. This extensive path requires significant capital investments in the development of instrument building, but does not guarantee a rapid yield. After all, the scientific workers' existing arsenal of facilities consists of instruments, often incomplete sets, which are frequently obsolete. Yet, everyone knows that the speed of traffic is determined by the speed of the slowest automobile!

An organizational maneuver, the conversion to the new, progressive research "technology" is needed. Its essence lies in the collective use of unique instruments and complexes of inter-connected highly productive instrument facilities. Such technology makes it possible to sharply increase the technical level of NIOKR and reduces the cost of the laboratory stage of work, due to the efficient use of equipment.

Often, even the largest scientific research institutes are in no condition to ensure the efficient use of their available equipment, the technical possibilities of which, measured in terms of improvement, are increasing rapidly. The use of individual instruments impoverishes the scientific information "extracted" using them, since it does not make it possible to obtain exhaustive results by using methods that complement each other. The use of systems of interconnected equipment, instead of incomplete sets of instruments, combining them with a computer, provides a qualitative leap in the development of the technical base of science, caused by the "cooperative" effect, which significantly exceeds the sum of the effects from independently used instrument facilities. This explains the need to convert science's experimental base to collective forms of equipment use, which make it possible to compensate to some extent for the shortage of equipment and for disproportion in the development of domestic scientific instrument building.

The concept of the collective use of scientific equipment began being implemented in our country in the early 1970's. Bases for renting instruments for NIOKR were created in large cities, making it possible to save over 10 million rubles annually. However, throughout the country on the whole the share of the stock of instruments used through a rental system is insignificant.

Relatively small and easily used instruments are rented out. This form of collective use is unsuitable for "heavy," stationary installations or systems and for complicated instruments, and as applied to this, it is a matter of renting computer (instrument) time for carrying out analyses and measurements, performed by the owners of the instrument facilities on orders from

detached organizations. In trying to compensate for expenses for using expensive and scarce equipment, some research organizations are forced to take this path.[3] In creating service laboratories, also known as collective use centers, they partially compensate for their own expenses at the expense of the detached organizations, while preserving the primacy of their own interests in using the instrument facilities.

Naturally, renting instrument time is not the basic activity for an academic or sectorial institute. Residual human and material resources are allocated for these purposes, which cannot help but affect the quality of service for detached users. It must also be taken into account that the list of services offered is rigidly limited by the possibilities of a specific scientific research institute's instrument inventory. The cost of service for users in such institutes is higher, than it would be in organizations which specialize in the collective use of modern complexes of instrument facilities and in performing different analyses and measurements on order using complex, mutually complementary methods.

The sectorial collective use centers, which are appearing without coordination and spontaneously on the basis of the institutions of different departments, are underpowered and therefore incapable of creating conditions for the mass involvement of potential users. Departmental barriers remain the main obstacle in this area. Success in developing collective forms of use, in our opinion, can only be achieved having created a network of specialized organizations on an inter-departmental basis and unified organizational principles.

In the developed capitalist countries, "scientific parks" or scientific instrument centers (NPTs) became a similar form for organizing scientific work. They comprise the basis of a state system for the collective use of complex scientific equipment and act as their own sort of "nationwide resource" in financial support of the state. The saturation of the centers with modern multi-purpose equipment for performing a whole cycle of physical and chemical research determines the success of the centers' activity, their universality and the high quality of scientific research and experimental design work.

According to data from the U.S. National Scientific Fund, in studies on computer hardware 81 percent of instruments in 1985 were in collective use. A similar form for the use of scientific equipment is extensively practiced by universities and industrial companies in the U.S. This is particularly marked in the use of expensive equipment. In U.S. universities in 1983, 41 percent of instruments costing over $10,000 and 60 percent of those costing over $75,000 were involved in different forms of collective use. The tendency continues to gather strength—in 1987, the Department of Energy allocated about 60 million dollars just for the maintenance of seven collective use centers. These data attest to the fact that, despite a capitalist market saturated with scientific instruments, scientific instrument centers are being effectively used to produce scientific knowledge. Even greater prospects for developing scientific instrument center networks exist under the conditions of socialism, for which collective forms of operation are inherent.

The creation of a state inter-departmental NPTs network in the USSR will be of unquestionable benefit for the country's economy. By our estimates, the expense of creating a single regional center (constructing production premises and housing for employees, acquiring sets of instruments), estimated at approximately 25 million rubles, should be repaid in 2-3 years. The high profitability of collective use centers is stipulated by the sharp, 10-fold reduction in expenses for producing a single measurement (analysis). After all, the coefficient of use for instruments in a collective use center, assuming a 2-shift work mode, reaches 0.6-0.7, when usually it does not exceed 0.1. Raising the quality of scientific research and experimental design work due to using new experimental facilities, previously inaccessible to researchers, also yields a great effect. It should be taken into account that in reducing the cost of analyses and measurements, the circle of potential users of modern scientific equipment expands sharply.

The human factor also affects the profitability of research: the skilled specialists of a collective use center will directly participate in the research itself, which saves on the costs to users for maintaining their own staff of (narrow) specialists, whose work in a different type of scientific research institute is often simply ineffective.

Creating a state collective use center network lies along the track of the changes in the structure of domestic science. Today, an MNTK system is being created, the employees of higher schools and plant specialists are becoming ever more broadly involved in solving scientific and technical problems, and the role of small research groups and temporary creative collectives, operating within the frameworks of NTTM, NTO, and scientific and introduction cooperatives, is growing. The creation of a NPTs network will be of inestimable aid to all of these collectives. However, small research collectives, for whom access to modern scientific instruments and computers used on a collective basis is the only possible way to conduct NIOKR at a high level, are particularly in need of NPTs services.

The development of collective forms of scientific equipment can reduce the psychological damage, inevitable given the monopoly of "elite" institutes over high-quality technical facilities, by creating more equitable conditions for the work of a significant share of scientific employees. The creation of NPTs will have a positive effect on communication among scientists within the framework of "users' associations," and on the exchange of scientific ideas and professional growth of young researchers.

The resolutions made by the CPSU Central Committee and USSR Council of Ministers on the accelerated development of the machine building complex stipulates the rapid development of an experimental and experimental-design base for industry. It seems that creating 10-15 NPTs in regions with a predominance of science-intensive sectors (Leningrad, Novosibirsk, Minsk, Kiev, Kharkov, Sverdlovsk, Rostov-na-Donu, Irkutsk, Khabarovsk and others), using part of the allocated capital investments, would be justifiable. Only 5 percent of the annual output of instrument building production, expressed in terms of costs, is needed in order to equip these NPTs, which would provide a 6-fold growth in NIOKR. This organizational maneuver could double the level of provision of instruments to research organizations in a few years.

In our opinion, a network of state cost-accounting NPTs could have been a partner in the Scientific Instruments MNTK. Collective use centers most fully suit the tasks of this MNTK in terms of assisting sectors of the economy in using and developing the latest equipment and technologies. They can serve as a proving ground for testing newly developed instrument systems and as a base for the substantiated prediction of the economy's needs for different kinds of scientific equipment.

As the experience of the U.S. and other developed countries in creating "scientific parks" has shown, the basic factor which determines their profitability is the science-intensiveness of the region's industry and, correspondingly, its need for the services of a collective use center. Taking this into account, Novosibirsk Oblast seems promising. The USSR Academy of Sciences Siberian Department institutes, USSR Academy of Medical Sciences branches and institutes, VASKhNIL, and numerous VUZs [Higher Educational Institution] and sectorial institutes are concentrated here. The proportion of these engaged in science and scientific service in the oblast is greater than in other regions of Siberia by a factor of 2-3. The oblast's industrial potential is aimed at developing the science-intensive sectors of machine building, instrument building and the petrochemical industry. The "Sibgeo" Scientific Production Association, the Novosibirsk Electrical Equipment Institute, the "Sibtekstilmash" plant, and others support the idea of creating a collective use center, counting on its assistance in overcoming the current shortage of scientific instruments, and they hope, in using advanced research methods, to accomplish a technological breakthrough in their fields.

**Footnotes**

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## Secrecy Apparatus Viewed as Unnecessary, Obsolete

*18140157 Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 15 Jan 89 p 2*

[Article by Doctor of Technical Sciences Professor L. Barskiy: "The Time of Glasnost and the Time of Secrecy"; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] Pardon me, please. I know that it is now customary to speak and write about this. Like about the intimate aspects of life. Everyone knows what this is. But they pretend that this does not exist. We have already admitted to the existence of prostitution, corruption, and drug addiction. But we speak about secrecy only in connection with the past. Although it would be worth pondering: Is there not much of it in the age of glasnost? At any rate, at least three questions need frank answers. Are all the secrets, which we are protecting, state secrets? How much does this protection cost? And who needs this?

It is ridiculous, it would seem, to make a secret out of backward production, archaic technology, computers of past generations, and enterprises that pollute the environment. However, we are doing this. Apparently, because the number of secrets decreases in proportion to our lag, which it is impossible to say about the apparatus which is called upon to protect them. Here is a secret ukase to continue the protection, not to confess. What for? If only not to lower the prestige.

It is always permitted to classify something. But a certain audacity is needed to declassify something, this is fraught. Therefore, the process of classification in our country is nearly irreversible. It is diffusing, gradually going beyond common sense. And then scientific and technical secrets, which are known to the entire world, remain a secret for the engineers of a neighboring plant, who are dealing with a similar question. While the intersectorial exchange of ideas, technologies, and inventions is altogether impossible. And the overall level and pace of development of equipment are steadily decreasing.

Hypotheses, scientific ideas, and theories in general, it would seem, are not liable to classification. However, the lack of clear boundaries between science and technology is also conducive here to casting "a shadow on wattle fence" (that is, to confusing matters). A bureaucratic principle is operating: it is easier to prohibit than to permit. Following it, bureaucrats of all ranks are also trying to change the principle of acceleration "everything that is not prohibited is permitted" into the diametrically opposed principle.

One of the "favorite" areas of secrecy is our resources: natural, raw material, economic, and material. During the age of satellites and computers, which are capable of calculating all industrial communications and consumption coefficients, the data on our resources are becoming widely accessible, specialists know them. Of course, except for our own economists. Hence it is clear how little logic there is in the protection of the coordinates and the size of the reserves of mineral deposits. Who will steal them? And to whom is this interesting, if 15-20 years are spent in our country on the development of deposits on our own?

Until recently the pandemia of secrecy was justified by the necessity of protecting defense information. But now new times have come, the policy of the cold war and confrontation has given way to disarmament talks and a treaty on the elimination of an entire class of missile weapons. Plants for the production of intermediate-range and shorter-range missiles are liable to inspection and constant observation. However, the reform of political thinking is not yet guaranteeing the restructuring of the bureaucratic apparatus. This is a different department.

The typical situation consists in the fact that departmental secrets are protected more vigilantly than state secrets. Such priority is easily explained by the possibility of the concealment of official oversights and disgraces. Their publication threatens specific people with troubles, while the revelation of state secrets is not so dangerous. Here the departments are trying to raise their secrets to the rank of state secrets. Only by this is it possible to explain the phenomenon of the long-term concealment of information on accidents, environmental pollution, fires, epidemics, and our other disasters. In short, they are preventing publications on all kinds of misfortunes not so much because we "are poor, but proud," but for the concealment of their own holes and the unsightly state of affairs.

The champions of secrecy for some reason do not notice or do not want to notice that the situation is the world has changed substantially. Not only as compared with the 1930's and 1940's, when the spirit of spy mania reigned, but also as compared with the 1960's and 1970's. The standard of living, the defense potential, and the authority of the state now no longer depend on the protection of information, but only on the development of science, technology, equipment, and information science. While excessive secrecy hinders precisely their development.

In addition to this invisible, although expensive cost of secrecy there is another, by no means symbolic cost. Has anyone calculated how many watchmen, guards, and servants of first departments we have? God forbid that they be less than 2 percent of the entire able-bodied population. Of course, enterprises, from which it is possible to take physical assets, need protection. But rayon committees, executive committees, institutes, or the Academy of Social Sciences, which should work in close contact with the people: What are they protecting there? Is it not departmental buffets?

I remember that during a tourist trip through Peru they brought us to the Ministry of Foreign Relations. The lack of watchmen and guards struck our tourists most of all. Once Japanese were asked why instead of militiamen on point duty in their country at times they post at intersections plaster casts. "We are not so rich," they replied, "as to allow healthy men to loaf the entire workday."

In our country not only "little old ladies-God's dandelions" are employed in the guard. A powerful staff of healthy men does not sow, does not plow, and does not build. It writes out and checks passes at institutions, in border zones, and at enterprises. At an institute the deputy director for procedure often receives a higher wage than a professor or doctor of sciences, even the director himself. But he does not design missiles or detectors, he merely observes the instructions which others write and approve.

The secrecy game is a cancerous tumor, which developed from the normal cells of the protection of truly state secrets, and has turned into a real disaster for science. It is preventing the exchange of information between scientists both outside and inside the country. Another price of this phenomenon is the unjustified duplication of works, the spending of the time of scientists on formal procedures, obstacles in the way of the appearance of new ideas, and the slowing of the development of science.

A French proverb states that the number of conspirators is directly proportionate to the number of members of the secret policy. I am afraid that the number of instructions and bans on publications in our country is directly proportionate to the number of "fanciers of bans." In any case, the procedure of publishing a scientific work is splendidly reminiscent of the children's game "do not say yes and no." In order to obtain a certificate of an expert commission, which permits publication, the author together with a five-member commission is obliged to take a written oath that the article contains nothing new, original, and interesting and that unfinished scientific works (as if it is possible to completely finish a scientific work) are not used there.

In conformity with the rules of this game, the oath is ritually legalized by a large number of documents with seals of arms. Erasures and corrections in them are not allowed, as at the State Bank. As a result the labor intensiveness of the official registration of accompanying documents often substantially exceeds the labor intensiveness of the writing of an article. Therefore, authors often prefer to decline the exchange of information with colleagues than to engage in this pointless work.

Indeed, if an article actually corresponds to these characteristics—"does not contain"—which they give it in the certificate of the expert commission, it simply does not make sense to publish it. Due to this all scientific and technical journals would simply have to be closed. But an editor, who has become an expert at his job, looks only for the observance in the certificate of formal attributes: the presence of the seals and the number of pages. Having found a mistake, the well-disposed editor turns pale, while the ill-disposed editor lasciviously rubs his hands. But in both cases the article...is returned to the author.

The costs of this game are not that inoffensive: according to my estimates, the enormous expenditure of time reduces the labor productivity of scientists by at least 4-7 percent. The prestige of Soviet scientific publications is steadily decreasing abroad. The very procedure, in which scientists are forced to defend themselves before ignoramuses, as people who are suspected of all but espionage, is also humiliating.

It seems that it is high time to grant the scientist himself the complete right to determine the possibility of the publication of his work. In the end he is himself vitally interested in its legal protection as an invention. And who will evaluate better than himself the possibility of using his work in defense equipment?

So why needs all this? The bureaucrats, who deal with secrecy, know how to prove the necessary of their own existence by "state interests." The number of secrets increases from instruction to instruction, including due to the classification of information that is known to the entire world.

In the service of secrecy not only the high wage and dust-free work are attractive. For in this sphere not only the secrets themselves, but also their ritual of the official registration and the activity of the apparatus are concealed from people's eyes, owing to this to a significant degree neglected and unpunished thing. But the power is considerable. For example, at our institute even a doctor of technical sciences is dealing enthusiastically with the drawing up of certificates of the expert commission, persecuting many venerable scientific associates like a little boy. And although everyone knows what kind of a "doctor" he is, he keeps the entire institute in fear.

Of course, in this powerful, although useless apparatus there are not only loafers, untalented people, and unsuccessful investigators. In it there are also clever people. So let us ponder: On what are we spending our efforts and working time?

These questions await answers. Secrecy is the reverse of glasnost. It is impossible to develop glasnost without reducing secrecy and the bureaucratic apparatus that stands guard over it. We need to learn to look at life with open eyes. And to speak frankly about everything.

## Pravda Interviews Chief of State Inventions Committee on Proposed Law

*18140126b Moscow PRAVDA in Russian*
*18 Jan 89 p 23*

[Interview by O. Mikheyev with I. Nayashkov, chairman of the State Committee on Inventions under the USSR State Committee on Science and Technology: "An Idea Goes on the Market." Passages in boldface as published. First paragraph is PRAVDA introduction]

[Text] **I. Nayashkov, chairman of Goskomizobreteniy [State Committee on Inventions], under the USSR State Committee on Science and Technology, answers a PRAVDA correspondent's questions.**

PRAVDA: Ivan Semenovich, why has preparation of the draft Law taken so long and occurred without the participation of a broad society of inventors, since discussions about it have been going on for several years already? Who will collect the remarks and corrections being received?

**I. Nayashkov:** The proposal to create this Law was made at a June 1985 CPSU Central Committee meeting on the problems of accelerating scientific and technical progress. Work began immediately, and the draft Law was ready soon after the 27th Party Congress. However, it was decided, correctly, I think, to delay it until the Law on the State Enterprise (association) was passed. Afterwards, taking its clauses into account, the draft was seriously rewritten. The drafting of the document was continued last year by a USSR Council of Ministers Presidium work group headed by Academician Ye.P. Velikhov.

I cannot accept reproach for the secrecy of this work. The representatives of ministries and departments, the VOIR [All-Union Society of Inventors and Rationalizers], eminent scientists, inventors and rationalizers, jurists and industrial leaders participated in it. As far as the procedure for further work is concerned, all proposals and remarks being received and published in the press will be studied and analyzed by the USSR Academy of Sciences Institute of State and Law, and the USSR Council of Ministers work group will summarize and decide each of them before March 15. The work will then be transferred to the appropriate deputy committees of the USSR Supreme Soviet.

PRAVDA: How do you personally evaluate the draft?

**I. Nayashkov:** I think that as a result of the overall efforts for universal discussion a good draft has been submitted, and it provides a basis for developing a definitive version after discussion. Compared to the Statute in effect until this time, the draft Law contains radically new solutions to the basic problems of inventions.

The main thing is it views inventions as a commodity, included in the socialist market system. All of the draft's articles are permeated with this idea. An intellectual commodity can now be bought and sold like any other product—a machine tool, materials, or technology.

PRAVDA: Many inventors and production leaders are voicing the opinion that the proposed draft Law does not properly solve a basic problem: enterprises still have few incentives for introducing an innovation. Labor collectives will not feel the measures outlined in Article 39 of the draft, believe supporters of this viewpoint, and they are indeed in no way related to the output of world-class production.

**I. Nayashkov:** I do not share these fears. In the process of preparing the draft, more than 20 enterprises from Moscow and other cities were studied, "adjusting" the mechanism of Article 39 for the 1987 report data. We are certain that the effect will be tangible: the share of profits that enterprises will be able to receive from using inventions is from 5 to 20 percent of the total profit. According to the draft Law, the enterprises can keep all of this share over the first 3 years. This time period forces enterprises to master the innovation more rapidly.

Of course, it would be naive to presume that one legal document can immediately direct the interests of all enterprises along the necessary direction. As I understand it, the task of the Law on Invention, along with other legislative acts, is to provide an effective mechanism for managing the economy.

PRAVDA: Nevertheless, one gets the impression that the new Law, in the published wording, will encourage the creation of all sorts of "trifles," of local innovations and partial improvements in production, which to this day also make up the basic share of introduction. After all, the entire reward for the invention is attached only to its use. However, great, revolutionary ideas of a global nature are most often implemented after years, giving rise to hundreds and thousands of smaller inventions later. Tsiolkovskiy's ideas were brilliant, but Korolev implemented them after decades. According to this Law, Tsiolkovskiy would not have received even a kopek. Apparently, we must also protect and evaluate these ideas?

