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USSR Report

SCIENCE AND TECHNOLOGY POLICY

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2 January 1986

USSR REPORT

SCIENCE AND TECHNOLOGY POLICY

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ORGANIZATION, PLANNING AND COORDINATION

ECONOMIC EXPERIMENTS, MANAGEMENT OF SCIENTIFIC PROGRESS

Moscow IZVESTIYA AKADEMII NAUK SSSR: SERIYA EKONOMICHESKAYA in Russian No 3,
May-Jun 85 pp 69-74

[Article by V. V. Ambrosius: "On the Improvement of the Economic Mechanism of the Management of Scientific and Technical Progress"; passages rendered in all capital letters printed in italics in source]

[Text] In the article the urgent directions of the further improvement of the economic mechanism of the management of scientific and technical progress are examined. The importance of economic experiments for the acceleration of scientific and technical progress and the further development of the economic mechanism is elucidated.

The tasks and directions of the improvement of the entire economic mechanism, which aim at the more complete use of the advantages and possibilities of mature socialism, at the extensive use in production of the achievements of science and technology and at the increase on this basis of its intensification and efficiency, are specified in the decisions of the 26th CPSU Congress and the subsequent CPSU Central Committee plenums.

Economic practice is slowly being reorganized in the indicated direction. At the same time the possibilities of the dynamic growth of the socialist economy are still not being completely used. The problem of the more extensive introduction of the achievements of science and technology in production is arousing some anxiety. In this connection the questions of the acceleration of scientific and technical progress and the improvement of its management in all the sections of the economy and of the taking for this of steps, which would ensure a radical change in this matter, which is vitally important for the country, are acquiring priority importance. The need to deal more vigorously with the improvement of the management of the entire economic mechanism stems from the ever increasing influence of scientific and technical progress on all aspects of socioeconomic development. However, in order to realize the extensive possibilities of the intensification of production, which scientific and technical progress is creating, a set of serious measures on the improvement of the economic mechanism should first of all be implemented. Here it is important to proceed from the general laws and principles, which follow from Marxist-Leninist theory and have been confirmed

by the experience of economic development in our country and the other socialist countries. The gained experience affords extensive possibilities for the choice of specific steps on the increase of the level of the management of the economy of mature socialism.

For this purpose economic experiments began to be used extensively in planning practice. During the economic experiments a system of plan indicators, economic levers and stimuli, financing and material and technical supply, measures, which are aimed at the increase of the economic responsibility of suppliers and consumers, and so on were developed. In the early 1970's economic experiments were conducted in the ministries of the electrical equipment industry, instrument making, automation equipment and control systems and heavy and transport machine building, the Main Administration of Motor Transport of the Moscow City Soviet Executive Committee and others. Then the sphere of effect of the economic experiments was broadened substantially. Construction organizations of Belorussia and Lithuania and industrial enterprises of Lvov Oblast, Krasnodar and other cities were changed over to the new conditions of work. The experience of the work under the new conditions of such large associations and enterprises as the Volga Motor Works (VAZ), the Shchekino Azot Association, the Sumy Machine Building Association imeni M. V. Frunze, the Kaluga Turbine Plant and others is well known.

In the early 1980's the economic experiments have encompassed not only union, but also republic ministries and departments, they apply to light, the food and local industry; economic methods of management are finding greater and greater use in the sphere of consumer services, agriculture and other areas of economic and cultural activity.

The results of the economic experiments are periodically generalized and analyzed, they are the basis, on which recommendations and suggestions on their further development are prepared and the corresponding party and government decisions and decrees are adopted. Thus, for example, the positive experience of the work of the electrical equipment industry under the conditions of the economic experiment on the planning and economic stimulation of scientific and technical progress found reflection in the July (1979) decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" and was extended to other sectors of industry. The situation is also similar with the generalization of the experiment on new forms of the organization of labor and wages at the Volga Motor Works and the Shchekino Azot Association; on the development and use of systems for the control of the quality of labor and products at enterprises of Lvov Oblast and at many others.

The decree of the CPSU Central Committee and the USSR Council of Ministers of 14 July 1983, "On Additional Measures on the Broadening of the Rights of Production Associations (Enterprises) of Industry in Planning and Economic Activity and on the Increase of Their Responsibility for the Results of Work," was an important stage in the development of the forms and methods of management. In conformity with this decree it was deemed expedient to conduct a large-scale economic experiment in five industrial ministries: heavy and transport machine building, the electrical equipment industry, the fuel

industry of the Ukraine, light industry of Belorussia and local industry of Lithuania. In 1985 another 21 union and republic ministries were included in the experiment. Moreover, consumer service enterprises of many oblasts of the country are being changed over to the new conditions of work. Suggestions on the improvement of the system of planning and economic stimulation in construction, in the sectors of the agroindustrial complex and so on are being prepared.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," in which important recommendations on the improvement of the planning of the development and introduction of new equipment in the national economy found reflection, was adopted on 18 August 1983.

Generalizing the gained experience of improving the forms and methods of the management of the economy at the present stage, it seems possible to distinguish the following most significant features.

IN THE AREA OF PLANNING--the implementation of measures on the development of an interconnected set of plans: the formulation (once every 5 years) of a Comprehensive Program of Scientific and Technical Progress for 20 Years, which includes a set of scientific, technical and socioeconomic forecasts; the elaboration (once every 5 years) of the Basic Directions of the Economic and Social Development of the Country for 10 Years; the increase of the role of the five-year plan as the main form of the planning of the economic and social development of the country and the basis of the organization of economic activity.

Within this set of long-term and intermediate-term plans the goal program methods of planning and the solution of important socioeconomic, scientific and technical problems underwent extensive development.

Definite gains have been made in the implementation of these measures. The formulation of the Comprehensive Program of Scientific and Technical Progress has become regular. The Basic Directions of USSR Economic and Social Development for 1981-1985 and the Period to 1990 were approved at the 26th CPSU Congress. The five-year plan for 1981-1985 was drafted in interconnection with them. In essence the drafting of a SET OF PLANS for the first time became a reality. The USSR Food Program, which was formulated and approved by the May (1982) CPSU Central Committee Plenum, is being implemented. Work is being performed on other long-term comprehensive programs: the energy program, the development of consumer goods production and services, the creation, the development of the production and the efficient use of computer technology and automated systems and others. The formulation and implementation of a number of most important regional goal programs are being carried. Starting with the 12th Five-Year Plan all-union, republic (interrepublic) and sectorial (intersectorial) scientific and technical programs of regions and territorial production complexes will be formulated; the priority allocation of resources, as well as limits of planning, surveying and contractual construction work is envisaged for their fulfillment.

The changeover to comprehensive planning on the basis of supply orders and the certification of the quality of the output being produced was an important unit in the improvement of the system of the planning of new equipment. As of 1984 the certification of industrial products with respect to two quality categories--the highest and first--was introduced. Items, which have not been certified with respect to these categories, are liable to removal from production. The introduction of differentiated standards of the updating of machine building products for the timely removal from production of obsolete types of equipment and the changeover to new, technically advanced models, which are conducive to the economic efficiency of production and are competitive on the world market, is envisaged as of 1986. The supply orders encompass all the stages of the work on the development and use of new equipment. They have the force of economic contracts, in which the specific performers and deadlines of fulfillment are outlined and the sources of financing and economic stimulation are also envisaged.

The method of supply orders found further development in the system of the planning and economic stimulation of the associations and enterprises, which are working under the conditions of the large-scale experiment. This was reflected in the changeover to the planning and evaluation of the work of economic units according to the indicator of the volume of product sales with allowance made for the fulfillment of the plan of deliveries in conformity with concluded contracts. The economic contract for the delivery of products became here the basic form of planned management.

Among the important aspects of the planning work of the associations and enterprises, which are participating in the large-scale economic experiment, is the limitation of the number of indicators, which are approved for them within the five-year plan, as well as the increase of the role of stable economic standards as an important lever of the influence of the plan on cost accounting. Of the approved plan indicators along with the sales volume the assignments on the increase of labor productivity, the decrease of the expenditures per ruble of output and the saving of the most important production resources, as well as the indicators, which are connected with the fulfillment of the plan of new equipment, are established. A decisive changeover to standard methods of management is being observed in all planning work. In conformity with this in the ministries, which have changed over to the new conditions, the drafting of the plan and the methods of the economic stimulation of its fulfillment to a greater and greater extent are based on the system of economic standards: the payments for the used productive capital; the formation of the wage fund; the formation of economic stimulation funds; the deductions from the accounting budget for the budget; the deductions from the profit for the unified fund for the development of science and technology; the expenditures on scientific research, experimental design and technological work; the formation of the fund for the remuneration of labor in science; the removal from production of obsolete products and others.

The sphere of bank financing is being broadened significantly.

IN THE AREA OF PRICING--the introduction of incentive markups in the amount of up to 70 percent on the wholesale prices for new, highly efficient products and reductions in the amount of up to 30 percent on the wholesale prices for

industrial products which are liable to removal from production. Associations and enterprises are granted the right to transfer 75 percent of the markups to the economic stimulation funds. Here the amount of the profit, which is reflected in the markups on prices, is taken into account not in the plan, but in the report, which creates additional stimuli for the output of high quality, efficient products.

IN THE AREA OF THE DEVELOPMENT OF COST ACCOUNTING RELATIONS IN THE SPHERE OF SCIENCE. At scientific research institutions and design bureaus the changeover has been made to payment for jobs, which have been completely finished and have been accepted by the client, with the simultaneous provision of working capital to scientific research institutes and design bureaus. Material incentive funds, funds for sociocultural measures and housing construction and funds for the development of the organization have begun to be formed at scientific production associations, scientific research institutes and design bureaus. In this respect sectorial research and planning and design organizations have been put on the same level as industrial enterprises.

The amount of the economic stimulation funds has been made directly dependent on the actual saving, which is obtained at enterprises from the fulfillment of measures on the introduction of new equipment, as well as on the economic impact of the production of a new item.

IN THE AREA OF THE ORGANIZATIONAL STRUCTURE--the streamlining of the network of scientific institutions and the intensification of their specialization. In a number of sectors of industry (first of all in the Ministry of the Electrical Equipment Industry) they have resolutely set out in the direction of the subordination of scientific research institutes to large industrial enterprises and associations and in the direction of the establishment of production and scientific production associations. This made it possible to shorten the time of development to two-fifths to two-thirds and to sharply increase its quality.

It was deemed expedient to extend the practice of the organization at associations and enterprises of temporary scientific production subdivisions for the solution of the most important national economic problems. The establishment of similar collectives for the solution of scientific and technical problems of an intersectorial nature is also envisaged.

It is planned to implement a set of measures, which are aimed at the rapid establishment and technical equipment of pilot and experimental bases and works. The assignments on the construction (renovation) of the indicated objects should be included in a priority manner in the five-year and annual plans.

Since 1984 the creation of reserves of capacities for the preparation of the production and the assimilation of the output of new types of equipment and materials has been envisaged in the plans.

As we see, as a result of the economic experiments very noticeable changes have been made in the economic mechanism and in the established forms and

methods of the organization of production. Their analysis showed that important positive results have been achieved, first of all the tightening up of the discipline of deliveries, a relative saving of the number of workers and accordingly the acceleration of the increase of labor productivity, the decrease of the product cost. At the same time the experiment either did not encompass several urgent national economic problems or is not fully ensuring their solution. The most important of such problems is the acceleration of scientific and technical progress on the basis of the increase of the interest of associations (enterprises) in the development and assimilation of new advanced equipment and technology and the increase of their economic responsibility for the achievement of high results in this sphere.

For the solution of the problem it is necessary, in our opinion, to increase the interest and responsibility of associations (enterprises) for the long-term, and not only the current results of production, especially for the production of output at a modern technical level. It is possible to achieve this, having extended cost accounting relations along with current production to applied scientific and design developments, as well as capital investments in the retooling and renovation of production. What on this level is most essential and important?