**I. Nayashkov:** In my opinion, the draft provides the opportunity for economic incentives for such unique, pioneering inventions as well. It includes the possibility, for instance, of enterprises awarding bonuses to the inventor for any benefit from his invention, not related to the economic effect. Measures and moral incentives are stipulated. Finally, there is a mechanism for registering scientific discoveries that encourage the achievement of high results in basic research.

PRAVDA: Ivan Semenovich, are you rejecting all the alarms and fears of rank-and-file inventors? Furthermore, in your opinion, are there weak points in the draft Law?

**I. Nayashkov:** I do not want to say that this is an ideal document. It does have clauses, on which it is necessary

to consult with the broadest circles of jurists, inventors and production leaders. For example, Article 12 allows for the existence of a patentee both in the form of an invention author, as well as jointly of an author-enterprise or social organization, and, separately, of enterprises and the state. Such diversity in interpreting forms of property for inventions does not exist in the laws of a single country in the world. In my opinion, the Law should not create difficulties in its application, and should be as simple and unambiguous as possible. Article 12 must be comprehensively and thoroughly discussed, in order to find the most reasonable solution.

PRAVDA: A question on the criteria for an invention (Article 6): How is "non-evident nature" better, compared to the previous "considerable differences," and why is "production applicability" used, instead of "positive effect"? The first criterion creates room for the arbitrariness of expert analysis, and the second makes it possible to consider anything, that can be manufactured, necessary.

**I. Nayashkov:** Today, most industrially developed countries in the world have introduced precisely these formulations in their criteria, considering them more progressive. Everyone interprets non-evident nature as that which raises the existing level of knowledge, which requires great creative work, and makes a break from the previously known. These criteria were recorded as an international standard at the 1970 Washington Conference. Moreover, within the framework of the UN World Organization for Intellectual Property, an agreement is now being prepared to coordinate patent legislation which asserts standardized criteria for the protectability of inventions.

PRAVDA: One gets the impression that a corps of directors wrote Article 48 on bonuses for cooperation in the application of inventions. After all, the bonuses are entirely unrelated to the final result of the enterprises' work. If you apply it, you will receive the full amount. Yet, was something specific was achieved, was the invention embodied in a manufactured item, what is its technical and economic level, and what are its consumer properties? The draft Law does not deal with this.

**I. Nayashkov:** In this case, we are relying on the growing strength and influence of labor collectives, which are solving ever more problems independently under the conditions of democratization and glasnost. On the other hand, no matter how you formulate the corresponding Articles of the Law, for the present time the enterprise does not live under the rigid and objective conditions of a socialist market, of the competitive struggle for a buyer for one's product—a few bonuses does not solve the problem of applying inventions.

PRAVDA: Today the Goskomizobreteniy Control Council confirms virtually all the denial decisions made by the commission of experts, which is a departmental body. Would it not be more reasonable to make this agency inter-departmental and independent, for example, within the structure of the AUCCTU?

Another question in regard to this: is there nothing in the draft Law about the VOIR, or about the recently created All-Union Association of Patent Researchers. After all, logically, they should mandatorily participate in the work of the appellate council and the patent courts. It turns out that the Law totally ignores social organizations, and that the whole protection of inventors' rights from the arbitrariness of the department officials is being assigned to the department itself? We still have no patent courts, and no cadres are being trained for them, which means that they will only begin working after 8-10 years!

**I. Nayashkov:** The production of inventions, and all procedures for their defense, registration, settlement of conflicts, and use, are part of state activity. For the time being, the state can transfer these functions to a social organization, even a most authoritative one, since precisely it guarantees the protection of the patentee's interests. Apparently, you are right about the fact that little attention was given to social organizations in the draft. There is the comprehensive discussion for this, in order to correct shortcomings through common efforts.

Yes, the control council does make mistakes, and we are trying to correct them. In our opinion, a great achievement of the draft Law is the creation of specialized and independent patent courts. For us, this is really a new, but extremely necessary institution. I hope that it will get on its feet more rapidly than you suggest. They started with nothing in China as well. A similar law was passed there in 1985, and in 2 years these courts had already appeared. We shall extensively use the experience of countries which have ages-old experience with patent courts. A special Statute will be prepared on them, and I am sure that they will stipulate the extensive participation of representatives of social organizations, including the VOIR, in the work of these courts as people's jury men, defenders, etc.

PRAVDA: I would like to compare the existing procedure and that proposed in the draft Law for the payment of compensation and the mechanism for the moral encouragement of inventors. Should they not be simplified? For instance, a good friend of mine is the author of 150 inventions, yet does not even think of some sort of honorary title. For this, one must collect an enormous number of papers confirming confirm the industrial use of each invention—this would take months, if not years. Then, one must pass through a mass of coordinating authorities, each of which has a right to hinder the course of the paper.

**I. Nayashkov:** The comparison can only be in the draft's favor. According to it, an inventor receives far more compensation. The "ceiling" has been changed to 20,000 rubles. Annually, an inventor will be able to receive no

less than 5 percent of the profit from the use of inventions during the entire term of the patent's effect. (Right now, as you know, it is no less than 2 percent).

As far as moral encouragement for inventors is concerned, I agree with you entirely. There is still a mass of bureaucratic chevaux-de-frise here. Through common efforts, we will eliminate them and simplify the procedures in the process of applying the Law.

In conclusion, I will say that even the very best version of a law cannot cover everything. Life forces us to make corrections in it and even new articles, taking expert, legal and commercial practice into account. Life will be our teacher.

## Formation of Patent Court Raises Constitutional Questions

*18140126a Moscow IZVESTIYA in Russian*
*18 Jan 89 p 2*

[Article by I. Avilina, candidate of juridical sciences, under the rubric: "Discussing the Draft Law on Inventor's Work in the USSR": "Who Are the Judges?"]

[Text] A distinguishing feature of the Draft Law on Inventor's Work is the special attention given to protecting the rights of inventors and patentees. The creation of so-called patent courts in the union republics and a USSR Patent Court (Articles 55 and 56 of the draft) is proposed.

It is a good idea to strengthen legal protection for citizens and organizations, especially in this sadly infamous zone of the omnipotence of the departmental approach and lack of rights for authors of technical innovations. What is more, this have the assistance of a prestigious legal form. However, is this form legal and will the patent court administer justice?

In my opinion, it will not be a court in the true meaning of the term. Just as State Arbitration (article 183 of the USSR Constitution) did not become a court: it is a specific law-applying department, a buttress for the command methods of economic leadership. Why? Because, as lawyers would say, the legal nature of the court and that of the special jurisdictional agencies (i.e., agencies called upon to settle legal disputes—I.A.), such as State Arbitration and the patent court, are fundamentally different.

So, just what is this patent court which is stipulated in the draft? Above all, it is created by a special decision of the legislature, not in accordance with the Constitution, which does not include this agency in the legal system of the Soviet State. The establishment of a regulation (procedure) for its activity is being stipulated by a special law. To what extent the norms of civil legal legislation, which guarantee a certain level of rights to participants in the case, will be applied—indeed, even whether they will be applied in general—to the interrelations between patent courts and citizens is unclear from the published draft. Furthermore, there is an extraordinarily important feature of a legal body, which the patent court entirely lacks: its decisions cannot be contested by a higher legal body. In the thinking of those who compiled the draft, neither the Supreme Courts of union republics nor the USSR Supreme Court have the right to reconsider these decisions. The aspiration to free "patent justice" from control is so great that the compilers of the draft "forgot" about the constitutional institution of the higher supervision of the prosecutor's office over the accurate and uniform implementation of laws. The right of supervision is granted to the chairman of the USSR Patent Court (Article 56 of the draft).

In general, everything about the "patent court" is clear. It is not a court at all. Things ought to be called what they are. The creation of a special system of jurisdictional bodies for the extra-judicial settlement of disputes now being considered by the courts is being proposed. This model, its merits and, even more so, its shortcomings, are well known, particularly to economic leaders and legal consultants. This is the system for the State Arbitration bodies. Restricting the competence of the court and removing a large group of cases from its jurisdiction are being proposed in order to "make work" for the new law-applying department.

For what sake are all these deviations from constitutional principles and from the clearly expressed course towards developing legal protection? Why is an inequality in the legal possibilities for citizens who live in different union republics even being built into the patent court system itself?: if a republic has no oblast system of division, cases are considered by the union republic patent court, whose decisions are not subject to appeal. How is the undemocratic nature of the principles for structuring the patent court system explained? After all, they are being created starting at the oblast level, but if there is no oblast level, then only a single patent court functions in the republic.

Everything is explained quite simply. The motives behind this legislative proposal are superficial. They are classic motives from the era of stagnation—not without reason, the Law on Inventor's Work has been under preparation for almost 8 years: inventors' work is complex, and courts allow mistakes and red tape in this work. So, let someone else examine them and bear the burden of responsibility for the quality of the work. This is all concealed by considerations regarding the fact that there are few such cases in the courts, that they require special knowledge of science and technology, etc., and consequently, let us create a new state structure that will guarantee a qualitative level for their investigation.

The considerations seem reasonable. After all, the draft sets forth, in particular, the possibility of contesting the validity of a patent, as well as of appealing decisions on refusal to issue of a patent, or issuing a patent with an incorrect indication of the number of rights within it, to

the Higher Appellate Council on Patent Expert Analysis, under the USSR GKNT. Right now, these cases are generally not being examined by the courts, and special knowledge for their correct resolution is actually quite necessary. This is true, but an institution for expert analysis which helps the court thoroughly investigate the factual aspect of a case already exists for these cases in process law. If this institution is serving the purposes of justice insufficiently effectively, it must be improved, for instance, by creating a group of independent experts under social organizations, etc. A judge can always involve an expert, a leading figure in his field, as an assistant. This same judge need be a specialist only in the field of law. Here, no one can replace him.

No one can dispute the fact that inventor's work is complex, owing to the technical "slant." And, because there are relatively few of these cases, judges are not managing to accumulate experience from case to case, and begin anew each time to investigate a fairly specific legal matter. This means that specialization is needed, but not specialization such as the draft proposes—not the creation of a special system of bodies, but a functional specialization within the framework of the existing system of judicial bodies. In the language of lawyers, this is a functional jurisdiction, which is used in many socialist countries to settle, for example, labor, family, marital, and economic cases, etc., and which we have entirely overlooked.

Beginning at the rayon level, it would be expedient to create specialized subdivisions of the judicial bodies: permanent sessions on patent cases (here, the term "patent court" is appropriate, since in this case it will fully conform to the essential nature). The staff of these sessions should include people's judges from a number chosen by the corresponding higher soviet of people's deputies. Depending on the number of cases, a permanent session on patent cases could be formed as an inter-rayon subdivision by special decision of the union republic's Supreme Court and Ministry of Justice. Coordination at the union level could be stipulated. In any event, it is important that it holds the same place in the legal system, as the people's court, i.e., that its decisions can be appealed to the oblast or similar court of a second authority. The sessions could, or more correctly, should be assizes. Concern must be shown for the convenience and accessibility of legal protection. It is not important, if this concern is expensive. If an organization or department, or even better, a specific official, who infringes on an inventor's rights, must compensate for all legal expenses out of his own pocket, next time he will think carefully before causing a conflict.

This same functional specialization is also necessary at the higher levels of the judicial system: in all courts, beginning with the oblast and ending with the union republic Supreme Courts and the USSR Supreme Court, a collegium on patent cases should be formed. It would be expedient to invite the leaders of the corresponding bodies (or their chairmen), including the USSR GKNT, to their meetings. This must be reinforced in law as a special legal requirement. Finally, it would also follow to add functional jurisdiction to the corresponding generic jurisdiction, taking the investigation of the most difficult and of specific cases to the competence of higher courts, right up to establishing the exclusive jurisdiction of the USSR Supreme Court's Collegium on Patent Cases for certain categories of disputes.

I think that this model of investigation will make protecting the rights of inventors effective, both from the position of all society, as well as of each citizen.

## International Aspects of Proposed Patent Law Discussed

*18140160 Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Feb 89 p 2*

[Article by S. Shtelmakh, honored inventor of the RSFSR [Russian Soviet Federated Socialist Republic] (Moscow): "A Mine Under Exports"; first paragraph is SOTSIALISTICHESKAYA INDUSTRIYA introduction]

[Text] I will cite examples of patent disputes in the United States. In 1986 the firm Smith International went bankrupt. The reason? A decision of the court: it awarded a payment of $205.4 million in favor of the patent holder (the firm Hughes Tool). The case of Polaroid versus Eastman Kodak: the court recognized the defendant to be guilty of violating several patents of the plaintiff. As a result the defendant was forced to halt all operations and to pay $494 million. There is a multitude of analogous examples throughout various countries. Such is the price of carelessness or mistakes in the evaluation of the patent situation.

We intend to appear on world markets. And one must remember: when in Rome do as the Romans do. Foreign firms "feel sorry" for us while the volume of exports is small. But they will react immediately to its increase. And if each one will pay foreign firms millions "for science," what will happen with our economy and prestige?

But I read the draft—and the impression is such that invention does not have any bearing on this problem. Moreover, the wording of the Law is directly provoking domestic enterprises and cooperatives, the State Committee for Science and Technology, and ministries to violate our and foreign laws and patents. What do I mean? It is a well-known fact: inventions often depend on already known inventions and include them. Moreover, the dependence is not only obvious—our expert commission now reports it, if this invention is protected in the USSR—but also hidden. But the draft of the Law does not in the least oblige experts to indicate the dependence of our new solution on ones patented somewhere abroad. Articles 9 and 36 give the applicant the right to use freely the technical solution and the patent holder to use the invention. Whether it is dependent or

independent is all the same to the authors of the draft. But since everything that is not prohibited is possible, there is no need for countrymen to look at others' church calendar. Hence, there is the risk that in case of exporting or even simple display in the country of the issuing of the patent the other's regulations will be violated by us. And the firm will file suit not in our humane Soviet court, but in the court of the country, whose patent laws we have violated.

For here is what is dangerous: Article 9 creates for our patent holder or the performer of a state order the illusion that the invention has been verified and that there are no mines. We will find out about these mines, about the unobvious dependence, when the product is already abroad, while our exporter or exhibitor is in the grip of the foreign firm. The information concerning to what countries we should not export will cost us dearly. And our entire insignificant saving on evaluation (less than 2 days are allocated per application) will be more than exceeded by the currency losses.

One must not wait until something serious happens. In order to be prepared for exports, we must establish our own system of the prevention of violations. I say this because from my own experience I know what the laws of others are. We made a fine—at the level of an invention—and quite competitive pump. And suddenly we discover with surprise that a foreign firm has patented in the United States, the FRG, Japan, and France the technical solution just for the ratio of the dimensions of the known elements of the pump. At first we laughed at such a level of an invention, but then shed a few tears. To us this ratio seemed obvious and insignificant. We were not about to submit an application, in order not to burden our own expert commission. But now it turned out that exportation had been shut off for us, or take an expensive patent for a trivial thing.

Here it turns out that in the preamble the orientation of the Law toward the assurance of the economic independence of the country is declared and in the text everything is the opposite. For a USSR patent is no so important for the protection of exports. Another thing is more important: first, how competent the evaluation of the competitive ability of the solution is and, second, how independent the solution is not only and not so much of Soviet, but first of all of foreign inventions and useful models. And, finally, it is of no small importance how efficiently the state will be able to protect patentable solutions, which have been identified in our country, from patenting by someone abroad. The draft does not take into account at all that even a negative result of evaluation is a very important result. Every dependent solution—whether or not the expert commission has recognized it as an invention—is a mine under exports.

But the new draft will help foreign firms very much to obtain patents for new solutions found by us. For under the conditions of cost accounting and the duties, which are proposed by the draft, people will begin to economize on evaluation and on the protection of "minor" patentable solutions. And this saving in rubles will lead to enormous losses of currency.

The mechanism of competition is incorporated in the foreign patent. Foreign laws for this reason can become not an obstacle, as now, but a motive force of our scientific and technical progress. Therefore, it is necessary not to hurry with the approval of this draft.

## Dual Ownership, Foreign Sales Provisions of Proposed Patent Laws Hit

*18410153b Moscow IZVESTIYA in Russian*
*17 Jan 89 p 2*

[Article by I. Mosin, staff correspondent, datelined Moscow: "The Focus of the Dispute: The Law on Invention: Your Opinion?"]

[Text] ***"At one time the Americans said, 'What's good for General Motors is good for America.' I might rephrase this to say, 'What's good for the inventor is good for the entire state.' Evaluating the draft Law on Invention in this light, I believe that it is unacceptable," said B. U. Ushakov, section head at the VNIIzhelezobeton [All-Union Scientific Research Institute for Reinforced Concrete], said in his speech at the plenary meeting of the TsS VOIR [Central Council of the All Union Society of Inventors and Rationalizers].***

The discussion demonstrated that the document presented for discussion has, let's be frank, a few opponents. As one might have expected, the inventors directed their sharpest criticism at the statute on dual ownership of a patent, whereby the rights to an idea belong simultaneously to the author and the enterprise.

V. Dozortsev, doctor of legal sciences and professor at the VNII [All-Union Research Institute] for Soviet Law, offered these statistics: 95 percent of all inventions here in our country are by employees in their official capacity. In practice this does not mean that issuing joint patents to the enterprise and the author will in the overwhelming majority of cases result in a situation in which the original author will end up without rights.

Many of the speakers could not hide their perplexity: Who decided that an enterprise can act as a creative entity? Yes, it can create conditions which foster invention activity. And it should have specific privileges for this. For example, the right for use of the inventions developed within its walls free of charge.

T. Pungas, Honored Inventor of the Estonian SSR, warns that a dual patent will give rise to a mass of conflicts between inventors and enterprises. One asks, why don't we take advantage of foreign experience? When a person is hired for creative work, a contract which stipulates who owns the rights to his inventions and how they will be used and compensated is immediately signed.

The speech by I. Bortnik, deputy chairman of the USSR GKNT [State Committee for Science and Technology] against the dual patent was a total surprise to many

participants at the meeting. Everyone knew that he was part of the working group that prepared the draft law which contained the disputed clause. Describing this work, he claimed that there might be an analogous system in the law in Argentina or Brazil,pbut he personally had not found one. Consultations between working group members and representatives of the international community showed that the form was far from final.

The clause regulating the inventor's right to sell his ideas abroad was also the target of criticism. According to the draft, this operation must be done according to a procedure defined by the USSR Council of Ministers. But how can one assess this clause if this "procedure" is unknown. Many voiced sincere concern that as soon as a foreign company would want to buy an idea from a Soviet author, some strict list of restrictions would go into effect.

The draft law unquestionably has quite a few new, progressive ideas. But at the same time it contains quite a few paragraphs taken almost unchanged from the old statute. In particular, it lists a mass of "nannies" responsible for the development of technical creativity—GKNT, Gosplan, the Council of People's Deputies, public organizations. Involving everybody is like involving nobody. The draft retains the requisite mechanism for introducing innovations. Is it necessary in the new economic environment?

Is it an accident or a natural development that the draft is, as before, aimed at regulation, control, and bureaucratization of inventors' activity. They've waited many years for this document. And now, when it has seen the light of day, it has aroused only a feeling of protest, disappointment, and worry about invention in most of them. Some even see an evil intent, an attempt, as before, "to prohibit" inventors. But some no longer believe that anything can be changed.

Like a drop of water, the draft law reflects all the complexity and controversy of the country's current economic, social, and public situation. The new shoots are very slowly fighting their way upward and winning living space for themselves. However, the administrative command system is making every effort to choke these shoots. The struggle is taking place at all levels. Including our consciousness. And here there are both victories and defeats. Unfortunately, the spirit of the bureaucratic system still penetrates and permeates many of our orders, laws, and decrees. The veil of old approaches and stale thinking lies on this draft as well.

Voices are heard saying that "the wrong people" prepared the draft. That it is against inventors. I don't agree. The draft was prepared by thinking people well informed about matters of invention. And, I can state, whose souls ache for it. But they are our contemporaries. They carry within themselves all the current controversies that are strewn on the pages of the draft.