First of all a different approach to the plan of the development of science and technology is necessary. Not the development and introduction of individual models of equipment or even their technological systems and not the high level of equipment as such, but the achievement by means of new equipment of high end results of the socioeconomic development of the country, the increase of labor productivity and the increase of the efficiency of the production resources being used should be the initial condition of the formulation of this plan. CONSEQUENTLY, ONE SHOULD REGARD AS THE CRITERION OF THE PLAN NOT TECHNICAL NOVELTY AND PROGRESSIVENESS, BUT THE INCREASE OF THE ULTIMATE ECONOMIC IMPACT IN THE NATIONAL ECONOMY--THE NATIONAL ECONOMIC NET PROFIT.

Further, in our opinion, the necessary changes should be made in the mechanism of the distribution of the profit. Here it is important to retain the fee for capital as a potentially effective lever of the efficient use of fixed capital and capital investments. Apparently, the suggestions on the introduction of a fee for capital investments at the level of the unified norm of effectiveness (approximately 14-15 percent) are legitimate. The fee for operating capital can be differentiated. It is also important that the fee for capital would be charged as a percent of not its initial, but its residual value.

The question of abolishing the division of amortization deductions for capital repair and renovation is also of not small importance. All the expenditures on capital repair, just as other types of repairs, should be attributed to the current expenses. The amortization should be credited only for renovation.

The indicator of the net, or accounting, profit is called upon to play a large role as the basic fund-forming indicator of the work of associations and enterprises. At the same time the need has arisen for the more resolute revision of prices for their greater approximation of the level of the socially necessary expenditures. Prices should to a greater extent reflect

supply and demand and act as control standards of the plan, which ensure a planning balance. Apparently, the practice of establishing price markups for efficiency and quality also needs substantial change. At present these markups mainly stimulate the producer and by no means guarantee the user the obtaining by him of the rated economic impact. To avoid this contradiction it is necessary, wherever this seems possible in accordance with the conditions of the economic experiment, to change over to agreed or contract prices.

The solution of these problems during the further development of economic experiments will make it possible to provide the necessary conditions for the acceleration of scientific and technical progress and the improvement of the entire economic mechanism.

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ORGANIZATION, PLANNING AND COORDINATION

UZBEK GOSPLAN OFFICIAL ON REPUBLIC SCIENTIFIC DEVELOPMENT

Tashkent EKONOMIKA I ZHIZN in Russian No 5, May 85 pp 44-48

[Interview with Chief of the Science and Technology Administration of the Uzbek SSR State Planning Committee Vakhid Akhmedovich Khodzhimatov by I. Osipova: "To Whom Will the Heights Surrender, or Several Questions on the Introduction of Scientific Developments in Production"; date and place not specified]

[Text] At the request of the journal EKONOMIKA I ZHIZN Chief of the Science and Technology Administration of the Uzbek SSR State Planning Committee Vakhid Akhmedovich Khodzhimatov answers these questions.

[Question] We speak with pride about the wide range and scale of the scientific and technical potential of our republic. The scientists of Uzbekistan have done much in order to bring all the sectors of the national economy up to the leading levels of science and technology. More than 400 different developments, the economic impact of which is estimated in the hundreds of millions of rubles, are completed by them annually and are turned over for practical use. But one also has to admit the fact that the achievements of science and technology are being "materialized" more and more slowly in production--the mechanism of the introduction of research and development is inadequately adjusted.

What are the reasons for the formed situation, how is the acceleration of the "science-production" process to be achieved--I would like, Vakhid Akhmedovich, to conduct our discussion today on this.

Let us turn to the facts. The scientific institutions of the Uzbek SSR Academy of Sciences have recommended for extensive practical use in the next few years over 140 developments which were completed by them. But only a few more than 50 of them actually are being used or will be used in the national economy. And what about the others? What is hindering their introduction? It would be very interesting and, no doubt, useful if we succeeded with your assistance in understanding why the fate of these developments has formed in precisely this way. For considerable efforts of scientists are incorporated in them, the state has spent considerable capital on them--why have they not yielded the proper return?

[Answer] The problem of speeding up the "science-production" process includes a complex set of the most diverse aspects--organizational, economic, legal, psychological and many others. In one interview we, of course, will not be able to cover all of them--let us touch upon just a few. Precisely the analysis of the works which you just mentioned--works which owing to some reasons or others remained "overboard" practical use--will help us, it seems, to clarify something. Such an analysis was made by the republic State Planning Committee jointly with interested ministries, departments and scientific institutions.

But before sharing a few of the conclusions, to which we came, I would like to make something like a small, if it is possible to express oneself this way, lyrical digression.

I would compare scientific research with the ascent of a mountain peak. A difficult, often lengthy ascent, which requires of each participant in it serious preparation, experience and, I will not be afraid to say, dedication. And from the entire collective or several collectives, which together are storming the height, the irreproachable coordination of actions. But what is to be considered the completion of such an ascent--the moment when the research or scientific development has been completed, the results have been obtained and can be recommended for practical use? It seems that on this leg of the journey it is still too early to regard the scientific heights as conquered. A responsible stage is ahead--the introduction of what was developed by scientists in the national economy. Here the remuneration of the labor of scientists and their moral and material stimulation are in no way connected with this last stage. And still, can a true figure of science regard his job as completely done, if the recommendations proposed by him have remained on the shelves of institute archives?

[Question] But to what extent does this depend on the author of the development himself or even an entire scientific collective? Is the reproach that the path from an idea to introduction at times proves to be unjustifiably drawn out, legitimate, is it legitimate to address this reproach to science?

[Answer] As is obvious from the very definition, two sides, two participants in social production are put into action in the "science-production" cycle. And both of them should be concerned that any valuable innovation would acquire as soon as possible the rights of citizenship in the national economy. But your very question is not accidental--a stable stereotype of the notions that the majority of obstacles in the way of an "idea" arise as of the moment when, having left the walls of the scientific laboratory, it "comes across" or, what is still worse, for some reason is not able to come across production, has formed. In particular, the press--both local and central--most often focuses its attention precisely on this aspect of the matter. Such notions, of course, are not without a basis, but they do not settle the problem of introduction to its full extent. And I would like first to direct attention to another aspect of it.

Thus, let us return to the data of the analysis made by us. I will emphasize once again that nearly 90 (!) of the named 140 plus works were not able to get a start in practical life. There are several reasons here.

Let us begin with the fact that a portion of the scientific developments could not be accepted by ministries or departments for a quite understandable reason--similar research had been successfully performed by the forces of the ministries themselves or sectorial institutes and planning and design organizations. For example, in 1980 the Institute of Chemistry of Plant Substances proposed its own method of ventilating cotton seed storehouses at oil mills, which prevents the overheating of the seeds and ensures the preservation of their quality. But 2 years prior to this a similar method, which was developed at the Leningrad Maslozhirprom Scientific Production Association, was adopted by our Ministry of the Food Industry--it is now already being used at 10 enterprises of this system. A similar factor also determined the fate of the Technological Plan of the Personnel Subsystem, which was done by the republic Kibernetika Scientific Production Association. A similar work of the Republic Computing and Data Processing Center of the Uzbek SSR Ministry of Motor Transport is already being successfully introduced in the system of this ministry. And such scientific developments, which originated as an inevitable result of the poor information of scientists about the state of affairs in their field of knowledge and about what their colleagues in the country and the republic are working on, among those submitted by the scientific institutions of the Academy of Sciences there were 13 such developments!

[Question] Vakhid Akhmedovich, but do the sources of this phenomenon, which for its own designation has found the already customary term "the parallelism" in scientific research--do its sources lie not only in the poor organization of the information service, but also, apparently, in the lack of the proper coordination of research?

[Answer] Certainly. And this is a very important aspect, to which we will again return without fail in our conversation. But for the present I would like to indicate a number of other reasons, for which completed developments did not find a road into production. Works which, most likely, should be classified as not being of practical value for today, constitute the next group of them.

As an example it is possible to cite the method of processing tomato seeds, which was recommended by the Institute of Microbiology and decreases somewhat their morbidity--the Uzbek SSR Ministry of Agriculture rated this work as nonurgent and rejected it. I will name another work of the Institute of Microbiology, "The Directed Growing of Active Races of Yeast for Apple Wine Making." Its authors, it would seem, did their work conscientiously and obtained convincing results--it is only that the use of their recommendations in practice proved to be inadvisable, since such products as fruit wines do not have at all a consumer demand. Or there is the following fact. The Special Planning and Design Bureau of the Kibernetika Automated Control System developed a system of the recognition of the code numbers of transportation units, which enables garages to record precisely the time of the departure and arrival of vehicles. The designers were convinced that the introduction of such a system would make it possible to decrease the idle times of motor transport, to increase labor productivity and so on. The promised economic impact was expressed in the amount of 10 million rubles. But, according to the data of the Ministry of Motor Transport, the proposed development cannot

ensure either a decrease of the idle times or an increase of labor productivity. Unfortunately, these examples are not isolated--work on minor themes and isolation from the real problems of life are still characteristic of some of our scientific collectives.

Another significant group of developments, whose movement into life was held up through the fault of the developers themselves, is the ones which were returned to the authors for modification: for the conducting of additional pilot production tests, the making of technical and economic calculations and the determination of the specific objects and extents of introduction.

[Question] That is, are these precisely the ones who halted in their "ascent," hoping that someone else would storm the "heights" for them, and therefore they did not perform even that part of the work, which they were obliged to perform?

[Answer] It is also possible to put it that way. But more strictly speaking, this is evidence of the indifference of the author to his "creation," to its further fate. And, unfortunately, there is much more such evidence than there might seem at first glance. How else is it possible to appraise, for example, such a case, when the Institute of Power Engineering and Automation asserts that a device proposed by it has been introduced at the Syrdarinskaya GRES, while in reality such work has not been performed at the electric power plant? Back in 1976 the Institute of Botany identified a new valuable tanning agent, but for 8 years has not gotten around to submitting the necessary materials in this regard to the interested organization--the republic Ministry of Light Industry. The Botanical Garden has a large number of important studies to its credit (suffice it to say that they concern the broadening of the raw material base of medicinal preparations), but here for some reason they are in no hurry (some developments are dated the same 1976!) to submit the materials to the appropriate ministry.

The data of the analysis made by us confirm that 36.3 percent (more than a third!) of all the proposals of the scientific institutions of the Uzbek SSR Academy of Sciences, about which we spoke above as not introduced, found themselves in this unenviable role first of all due to the untimely submitting of materials for the consideration of the scientific and technical councils and expert commissions of ministries and departments.

[Question] Vakhid Akhmedovich! It is hard to believe this! For it is impossible to doubt the interest of scientists and designers in the fact that their work would find its "place under the sun" in the national economy. At one of the round-table meetings of the newspaper SOVETSKAYA ROSSIYA, which was devoted to the problems of the acceleration of scientific and technical progress, the question was posed point-blank: Who is more interested in introduction--the enterprise or the developers? And the scale tipped unconditionally in the direction of science. How did it suddenly happen that its representatives turned out in this case (rather, many cases!) to have so little interest in the advance of their works into life?

[Answer] Perhaps it is a matter here not of a lack of interest--who in reality does not want to see his idea implemented?--but of a lack of

organization, the failure to observe the elementary requirements of state discipline. Judge for yourself. The Uzbek Kibernetika Scientific Production Association counted to its credit 40 completed scientific and technical developments. The overwhelming majority of them were not submitted to the scientific and technical councils of the ministries and departments, in which introduction was planned and it was proposed to carry out the circulation of the developments. And here is the result: only two proposals of Kibernetika, as the analysis showed, by the moment in question had been able to be recommended for extensive introduction.

At several scientific institutions an incorrect practice has formed--the materials on completed developments, bypassing the expert councils of ministries and departments, are turned over directly to individual shops of enterprises, to organizations, kolkhozes and sovkhoses, where certificates on introduction are drawn up. To what does this lead? To the fact that the developments accepted for introduction are not backed in a planned manner with the necessary material and financial resources, their practical implementation is thereby checked.

[Question] Vakhid Akhmedovich! In our conversation many of the "ruts," in which an innovation can get stuck, without yet having crossed the threshold of the scientific institution at which it originated, have been named. But it has ahead the distance between this threshold and, say, the plant shop or the kolkhoz field. And it is no secret that at times years are spent on overcoming this distance.