Overcoming dogma and stereotypes in the public consciousness is an extremely difficult thing. Even those who seem to suffer most cannot escape them. For example, many inventors at the meeting again called for the creation of some miraculous mechanism for introducing innovations. One believed that managers should be punished in the most severe way for delays. Others, that they had to be given incentives. But we've had all these, and they don't work!If we want the law to work, then the inventor must be its primarypsubject. But not like a machine for producing ideas, but a fully empowered owner of his own intellectual goods. Only then will he be interested in its continuous reproduction, improvement, and advantageous use. Everything else is from the devil.

I predict objections: If we would only give inventors free rein, they would sell all their inventions abroad. What can I say? Let's be realistic. Many countries are so far ahead in scientific technical development that I am afraid that we would hardly survive on the big profits from the sale of our intellectual goods. But if everyone starts to want to take advantage of our ideas? Well, good for them! Who will suffer? The State? It will receive hard currency. The author? A powerful stimulus to creativity, and the opportunity to substantially improve his material position. Who is against this?

Every one of our new laws is a brick in the building of perestroika. Its strength determines the reliability of the entire building. But how to ensure it if we cling to the past? Essentially about a month was given to the discussion of this draft law. We took several years to develop it, and now we want to digest it in a few weeks? Is this logical? What's the rush?I. Bortnikov's position seems seems more logical to me personally. He suggested that we not hurry with the new law, but develop and put into force an interim statute which would regulate inventive activity. It could be amended yearly, so that the law would organically "mature" with the new economic mechanism.

## Patent Cooperative Helps Inventors Through Red Tape

*18140126c Moscow NTR: PROBLEMY I RESHENIYA in Russian No 23, 6-19 Dec 89 p 2*

[Article by I. Krylov: "A Patent Without Red Tape"; first two paragraphs are NTR introduction. Passages in boldface as published]

[Text] **One year and 100 registered claims—this is the first result of the Inventor's Cooperative Center (IKTs) under the Moscow City Executive Committee.**

**L. A. Flekser, leader of the IKTs patent group, is holding receiving hours. He listens carefully to the inventor and rapidly chooses a patent researcher specializing in this subject area for him.**

"Today, our aktiv has more than 100 of the capital's best patent researchers," says Leonid Abramovich, "and their aggregate intellectual potential covers virtually all fields of science and technology in which patent decisions could be made: from mining to children's games.

The cooperative involves the necessary specialist for the required period of time, paying for his work according to a labor agreement.

It costs an inventor 200 rubles for the center's claim registration services. Of this, registering a contract with IKTs costs 10 rubles, and compiling the text of the claim and registering the whole set of claim documentation (including the making of drawings, typing work, and copying the documents) costs 40 rubles. The remaining 150 rubles is paid for the conduct of a complete search of the patent library fund for the invention by the patent specialist. In principle, an inventor can also come here with a "raw" idea and explain it "with his fingers," so to speak. When necessary, the cooperative can make an experimental model and, if the invention promises a large profit, begin its production. Incidentally, the cooperative is calculated to be more generous than the state is to its authors by a factor of 5: for inventions accepted for production by IKTs, an author receives 10 percent of the total profit.

The advantage of IKTs is the rapid time period for registering claims (usually 2 weeks, or up to a month only on particularly complicated inventions) and the low cost of the work. After all, according to the existing tariffs of the All-Union Center for Patent Services, registering a claim and conducting a complete patent search is more expensive by a factor of about 8. Moreover, if the invention is of interest to IKTs for implementation in production, the claim is registered for free, at the cooperative's expense. Claims for war invalids and young students are also registered at the cooperative's expense.

The IKTs does not limit itself only to assisting in claim registration. Its patent specialists will help compile a well-argued objection to a denial decision made by the commission of experts and, if necessary, will defend the inventor's interests right up to court and offer all legal consultation for free.

The cooperative recently came up with yet another important area of work—performing patent research on orders from enterprises and organizations. Solid customers, such as the 2nd Moscow Watch Plant, the Moscow Energy Institute, and the Orlov "Nauchpribor" Association have already concluded contracts with IKTs for carrying out patent research. The cooperative is planning to open branches in Leningrad, Tashkent and Bryansk.

## Japanese Seek Soviet Invention Ignored by Construction Industry

*18410153a Moscow IZVESTIYA in Russian 6 Feb 89 p 2*

[Article by V. Konovalov: "Whose Wall is Stronger: An Inventor Found a Way to 'Push' an Idea"]

[Text] A former military pilot now retired in Tambov, Kim Yemel'yanovich Kotenev invented a wall. This isn't a joke or metaphor. He has an Author's Certificate ssued in 1987. A day or two ago, the USSR State Committee for Inventions and Discoveries granted the author a priority certificate for the invention of a second wall. Kim Kotenev found an original and economical way to lay brick. Simple and unexpected. Then it was discovered that no one had ever before thought of the idea.

But it turned out to be simpler to invent a wall than to break down the wall of bureaucratic indifference. The application was submitted four times before author exclusivity was granted: Kotenev's bricklaying method results in significant savings in structural materials and makes it possible to improve the strength of a structure. It is particularly effective in agriculture.

The first structure built with the new method appeared. The "Streletskiy" State Farm in Tamov Oblast planned to build an apiary. But they had enough brick for only half the structure. So Kotenev offered his services. The calculations proved correct. There was brick left over. Less solution was required. But the main thing was that the new apiary turned out to be much stronger and better ventilated.

No matter how Kim Yemel'yanovich reassured people that everyone would benefit, no one wanted to introduce and popularize the new method, which had been further refined. And given current procedures, the use of the method brought him no special material benefit either. He was motivated only by enthusiasm.

"It's not even a brick wall, but some kind of a padded one," he says about his travels from office to office. "No one is against it, everyone says they're for it, but the matter is at standstill.

"The problem is that, with all the method's simplicity, its use requires the authors' personal participation at first. And this means that they have to have some sort of legal status, and a specific system of relationships with users is required.

Kotenev still found a solution. He created a family cooperative. He is ready to sign contracts to work with farms and organizations, to form on site temporary collectives to build housing, storage facilities, minip+elevators. They guarantee savings of 30 to 75 percent of the brick and even more solution, increased strength, and even earthquake stability. There are even proposals from scientific research institutes to make a deal.

By the way, foreigners, primarily the Japanese, are interested in the invention. But Kim Yemel'yanovich himself has high hopes that his method will be widely used in his own country in the agricultural non-black earth zones.

By the way, if the prospect of cooperation interests anyone (i.e., only farms and organizations, not individual builders) the business address kv. 4, ul. Usiyevicha 11 a, Tambov, 293041.

The Kotenev family thus solved its problem by creating a co-op. It sees the co-op as multi-faceted, not just for construction. So the inventor's experience shows that if a new idea is worth it, it is easier for it to find a use under the current conditions. It may even become the basis for a private business.

## MNTK Forms International Marketing Cooperative

*18140127a Moscow NTR: PROBLEMY I RESHENIYA in Russian No 21, 8-21 Nov 88 p 2*

[Article by S. Tachayev under the rubric "The Pulse of the Scientific and Technical Revolution" (Leningrad): "Ankor Is a Middleman"; first paragraph is NTR: PROBLEMY I RESHENIYA introduction]

[Text] The USSR annually patents abroad about 700 inventions—as many as the average sort of western firm. It is not many. But even those enterprises of ours, which do produce quite competitive products, cannot "serve" them in a fine manner due to the embryonic state of advertising, poor design, and the lack of information on foreign rivals.

The Ankor-Marketing Intermediary Cooperative, which was recently formed under the Mekhanobr Interbranch Scientific Technical Complex, has undertaken to fill this gap. Ankor is an abbreviation which means "analysis of the competitive ability" [analiz konkurentosposibnosti].

"The goal of our firm is to increase the effectiveness of the foreign economic activity of Mekhanobr and other enterprises of Leningrad," explains Candidate of Technical Sciences V. Vasilyev, chairman of the cooperative. "In contrast to other state and cooperative organizations, we perform the entire set of operations from the evaluation of the competitive ability of developments to patenting abroad and foreign economic realization. Special attention is being devoted to the analysis of the activity of foreign firms, the study of the world market, and on the basis of this the correct choice of partners and forms of cooperation."

While at exhibitions of foreign technologies, I have repeatedly heard: "Ours do not amount to anything!" The appraisal as a whole is justified, especially with respect to consumer goods. The magic of the "firm" also affects specialists with powers, who willingly purchase equipment abroad.

"Nearly all the foreign firms on the Soviet market want just one thing—to sell products," Vsevolod Dmitriyevich continues. "There is no use hiding it, in many areas of industry we have fallen noticeably behind, and the purchase of goods abroad is an expedient matter. But this 'inferiority complex' is going too far, and Soviet enterprises at times purchase products that are advanced only in their packaging. Recently our cooperative studied the affairs of one foreign firm, from which equipment was purchased. The conclusion: the firm is not considered recognized on the world market and sells very little, while we purchased products of yesterday. Unfortunately, specialists turned to Ankor too later, after the conclusion of the deal. In order not to give up after a fight, we advise turning to us in good time. Ankor will help to take the foreign firm down a peg, will determine the optimum form of cooperation with it, and will draw up a draft of license contracts."

In addition to the Mekhanobr Interbranch Scientific Technical Complex, which is a collective member of the cooperative, the Kirovskiy zavod Production Association, the Central Scientific Research Institute of the Maritime Fleet, enterprises of the ministries of shipbuilding and geology, and others appear among the clients. In all contracts for comprehensive studies in the amount of more than 300,000 rubles have been concluded.

One of the directions of the activity of the cooperation is the selection of promising inventions. Those which for bureaucratic reasons science and industry do not want to introduce.

I believe that the assistance of Ankor will also be required by organizations, which are seeking an outlet to the foreign market and do not want to sell their products for next to nothing. There are also difficulties here. The capitalists, alas, are not following the Soviet market—they have stopped expecting prompt agreements and colorful advertising. Therefore, Ankor is also planning the holding of exhibitions with modern advertising, to which one is not ashamed to invite "firm men."

That is what kind of unusual cooperative is working on the 21st Line of Vasilyevskiy Island, House 8a.

## Progress Report on CEMA Comprehensive Program for S&T

*18140127b Moscow NTR: PROBLEMY I RESHENIYA in Russian No 23, 6-19 Dec 88 pp 4, 5*

["Abridged version" of speech by CEMA Secretary V. Sychev at the International Practical Conference "The Scientific and Technical Revolution and the Strategy of the Socioeconomic Development of the CEMA Member Countries" in the middle of November 1988 at the Academy of Social Sciences attached to the CPSU Central Committee, under the rubric "The Problem Up Close": "Three Years Have Passed"; abridgment by V. Baronin. Passages in boldface as published; first three paragraphs are NTR: PROBLEMY I RESHENIYA introduction]

[Text] The Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 (KP NTP) was adopted at the 41st (extraordinary) meeting of the CEMA Session in Moscow in December 1985.

What has it been possible to do? This was discussed at the International Practical Conference "The Scientific and Technical Revolution and the Strategy of the Socioeconomic Development of the CEMA Member Countries," which was held in the middle of November at the Academy of the National Economy attached to the CPSU Central Committee.

Today we are publishing the abridged text of the report, which CEMA Secretary V. Sychev delivered at the conference.

The Comprehensive Program (KP NTP) is the long-term strategy of the cooperation of the CEMA member countries in the development and use of fundamentally new types of equipment and technology by the concentration of the efforts of the countries in five priority directions: the electronization of the national economy, its integrated automation, the rapid development of atomic power engineering, the development of new materials and the technologies of their production and processing, and the rapid development of biotechnology.

These directions were chosen owing to the fact that advanced achievements of science and technology, which make it possible to bring about qualitative changes in all areas of the national economy and to convert it to a fundamentally new material and technical base, are at their basis. Not by chance does the program envisage by 2000 to increase labor productivity by at least twofold and to reduce drastically the specific consumption of power and raw materials per unit of national income.

Now about the results in the individual directions. More than 350 organizations of the CEMA member countries are working on the elaboration of 35 problems of **the first priority direction—"The Electronization of the National Economy."** The supply of all the sectors of the national economy with advanced computer hardware, means of communication and information transmission, television and radio broadcasting, as well as items of electronic engineering is the main goal of cooperation (when fulfilling 800 assignments of this direction). First of all the problems of developing a supercomputer with a performance of more than 10 billion operations a second with the use of elements of artificial intelligence are being worked on. By 1988 the development of six promising models of the Ryad-3 Unified System of Electronic Computers, seven models of personal computers, five types of small computers and basic modules had been completed.

Of the completed developments of **the second direction—"The Integrated Automation of the National Economy"**—it is possible to name the developed 5 robotic complexes (machine tool), including for the machining of shafts and flanges and the grinding of disks, as well as 12 types of automatic manipulators and industrial robots for the unloading and loading of parts; an NC internal grinding machine; hydraulic cylinders for industrial robots, and others.

Within **the third direction—"The Development of Atomic Power Engineering"**—the development of 56 types of new products with the organization of specialized and cooperated production is proposed.

The operations on the development of one of the units for the study of controlled thermonuclear fusion—the Tokamak-15—have entered the final stage. I will recall that during the experiments on the Tokamak-10 unit a record temperature of the electron component of plasma—100 million degrees—was obtained.

In all 82 types of new materials and 95 types of advanced equipment and technological processes should be assimilated as a result of cooperation **in the fourth priority direction—"New Materials and the Technologies of Their Production and Processing."** Specific results have already been obtained: the production of throwaway inserts based on oxide and oxycarbide ceramics was organized, the industrial production of freon-resistant shockproof polystyrene for household refrigerators was set up, a new high-strength material made of stainless steel fibers for the production of high-energy heat exchangers of complex form was developed, and, finally, a pilot-scale industrial plant for the obtaining of steel amorphous band more than 100 millimeters wide was established.

Within **the fifth priority direction—"The Rapid Development of Biotechnology"**—the industrial assimilation of preparations of soil microorganisms for various agricultural crops, vaccines against foot and mouth disease, interferon, a number of testing systems for the diagnosis of human diseases has been started.

Summarizing the first 3 years, I would like to note that the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 has already played a positive role in the intensification and stimulation of multilateral cooperation.

This found expression, first, in the achievement of an unprecedented scope of the work. More than 1,500 organizations of all the countries, including about 500 Soviet organizations, are participating in the implementation of the program. Work is being performed on about 3,000 assignments, which envisage the development of more than 2,500 new types of equipment, technologies, and materials.

Second, the very short time, which is specified in the majority of problems of the Comprehensive Program, required the efficiency of the settlement of various questions to be increased substantially, bureaucratic correspondence to be reduced to a minimum, departmental barriers to be vigorously overcome....

It is possible to continue further the discussion on the achievements and results, but, as they say, what has been done is our doing. In this connection it is much more useful to talk about what is hindering vigorous progress.

The 3 years of experience of working on the fulfillment of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000

made it possible to identify a number of serious problems which are connected with the imperfection of the mechanism of its implementation.

Let us begin with the fact that during the formulation of the program several completed developments or developments being completed, which, as it turned out later, were not of vital importance and, thus, did not conform to the goals of the program, proved to be included in it.

Jobs, which should have been assigned to the level of sectorial jobs or even a lower level, also made up a significant percentage.

Here it turned out that the assignments of the state level, according to several estimates, come to about 47 percent. Owing to this the completion of developments and the assimilation of their results in industry did not make a substantial contribution to the national economy of the CEMA member countries.

Unfortunately, there ended up to be among the coperforming organizations of some assignments or others those, which did not have experience of cooperation, did not know the possibilities of their partners, and did not have a modern technical and material base, without which development at a high technical level and in a short time is impossible. Not by chance in the past years have many countries changed the composition of the performers of assignments, for the level of developments was lower than the requirements and tasks of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000. Moreover, this level in many cases was evaluated after the approval of the detailed programs of cooperation.

This circumstance also served as one of the reasons that developments, which have been completed and turned over to production, thus far have not influenced in any way appreciably the economic growth of our countries, the expansion of their export potentials.

About another bottleneck in the implementation of the Comprehensive Program. I have in mind the large-scale assimilation of developments on the basis of specialization and cooperation with enterprises and organizations of the CEMA member countries. This question should be studied already at the stage of research and development. In practice this is not happening. The majority of programs of cooperation have been agreed upon by the participating countries only with respect to scientific research work and experimental design work as the least resource-consuming part. With respect to the questions of cooperation at the stages of the assimilation of production and the marketing of new equipment and technologies uncertainty remains to this day, inasmuch as the head organizations, as a rule, are scientific research or planning and design organizations and do not have either production capacities or an influence on industrial enterprises.

In many cases the parameters and operating indicators of the final product of research and development are unclear. This is preventing the countries from determining their own needs for this product, which in turn does not make it possible to advance sound proposals on the specialization and cooperation of production.

Moreover, the settlement of the questions of organizing the industrial assimilation of developments of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 on the basis of specialization and cooperation is coming up against difficulties when coordinating the prices for reciprocally delivered products.

The lack of special-purpose financing is a serious shortcoming in the implementation of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000. As is known, the program envisages three types of financing of operations: with the internal assets of the organization of each country, which has received a portion of the operations; by means of credits of the international banks of the CEMA countries; by the creation of special joint funds. Meanwhile, the analysis showed that the assignments of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 are being financed only by the first method, that is, each organization performs work within its own budget. Here general estimates for the performance of work on problems, as a rule, are also lacking, while sources of investments for the assimilation of the results of research and development by industry are not envisaged. This is also contributing to the breaking of the "science—technology—production— marketing" cycle in its most important part—the changeover to industrial production. But the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 was drawn up with allowance made for precisely this entire cycle!

In this connection it is rather interesting to turn to the experience of implementing the West European Eureka Program. The preliminary study of projects (assignments) at all the stages of their formulation is its most important peculiarity. Here considerable attention is being devoted to the initial stage:

— the suggestions on a project are thoroughly studied and substantiated, the total cost of the entire set of operations and the time of their accomplishment are determined;

— the thorough examination of all submitted proposals is a part of the procedure of approving projects;

— competitiveness is encouraged when considering the projects.

In the Eureka Program each country (or organization), which is interested in participating, contributes specific

assets to a common fund, which covers the basic expenditures on the formulation of the project. This fund is used in a centralized manner by the management of the project. Such financing makes it possible to control more efficiently the progress of the formulation and introduction of a program.

Great importance is being attached to the stimulation of the participants in a project. In the Eureka Program special funds made up of payments by the countries and the EEC for supplementary financing are being created for these purposes. The participants in developments of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000, except for additional organizational problems, do not receive any benefits. As a result they have little interest in extending cooperation. Precisely for this reason only the elaboration of several general technical requirements and standards is in many cases the result of joint scientific and technical cooperation within CEMA.

Another important consideration. Its essence is that in the capitalist countries the formulation of programs begins with the stage of the formation of information systems, which become components of their infrastructure. Within the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 there are only individual fragments of such information systems, which are connected with publishing activity.

The participation of large industrial firms in the programs of the capitalist countries eliminates the question of the quickest introduction of the results of completed projects. Within the assignments of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000, as was already noted, the transition from the stage of the development of prototypes to their mass production thus far has not been finished, which in many respects is explained by the lack of an interested client.

The progress of the completion of the operations within the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 was examined in detail at the 43d and 44th meetings of the CEMA Session, the participants of which elaborated a set of steps on the elimination of the existing negative phenomena.

In this connection close attention should be directed to the problem of the economic effectiveness of cooperation during the implementation of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000. Under the conditions of administrative methods of the management of cooperation the question of its effectiveness for the coperforming organizations was of quite abstract importance: all the measures were financed from centralized sources, while the exchange of products with partners simply did not affect the results of their economic activity.

The introduction of self-support [samookupayemost] and self-financing will already in the immediate future force enterprises and organizations to approach critically the evaluation of the profitability and advantages of cooperation with organizations of other countries in the solution of scientific or production problems. Meanwhile, the analysis shows that the overall balance in such calculations is in far from all cases in favor of cooperation.

It is significant that in the practice of coordinating the contract prices for the results of research and development and models of instruments and equipment in accordance with the assignments of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 the partners in an unfounded manner overstate the prices, the asked amounts greatly exceed the real value of the results being transferred.

Thus, the economic reforms, which are being carried out in the CEMA countries, are raising quite pointedly the question of the adaptation of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 to the new economic conditions. It is necessary to establish a system which stimulates the direct interest of organizations and enterprises in the fulfillment of the assignments of the program. Here it is important to find an opportunity to divert attention from immediate commercial advantages. The interest of developers and production workers should be concentrated on the prospects of long-term cooperation and its potential results.

I would like to direct attention to the factor of the dynamic nature of our work or its reverse. Back at the 41st meeting of the CEMA Session when adopting the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 the decision on the necessity of its periodic updating and development was made. Today it is difficult to say that everything here is in order. Thus, for example, so far such a problem as high-temperature superconductivity, with which the most important breakthroughs in equipment and technology are connected today throughout the world, has not been included in the program. For the present the sluggish study of proposals on the updating and development of the program, which, moreover, are of a cosmetic nature, is taking place in CEMA organs.

The task today is to organize cooperation when fulfilling the projects of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 on an economic basis with the unfailing observance of the interests of all the participants in the "science—technology—production—realization" cycle.

In this connection the proposal of Academician Paton on the establishment for the implementation of the projects of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000 of consortiums or associations, of which large producers,

developer organizations, consumers of the finished product, and national and international banks of the participating countries can be members, merits attention.

In conclusion I would like to note the following. The negative things, which are connected with the fulfillment of the Comprehensive Program of Scientific and Technical Progress of the CEMA Member Countries to 2000, are due to the shortcomings of the existing mechanism of cooperation. Therefore, in CEMA the question of its radical structuring, particularly the study of the conditions for the possibility establishment of a combined market, has been raised.

This task is difficult and requires careful scientific analysis. We hope that the representatives of the social and economic sciences of the CEMA member countries will join in the process of developing a reliable theoretical base for the quickest restructuring of the mechanism of multilateral cooperation. This is the only realistic means for accelerating scientific and technical progress in the countries of our socialist community.

## Soviet Scientists Visiting West Urged To Meet Emigre Counterparts

*18140143b Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Feb 89 p 3*

[Interview of Academician Yuriy Vasilyevich Gulyayev, director of the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences, by N. Mosin: "Dialog with Emigres; It is Being Started by the USSR Union of Scientific and Engineering Societies"; first paragraph is source introduction]

[Text] Emigres.... For long years, it was impressed upon us that these people who for various reasons left to live abroad, were thieves, chasing after easy money, traitors, even enemies of the people. But today one of the accomplishments of the new thinking has been the creation of an international commission attached to the USSR Union of Scientific and Engineering Societies relating to ties with our former compatriot scientists and specialists. Here is what Academician Yu. Gulyayev, a member of the commission and director of the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences, says:

**Y. V. Gulyayev:** I must admit that I myself have not fully realized how much more we have become tolerant and caring and, finally, more honest to ourselves in the years of perestroika. Imagine: today we ourselves will be seeking to make contact and interact with people who only yesterday many of us tried not to recall. Everyone remembers how only recently our former compatriots—major scientists and engineers—were not invited nor even permitted to attend international meetings held in the country. And Soviet specialists going abroad on an assignment or on a holiday were told not to associate with these people. Actually, the problem of emigration is not so simple that it can be solved with the help of prohibitions and restrictions. We are beginning to understand only now that in the behavior of these people far from everything is ambiguous. In order to decide on leaving the Motherland, very strong motives are required.

Our country has gone through several waves of emigration. And each of them unfortunately has taken with it into far-off lands many talented and honest writers, artists and scientists who loved their Motherland. But this is not an accident: the fact is that the intelligentsia more acutely and painfully perceives everything that happens to its Motherland. The first wave of emigration began after the events of 1905, the second at the time and after the 1917 revolution. Many war prisoners and those brought out for work in the years of the Great Patriotic War remained abroad, fearing repressions. It is possible to understand these people somewhat. It is much more difficult to look with moderation at the fourth deliberate way of emigration which took place during the period of stagnation.

SOTSIALISTICHESKAYA INDUSTRIYA: How many of our scientists decided to leave the country?

**Y. V. Gulyayev:** I can only speak of people who are physicists by profession. The fate of many of them is known to me, and I maintain contacts with some of them. For example, senior scientific associate R. Kazarinov, a specialist with a world-famous name in the field of semiconductors, works for the American Bell Telephone Company. A. Kaplan, a former staff member of our institute, is now a professor heading a department at Johns Hopkins University. He is a recognized authority in the field of optoelectronics. A. Khachaturyan, whose books have become manuals for specialists in the field of physics of metals, is at a university in Berlin. The former Leningrad physical and technical specialist M. Shur is today a professor at Minnesota State University in the city of Minneapolis.

But I want to remind you that among our compatriots abroad there are not only those who left recently. Among Russians, there are many emigres who are in their second, even third generation. For example, the head of a department at the famous computer-making IBM company is A. Malozemov. He brilliantly speaks Russian and considers himself a Russian and his homeland as Russia. Although he was born far from it, A. Maradudin, the son of a White Russian emigre, is a famous physicist in America.

All these are physicist scientists and, as is said, of the first magnitude. I referred to far from everyone whom I know personally. And who are famous specialists throughout the whole world. And it also would be possible to name many outstanding mathematicians, geneticists, chemists, biologists and representatives of other professions. And engineers could also be added to them. Evidently, the count could reach many thousands. We so far have not had such statistics. We are only

beginning to learn about our specialists who went abroad. And we will be grateful to everyone who helps us in this.

I will say further that we do not intend to leave out of our field of vision representatives of the scientific and technical intelligentsia who are only thinking of leaving the country. In particular, we should now try to establish contacts and agree on possible cooperation. If similar steps should be taken on their side, they would find understanding among us.

SOTSIALISTICHESKAYA INDUSTRIYA: Yuriy Vasilyevich, you have been proposed as a candidate for election to the people's deputies of the USSR. Would work with compatriots somehow be reflected in your program?

**Y. V. Gulyayev:** Without a doubt. As a deputy candidate, I intend to see to it that the efforts of the community in the direction of expansion and strengthening of cooperation receive comprehensive state support.

SOTSIALISTICHESKAYA INDUSTRIYA: Tell me, are you confident that there will be a response to your proposals for cooperation and will they be accepted? After all, many of them left our country to sever ties with it for all time.

**Y. V. Gulyayev:** In life, miracles still happen. Once I was walking in New York and suddenly heard someone hailing me in Russian. Turning around, I could not believe my eyes: before me stood Nina Danchenko, an engineer by profession and a former associate from our institute. In my youth I was together with her in the institute's Komsomol Committee. Subsequently she married a Canadian musician and left with him. For a long time we talked about life. In general, everything is fine with her. But in her soul, she is always with us.

Possibly I have been lucky: in my meetings with former compatriots none of them threw mud at the Motherland. I will also say: an impression was created that most of them in the depths of their souls continue to consider Russia, the Ukraine, Lithuania or Armenia as their homeland. One should not forget that many of those who left expressed disagreement not with socialism itself but with the form of its realization at that time.

I confess that I did not meet a single person among the emigres who in one way or another did not want to help us. You know that if there is something sacred in the soul it would be children and a feeling for the Motherland. It is not the Motherland that obliged many of our compatriots to look for a refuge and understanding in alien lands. They know this. And at this time, due to the onset of changes in the country, a wave of interest and a desire to take part within their power in perestroika are growing among our emigres. Recently I met a very well known physicist who left during the stagnant years. Even he admitted that today he would not have left the country for anything.

Of course, it is necessary in each concrete case to soberly assess with whom we are dealing. And the degree of resentment varies. Both the life situation and position are individual in each case. This means that one has to talk differently with each individual.

SOTSIALISTICHESKAYA INDUSTRIYA: We have different organizations maintaining ties with our compatriots who have gone abroad. Would you not be duplicating them?

**Y. V. Gulyayev:** In contradistinction to these organizations, we want to concentrate attention solely on scientists and engineering and technical personnel. Both on the professional level and from the point of view of life interests, the people of this group have much in common. It is a lot simpler for them to find a common language. In addition, we do not want simply to visit each other as guests but there where possible to turn relations onto a business plane. Joint work is the best course to mutual understanding. I am confident that the more organizations engaged in cooperation, the more diversified the forms of their activities, the faster will we learn to respect each other.

SOTSIALISTICHESKAYA INDUSTRIYA: Are there any sorts of proposals and concrete steps on the path of cooperation?

**Y. V. Gulyayev:** We as yet have not left the search stage. For this reason we do not have any ready prescriptions. But A. Kaplan, for example, has already proposed to accept for study one or two of our graduate students. A comparable proposal was once made by A. Maradudin. Their value becomes understandable if we remember that the situation in regard to the training of our students, graduate students and young scientists in the world's scientific centers leaves much to be desired. In the United States, about 20,000 Chinese students study each year. Even today ours number only 11.

Incidentally, most emigres who have attained a prominent position in their new homeland are most actively helping their countrymen in acquiring a profession, improving qualifications and establishing mutual contacts. A great deal of energy is given to this, for example, in Oxford by the well-known Hungarian physicist Solimar. And only we just don't seem to get started.

Many of our countrymen occupy a high position and enjoy considerable prestige in scientific, technical, political and public circles. Who but they can best help millions of simple people living in this country to believe in the sincerity of our intentions? A similar position is to be found in economics and science. We have become

accustomed to act only through official channels. But practice shows that personal contacts and informal ties are much more effective.

Why not, for example, create abroad with the aid of our compatriots joint laboratories, enterprises, institutes and temporary groups? On the other hand, scientists abroad should more widely resort to the expert examination and realization of our plans. The forms of cooperation could be most varied. And we hope that both Soviet scientists and their foreign colleagues would come to our commission with concrete proposals and ideas.

SOTSIALISTICHESKAYA INDUSTRIYA: Tell me, Yuriy Vasilyevich, don't you feel a certain inner awkwardness: first we forced people to leave, but now we propose to them to cooperate?

**Y. V. Gulyayev:** In recent years, we learned so much that is new and unexpected about ourselves that many of us, I believe, have repeatedly experienced a feeling of bitterness, resentment, shame and bewilderment. For the most diverse reasons. What should we do now? We need to untangle these knots. We have not even come near the emigration problem, we are still taking the first steps. But I am confident that our former compatriots clearly differentiate between that which happened earlier and that which is taking place in our country today. The new thinking has touched even them. I think that both they and we need to deal as quickly as possible with mutual recriminations, resentments and misunderstanding. In the final analysis, the Motherland is the same for all of us.

## Soviet Members of 'International Computer Club' To Use French Computers

*18140143a Moscow NTR: PROBLEMY I RESHENIYA in Russian No 1(88), 1989 p 3*

[Interview of V. Pavlenko, export director of the SDS firm, France, to countries of East Europe and China, and B. Hopkins, head of educational programs for the organizations Young Ambassadors of America and Builders of a Single Society, United States, by Yu. Meshkov: "The International Computer Club Opens Its Doors"; first two paragraphs are source introduction]

[Text] In December, the founding conference of the International Computer Club (MKK) was held at TsMT [expansion not available]. The first step was taken with the creation of the Interznaniye [Interknowledge] International Association, the "brain center" which the International Computer Club is bound to become. Its principal task is to cooperate in the use of computer and communication technologies for the benefit of improving international ties, mutual information and trust.

Our correspondent Yu. Meshkov talked with two of the first foreign members of the International Computer Club who took part in the conference.

Interview of V. Pavlenko, France, export director of the SDS firm to countries of East Europe and China:

NTR: PROBLEMY I RESHENIYA: What does the firm expect from its participation in the International Computer Club?

**V. Pavlenko:** We are interested in the use of the Soviet programmers' potential for the development of general programs. Later we could sell these programs in Western Europe and the Soviet colleagues in the USSR and the CEMA countries.

NTR: PROBLEMY I RESHENIYA: Will you selling or promoting dissemination?

**V. Pavlenko:** We still have to reach agreement on a multitude of financial questions and on copyright. We could assume the role of a middleman in these trade operations. Despite the changes taking place in the USSR in the economy, it is still quite difficult for Soviet organizations to enter the Western market. Ignorance of market conditions and lack of experience in handling commercial deals are apparent. There are many organizations which have something to offer Western partners, but it is very difficult for them to open their own currency account. We could open such accounts on the basis of a mutual agreement, as this can be done in 15 minutes in Europe. In a word, freer access to the Western market is needed. I am confident that the way will be in the form of software, and not only from the Soviet Union. Initially this all will be done obviously the other way around: for the development of software, hardware and suitable programmers are required. For the establishment of such channels, both sides need initiative and freedom in making decisions.

NTR: PROBLEMY I RESHENIYA: What will the first steps be your firm will take in the International Computer Club?

**V. Pavlenko:** They have already been taken. We in particular made arrangements with the French firm Bulle, also a member of the International Computer Club, on granting to Soviet specialists temporary use of several computers of this firm. Before the start of deliveries of computers through our firm, this will serve as a kind of solution in the situation. In any case, these are excellent computers, and even today one can start work on them on a program of assistance to Armenia, which, as you know, is one of the first-priority plans of the International Computer Club. (See NTR, No 24, 1988—Yu.M.). In France as well as among Western European firms and computer clubs, we shall launch a campaign to join the International Computer Club and organize the collection of monetary resources for the purchase of computers for the just organized international club in Moscow. A number of firms are ready to offer their computers as a gift to the new organization. But here I think it is necessary to resolve immediately problems of customs duties. In my opinion, it is unnatural to levy a

duty for such a form of assistance. In addition, an agreement exists that our firm, as a cofounder of the International Computer Club, will make its entry fee in the amount of 250,000 rubles through the delivery of computers in this amount.

Interview of B. Hopkins (U.S.A.), head of educational programs for the organizations Young Ambassadors of America and Builders of a Single Society, the first individual member of the International Computer Club:

NTR: PROBLEMY I RESHENIYA: What interests brought you to the International Computer Club?

**B. Hopkins:** I as a teacher in education am interested in problems of development of educational computer programs. In particular, the experience of Soviet programmers. I want to study the Russian language with the help of a computer and at the same time to advertise my own products among Soviet specialists.

NTR: PROBLEMY I RESHENIYA: What will you tell your colleagues about the International Computer Club when you return to the United States?

**B. Hopkins:** I shall try to convince them to also join this club—our entire organization of Young Ambassadors of America. This is a good bridge for the development of contacts between East and West. Incidentally, the paper which we are now publishing for the second year is called THE BRIDGE. The degree of its durability depends on each us standing at its two sides.

## Exhibition Shows Computers To Be Imported from PRC

*18410154 Moscow SOVETSKAYA ROSSIYA in Russian 3 Feb 89 p 1*

[Article by S. Kapustin: "Electronics From 'The Great Wall'"]

[Text] ***An exhibit of personal computers from the well-known Chinese company "Great Wall" has opened in Moscow at VDNKh's [All-Union Exposition of the Achievements of the National Economy] Computer Pavilion.***

"We've scheduled this technical exhibit for the negotiations beginning February 9 between the KNR [PRC] and USSR on the supply of Chinese computers," says Chi Wei, company chairman. "The goal of our exhibit, which is so far only for organizations, is to identify the specific quantity of electronics which we can exchange for Soviet goods. Representatives of almost all Soviet ministries have already visited us. The proposals gathered include some rather interesting and, of course, mutually beneficial ones. The visitors' book already has many addresses and comments. Specialists rightly noted the total compatibility and similarity of our computers with American computers. We will hope that in the near future we will ship Chinese electronics equipment not only to the USA, Japan, and Hong Kong, but also to the Soviet Union."

## Problems in Forming an Information Society

*18140128a Moscow NTR: PROBLEMY I RESHENIYA in Russian No 22, 22 Nov-5 Dec 88 p 3*

[Interview by F. Vladov with Professor A.I. Rakitov: "We Did Not Know Too Much..."; first paragraph is NTR introduction. Passages in boldface as published]

[Text] **The first All-Union Symposium on Social and Methodological Problems in Information Science, Information Technology, and the Informatization of Society was held in the city of Obninsk, near Moscow. This is a unique stage in the new movement for the creation of an "information society," which appeared in 1986, in our country. Professor A. I. Rakitov, chairman of the symposium organizational committee, tells our correspondent F. Vladov about this movement, which unites the most diverse specialists.**

Until last year, the expression "information society" itself, if used at all, then only in a profane context, as something inherent only to conservative capitalism. In actuality, this is a society in which the production of services and information holds a central place. It is worth stating that information is a necessary condition for the development of the national economic complex. We have created a powerful socialist industrial society, but, as has now become obvious, with a backward structure, confused communications, displaced distribution relations, etc. We have solved present-day, sometimes immediate tasks, putting off of the rest "for later." "More steel," "more tractors," "more specialists"... Today we smelt almost as much steel, as the whole rest of the world, and the number of Soviet engineers or, for instance, tractors, somewhat exceeds the number of American ones. Nevertheless, we experience a shortage of one thing or another, then another, and then something else. The trouble is that the concept of what and whom all this wealth is for, and of how to use it most rationally, was never developed in a timely fashion.

Most shortcomings—in ecology, health care, education and so on—have occurred because of the inadequacy of our knowledge. Very frequently, we either did not know the true state of affairs, or the world situation in one or another field and, correspondingly, we were unable to predict consequences or use world experience to solve the most important problems. In short, we did not know too much, although we nonetheless thought that we could live this way. However, just as a chronic disease sooner or later goes into a sharp relapse, so was our ignorance manifested in very painful social processes.

Right now, the idea of the beginning of a society, based on knowledge (knowledge society [this was in English—Translator]), is becoming increasing widespread throughout the world. Those countries which do not manage to do this, will become their own sort of information colony. Therefore, we must urgently engage in developing nothing more nor less than a new social ideal—information socialism—and our efforts should be aimed at its interpretation and creation.

Much attention is devoted to the strategy of informatization by all developed countries. Virtually everywhere, the corresponding conceptual development has already appeared and articles and monographs are coming out in a continuous flow. Even in little Switzerland, one of the latest books on this topic lists hundreds of works in the bibliography. We have only a few articles and one review.

Nonetheless, definite shifts are taking place. At the symposium, we discussed how the instructions of higher agencies concerning the development, on a competitive basis, of the concept of informatization of Soviet society are being fulfilled. Two collectives are working on this: in Moscow and in Kiev. Work on the first version should be finished in December.

In itself, competition between projects is, unquestionably, the correct way. However, how come there are only two participants in the "competition?!" Moreover, it was discovered in the course of the discussions that these developers, both groups, lack the necessary goal-oriented studies. We still know little about society's information needs, its information saturation, dynamics and prospects.

Furthermore, the projects are of a primarily scientific and technical and engineering nature at first glance. Meanwhile it is unclear, how much they will reflect social, moral, world-outlook, cultural and other very important aspects, since the corresponding specialists in said groups are clearly lacking. The development work is being done wondrously secretly, and scientific society does not in fact know about them.

The important conclusion that the symposium participants made is that we must not create large state concepts, particularly on the informatization of society, on a departmental basis. This requires comprehensive interdepartmental collectives and serious scientific studies.