[Answer] I will continue this thought. The time, which is spent on the drawing up and turning over of technical specifications to production, is estimated now at approximately 5-6 years. But between the making of the decision on the development of a new type of product and its series production the distance is lengthened to 7-8 years. These are the data for the country. But in our republic this process is of an even more protracted nature. Because of this it happens that new equipment becomes obsolete even before the start of its mass production. This occurs to a certain extent because there has now formed such a situation, in case of which some organizations perform scientific research, others carry out design development and the production of prototypes, still others carry out the development of technology. Such a structure, it seems, no longer conforms to the requirements of today--neither the increased level of productive forces nor the current forms of the organization of production.

Thus far the lack of interest of ministries and departments in the priority fulfillment of the plans of the development of science and technology and their inadequate coordination with the other sections of the plans of economic and social development have appreciably hindered the matter. And the individual enterprise today, let us say frankly, in most cases is not too interested in the use of a scientific and technical innovation, especially if it requires the rearrangement of the technological cycle and, hence, can temporarily worsen the basic plan indicators and by that influence both the evaluation of the activity of the enterprise and the amounts of the economic stimulation funds.

[Question] As one production worker expressed himself figuratively: "The scientific crop will yield a harvest tomorrow, but the plan must be fulfilled today. And at this juncture one need not choose."

[Answer] That is right. It is no trouble to confirm this thesis with examples. Thus, due to the need to make the corresponding changes in the production plans the Ministry of Light Industry is delaying the introduction at once of several suggestions of the institute of the textile and light industry.

[Question] The same enterprise, apparently, has also headed in the direction of the rotary-pulse equipment, which was developed at the Tashkent Highway Institute and about which our journal recently wrote. It has already, it can be said, won half the country, but our ministries of construction, construction materials and power engineering, to which the extensive assimilation of this innovation has been assigned, are still "hesitating."

[Answer] Not by chance are the workers of the republic State Planning Committee coming forth with proposals on the introduction of the plan indicator of the efficiency of the introduction of new equipment, which should be grouped with the fund-forming indicators, and first of all with those which form the material incentive fund. This would increase significantly the interest of enterprises in stepping up the pace of the assimilation of the innovations suggested by scientists.

The ministries and departments need to coordinate better the plans on science and technology with the plans of the development of the sector. It is a question of the formation of the themes of scientific research and experimental design developments on the basis of the demands of industrial enterprises and in conformity with the prospect of the technical and economic development of the sector. I have already spoken once on the pages of your journal about such an important economic lever, which ensures the close cooperation of science and production, as the theme-by-theme financing of scientific developments through the system of supply orders. But this has to be spoken about again, since this system, which is conducive to the concentration of financial, material, technical and manpower resources on the solution of vitally important scientific and technical problems, has not yet become in our republic an effective tool of goal planning. So far the problem sectorial laboratories of academic institutes, which blend with the system of supply orders and are completely financed at the expense of ministries and departments, have not become properly "acclimated" here.

[Question] Vakhid Akhmedovich, apparently, this is not the only question connected with introduction, which has already been raised on our pages and to which it makes sense to return, since the problems touched upon remain urgent.

[Answer] Of course. I will recall, for example, such an unused reserve of the planned influence on the acceleration of the processes of introduction as the development of the republic automated system for the management of the development of science and technology, which includes a subsystem of the forecasting of the scientific and technical potential, planning calculations on science and technology, the management of the formulation and

implementation of the most important programs, as well as a center of the exchange of current information on the scientific developments, which are being carried out and are liable to introduction. Such a system would help to avoid many of the shortcomings, of which it was a question at the beginning of our conversation, particularly the parallelism in the work of various scientific departments.

Unfortunately, so far the question of such an important link in the "science-production" chain as the pilot experimental base has not become obsolete. Frequently this chain is broken precisely here. This break affects especially appreciably the science of higher educational institutions, since at nearly all higher educational institutions there is no pilot experimental base. True, a joint center of higher educational institutions for the service of scientific research operates at Tashkent State University, but its potentials are being used far from completely. The organization of such a center is one of the means of solving the problem. There are also other means: the establishment jointly with sectorial ministries and departments of educational scientific production associations or the attachment of the faculties of technical higher educational institutions to enterprises--for the purpose of their use as an experimental production base.

[Question] Vakhid Akhmedovich, now, probably, it is the right time to discuss the coordination of scientific research in the republic, how it is most advisable to unite the efforts of sectorial science, academic science and the science of higher educational institutions, and how to connect them more closely with the basic directions and the specific needs of socioeconomic development.

[Answer] First of all I would focus attention on the goal program methods of management. As is known, experience in solving scientific and technical problems on the basis of elaborations of comprehensive goal programs exists in Uzbekistan--during the current five-year plan more than 150 scientific, planning and design and production organizations are fulfilling over 800 assignments in conformity with such programs--of both a republic and an all-union scale. Being a directive planning document, the comprehensive programs unite into a single whole resources, performers, material and technical supply and the stage-by-stage dates of the completion of operations, no matter to what spheres of activity they pertain. In this way the isolation of academic science, sectorial science and the science of higher educational institutions is being overcome, and at the same time the gap in time between scientific research, the experimental checking of an innovation and its mass application is being reduced significantly.

It must be admitted that at this stage the implementation of these programs is not always going in as smooth, adjusted and coordinated a way as is necessary for the good of the matter: it still happens that in case of the inclusion of some sections or others of the program in the plans of sectorial scientific, planning and design and technological organizations certain obstacles have to be overcome. A way out is seen in legalizing the special-purpose financing of such programs and in setting up in the republic a unified coordinating center which has the necessary powers and rights.

The increase of the scale of the use of comprehensive programs, which are aimed at the solution of the most important regional problems, is the basic direction of the acceleration of scientific and technical progress in the republic. The very choice of the programs being planned today, on the fulfillment of which Uzbekistan has to work already during the 12th Five-Year Plan, is significant--they will concentrate scientific forces on the most urgent problems of scientific and technical progress in the most important sectors of our economy. This choice is dictated by the current and long-range needs of the national economy and by the aspiration to increase the contribution of the republic to the economic and social development of our society.