Hence, the decision arose to create an independent institute for the informatization of society on the basis of social principles. The members—I emphasize, members, not employees—of this institute will be involved in cooperation based on social principles, i.e., scientists will invite scientists. Any professional who has adequately proven himself in this field and wants his ideas and programs to be discussed by a circle of interested colleagues may become a member.

If his ideas are truly worthy, we will be able to assemble the "team" needed in order to develop and implement them, and will conclude an agreement. This is all with a minimal overhead, since we will have virtually no staff bureaucratic apparatus.

We are trying to create "risk capital" which, as everyone knows, has become one of the most important sources behind the improbably rapid development of the computer industry in Western countries.

Incidentally, fears were repeatedly expressed that our social institute will not last without serious payment for work: they say, "scientific workers will not join you." In such cases, I always remember the words of my colleague, Professor I.S. Kon, who once remarked that "scientists create science, but scientific workers live at its expense." So, we need scientists here, and we are inviting precisely them. We hope precisely for them.

## Role of 'Shadow Economy' in S&T Progress

*18140128b Moscow NTR: PROBLEMY IN RESHENIYA in Russian No 22, 22 Nov-5 Dec 88 p 7*

[Article by O. Osipenko, candidate of economic sciences: "Scientific and Technical Progress and the 'Shadow Economy'"; first two paragraphs are NTR introduction. Passages in boldface as published]

[Text] **Since the relatively recent days, when the term "shadow economy" was granted citizenship here, up to the present time, somehow only the system for various kinds of "left-sided" services related to this term. This is an obvious misunderstanding.**

**In reality, it is represented by three interrelated sectors of the illegal economy: spontaneous artel and individual labor activity, the "black" market in commodities for mass and industrial consumption, and organized economic crime.**

The scale of the first sector is already impressive. Here, 20-30 million people engage in innocent, as they sometimes assume, amusements in the "toy store" of unregistered services. As a result, for every officially registered cooperative or "individual" worker, there are some 25-30 of their "underground" colleagues right now. Even according to very optimistic data from the Union statistical agencies, the country's population annually supplements the incomes of private individuals by a sum of 1.5 billion rubles for performing "left" services. The USSR Gosplan NIEI's [expansion unknown] calculations are more realistic. According to these data, turnover in the shadow economy in illegal services (representing, we emphasize, only one area of this sector) annually reaches 14-16 billion rubles, of which unregistered payments for medical services consists of 2.5-3 billion rubles, and for tutoring—1.5 billion rubles annually.

The results of surveys of representatives from different social and age groups, which have indicated that half of them (consequently, of us) acquire scarce goods through overpayment, is the "calling card" of the second sector in the shadow economy—the "black" market in commodities. This, I would like to note in particular, is not merely the caprice of an ordinary shortage, but a system for the planned formation of shortages, which involves both the activities of professional speculators, as well as paid blessings to those who engage in it while not leaving their basic work place in the state system of trade and services. The might of the latter can be judged by the data from another criminological study: 84 percent of those surveyed had been victims of extortion, and 73 percent—repeatedly.

The third sector, known simply as the mafia, has no need of a "character reference" at all. The reader well knows about the "cotton," "Rostov," "Moscow," "Sochi," and other cases. I will note only that all in all the annual turnover for the shadow economy on the whole reaches, by some estimates, a third of the sum kept by the population in USSR State Savings Bank institutions (283 billion rubles).

However, all these "figures" only characterize one aspect of the problem—the economic one. Yet, after all, the shadow economy gives rise to a shadow law, shadow morals, shadow social structures, etc. In short, indisputably, this is a serious and neglected disease. What are the methods of treatment?

The most diverse prescriptions are being suggested. One of the most radical (if one believes the authors) is to curtail economic methods of management and rehabilitate the directive-command methods, cleansing them of their bureaucratic coating beforehand. No exception is made for the spheres of scientific and technical progress (the work of independent cost-accounting centers, conversion of scientific research institutes and design bureaus to contract principles of work, scientific and technical cooperatives, and individual scientific and technical activity). Is there a shadow economy here? The point is that this typical attack by the "radicals" was inspired by a recently expressed version of the origin in the USSR of organized economic crime, which holds a central place in the shadow economy.

For instance, they claim that the mafia appeared here during the period of formation of a normal economic mechanism in the country, and that there was not even a ghost of it in the 1930s. The argument is as follows: an autocracy or a totalitarian regime do not permit organized economic crime. What kind of mafia was there, they say, when there was almost universal poverty throughout the country!

However, allow me, I cannot help but object: what was Beriya-ism, if not a highly organized, very rigid system of crime, leaning on the entire might of the state system? In the end, what makes the mafia a mafia, if not systematic, organized criminal activity, sooner or later taking on a greedy economic slant? Was Stalinism really just a system for suppressing political dissidence? Is it tangible or important for us if a "reborn apparatchik" puts the state's millions in his pocket or deprives you of your millions in the same amount? In order to keep such a right (the right to lean on the economy) for itself, it throws millions of people north and east to implement

the assignments of the "Stalinist 5-year periods" "in the historically shortest period of time?!" Is this not economic power, not income in a perverted politicized form?

True, the traditional view of the mafia is like that of an iceberg. The upper part is the "god-fathers," the "capo regime," "hits" and other general criminal filth. The lower part consists of corrupt ministers, judges, police, party leaders, etc. Yet, what if the block of ice is unified in its two hypostases? What if both the first and the second are contained in one person?

Unfortunately, all of these doubts are not a tribute to historic truth alone. Proceeding from the certainty that an ideal administrative system provides freedom from the mafia, but that commodity-monetary relations encourage it, one can come to ridiculous conclusions, as well as practical ones. The "radicals" have already made them: curtail the cooperative movement ("it provokes racketeering"), stop playing with leases and shares, and put "iron-handed" people in key positions, and not a trace of organized crime will remain. At the same time, I would like to add, nor will any trace remain of an economy with claims to world scientific and technical leadership.

Meanwhile, something in particular should be said about the increasingly more frequent attacks on cooperatives, under the slogan of crowding out the shadow economy. The ink of the text of the Law on Cooperatives is not even dry yet, and again we are hearing appeals, which were unpopular when its draft was under discussion, to re-examine this "unsuccessful experiment" (?!). What are cooperative workers being incriminated for this time? As it turns out, for the tendency of the legitimate cooperative sector to join with organized crime. Revealing cases of the organization of large-scale speculation under the guise of official artel activity, of corruption, and of financial abuses are cited. In this regard, the attempt to interpret the problems in the individual cooperative area of our economy as its own fault is simply obvious.

Conversely, the fact that a system for separating the civilized cooperative worker from the cooperative movement has been created and operates effectively is being persistently hushed up. After all, what is so remarkable about this system itself? We must still atone for the difficulties with supply, sale, and advertisement, which provoke the "understanding treatment" so desirable for "desk" officials on the part of cooperative workers (the author knows of cases, in which lines formed for giving bribes to the officials on whom these matters depend). Until the bribe, often simply nothing gets done: as before, an agreement from a "sponsor" organization and "voluntary" deductions for the rayon fund are required from cooperative workers, even at the registration stage. Meanwhile, not even highly respected scientific and technical cooperatives, unrelated to the shadow economy, risk jumping over the barrier of the slogan, which recently appeared in full primitive grandeur: "Halt attempts to entice highly skilled cadres from the state sector into cooperatives!"

Meanwhile, the "radicals" are trying to compensate for the lack of a direct tie by diligently overemphasizing an indirect tie which does not in reality exist. I recently had the "good fortune" to encounter the following opinion: in the future, scientific and technical cooperative [NTK] workers will be in the service of the shadow economy, since cooperative workers in lagging sectors (with which NTKs cooperate) have already become its full representatives.

Moreover, one gets the impression that distrust in the NTK is projected onto any small scientific collective. Of course, our readers know what sort of significance is given to small innovation groups in countries which lead in scientific and technical respects. I shall be so bold as to remind everyone that four-fifths of all inventions and innovations in the U.S. are made by small businesses. The mass de-concentration of traditional scientific and technical structures "from below" is not just the latest fashion and is no mere non-conformity game: the future belongs to small companies. "The time has come for companies which are small, but strong. Inventors' organizations should not be organized," believes Professor Kadzuo Noda, one of the organizers of the Japanese association of small innovation companies, "New Business Conference." The benefit of the legal independence of "venture" groups has also been realized in some socialist countries. For instance, this year a decision was made in the Chinese People's Republic to create technopolises—networks of special "super-open" scientific and technical zones where primarily small application companies, which have received solid privileges, will be located, concentrated in one part of the city.

According to authoritative Western estimates, the optimal "staff" of an independent applications group consists of seven people. Do the organizers of our science know about this? I am certain that they know. However, has anyone happened to hear of a fully independent, autonomous group with this number of employees that has detached itself, for instance, from a scientific research institute or design bureau? Not about a scientific and technical cooperative, but precisely about a state "separate laboratory" (if the analogy with separate divisions in troops is appropriate)? Hardly. Of course, so-called temporary collectives are being created in our research organizations. However, in my opinion, this is really reminiscent of playing at independence and of a tribute to fashion. What is the point of such "temporaries," if their collectives have neither legal, nor economic autonomy, and their leaders are not even free to solve the simplest cadre problems?

How come autonomous "ventures" are not being created on the basis of our scientific research institutes? (Of course, this is where they are objectively, i.e., taking technical and experimental features into account above all, possible). This question, which I asked one organizer of academic science, evoked stormy indignation: supposedly, this would mean converting the "structured system of powerful scientific and technical centers into a sea of uncontrollable cooperative workers." In this version of

our scientific and technical "originality," it is not so much the infamous controllability argument (in whose shadow, the comrades who possess power are preserving their own privileges), as much as the shining comparison, which draws attention. Apparently, it should be interpreted thusly: placing cooperatives on the same footing with future scientific and technical structures (as a polemic trick in this case—judging by everything, true equalization of rights is not seen even in nightmares) is a higher degree of condemnation, converting into contempt.

Oh, this undying faith in everything being highly-concentrated "from above," in semi-official organs! It would be surprising, if the omnipotence of this feeling did not spread even to the development of proposals for crowding out the shadow economy. Here, above all, is a word to advanced Soviet science.

Who among us is working on the systematic study of the shadow economy? Systematic—no one. Fragmented—yes, but only to the extent of departmental interests. The law enforcement structures reveal the greatest departmental greed (fully justified, by the way). What is so unexpected about the fact that even in mass publications the propaganda for measures of a purely legal nature, drafted in the scientific research institutes of respected departments, prevails? There is a broad choice of instruments here—from granting special authorities to particular subdivisions for the struggle against the mafia, up to beliefs, untroubled by doubt, in the omnipotence of a particular article in the criminal code which stipulates strict punishment for participating in an organized criminal formation. Among these examples, there are also measures "of a purely sociological nature," the pearl of which were the suggestions for the normative reinforcement of "the presumption of guilt": one is the granted the right to prove, for instance, that a dacha was built using earned income; if one does not succeed confiscation of the dacha and imprisonment for its unfortunate owner.

A considerably more modest role is assigned to measures of an economic nature for the simple reason that economic science, as before, is not seriously studying the shadow sector. Goskomstat avoids making official estimates of the scale of the shadow economy in the USSR, and therefore highly theoretical expert estimates prevail here at times.

However, the most dismal thing, perhaps, does not even lie in this. The most wonderful economic methods are being easily blocked by actual people in key posts. We willing do not want to note the fact that the "Cadres solve everything!" slogan was long ago taken to arms both by the home-grown mafia, as well as by the organizers of large-scale speculation. It would be all right, if it were only a question of "their" cadres, but I am referring to our own cadres, which so easily convert into "theirs."

Are we doing everything for restructuring in this sector, crucial for victory over the shadow economic? The first steps—the activity of labor collective councils and the election of line leaders in enterprises and VUZs [Higher Educational Institution]—have been taken. However, we must go further. After all, it is clear that under the conditions of healthy socialism, of course, the people should create cadre policy.

## AzSSR Science Officials Censured for Illegal Meetings

*18140130a Baku BAKINSKIY RABOCHIY in Russian 9 Dec 88 p 3*

[Article: "In the Azerbaijan SSR Academy of Sciences"]

[Text] The republic Academy of Sciences Presidium and a number of its subdivisions considered the question of the responsibility of leading and other scientific employees for failure to take effective steps to ensure the normal work of labor collectives, and for the participation by some associates in unsanctioned meetings and marches and other illegal actions.

Doctors of philosophical sciences, directors Ya.V. Karayev, Institute of Literature imeni Nizami, Dzh.V. Kagramanov, Institute of Manuscripts, and A.A. Gadzhiyev, Museum of Azerbaijan Literature imeni Nizami, were severely reprimanded for failure to ensure high labor discipline and failure to take serious steps to prevent participation in illegal meetings on the part of a number of associates at the scientific research institutions which they manage. They were all warned that more severe measures would be applied, if labor discipline in their collectives is not restored as soon as possible.

A.K. Aliyev and A.M. Farzaliyev, leading and senior scientific associates at the Institute of Manuscripts, were released from their posts for long absences from work and participation in unsanctioned meetings.

R.N. Aliyev and G.G. Gerischi, senior and junior scientific associates at the Institute of Azerbaijan Literature imeni Nizami, were released from their posts for gross violations of labor discipline and participation in demonstrations. Kh.R. Khalilov, senior scientific associate, was severely reprimanded. He was warned that more severe measures would be taken in the event of a similar occurrence.

M.F. Gatemi, senior scientific associate at the Museum of Azerbaijan Literature imeni Nizami, was released from his post for failure to implement the decisions of the collective's general meeting, gross violations of labor discipline, and active participation in illegal meetings.

AzSSR Academy of Sciences corresponding members, directors V.Dzh. Gadzhiyev, Institute of Botany, and M.I. Rustamov, Institute of Petrochemical Processes, were severely reprimanded for failure to take the necessary steps to prevent the participation of associates in unsanctioned meetings and demonstrations. They were warned that more severe disciplinary measures would be taken if similar events were repeated in the collectives they head.

The matter of the improper actions of R.G. Rizayev, director, Institute of Inorganic and Physical Chemistry, republic academy of sciences corresponding member, will be considered immediately after his appearance at work.

A.K. Kuliyev and A.S. Safarov, scientific associates, and M.S. Guseynov and M.A. Valiyev, senior scientific associates, Institute for Petrochemical Processes, were released from their posts for violating the requirements of a special statute of the city of Baku, as well as of the USSR Supreme Soviet Presidium Ukase "On the Procedure for Organizing and Conducting Gatherings, Meetings, Street Marches and Demonstrations" of 28 July 1988 and the corresponding AzSSR Supreme Soviet Presidium ukase.

## Civil Unrest, Disturbances Affect AzSSR Academy of Sciences

*18140144 Baku BAKINSKIY RABOCHIY in Russian 20 Dec 88 pp 1, 2*

[Article (AZERINFORM): "Increase the Contribution of Science to Restructuring. The General Assembly of the Azerbaijan SSR Academy of Sciences"]

[Text] The role of Soviet science in the matter of restructuring and in the processes of the modernization of the life of our society on the basis of the principles of democratization and glasnost is great and responsible. In many respects the determined advance of the economy of the country and the spiritual development of the people depend on how completely and with the maximum return the scientific potential will be put to use and on how effectively the priority directions of research will be developed. The discussion of the General Assembly of the Azerbaijan SSR Academy of Sciences, which was held on 17 December, proceeded in light of these basic demands, which were posed by the party for Soviet science. The progress of restructuring and the tasks facing scientific institutions of the republic were discussed at it.

First Secretary of the Azerbaijan CP Central Committee A.Kh. Vezirov and President of the USSR Academy of Sciences G.I. Marchuk took part in the work of the assembly.

While delivering the report, President of the Azerbaijan SSR Academy of Sciences E.Yu. Zalayev reported that, while in Yerevan soon after the earthquake, he expressed on behalf of the scientific community and the intelligentsia of our republic deep condolence to Armenian scientists in connection with the natural disaster which had befallen Armenia.

The speaker reported to the assembly on the great and responsible tasks on the improvement of the structure of academic institutions, the determination of the priority directions of their activity, and the replacement of personnel. The retained unwieldy mechanism and excessive centralization of the management of science were criticized. It is necessary to study in earnest work under the conditions of expanding glasnost and democracy. In recent times the activity of the academy has been at the center of attention of the community of the republic. Critical remarks meant for the academy are being

expressed on the pages of the press and on television. And however sad it is to admit, they are justified and, in the final analysis, should benefit the matter.

The practice of the recent past shows that the republic Academy of Sciences, which is called upon to develop basic research, was often forced to deal with the solution of special, minor problems. Considerable manpower, material, and technical resources were diverted for this, proper attention was to devoted to the development of important directions of basic science, as a result today one has to note a serious lag in a number of directions.

The Academy of Sciences suffered greatly from administrative interference, strong-willed planning, and the lack of public objective evaluations. As a result of such an approach at present the technical sciences are hardly represented at it.

It is necessary to stimulate in every possible way the role of the social sciences. The problems of the history, literature, language, and culture of the Azerbaijan people and the poorly studied questions of the establishment and consolidation of Soviet power in Azerbaijan and of national and international relations are being put in one of the priority places here. Journalism, the cinema, and the theater are actively intruding into this process. Proposals have been prepared on the establishment at the Azerbaijan SSR Academy of Sciences of an institute of national relations and a sociology center for the purposes of the further expansion and intensification of research and the formulation of scientifically sound proposals.

The overall situation of the development of science in the world is such, the president said, that the solution of important basic problems is possible only with the participation of a group of researchers of various scientific centers, who are working in the same direction. On this basis, the more complete integration of the academies of sciences of the union republics with each other and with the USSR Academy of Sciences is one of the main peculiarities of the restructuring of academic science.

Our society is a socialist, international one. In the world there is no other such country, Academician M.A. Ibragimov noted. The history of mankind does not know at all a similar society, when millions of people have been united into a unified socialist family. And here, unfortunately, in this society, which lives by the ideals of lofty internationalism, humanism, and humanity, people, who express ideas that are radically at variance not only with internationalism in general, but with the essence of human nature as a whole, are appearing.

Some unscrupulous people have drawn into the events in the Nagorno-Karabakh Autonomous Oblast and around it a lot of honest people and want to cause a clash between the Azerbaijan and Armenian peoples. Of course, some scientists and representatives of the intelligentsia made a mistake, having given them the initiative. Especially as this is not in the traditions and not in the nature of the people of Baku, the residents of a city with glorious revolutionary traditions. It is gratifying that today the extremists, ignoramuses, and devotees are being decisively repulsed in words, and not in deed. Today there is no more important a task than to promote the unification of the healthy forces in society, to arouse good feelings of mercy, and to cultivate fraternity and solidarity.

Particular responsibility here rests with the figures of national culture, who in many respects govern the moral and spiritual character of their people. M.S. Gorbachev has spoken about this more than one in his speeches.

There is another very important question. This is the history of the Azerbaijan people, their intelligentsia and science. During the years of Soviet power owing to the assistance of the party and the assistance of representatives of the Russian people and researchers from other fraternal republics many fine scientists have appeared in Azerbaijan. They are working with great energy and are providing a scientific product of real value. However, a large portion of it then lies on shelves for many years. Is this really tolerable?

Primarily elements of an extremist disposition, Academician Sh.F. Mekhtiyev noted, are to blame for the development of the conflict on an international basis. He cited specific examples of how they, without being properly repulsed, instilled in the consciousness of people nationalistic ideas, twisted and distorted the facts in various areas of science and culture, and artificially set the two peoples against each other. As a result even such an authoritative scientist as Academician A.A. Sakharov, who made a statement which does not have anything in common with the actual state of affairs, yielded to their slander. But it is such that, for example, at just the Institute of Geology of the republic Academy of Sciences in recent years tens of Armenian scientists have defended doctoral and candidate dissertations. A similar situation is also observed at many other academic institutions of Azerbaijan, which are cooperating closely with institutes of a related type at the regional level.

The speaker dwelt on the problems of the Caspian Sea, which have become more acute in recent times and require serious comprehensive study. In this connection the speaker raised the question of establishing in Baku an institute of the Caspian Sea.

The Institute of Zoology, Academician M.A. Musayev, its director, said, is performing work on the the identification of insects, which could be involved in biological methods of plant protection and be used in the combating of agricultural pests, particularly the boll worm. At present a technological line for the mass breeding of such insects has been developed jointly with the All-Union Scientific Production Association. Now it is necessary to complete the production testing of this line and, having finally perfected it, to use it on a broad scale in agriculture.

In order to provide the population of Azerbaijan, a small republic with multisectorial agriculture, with products of animal husbandry, it is necessary to maintain highly productive breeds of livestock. While this is placing on the agenda the question of the quickest repair of the herd. The method of transplanting embryos, on which they are working at the Institute of Zoology, will make it possible to obtain from 1 productive cow up to 50 calves. The Council for the Agroindustrial Complex has set up a special center for the introduction of this method at farms.

Academician A.A. Makhmudov, director of the Institute of Economics, touched upon the questions of the development of economic science in light of the tasks of the present stage of restructuring and for the more distant future. He noted that although the concept of the socioeconomic development of Azerbaijan to 2000 has been developed, it is constantly being updated. Concern was expressed that the number of economists is increasing rapidly, while the quality of their vocational training remains low. Economic science is as if walking behind the cart and is in no hurry to elaborate the problems, which it would be possible to set for the political leadership.

Academician A.Kh. Mirzadzhanzade dwelt on the causes of the decline of the prestige of the petroleum school of Azerbaijan. A trend has formed, when the demands of the most important sector of the national economy are not being met. Such a situation is also characteristic of other regions of the country. The speaker critically analyzed the status of basic and applied research in petroleum production and noted the priority directions which should ensure its great effectiveness.

One should, he continued, expedite the settlement of the question of opening an all-union boarding school, where future petroleum specialists, the most gifted of whom could then enter science, would study starting with the 1st year.

Academician Z.M. Buniyatov, director of the Institute of Oriental Studies, focused attention on the actions of the antirestructuring forces in science and the organization of the effective combating of them. The events in the Nagorno-Karabakh Autonomous Oblast and around it halted the normal course of work at many academic institutions. Moreover, each one hears only itself. Therefore, in the opinion of the speaker, the time has come to establish in Moscow an institute of international relations, at which it is necessary to gather real intellectuals and highly competent scientists.

We live in a communal apartment which is called Transcaucasia, the speaker said figuratively. Here it is impossible for someone to say who is older. It is necessary to work eye to eye, to sit down at the same table to solve controversial problems, and to debate freely.

It is intolerable that there was pressure on people depending on their ethnic origin and national affiliation. Democracy does not signify the onslaught of permissiveness. Whoever has allowed it should undergo punishment.

Only 12 years remain until the end of the century. Future generations will ask the question: "With what did you deal here?" The Presidium of the republic Academy of Sciences should, at last, begin to work, and not be present at events. A struggle of opinions is occurring in science. And even though the debate will be most pointed, it is necessary to treat the other opinion with respect and to know how not to reject it, but to refute or accept it. There were too many distortions. It is necessary to create such an atmosphere, in which it would be possible to work for the common cause. The reform of thinking, glasnost, and democracy require new approaches, and it is necessary to seek them by common efforts.

Having noted that today society needs theoretical thought to work at the level of the needs of social development and restructuring, Corresponding Member A.F. Dashdamirov said: The events in the Nagorno-Karabakh Autonomous Oblast and around it let us feel with all acuteness how substantial the gap in our social science was. Inadequate knowledge, primitive social research, and defects and omissions in the area of national relations did not make it possible to meet fully prepared the challenge, which the events in the process of restructuring threw down to us. In this connection the speaker stressed the necessity of establishing in the system of the republic Academy of Sciences an institute of national relations and a sociological research center, which would begin to deal with the elaboration of important social and sociopsychological problems. While speaking about the problems that arose in Azerbaijan and Armenia in connection with migrants, Comrade Dashdamirov proposed to hold a representative conference for the elaboration of the most reasonable, humane approach to the settlement of this question.

Transcaucasia, including the territory of Azerbaijan, is a unique site for the conducting of seismic research. In this light, in the opinion of Corresponding Member of the USSR Academy of Sciences G.B. Abdullayev, director of the Institute of Physics, it would be advisable, having united the efforts of scientists, to establish a seismology institute. The assistance of the USSR Academy of Sciences is necessary here.

Corresponding Member A.A. Alizade, director of the Institute of Geology of the Azerbaijan SSR Academy of Sciences, also dwelt on questions connected with the status of seismic research. Today it is necessary to strengthen the technical equipment of seismological services of the region and their manpower supply. The most serious problem is the geophysical support of forecasting work on the territory of the Malyy Kavkaz Range. The question of the coordination of the forecasting studies, which are being conducted on the territory of the Caucasus, should be settled on a unionwide scale, there is no

efficient interaction here between the USSR Academy of Sciences and the USSR Ministry of Geology.

The problem of petroleum and gas production, which is traditional for Azerbaijan science, Corresponding Member of the USSR Academy of Sciences M.T. Abasov said, should be one of the priority directions of the activity of the Azerbaijan SSR Academy of Sciences. However, the attitude on the part of the academy toward this direction is entirely unjustified. Practice requires the concentration in this area of the efforts of academic and sectorial scientific institutions.

Corresponding Member M.A. Ismaylov, deputy director of the Institute of History, dwelt on the problems of the development of historical science.

Corresponding Member Dzh.E. Allakhberdiyev, prorector of the Azerbaijan State University imeni S.M. Kirov, stressed the necessity of coordinating the joint efforts of scientists on the normalization of international relations in the two neighboring republics. He also touched up questions, which are connected with the democratic principles in the activity of the Academy of Sciences, and sharply criticized the presidium of the Academy of Sciences.

First Secretary of the Azerbaijan CP Central Committee A.Kh. Vezirov addressed the assembly.

I am speaking, he said, for the first time in this hall, from this rostrum. I liked to come here very much when I was a student, to this day I am under the immense impression of the lecture, which I heard here, of the outstanding historian Academician Ye.V. Tarle. Why did I recall this? Unfortunately, such speeches have become very few, we are inviting too few well-known scientists, very little lofty science is being heard from this rostrum.

Addressing G.I. Marchuk, Comrade Vezirov said: First of all I want, Guriy Ivanovich, to thank you for the fact that after our conversation, which was during the 19th All-Union Party Conference on the fate of Azerbaijan science, you kept your promise and found the opportunity, in spite of your enormous load, to come to us. And today's discussion, we hope, will settle in your memory, and the proposals, which you have written down, will find embodiment in the activity of the USSR Academy of Sciences on behalf of settling the questions raised here.

I welcome President of the Georgian Academy of Sciences Comrade A.N. Tavkhelidze. I am very glad that you and I shared opinions and that there are good joint ideas. We need to revive or to develop new directions of our cooperation. We are confident that we will link up both Armenian and other comrades in order to increase the contribution of scientists of the region to our common science.

I am firmly convinced that without science, without reliance on it there can be no serious and successful management of any sphere of life of the republic. Precisely for this reason I have had during this time a number of meetings with scientists, at which we analyzed what the return of science is. There was a serious discussion of this at the Azerbaijan CP Central Committee Plenum in August. We were forced to state that since the April (1985) CPSU Central Committee Plenum the republic Academy of Sciences in practice has not been restructured, its presidium on its own initiative did not submit for the consideration of management organs of the republic a single suggestion on the problems of the socioeconomic and spiritual development of our republic.

In particular, there are no practical suggestions in the area of the development of the Azerbaijan language on questions, which are connected with the spiritual and moral life of society. And we were forced to bring together the executives of scientific institutions and to reproach them for the fact that, while appealing on the pages of the press and on radio and television to develop and improve the Azerbaijan language, none of them had exerted any efforts in this direction.

Suggestions of the Academy of Sciences on the socioeconomic development of our republic recently arrived at the Central Committee. It was shameful to read this document, which is an unsystematized, nongeneralized set of suggestions which do not answer vital questions of the life of the republic. Take if only the preparation for the Central Committee plenum on questions of housing construction. We considered 8,600 suggestions which were received by the Central Committee and other republic organs. Unfortunately, we received practically nothing serious from scientific institutions. In the next few days the health program will be submitted for national discussion, and here we were not able to rely on the assistance of scientists. The fulfillment of the Food Program is one of the priority directions. How are scientist helping in its accomplishment? With respect to the improvement of fodder production it was proposed to plant soy beans and lupine. And that is all! We all know that soy beans and lupine are good fodder for livestock. So is it really necessary to maintain the institute in order to obtain such a recommendation? Let the comrades give serious thought to this.

I cited this example so that you would understand how we need your recommendations. We will henceforth also not reduce these demands. Without reliance on science, without the efficient use of the scientific potential there cannot be serious work and there is no prospect.

This means that one should increase the demands on institutes and think about the very structure of the presidium of the academy. Everything should be done in order to ensure a great effectiveness and return from the enormous potential which is concentrated at scientific institutions that are connected with economics. We

expect enormous assistance from the Academy of Sciences and from its presidium and demand that its efficiency be increased.

Unfortunately, it has to be admitted that scientific institutes are operating very inactively. Cost accounting is being introduced in a lax manner, but precisely it does not enable the people, who have attached themselves to science, to feel free. It is necessary that every ruble invested in science would yield not kopecks of profit, but 2-5 and, even better, 10 rubles for our treasury, for our people. Here our economists should also voice their weighty opinion.

A very important problem, Comrade Vezirov continued, is the decrease of the age of scientific personnel. It is necessary to create all the conditions for the promotion of capable, energetic, resourceful young people and for the revelation of the talent of young scientists, to give them a free hand in creative work, and to help them to show their worth.

Today at the assembly there was a discussion on computerization. A few days ago I spoke by telephone with Comrade N.I. Ryzhkov. In spite of the enormous pressure of his work, which is connected with the work of the commission of the Politburo of the CPSU Central Committee in Armenia, he said that in the very near future in the USSR Council of Ministers a document on the computerization of the Azerbaijan SSR, which is being drafted at our request, will be prepared. During such a disaster, at such a difficult time the leadership of the country is thinking about how to solve the problems of our republic as well.

Or take questions of ecology. I am astonished by the number of letter-appeals to deal with these problems, which we are receiving in the Central Committee. But when workers, peasants, and literary people talk about this, it is understandable. But now if scientists, from whom we also expect practical recommendations in this area, address to us similar appeals to fight for ecology, how is one to explain such a thing? When, finally, will the idle talk end, when will we get from figures of science practical, sound suggestions?

In the sphere of folk crafts at the farms of our republic output worth nearly 120 million rubles is being produced, while in Georgia output worth nearly 500 million rubles is being produced. But we have no fewer opportunities and many people who are not employed in socially useful labor. Hence, we could also produce far more such output. But science is keeping silent and is not giving us its recommendations.

Today many interesting, important suggestions were submitted—on the establishment of an institute of the Caspian Sea, on the development of new biological means of plant protection, on the organization of an institute of international relations, and on the representation of scientists in elected state organs. Practical criticism meant for the Presidium of the Academy of Sciences was voiced. All these are problems, which must be solved and on which we should work.

More attention should be devoted to the questions of the training of scientific personnel and the increase of the level of their knowledge. Initiative should be displayed with respect to the sending of young, talented scientists for various practical studies and training to Moscow and other scientific centers, including abroad.

Having touched upon the recent events in Baku, A.Kh. Vezirov noted that among the organizers of the disturbances there were many scientific personnel, which testifies to the great neglect of ideological and educational work in the system of the Academy of Sciences. With all rigor we will hold the communists and the executives of scientific institutions accountable for order and for the observance of the law and will not allow it to be violated.

The question of the education of labor collectives in the spirit of socialist internationalism and the principles of our society is now becoming especially urgent. It is very important that scientific collectives would also live in accordance with the laws of the friendship and fraternity of the Soviet people and that violations in this area would not be committed anywhere. We will steadfastly follow the international traditions of the Azerbaijan people and will act in the spirit of the demands of the party, within the framework of the USSR and Azerbaijan SSR constitutions, and in the greatest interests of our socialist homeland. There cannot be other approaches here.

Evaluating the discussion that developed at the assembly, Comrade Vezirov noted that the basic attention of scientists should be focused on the priority directions which face Azerbaijan science in light of the needs of society. He expressed the hope that Azerbaijan scientists and the Academy of Sciences would reform more actively and would make an effective contribution to the campaign for revolutionary changes in the country.

President of the USSR Academy of Sciences G.I. Marchuk summarized the assembly.

We arrived in Baku, he said, from Yerevan, where the day before we attended a meeting of the commission of the Politburo of the CPSU Central Committee and held an expanded meeting of the Presidium of the Armenian SSR Academy of Sciences, in which the presidents of the academies of sciences of Azerbaijan and Georgia participated. The problems of international relations and the strengthening of the contacts of scientists of the region were examined, the questions of the contribution of scientific institutions to the work on eliminating the consequences of the natural disaster in Armenia were discussed. Great concern was expressed about the fact

that the tied knots have to be undone step by step, which, of course, is hindering the solution of the accumulated problems in science.

I would like to direct attention to the following. First, all of you and I—academicians and corresponding members—should sense very great responsibility for what is happening in the country and the republic. The events of recent months, to which a principled evaluation was given in the statements of the speakers and of Comrade A.Kh. Vezirov, are forcing one to be alert. They, in particular, testify to the fact that the Azerbaijan Academy of Sciences, apparently, does not have the proper authority. And although we understand all the difficulty of the emerging conditions, it is all the more necessary to work with greater efficiency and, of course, to restore relations with Armenian scientists and with the Armenian Academy of Sciences.

Here it was said that one must find common themes and common problems, especially social scientists must find them. In this case one should remember the humanistic traditions of our society. We should help each other and should improve each other. And in precisely the same way we should not forget the factor common to mankind. There is one planet, there is one world, in which we must all exist together. This is the concept that we should follow.

It hurts me greatly that events, which bewildered all of us, occurred in Azerbaijan in recent months. But I believe that both the union and the republic academies will learn a lesson from this. Scientists need to meet more with the people and to speak out more on television and radio and in the press from truly international positions. The harm, which the antirestructuring elements have done to the processes of modernizing life in the republic, was correctly spoken about here. There was an attempt to encroach upon the revolutionary, international traditions, for which the Azerbaijan people were always famous. Historians and social scientists have to analyze why all this happened.

The question of personnel seems very important. The unbalance of the composition of personnel was spoken about here. I want to cite on this level the example of the Georgian SSR Academy of Sciences. Up to some time at the Georgian Academy of Sciences there was an influx of personnel from outside. Then its own forces appeared, but 2 decades passed, and it turned out that the level of Georgian science had declined somewhat. And at that time President of the Georgian Academy of Sciences A.N. Tavkhelidze, who is attending your assembly, turned to us for assistance. We invited to our institutes a large number of scientists from Georgia. And in 5 years people, who restored the former scientific fame of the republic, appeared. An analogous experiment was also conducted at the Academy of Sciences of Kazakhstan, where they were also experiencing difficulties with personnel. At the Siberian Department of the USSR Academy of Sciences they established for Alma-Ata a splendid school in computational mathematics. And this also yielded fine fruits. One must already remember: as soon as contact with the outside world is disrupted, everything ends. Let this experience also be instructive for the Azerbaijan Academy of Sciences.

Soon the election to the Azerbaijan SSR Academy of Sciences is to be held. It should provide an influx of fresh forces. The time has come to raise qualitatively new, fundamental organizational questions which are closely linked with the socioeconomic development of the republic. Here the development of basic research and the work connected with the practice tasks, which face the economy of Azerbaijan and the spiritual sphere, should be harmoniously combined. We expect that academicians and corresponding members would participate most actively in the competition for the development of the most important basic and applied directions. Precisely participation in such competition and the effectiveness of research will make it possible to determine the real scientific character of the scientist.

We will use in practice invitations of Azerbaijan scientists with reports to international conferences and symposiums at the expense of the USSR Academy of Sciences. But for this we need objective evaluations and indicators for all academicians and corresponding members.

Comrade Marchuk expressed confidence that the Azerbaijan SSR Academy of Sciences would overcome the lag, would regain the lost positions, and would increase the contribution to the cause of restructuring.

Secretary of the Azerbaijan CP Central Committee R.Ya. Zeynalov, I.A. Rozanov, chief of a sector of the CPSU Central Committee, and R.A. Aliyev, chief of the Science and Educational Institutions Department of the Azerbaijan CP Central Committee, took part in the work of the assembly.

## 'Radical Reforms' Needed in AzSSR Academy of Sciences

*18140156 Baku BAKINSKIY RABOCHIY in Russian 29 Dec 88 p 3*

[Letter to BAKINSKIY RABOCHIY: "Radical Changes in Science Are Needed"]

[Text] The General Assembly of the Azerbaijan SSR Academy of Sciences, which discussed the progress of restructuring and the tasks facing the scientific institutions of the republic, was held on 17 December 1988. The question, which was submitted for discussion by the members of the republic headquarters of science, is of particular importance for the fates of restructuring in our republic.

The state of affairs, which has formed at the Azerbaijan Academy of Sciences, could not but cause us, the participants in this assembly, alarm and a deep sense of

concern. President of the USSR Academy of Sciences G.I. Marchuk voiced much serious criticism and many wishes with respect to the improvement of the activity of scientific institutions of the republic. As First Secretary of the Azerbaijan CP Central Committee A.Kh. Vezirov correctly stressed, since the April (1985) CPSU Central Committee Plenum the Azerbaijan SSR Academy of Sciences has not been restructured, while its presidium has not submitted for the consideration of management organs a single significant proposal on the problems of the socioeconomic and spiritual development of our republic. Not all of us were able to speak at this assembly, not everything was expressed at it. Therefore, moved the sense of responsibility and realizing the role of science in the processes of modernizing all spheres of our life, we consider it our duty to express our thoughts and opinions through the press.

First of all one has to note with bitterness that as a result of the bureaucratic command style of work, which over the years was spread in the republic and also directly concerned the sphere of science, serious harm was done to the activity of the Academy of Sciences. Such extremely negative phenomena as devotion to cliquishness, clannishness, and protectionism became firmly grounded in many structures of the academy. Here over the long years of stagnation people, who had not shown themselves to be either prominent scientists or skillful organizers of science, were often appointed or "elected" to key positions. In case of election to the academy and in case of the selection and placement of personnel first of all family ties, clannishness, and personal loyalty were the main criteria.

As a result the prestige of science declined, the occupation of scientist and science worker was morally devalued, an atmosphere of creative stagnation and equability formed at many scientific institutions.

This is in what lie, in our opinion, the main reasons that the academy is not playing the role intended for it in the acceleration of the socioeconomic development of the republic.

It is possible to activate the scientific factor and to increase the social status and prestige of science only by way of its radical, thorough restructuring. It is a question of the sweeping away of many obsolete structures and resolute steps on the improvement of the management of scientific and technical progress, the democratization of the situation in science, and the overcoming of bureaucracy and administration by mere decree. The creation of a creative atmosphere for the maximum display of talents and initiative and the equal competitiveness and rivalry of scientific ideas and opinions is a powerful stimulus of scientific development.

The Academy of Sciences urgently needs the consolidation of its healthy forces and the influx of talented young scientists, who are capable of devoting themselves to unselfish service to science and their people. We are unanimous in the opinion that the time has come to renounce the quagmire of duplication, a focus on petty themes, and departure from the highroad of scientific and technical progress.