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ORGANIZATION, PLANNING AND COORDINATION

DEVELOPMENT OF LOW-WASTE TECHNOLOGIES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Jun 85 p 2

[Article by First Deputy Chairman of the USSR State Committee for Science and Technology L. Yefremov: "The Reserves of Low-Waste Technologies"]

[Text] In going to meet the 27th CPSU Congress, the party is placing in the forefront the fundamental acceleration of scientific and technical progress as the main strategic lever of the intensification of the national economy and the better use of the accumulated potential. In particular, it is a question of the changeover to fundamentally new technological systems which provide the greatest efficiency. Along with the sharp increase of labor productivity and the minimum expenditures of resources per unit of output these systems are also called upon to ensure the meeting of the highest ecological requirements.

Practical experience shows that the inefficient use of raw material resources is one of the main causes of the disturbance of natural systems and environmental pollution. As a rule, dumps of waste products, discharges and effluents, on the neutralization of which considerable assets have to be spent, appear precisely here. From this standpoint the resource-saving policy at the same time is also a conservation policy. Moreover, it provides a significant economic gain in case of the skillful use of waste products.

"The finding of a means of producing something useful from waste is the main goal of advanced technology," the famous Russian scientist D. I. Mendeleev wrote back during the last century. Life has confirmed this bold scientific prediction. The secondary resources, which are obtained from waste products, usually cost the country several times less than newly extracted resources. For example, the production cost of steel, which is smelted from scraps of ferrous metals, is one-fifth as great as that of steel obtained from pig iron. But the technologies, in which the processing of a significant portion of the waste products is envisaged, by virtue of which they have received the name of low-waste technologies, provide an especially great impact.

At one time the concept of what is called "zero growth" cause a considerable stir abroad. Its authors claimed that the rapid increase of waste products and environmental pollution already in the foreseeable future would make it incumbent to halt the development of world production. Accordingly, the

increase of the standard of living of people would also have to be limited. Soviet scientists did not agree with this gloomy forecast. To counterbalance it they advanced and substantiated scientifically the idea of waste-free, ecologically harmless production complexes, in which the byproducts of some conversions become the source raw materials for others. This idea received extensive international recognition. It was the basis for the Declaration on Low-Waste and Waste-Free Technology and the Use of Waste Products, which was adopted at an all-European conference which was convened 6 years ago on the initiative of our country.

It is difficult to overestimate the importance of this step: for many countries the policy of the development of low-waste technologies became a strategic direction in the solution of ecological problems. Academicians N. Semenov, I. Petryanov-Sokolov and B. Laskorin and other Soviet scientists made a large contribution to the formation and development of this direction. The scientific foundations of low-waste technologies and the principles of the development of advanced processes were formulated in their works. Today they are being used extensively in various sectors.

Among the main achievements in this direction it is possible to note the technology of the direct reduction of sponge iron from its oxides, which makes it possible to reject the blast furnace and byproduct coke processes, which pollute the environment. The oxygen flash smelting copper-zinc concentrates is making it possible to decrease sharply the discharges of sulfur dioxide into the atmosphere. While the oxygen-alkali bleaching of paper pulp has greatly reduced the amounts of sewage.

On the basis of such processes low-waste works have been set up at the Oskol Electrometallurgical Combine, the Cherepovets Metallurgical Combine, the Balkhash and Norilsk mining and metallurgical combines, at the chemical enterprises in Dorogobuzh and Rossosh, at the Angarsk Cement Plant and the Pikalevo Alumina Combine. It is also possible to name as an example the Uralasbest Combine, at which the technology of purifying recirculating air made it possible to decrease the annual consumption of electric power by 260 million kWh and provided an economic impact on the order of 10 million rubles.

But, in spite of the achieved results, much still has to be done both in the area of the development of new low-waste technologies and for their extensive introduction.

Comparatively recently the majority of technologies were developed with a view of obtaining one or, at best, two or three final products. In order to adapt raw materials for such processing, it is necessary to enrich them in every possible way, extracting the main component in concentrated form. Now it is a question of the development of technologies which are capable of converting multiple-component raw materials into a wide range of products.

On the organizational level the practice of setting up territorial production complexes conforms to the greatest extent to this idea. Within them industrial centers with nearly zero waste products and discharges into the environment can be formed on the basis of the optimum combination of works and

the exchange of products among them. The studies on the Kansk-Achinsk Fuel and Power Complex, for example, were performed with such an aim. On the basis of its coals it is planned to obtain not only thermal energy and electric power, but also coke, fuel briquets and other products of power technological processing. Moreover, the associated rock and ash will be used for the production of construction materials, while the waste heat will be used at hothouse farms and fish hatcheries.

Unfortunately, owing to departmental isolation such an approach has not yet become the norm. The cases when the plans of new works and works being renovated are drawn up without consideration of the latest achievements in the area of low-waste and resource-saving technologies, are also causing considerable anxiety. Meanwhile we have today an extensive arsenal of means and methods, which make it possible to intensify many processes without detriment to the environment.

Among the low-waste technologies there are, for example, the widely known methods of powder metallurgy, hydrometallurgy, the continuous teeming of metals, combined casting and rolling in pyrometallurgy and the filingless cutting of materials. The inclusion of dispersible waste products in hardening compounds based on cement, bitumen, polymers, glass and ceramic clay provides a large gain.

In speaking about preserving the cleanness of the atmosphere, it is impossible not to recall that today in many technological processes air is used as an oxidizing medium. Due to the fact that the content of oxygen in it is small, the amount of exhaust, for example, in case of the combustion of organic fuel is fivefold greater than in case of the use of oxygen alone. Moreover, the nitrogen, which is contained in the air, in this case forms harmful oxides. It is clear that it is possible to avoid these consequences by changing over to a blast in the form of technical oxygen.

Great tasks also face science. It is a question of the development of highly efficient technological processes which are based on extremely high pressures and extremely low temperatures, shock waves and laser radiation, high temperature plasma, electron beams and other physical means of action. The research, the goal of which is to transfer the complete processing of natural raw materials directly to the depths of the earth, is also affording tempting prospects. It is a question of the extensive use of the underground leaching of ores and minerals by chemical and microbiological means, the underground gasification of coals and other similar geotechnological processes.