It is necessary that the idea: today it is not enough merely to correct the mistakes and omissions in scientific and personnel policy, would become firmly established in the consciousness of the entire scientific intelligentsia. Radical changes for the assurance of a breakthrough in basic research and the solution on this basis of the accumulated economic, social, cultural, ecological, and other important problems of the republic are needed.

The responsibility of scientists and the entire intelligentsia for spiritual progress, the increase of the intellectual potential of the people, and the cultivation of the lofty feelings of civic spirit, Soviet patriotism, and socialism internationalism is great.

Events of recent times have show that far from all scientists, and first of all social scientists, have such a sense of responsibility—some of them were not at their best in the formed situation, missed the initiative, and did not give a worthy response to the questions which worry the people. Moreover, there were also such scientists who openly followed the lead of the antirestructuring, corrupt elements.

Our duty is to learn serious lessons from everything that happened and to oppose to destructive processes the creative inspiration of restructuring.

We are firmly convinced that the resolute, uncompromising implementation of the policy of the acceleration of the socioeconomic development of the republic, which is being steadfastly and consistently pursued by the Azerbaijan CP Central Committee, is the key to the solution of all the problems which accumulated during the years of stagnation. The direct duty of scientists is to realize not only their involvement in, but also their enormous responsibility for the implementation of this policy.

[Signed] Academicians of the Azerbaijan SSR Academy of Sciences V.S. Aliyev, M.I. Aliyev, Z.M. Buniyatov, F.K. Kocharli, and E.Sh. Shikhalibeyli and Corresponding Members of the Azerbaijan SSR Academy of Sciences S.M. Aliyev, Dzh.E. Allakhverdiyev, K.N. Dzhalilov, B.K. Zeynalov, M.A. Ismailov, Yu.G. Kambarov, A.M. Mirakhmedov, S.G. Salayev, N.D. Tairov, and K.A. Talybzade

## Report on International Arctic Conference

*18140145b Moscow NTR: PROBLEMY I RESHENIYA in Russian No 1(88), 1989 p 2*

[Report by V. Khattatov, deputy director of the Central Aerological Observatory of the USSR State Committee for Hydrometeorology and Environmental Control, provided to NTR correspondent: "The Arctic. The Ice Has Started to Move...."; first paragraph is source introduction]

[Text] From 12 to 15 December of last year, the first international conference on coordination of scientific research in the Arctic was held in Leningrad. The event is noteworthy not only for the fact of an important forum of scientists being held. Why? One of the conference's participants, V. Khattatov, deputy director of the Central Aerological Observatory of the USSR State Committee for Hydrometeorology and Environmental Control, provides an answer to our correspondent.

The holding of this conference in my opinion is one more achivement of the new political and ecological thinking. We found an understanding among all circles of the different countries to the effect that global ecological catastrophes recognize no state boundaries and that the safety of mankind safety can be ensured only by a union of the intellectual and economic potentials of all of the planet's countries.

The first attempt to make the Arctic an open zone for international scientific cooperation was made more than 25 years ago. At that time, scientists came out with such an initiative. But in that period it was not supported by all the countries adjoining the Arctic. Apparently a big role was played here by strategic defense related interests.

Now the situation, as we see, has sharply changed. And on the basis of an initiative of the Soviet Union introduced in October of the year before last by M.S. Gorbachev in Murmansk, a real forum was created which has become a kind of symbolic opening of Arctic boundaries for scientific and commercial international cooperation.

On the eve of the conference, a meeting also took place in Leningrad of representatives of eight countries directly interested in cooperation in the Arctic. The result of these talks was a decision for creation of an International Arctic Scientific Committee (MANK) which will begin to function in the middle of this year.

But why, strictly speaking, is it necessary to develop scientific research in the Arctic? Would it not be better to deal with ecological problems there where the bulk of the people live? Here is why. Many scientists are predicting that in the next 40-50 years a global climatic change will take place on Earth—warming due to the so-called "greenhouse effect." Naturally, we cannot guess and wait passively for a cataclysm to take place. But we need to engage in a real evaluation of the situation and to conduct serious research in such places as the Arctic. The secret of its geophysical and biological uniqueness lies in its great sensitivity to various changes and disturbances of the biosphere. Whereas in the middle latitudes, average annual temperature will change only 1 degree Centigrade, in the Arctic the figure will be 10 degrees Centigrade. For this reason it is easiest of all to record all climatic fluctuations in the polar regions, in the natural laboratories of Earth's climate.

The conditions for research on the ionosophere are also unique in the polar zones. The fact is that the earth's magnetic pole is also in the Arctic. Moreover, here both academic and concrete applied plans are already being solved. For example, problems of radio communication. The development of conditions and methods of piloting vessels in the wintertime in the Arctic Ocean is an important national-economic problem.

In addition, unlike the Antarctic, the northern polar regions are inhabited by people. It is necessary to preserve a living environment worthy of the human being who lives there.

But the solution of all these problems and tasks calls for colossal scientific manpower and, most important, monetary outlays which are ruinous for a single country.

At their first conference, the scientists worked out most promising and priority directions in joint research on the Arctic. And on the basis of these recommendations, the International Arctic Scientific Committee has already worked out concrete scientific and applied plans.

## Paton Comments on Significant Prizes for S&T Work

*18140161b Kiev PRAVDA UKRAINY in Russian*
*25 Dec 88 p 4*

[Article by President of the Ukrainian SSR Academy of Sciences Academician B. Ye. Paton, chairman of the Committee for Ukrainian SSR State Prizes in Science and Technology attached to the Ukrainian SSR Council of Ministers and twice Hero of Socialist Labor:" "Strengthen the Union of Science and Practice. Chairman of the Committee for Ukrainian SSR State Prizes in Science and Technology and President of the Ukrainian SSR Academy of Sciences Academician B. Ye. Paton, Twice Hero of Socialist Labor, Gives and Account"]

[Text] First of all I want to note the importance of the encouragement of the fruitful creative activity of scientists, specialists, and production innovators and the use for this of both moral and material stimuli. On this level the Ukrainian SSR State Prizes are a universals means, to which their ever increasing popularity and prestige testify.

For the sake of fairness it should be said that these qualities were established owing to the democratic approach to the awarding of the prizes, which is based on honest creative competition, the thorough scientific and technical evaluation of the works submitted for the prizes, a frank discussion among specialists on their merits and drawbacks, the independence of such opinions, and, finally, the making of the decisions on the awarding of the prizes only by secret ballot.

Now about the works, to which the prizes were awarded, and the new winners.

The collective of scientists, which prepared under the supervision of Academician of the Ukrainian SSR Academy of Sciences Aleksandr Nikolayevich Guz a multivolume basic scientific work, in which the results in the area of the mechanics of a deformable solid are generalized and systematized, commences the list of winners of this year. The questions of the equilibrium, stability, and dynamics of elements of components made of isotropic and anisotropic materials, which are in an elastic and elastoplastic state, are examined most thoroughly in this work. New mechanical effects, which are connected with the range of change of the physical and geometric parameters of components, are identified. As a result engineering practice was enriched with new methods of design, while the suggestions of the scientists were materialized in newly developed components of machines and structures, which have high reliability with a significantly smaller materials intensiveness.

The work of scientists, who are working fruitfully on the problem of the automation of the designing and tests of advanced complex objects of new equipment, was properly commended. Thus, a direct verbal dialog with a computer in natural language is carried out by means of the instrument complexes, which were developed by them and which in the now accepted terminology are called workplaces (ARM's). With minimum expenditures of time specialists find the optimum design and technological solutions, purposefully carry out tests and the debugging of microprocessor equipment, and also perform a number of other operations. In short, the performers of this work made a substantial contribution to the intellectualization of means of information science and computer hardware and revealed new possibilities of the intensification of the labor of engineers and scientific personnel.

Our knowledge of the properties of metals and hard alloys was significantly expanded owing to the research of physicists. In addition to the great exclusively scientific significance of the very work "Positron Studies of Solids," its results make it possible to use new effective methods of the diagnosis of the corrosion resistance of metals and to use more reliable methods of checking the crystals which are used for the making of semiconductor instruments.

The multivolume work of Academician of the Ukrainian SSR Academy of Sciences Yuriy Konstantinovich Delimarskiy, in which the most important results of the research on the chemistry and electrochemistry of ion melts are generalized, was awarded the prize. A detailed description of a number of new advanced electrochemical technologies, which were proposed by the author, including for the removal and separation of heavy metals, the application of aluminized coatings, and the obtaining of aluminum alloys, and other processes, is given in the books.

A wide range of specialists and scientists will greet with satisfaction the news on the awarding of the prize to the authors of "Russko-ukrainsko-latinskiy zoologicheskiy slovar" [Russian-Ukrainian-Latin Zoological Dictionary], which was produced by Academician of the Ukrainian SSR Academy of Sciences Aleksandr Prokofyevich Markevich and Candidate of Biological Sciences Konstantin Ilarionovich Tatarko.

For what is this scientific work noteworthy?

First of all for the fact that the authors did incredibly difficult work on the standardization, improvement, and enrichment of the already existing stock of zoological terms in both Russian and Ukrainian. Thus, the dictionary introduces into modern Russian and Ukrainian precise scientific terms, which is of permanent importance for information exchange and is a specific contribution to the development of the culture of the fraternal peoples. Therefore, the indicated work has become a handbook of not only zoologists, but also specialists in the field of nature conservation, forestry and agriculture, and health care and literary personnel.

Three collectives of medical personnel are among the winners of the republic State Prizes.

The prize was awarded to one of them, which is headed by Academician of the Ukrainian SSR Academy of Sciences Nikolay Mikhaylovich Amosov, for achievements in the performance of reconstructive operations on heart valves. More than 4,000 operations are performed annually in accordance with the methods, which were developed by the winners, at the Kiev Scientific Research Institute of Cardiovascular Surgery. The majority of those who have undergone treatment are working successfully in the national economy.

Another collective was commended for successes in the diagnosis, prevention of diseases, and treatment of endocrine glands. Thus, they used for the first time the transplanting of organ cultures in case of chronic insufficiency of the adrenal glands and new methods of surgical interventions and anesthetization. As a result the mortality rate from illnesses and post-treatment complications were reduced by several fold.

We are glad of the recognition of the successes of ophthalmologists of the republic, who under the supervision of Professor Nikolay Markovich Sergiyenko developed and introduced extensively in practice operative methods of the treatment of the organs of sight with the implantation of an artificial lens. The lens, which is used for implantations, surpasses in its characteristics the best domestic and foreign analogs.

Among those awarded the prizes there are two works in the field of metallurgy. These works are a vivid example of the fact that a new, qualitatively higher indicator of production activity can be achieved only as a result of the interested union of scientists and workers of industry. Therefore, it is quite natural that both specialists of enterprises and researchers of academic and sectorial institutes were the winners for these developments. And there is another noteworthy feature of the works that were awarded the prizes. Not only fundamentally new, but also ecologically clean, waste-free technologies constitute their basis, while the obtained products successfully compete with products of the best foreign firms and are in demand on the world market. In particular, the purchases of the iron powder of the Brovary Plant by American firms testifies to this.

The work on the development of a set of machinery and new methods of dust suppression in coal mines is devoted to the significant successes in the solution of the problem of improving the public health conditions of labor in the mining industry. These measures were also carried out in a creative union by scientists and specialists of a number of industrial enterprises under the supervision of Doctor of Technical Sciences Aleksandr Mikhaylovich Moskalev.

The important national economic task of providing modern high and superhigh voltage power transmission lines with qualitatively new suspension insulators was accomplished by the collective of winners under the supervision of Professor Nikolay Andreyevich Nikolayev. Insulators, which are produced from tempered dialkali glass, are distinguished by a high operating reliability and a comparatively small weight and size. At present more than half of the power transmission lines in our country and in the majority of CEMA countries are being built with the use of such Soviet-made insulators.

I believe that the public will greet with satisfaction the report that the developers of the automated system of the diagnosis of the engines on Tu-154 airplanes were awarded the Ukrainian SSR State Prize. For owing to the extensive use of these systems at enterprises of civil aviation the problem of the accident rate because of inflight failures of the engines of one of the most widely used airliners in our country has practically been eliminated.

As always, the authors of the two best textbooks wind up the list of winners. Both textbooks are intended for undergraduates of higher educational institutions. In the opinion of professors, instructors, and students themselves, these books are distinguished by the fundamentality, clarity, and rationality of the presentation of the material, purposefully direct attention to the necessity of a knowledge of the deep essence of the subject of study, and, what is especially important, instill in future specialists a taste for research work.

Such are the brief descriptions of the works, which were awarded the Ukrainian SSR State Prizes in Science and Technology in 1988.

I wish the winners good health and new creative successes.

## UkSSR Awards State Prizes for Achievements in S&T

*18140161a Kiev PRAVDA UKRAINY in Russian 25 Dec 88 pp 1, 3*

[Decree of the Central Committee of the Communist Party of the Ukraine and the Ukrainian SSR Council of Ministers "On the Awarding of the 1988 Ukrainian SSR State Prizes in Science and Technology"]

[Text] The Central Committee of the Communist Party of the Ukraine and the Ukrainian SSR Council of Ministers, having considered the representation of the Committee for Ukrainian SSR State Prizes in Science and Technology attached to the Ukrainian SSR Council of Ministers, resolve to award the 1988 Ukrainian SSR State Prizes to:

### In Science and Technology

1. Academician of the Ukrainian SSR Academy of Sciences Aleksandr Nikolayevich Guz, director of the Institute of Mechanics of the Ukrainian SSR Academy of Sciences, supervisor of the work; Doctors of Physical Mathematical Sciences Ivan Yuryevich Babich, Yuriy

Nikolayevich Podilchuk, and Nikolay Aleksandrovich Shulga, heads of divisions, and Doctor of Physical Mathematical Sciences Yuriy Nikolayevich Nemish, head of a laboratory, workers of the same institute; Corresponding Member of the Ukrainian SSR Academy of Sciences Viktor Timofeyevich Grinchenko, director of the Institute of Hydromechanics of the Ukrainian SSR Academy of Sciences; Corresponding Member of the Ukrainian SSR Academy of Sciences Andrey Feofanovich Ulitko, head of a chair of Kiev State University imeni T.G. Shevchenko; Doctor of Physical Mathematical Sciences Vladimir Terentyevich Golovchan, head of a division of the Institute of Superhard Materials of the Ukrainian SSR Academy of Sciences—for the six-volume monograph "Prostranstvennyye zadachi teorii uprugosti i plastichnosti" [Spatial Problems of the Theory of Elasticity and Plasticity], which was published in 1984-1986.

2. Doctor of Technical Sciences Aleksandr Vasilyevich Palagin, deputy director, Doctor of Technical Sciences Taras Klimovich Vintsyuk and Candidate of Physical Mathematical Sciences Mikhail Ivanovich Shlezinger, heads of divisions, Candidate of Physical Mathematical Sciences Yuriy Georgiyevich Krivonos, scientific secretary, Miroslav Yefremovich Ovcharuk, chief of a sectorial problem department, Valeriy Grigoryevich Beskrovnyy, chief of a division of the same department, workers of the Institute of Cybernetics imeni V.M. Glushkov of the Ukrainian SSR Academy of Sciences; Doctor of Physical Mathematical Sciences Anatoliy Vasilyevich Anisimov, head of a chair of Kiev State University imeni T.G. Shevchenko; Candidate of Technical Sciences Yuriy Konstantinovich Lushnikov, deputy director, Candidate of Technical Sciences Leonid Tikhonovich Anisimov, chief of a division, workers of a scientific research institute—for the development and introduction of a family of intelligent microprocessor workstations and complexes with a flexible architecture.

3. Academician of the Ukrainian SSR Academy of Sciences Adrian Anatolyevich Smirnov, adviser of the board of directors, Doctor of Physical Mathematical Sciences Viktor Serafimovich Mikhalenkov, leading scientific associate, Candidate of Physical Mathematical Sciences Vladilen Ivanovich Silantyev, head of a laboratory, Candidates of Physical Mathematical Sciences Ella Georgiyevna Madatova, Sofya Grigoryevna Sakharova, and Rema Georgiyevna Fedchenko, senior scientific associates, workers of the Institute of Metal Physics of the Ukrainian SSR Academy of Sciences; Doctor of Physical Mathematical Sciences Aleksey Viktorovich Lyubchenko, leading scientific associate of the Institute of Semiconductors of the Ukrainian SSR Academy of Sciences; Candidate of Physical Mathematical Sciences Viktor Vasilyevich Dyakin, head of a laboratory of the Institute of Surface Physics of the Ukrainian SSR Academy of Sciences; Corresponding Member of the Ukrainian SSR Academy of Sciences Mikhail Aleksandrovich Krivoglaz (posthumously); Doctor of Technical Sciences Ilya Yakovlevich Dekhtyar (posthumously)—for the series of works "Positron Studies of the Structure of Solids."

4. Academician of the Ukrainian SSR Academy of Sciences Yuriy Konstantinovich Delimarskiy, adviser of the board of directors of the Institute of General and Inorganic Chemistry of the Ukrainian SSR Academy of Sciences—for a series of monographs on the chemistry and electrochemistry of ion melts, which were published in 1978-1986.

5. Academician of the Ukrainian SSR Academy of Sciences Aleksandr Prokofyevich Markevich, head of a division of the Institute of Hydrobiology of the Ukrainian SSR Academy of Sciences; Candidate of Biological Sciences Konstantin Ilarionovich Tatarko (posthumously)—for "Russko-ukrainsko-latinskiy zoologicheskiy slovar. Terminologiya i nomenklatura" [Russian-Ukrainian-Latin Zoological Dictionary. Terminology and Nomenclature], which was published in 1983.

6. Academician of the Ukrainian SSR Academy of Sciences Nikolay Mikhaylovich Amosov, director of the Kiev Scientific Research Institute of Cardiovascular Surgery, supervisor of the work; Doctor of Medical Sciences Gennadiy Vasilyevich Knyshov, deputy director, Doctors of Medical Sciences Yakov Abramovich Bendet, Aleksandr Stepanovich Valko, Mikhail Frantsevich Zinkovskiy, Yuriy Vladimirovich Panichkin, Leonid Lukich Sitar, and Aleksey Aleksandrovich Tsyganiy and Candidates of Medical Sciences Aleksandr Alekseyevich Vadnev and Vasiliy Ivanovich Ursulenko, heads of departments, workers of the same institute—for the series of works "The Development and Extensive Introduction in Practice of Reconstructive Operations on Heart Valves."

7. Doctors of Medical Sciences Ivan Denisovich Tanasiyenko, Leonard Petrovich Chepkiy, and Makar Petrovich Cherenko, heads of chairs, Candidate of Medical Sciences Arkadiy Pavlovich Stepanenko, docent, Candidate of Medical Sciences Nikolay Iosifovich Romanyuk, assistant lecturer, workers of the Kiev Medical Institute imeni Academician A.A. Bogomolets; Doctor of Medical Sciences Igor Vasilyevich Komisarenko, Candidate of Medical Sciences Stanislav Iosifovich Rybakov, senior scientific associate, workers of the Kiev Scientific Research Institute of Endocrinology and Metabolism; Doctor of Medical Sciences Aleksandr Kirillovich Gorchakov (posthumously); Doctor of Medical Sciences Natalya Vladimirovna Romashkan (posthumously)—for the series of works "The Scientific Development and Introduction in General Health Care Practice of Methods of the Diagnosis, Surgical Treatment, and Prevention of Diseases of Endocrine Glands."

8. Doctor of Medical Sciences Nikolay Markovich Sergiyenko, head of a chair of the Kiev State Institute of the Advanced Training of Physicians, supervisor of the work; Doctor of Medical Sciences Ivan Mikhaylovich Logay, director of the Odessa Scientific Research Institute of Eye Diseases and Tissue Therapy imeni V.P. Filatov; Candidate of Medical Sciences Zoya Fedorovna Veselovskaya, head of a department, Yelena Zenonovna

Stavnichuk and Alina Yaropolkovna Pishel, junior scientific associates, workers of the same institute—for the series of works "The Comprehensive Development and Introduction in General Medical Practice of Methods of Intraocular Correction."