In our country all the conditions exist for the successful implementation of these ideas. In recent times the CPSU Central Committee and the USSR Council of Ministers have adopted a number of important decisions, which envisage the development and introduction of fundamentally new low-waste technologies and equipment for them. A large complex of research and development has to be performed within the all-union scientific and technical programs, which are

being formulated for the coming five-year plan. A firm foundation will thereby be laid for the rapid development of our economy without detriment to the environment.

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ORGANIZATION, PLANNING AND COORDINATION

COMPREHENSIVE GOAL PROGRAMS AS BASIS OF PLANNING

Moscow SOVETSKAYA ROSSIYA in Russian 11 Jun 85 p 2

[Article by Corresponding Member of the USSR Academy of Sciences I. Nesterov:
"From the Experiment to Practice"]

[Text] Scientific and technical progress. M. S. Gorbachev once again directed attention to the need for a serious attitude toward this topical problem in his speech at the meeting of the party and economic aktiv in Leningrad. It was emphasized that the progressive development of society, the improvement of its material and technical base, in short, what is contained in the concept "progress," cannot occur by itself. All this is a result of the intense labor of every Soviet individual.

Many people, as is known, are convinced: if the 20th century is behind the window, progress is inevitable. As if it is entirely a matter of luck: if you were born at the right time, reap the fruits of progress and no longer worry about anything. Not by chance is it possible to hear words about the contribution to progress from scientists, who have not performed a single serious study, from engineers, who have not enriched practice with new ideas, and from managers of enterprises, at which they work at obsolete equipment and manual labor flourishes.

It is time, it seems, to thoroughly understand that progress and, hence, both the might of the country and the well-being of each of us depend on us. If today you did not work as hard as possible, if you allowed yourself to neglect the quality, if, being concerned about the immediate advantage, you brushed aside what is new, tomorrow this will turn into a line at the store, a shortage of new things, the lagging of the sector. And it is not worth reassuring oneself that the interconnection here is not such a direct one. It is more direct than it seems to us.

If you try, it is possible to trace the chain from the incorrectly organized experiment, from the loose nut, that is, from elementary negligence, to the upsetting of the assignment. Unfortunately, the existing system of the management of scientific and technical progress does not make it possible to keep this chain constantly in the field of view and to evaluate the specific contribution of each performer to the end result. Not without reason is the

urgent need for the improvement and even the radical reorganization of this system spoken about in recent party documents.

Which unit first of all needs improvement? In my opinion, it is planning. There is no shortage of scientific and technical plans and programs. They are being adopted by enterprises, sectors, the Academy of Sciences and the USSR State Committee for Science and Technology. But look closely: there are few points of contact in them. The fulfillment of one in no way depends on another and does not help it. The program, which was formulated by the USSR State Committee for Science and Technology and the USSR Academy of Sciences, on questions, which have been recognized as being of state importance, is not perceived as a priority program either by the sector or by the enterprises which are among the coperformers. As a result the deadlines of the fulfillment of the majority of goal programs are postponed more than once each, while the ones, which are considered completed, do not obtain extensive dissemination in the national economy.

What is the solution? It has been known for a long time: to develop scientific and technical, economic and social comprehensive goal programs, which as the most important components should become the basis of the state long-range plans. It is desirable that these programs would be of the same rank as the Food and Energy Programs, in the implementation of which all of society is involved.

Several years ago in party and government decrees the need for the formulation of such programs by the USSR State Planning Committee with the participation of ministries and departments was indicated and their list for the immediate future was specified. Unfortunately, we are not seeing the consistent fulfillment of these decrees. And as a result we are faced, for example, with the following facts: the sector, which introduced several thousand robots and robotic devices, did not achieve owing to them either an increase of labor production or a decrease of the number of workers. The reason is clear: the enterprises of the sector were not able in time to reorganize production and to prepare it for the most effective use of automatic workers. While this happened, it seems, because at the headquarters of the sector there was no program of the changeover of enterprises to a modern level of production, which had been studied in detail and was mandatory for fulfillment.

Meanwhile the development of such sectorial programs, which for the present have not become a part of statewide programs, can be of considerable benefit. Our Western Siberian Scientific Research Institute of Geological Prospecting for Petroleum has been working in accordance with goal programs already for 3 years. How has the management of research been organized at our place? Departing from the goal programs which were approved by the ministry, the institute is drawing up its own.

Let us take one of the programs, on the fulfillment of which the collective of the institute is working--"The Determination of the Main Directions of the Prospecting for Petroleum in Western Siberia." It is simultaneously included in the goal program of the ministry and in the all-union program "Siberia." Drawn up for the five-year plan, the program is broken down by years, is adjusted, is distributed among departments and serves as one of the basic

directions of the work of the institute. Such practice makes it possible significantly more easily than before its introduction to manage scientific research and to bring an idea up to practical introduction. This became possible because the program permeates the entire structure of the sector and enables its planning and control organs to keep track of the course of the fulfillment of work down to the specific performers. In turn realistic rapid information, which is easily processed in the ministry and is turned over to planning organs, moves upward from them. The latter obtain the opportunity with eyes open to plan the volumes of the introduction of developments and other indicators and to hold people strictly accountable for their fulfillment.

This arrangement of the management of scientific research is being used at our institute as an experiment. In 4 years it has, in our opinion, fully demonstrated its viability. The efficiency of the work of associates has increased by several fold, the volume of introduction has increased appreciably. The question arises: Is it worth regarding it further as experimental? Is it not time to incorporate this procedure in the basis of the work of the other institutes of the country as well?

Here is what else I would like to dwell on in more detail. The analysis of the efficiency of science in various countries shows that under present conditions such a ratio of the distribution of resources is more and more suited: for basic research--10 percent, for applied research--30 percent and for the assimilation of developments--60 percent. All countries, even those which for some reasons chose their own path of scientific and technical development, are arriving at it. It is well known, for example, that Japan for a long time preferred to use ready-made ideas, acquiring them in the form of patents and licenses in other countries. However, now it also is approaching in the distribution of resources the generally accepted ratio. Through inertia we are adhering to a different ratio--10, 60 and 30. By which we are also creating for ourselves a mass of difficulties. The stage of introduction is the most difficult as it is, but we are still stripping it of resources.