9. Candidate of Technical Sciences Viktor Nikolayevich Klimenko, deputy director, Candidate of Technical Sciences Aleksandr Fedorovich Zhornyak, head of a laboratory, workers of the Institute of Problems of Material Science imeni I.N. Frantsevich of the Ukrainian SSR Academy of Sciences; Aleksandr Ivanovich Yeroshenko, deputy chief engineer, Candidate of Technical Sciences Aleksandr Nikolayevich Krivenko, design engineer, Vadim Dmitriyevich Pirog and Yuriy Vasilyevich Kolesnichenko, chiefs of divisions, Sergey Leonidovich Vyskrebentsev, senior foreman, workers of the Brovary Plant of Powder Metallurgy imeni 60-letiya Sovetskoy Ukrainy; Mikhail Leonidovich Rubalskiy, manager, Vladimir Ivanovich Milnikov, senior representative, workers of the organ of State Product Acceptance at the same plant; Leonid Semenovich Shkolnik, chief project engineer of the Ukrainian State Institute for the Designing of Metallurgical Plants—for the development and introduction at the Brovary Plant of Powder Metallurgy of a resource-saving technology of the production of pulverized iron powder and a mechanized complex for its implementation.

10. Boris Fedorovich Velichko, director of the Nikopolsk Plant of Ferroalloys; Candidate of Technical Sciences Grigoriy Dmitriyevich Tkach, chief of the central plant laboratory, Vladimir Maksimovich Stativa, deputy chief of a shop, Valeriy Alekseyevich Vyshkin, leader of a brigade of workers of a section, workers of the same plant; Viktor Iosifovich Ishutin, chief specialists of the All-Union Industrial Association for the Production of Ferroalloys; Candidate of Technical Sciences Sergey Georgiyevich Grishchenko, head of a laboratory, Candidate of Technical Sciences Aleksandr Grigoryevich Yashchenko, leading scientific associate, workers of the Ukrainian Scientific Research Institute of Special Steels, Alloys, and Ferroalloys; Candidate of Technical Sciences Alfred Alfredovich Grabeklis, head of a laboratory of the Ural Scientific Research Institute of Ferrous Metals; Candidate of Technical Sciences Anatoliy Nikolayevich Ovcharuk, leading scientific associate, Candidate of Technical Sciences Ivan Pavlovich Rogachev, senior scientific associate, workers of the Dnepropetrovsk Metallurgical Institute—for the development and assimilation of a resource-saving technology of the melting of manganese ferroalloys on the basis of the comprehensive use of waste slags and incidentally formed metal products.

11. Doctor of Technical Sciences Aleksandr Nikolayevich Moskalev, head of a division of the Institute of Geotechnical Mechanics of the Ukrainian SSR Academy of Sciences, supervisor of the work; Doctor of Technical Sciences Leonid Mikhaylovich Vasilyev, head of a laboratory, Candidate of Technical Sciences Anatoliy Trofimovich Nikolayev, head of a division of the Special Design and Technological Bureau, workers of the same institute; Candidate of Technical Sciences Leonid Nikolayevich Karagodin, deputy chief of an administration of the USSR Ministry of the Coal Industry; Candidate of Technical Sciences Igor Grigoryevich Ishchuk, head of a laboratory of the Institute of Mining imeni A.A. Skochinskiy; Candidate of Technical Sciences Eduard Nikolayevich Medvedev, head of a laboratory of the Makeyevka State Institute for Work Safety in the Mining Industry; Candidate of Technical Sciences Aleksandr Vasilyevich Trubitsyn, head of a division of the Vostochnyy Scientific Research Institute for Work Safety in the Mining Industry; Anatoliy Dmitriyevich Bychenok, director of the Teplogorsk Plant of Hydraulic Equipment; Vladimir Ivanovich Bandurin, chief designer of the same plant; Yevgeniy Aleksandrovich Ivonin, deputy technical director of the Stakhanov Production Association for Coal Mining—for the development and introduction of a new generation of a set of machinery for the preliminary working of coal seams for the control of dust in shafts.

12. Doctor of Technical Sciences Nikolay Andreyevich Nikolayev, head of a chair of Lvov Polytechnical Institute imeni Leninskogo komsomola, supervisor of the work; Candidate of Technical Sciences Stepan Ivanovich Dyakovskiy, docent of the same institute; Candidate of Physical Mathematical Sciences Fedor Vasilyevich Semerak, senior scientific associate of the Institute of Applied Problems of Mechanics and Mathematics of the Ukrainian SSR Academy of Sciences; Mikhail Panteleyevich Zhdanyuk, deputy general director of the Soyuzelektrosetizolyatsiya All-Union Production Association; Nikolay Yakovlevich Gusak, head of a division of the Special Design and Technological Bureau for Insulators and Accessories of the same association; Anatoliy Konstantinovich Konstantinov, deputy director, Sofiya Vasilyevna Omelyan, chief of the central plant laboratory, Yuriy Andreyevich Buryak, adjuster, workers of the Lvov Insulator Plant; Nikolay Yegorovich Fiklisov, deputy chief engineer, Nikolay Stepanovich Nazarov, adjuster, workers of the Yuzhnouralsk Accessories and Insulator Plant—for the development and study of small suspension insulators made of tempered dialkali glass for high and superhigh voltage power transmission lines and their introduction in industrial production.

13. Doctor of Technical Sciences Leonid Petrovich Lozitskiy, head of a chair of the Kiev Institute of Civil Aviation Engineers imeni 60-letiya SSSR, supervisor of the work; Candidate of Technical Sciences Anatoliy Vasilyevich Tarasenko, head of a laboratory, Candidate of Technical Sciences Igor Ivanovich Marchenko, senior scientific associate, Candidates of Technical Sciences Mikhail Dmitriyevich Avdoshko and Ivan Ivanovich Gvozdetskiy, docents, Andrey Vladimirovich Sobol and Vladimir Viktorovich Kamyshin, junior scientific associates, workers of the same institute; Aleksandr Nikolayevich Avdeyev, senior engineer, Roman Moiseyevich Shpilman, chief of a section, workers of the Borispol United Air Detachment—for the development and introduction at operating enterprises of civil aviation of

an automated system of the diagnosis of NK-8-2U engines on Tu-154 airplanes.

**For Textbooks for Undergraduates of Higher Educational Institutions**

1. Corresponding Member of the Ukrainian SSR Academy of Sciences Aleksandr Aleksandrovich Pashchenko, head of a chair of Kiev Polytechnical Institute imeni 50-letiya Velikoy Oktyabrskoy sotsialisticheskoy revolyutsii, supervisor of the work; Doctor of Technical Sciences Vladimir Petrovich Serbin, professor, Candidate of Technical Sciences Yelena Aleksandrovna Starchevskaya, docent, workers of the same institute—for the textbook "Vyazhushchiye materialy" [Binders], which was published in 1985 (2d edition).

2. Doctor of Agricultural Sciences Sergey Vasilyevich Shevchenko, professor of the Lvov Forestry Engineering Institute; Candidate of Biological Sciences Anatoliy Vasilyevich Tsilyurik, head of a chair of the Ukrainian Agricultural Academy—for the textbook "Lesnaya fitopatologiya" [Forest Phytopathology], which was published in 1986.

[Signed] Secretary of the Central Committee of the Communist Party of the Ukraine V. Shcherbitskiy

Chairman of the Ukrainian SSR Council of Ministers V. Masol

## LaSSR Grants Award for Liquid Membrane Research

*18140116 Riga IZVESTIYA AKADEMII NAUK LATVIYSKOY SSR in Russian No 7, Jul 88 pp 125-126*

[Article by L. Kulikova: "Latvian SSR Academy of Sciences Prizes: Prize imeni G. Vanag Awarded to B.A. Purin"]

[Text] USSR Academy of Sciences Academician B.A. Purin was awarded the prize imeni G. Vanag in 1988 for the series "*Elektrokhimicheskaya Ekstraktsiya i Reekstraktsiya s Ispolzovaniyem Zhidkikh Membran" [Electrochemical Extraction and Re-Extraction Using Liquid Membranes], done at the LaSSR Academy of Sciences Institute of Inorganic Chemistry (INKh).*

In the late 1960's, B.A. Purin, to solve the problem of obtaining highly pure metals, advanced the idea of using a layer of an organic solution of a certain composition in order to separate the anode and cathode spaces when carrying out the process of electrolysis. The composition of the organic solution was chosen in such a way that it was able to selectively extract impurities existing in the electrolyte, and a current flowing through the system would accelerate this extraction. Experiments yielded positive results, but particular attention in this connection was devoted to the properties and behavior of the extractive agent itself, applied in the system as a membrane in an electrical field. The initial results have already indicated that these liquid membranes can be used to implement the independent processes of extracting, concentrating and separating metal ions. Thus, a new, rapidly developing scientific area has appeared under the B.A. Purin's guidance—electrochemical extraction and re-extraction using liquid membranes, the task of which is to solve the problems of comprehensive using raw materials and protecting the surrounding environment at a modern scientific and technical level.

As compared to liquid extraction, membrane technology provides a higher degree of extraction of compounds from dilute solutions and a more effective separation of elements, closed in terms of properties, with the least expenditure of organic reagents. Moreover, this method makes it possible to reduce the number of steps in extraction, to lessen the pollution of aqueous solutions with organic substances, and to expand the range of usable reagents at the expense of using expensive and more water-soluble ones.

There are several methods for performing membrane extraction—through impregnated liquid membranes or in a multiple emulsion. The possibility of significantly intensifying the process generates stronger interest in the latter method, but this presents considerable difficulties related to solving problems with the stability of emulsion membranes and their stratification.

The use of liquid membranes, which consist of a layer of semi-water- soluble organic liquid of a certain composition which in one way or another contacts two aqueous phases, spatially separated from each other, is yet another matter. A characteristic feature and basic merit of these membranes, predominantly studied at the electrochemistry laboratory led by B.A. Purin, is their selectivity, which is achieved due to the purposeful introduction of organic reagents: there is a possibility of implementing the process in a closed, circulating mode and of significant capacity (compared, for example, to impregnated membranes).

A distinctive feature of the research conducted by B.A. Purin and his associates is the imposition of an electric field on the membrane system, which makes it possible to regulate the selectivity, speed and completeness of ion extraction by changing the form, strength and direction of the current which is flowing.

In order to solve the task which has been set, both the extensive use of modern research methods, as well as the development of new and original methods and equipment for scientific and technological purposes, is required. These are used to study the behavior of liquid membranes with an "open" phase separation border, where direct contact of the organic solution with the aqueous phases is provided, and that of membranes which are separated from the aqueous solutions by semi-penetrable walls, for which cellophane, nuclear filters, solid ion-exchange membranes, etc., are used

depending on the set task and conditions of the experiment. In recent years, much attention has been devoted to studying the promising combination of liquid membranes with semi- penetrable walls, such as tubular porous fibers and polymer films.

This comprehensive approach has made it possible to discover a whole range of new phenomena and laws. Thus, as a result of studying the separation border between organic solutions of onium salts, macrocyclical and other compounds with the aqueous solutions of a number of metals, the competitive adsorption of anions at the phase separation border has been discovered and an interconnection between the interphase border structure and the selectivity of the extraction system has been shown.

The cyclic volt-ampere measurement method, used to study liquid membranes for the first time, makes it possible to study the laws of metal ion transfer across a water/oil border in different systems. In verifying the established dependencies, a method for quantitatively determining ionophor [ionofor] complexes with metal salts and ion associations in non-aqueous solvents was developed. As a result of the studies of the electrode and transport properties of liquid membranes based on crown-ethers, cryptands [kriptandov] and other complex- generators, an entire series of ion selective electrodes, successfully used in the potentiometer method of analysis, has been created.

In the transfer of a number of metal ions through liquid membranes, an electrical disruption phenomenon was discovered, and determining the causes of this state of the electrochemical system (co-transfer of water, formation of a water/oil type emulsion in the membrane space, and the development of ion-conductive through channels within it) enabled the discovery of methods to overcome it.

Under the guidance of B.A. Purin, a general methodological approach to selecting the mobile ion carrier in the liquid membrane is being developed. In this regard, an interrelation between the chemical structure of the membrane-active complex and the kinetics of the inter- ligand exchange in its first coordination sphere with the transport properties of complex carriers was discovered and it was shown that, using bifunctional and complex mobile carriers, it is possible to significantly expand the possibilities of classical linked transport systems.

Research in this field for solving the problems of extracting metals from organic phases, particularly when it is difficult or generally impossible using known methods, is generating great interest. The imposition of a constant electric field has made it possible to develop a single-stage method for transporting platinic metals out of organic solutions based on amino salts and quaternary onium bases, into diluted solutions of mineral acids with a very high degree of extraction.

Understanding the importance of applying specific laboratory systems in industry, B.A. Purin directly participated in developing and improving technological systems for implementing the processes of extraction and concentration of metals from aqueous and organic solutions.

One of these uses a multi-chamber electrodialyzer with a liquid membrane included between semi-penetrable walls, which makes it possible to perform the processes of pertraction [pertraktsii] and re-extraction both in periodic, as well as in continuous modes. In this system, expensive or more water-soluble extraction agents can be used for modifying the liquid membrane. Moreover, the process can be implemented in several stages using a package of circulating liquid membranes.

In another system, a membrane with an "open" separation border between the aqueous and organic phases is used in the extraction stage. The process of extraction is carried out in the emulsion layer during the imposition of an electric field. After the separation of phases the liquid membrane, which contains the target component and is circulating between the semi-penetrable walls, is subjected to electrochemical re- extraction and returns to the beginning of the process—to the extraction stage. The aqueous solution of the re-extract, which also circulates in a closed system, can serve at the same time as the electrolyte for precipitating the component being extracted.

Obviously, the closed cycle systems and devices developed in recent years, in which the external surfaces of hollow fibers and porous tubes are washed by a thin layer of liquid membrane, are the most promising. The original solution to the problem of imposing an electric field on a membrane system makes it possible to combine the processes of electrochemical pertraction [pertraktsii] and hydrometallurgy in these devices.

The prospects for work on membrane extraction today are entirely obvious (a study of numerous data attests to this). The greatest economic effect should be expected in the extraction of valuable and toxic components from sewage water, as well as in those sectors of industry, where ever more dilute technological solutions are being involved in processing. The use of electrochemical extraction provides a possibility for converting to automated and closed technological cycles, which is important both for solving problems of protecting the surrounding environment, as well as for converting to intensive production methods.

The importance and significance of the work done under the guidance of B.A. Purin has been acknowledged by Soviet and foreign scientists. It is no accident that the LaSSR Academy of Sciences INKh has been confirmed as the leading organization in the USSR for research on liquid membranes.

UDC 006.354:621:001.8

## Abstracts of Articles From STANDARTY I KACHESTVO, November 1988

### Major Ways to a Higher Efficiency of New Machinery Development

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 109*

[Article by B. N. Sokolov]

[Abstract] It is argued necessary that the stage of R&D work should be given more attention in the process of new machinery development. A vital importance of tests and training of high-qualification test engineers and experimentors is stressed. Figures 2.



UDC 658.511.4:001.8:006.354

### Advancement of the Tooling-Up Process in the Conditions of Accelerated Progress of Science and Technology

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 109*

[Article by A. I. Nikolaenko and Y. N. Yarmashev]

[Abstract] The problems discussed are those of further advancement of standardization of the process of tooling-up for production. Solution of these problems is expected to lead to shortening of the time of new machinery development and introduction in production and to the use, at enterprises, of new and advanced kinds of machinery and processes. References 3.



UDC 025.4:621-229.001.33:658.512.6

### Typization of Thermal Effect Assembly Processes on the Basis of Production-Wise Classifier of Joints

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 109*

[Article by B. M. Arpent'ev and A. G. Silber]

[Abstract] General principles of assembly processes in terms of production-wise parameters unified by the respective codes of the classifier are discussed. A method of designing an interference-fit assembly process involving thermal effects is suggested. References 5; 1 diagram, 1 table.



UDC 001.8:621:631.3

### On Principles of Modular Machine and Instrument Design

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 109*

[Article by A. V. Demsky and E. N. Pylakin]

[Abstract] Experience gained by industries in the field of modular design is used to define the principles of modular design as concerns the fulfilment of the requirements to component parts and their compatibility, to layouts and product design modules. Figures 3; tables 2, 1 diagram; references 4.



UDC 744:658.5.012.1

### The Modular Principle in the Dimensional Analysis of a Drawing

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 109-110*

[Article by A. I. Solov'ev]

[Abstract] Application of the principles of simulation to dimensional analysis of workpiece and assembly dimensional chains of machines and instruments is described. The author constructs equations of modular dimensional chains and analyzes them so as to demonstrate the applicability of the equal quality methods. 1 Figure; tables 2; references 3.



UDC 658.5.012.1:658.562:006.067

### What Prevents Gospriomka From Assuring a Radical Improvement of Product Performance and Quality?

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 110*

[Article by G. N. Noreyka, L. V. Tsoy, G. B. Kim and V. G. Dadykin]

[Abstract] Principal reasons of the unending contradictions between Gospriomka and the management of the "50 Years of the USSR" Tashkent Tractor Plant Production Association are analyzed. Some directions of Gospriomka restructuring are suggested. 

UDC 620.1:006.354

### State Testing of Products: Lessons, Problems, Prospects

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 110*

[Abstract] M. A. Ushakov, Head of the Department of Product Quality Evaluation and Certification, USSR State Standards Committee, is interviewed on problems of regulatory and methodic assurance of further advancement and improvement of the system of State testing of products.

UDC 006.032:001.8

### When, How, and Who Is To Enforce International Standards ISO 9000-9004?

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 110*

[Article by R. V. Rakhlin and M. E. Svitkin]

[Abstract] Leaders of the Commission on Quality Control at Enterprises and Associations of the Leningrad Regional Council of the Scientific and Technological Society discuss challenges, prospects and major difficulties in introduction of the ISO standards on quality systems.



UDC 001.8:658.562:006.354

### Prospects for Further Work Development in Product Quality

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 110*

[Article by V. M. Krikun and A. I. Troshin]

[Abstract] Analysis of reasons for low efficiency of the employed systems of quality control and the target of quality improvement of Soviet products to the world standards level is used as the basis for an all-round consideration of fundamental notions, such as "product quality", "labour quality", and "process quality". In so doing, "product quality" is regarded as a purpose of production management, rather than as an object. References 6.



UDC 001.4:65:658.562

### The Work of the EOQC Glossary Committee and the Results of Its 31st Meeting

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 110*

[Article by A. K. Dzhincharadze and V. L. Nalepin]

[Abstract] The results of discussions concerning the 6th edition of the EOQC Terms Glossary are reviewed and measures to ensure its efficient application in the USSR are outlined.



UDC 006.354.065:001.4:061.3:681.3

### Standardization in Information Science: Problems and Prospects

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 111*

[Article by Y. N. Minaev]

[Abstract] Problems of standardization methods and principles development with reference to information science are discussed. A unified procedure of software system functioning quality analysis is suggested for use while solving actual problems of standardization in information science. References 11.



UDC 006.032/.039:658.012.011.56

### Computerized Maintenance of a File of Regulatory Engineering Documentation

*18140136 Moscow STANDARTY I KACHESTVO in Russian No 11, Nov 88 p 111*

[Article by V. I. Lepnyakov and G. S. Sokol'nik]

[Abstract] Experience of development and operation of a computerized system for maintenance of a file of regulatory engineering documentation (standards, specification, etc.) is outlined. The system makes it possible to reduce the cost of maintenance of the file of regulatory engineering documentation, to shorten the delays in, and to improve the quality of, information presentation to designer, engineers and other specialists of an enterprise. 1 form, 1 table.