Among them the main ones are the reserve capacities of enterprises. Calculations show that in different sectors of industry they should come to 30 to 40 percent of the total production capacity. Then it will be possible at enterprises to develop new technologies and equipment and to assimilate them in a planned manner without detriment to the fulfillment of the plan. In order to achieve such a situation, the allocations should be broken down as follows: 25 percent for research, 75 percent for introduction.

Of course, all the proposals, which are aimed at the improvement of the management of scientific and technical progress, require careful study and checking. However, many of them have already passed the test of time and have demonstrated their promise. Precisely by means of them, it seems, it is possible to achieve, as the party requires, a radical change in this most important direction of our development.

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ORGANIZATION, PLANNING AND COORDINATION

PROBLEMS OF INTRODUCING SCIENTIFIC DEVELOPMENTS IN LATVIA

Moscow LITERATURNAYA GAZETA in Russian 29 May 85 p 10

[Interview with Chairman of the Latvian SSR Council of Ministers Yuriy Yanovich Ruben by LITERATURNAYA GAZETA correspondent G. Tselms (Riga): "Equipment Plus Interest"; date not specified]

[Text] In the rate of scientific and technical progress Latvia is in the group of leaders, being ahead in labor productivity of the control figures of the five-year plan. The entire increase of output of the republic is being provided by means of this. But the scientific and technical revolution is posing new problems, to which the interview of our correspondent is devoted.

[Question] Yuriy Yanovich, why is the time of introduction growing longer? The path from an idea to an industrial series, according to the estimates of specialists, on the average is equal to 8-9 years. Perhaps this is an unpleasant consequence of the scientific and technical revolution? I want to say that products are becoming more complex and are being improved. Probably the time of their assimilation is inevitably increasing. And we will have to resign ourselves to this.

[Answer] Now it is quite impossible to resign ourselves! The scientific and technical revolution actually is throwing us such a problem, but we are obliged to solve it. We are obliged because engineering and scientific ideas now become obsolete extremely rapidly. It is believed that the average time of their obsolescence today is 6-8 years, while tomorrow it will be even less. Hence, by the time an idea is accepted by production, it has already fallen hopelessly behind. And how many of them are fated not to be implemented at all! Once the work of 12 different planning and design organizations was checked in the republic. It turned out that 14-36 percent of the developments survive until implementation.

[Question] The efficiency of steam engines of the beginning of the century.

[Answer] At scientific research institutes, I believe, the efficiency is even less. But meanwhile in our republic there is an organization which implements 95 percent of its developments. And the time from the design to introduction

does not exceed 3 years. I have in mind the ORIONT cost accounting introducing firm. There work at it 22 designers and about 30 workers--highly skilled specialists. When it is necessary to fill an order which requires specific knowledge and skills, the firm concludes contracts with other specialists, for this they have an "unmanned fund." ORIONT also has its own production shops. And recently the decision was made on the transfer to the firm of the areas of one former plant. ORIONT has a full file of orders. But only the ones, which promise a large and quick return, end up in the plan. One of the factors of the success of the firm is that the wage of its associates depends directly on the efficiency of introducing work.

[Question] Yuriy Yanovich! The existence at enterprises of bonuses for the introduction of new equipment always seemed strange to me. Just as the accountability for the fulfillment of the plan on its introduction. This is, after all, no more than an intermediate result. In this way it is possible to pay a bonus for the scientific organization of labor, for the standards of production and so on ad infinitum. If the economic mechanism is operating normally, the enterprise owing to modernization can improve its economic indicators and, hence, the material status of the workers.

[Answer] In general it is abnormal that the plan on new equipment exists today autonomously, in isolation of the production plan. Hence the paradox: it is possible to decrease the quality of products, to reduce their quantity, but in so doing to receive a bonus for the introduction of new equipment. Must it be said what the cost of such a plan is? The main thing is the end result, the product. I am speaking elementary truths, but, unfortunately, they still have to be proven. But is that not also how it is in agriculture, when we plan for kolkhozes, say, the production of hay, but it would be necessary to plan the production of only milk and meat? Paradoxes are actually encountered. At a modernized works the wages at times are less than at a technically backward one. For wherever the norm setting of labor has been carried out on a scientific basis, it is really necessary to earn the wage. While at works without prestige it is necessary to pay extra for the difficulty of labor.

The economic experiment promises definite beneficial changes. The enterprises, which changed over to its conditions, received an additional stimulus to work well. First of all because the plans become stable. Under the conditions of the experiment the results of the work of the enterprises are closely connected with the pocket of the workers. Incidentally, I would like to emphasize: it is necessary to extend and improve the experiment.

Some manager of an enterprise would be happy to introduce a brilliant idea of scientists, and the burden at times is very heavy. The economic manager is up to his neck in his own immediate problems. Most often he does not have the people, the free equipment and the time to bring an idea up to a series model. While sometimes an innovation in addition arouses valid apprehension. The economic manager will always find thousands of means to sabotage questionable ideas. Now if the propaganda for an innovation were objective--if the idea were presented not on paper, but as an instrument, a unit, in short, a prototype, then it would be a different matter. The point is that today a

very important link or transmission gear, if you wish, is lacking between science and production.

[Question] But is this problem not being solved by the establishment of scientific production associations?

[Answer] Only in part. In the republic there are only a few scientific production associations which have their own institutes. And not all of them are capable of leading production. The majority of applied, sectorial scientific research institutes have a very weak production base. Academic institutes and higher educational institutions usually are even farther from production.

We have been working on the solution of this problem for many years now and have been seeking different versions. Complexes: an academic institute which is united with an experimental pilot plant, have shown themselves to advantage. For example, the Scientific Research Institute of Organic Synthesis of the Latvian SSR Academy of Sciences at its experimental plant is turning basic research into applied research, and then into a batch of medicinal preparations. At times a complex is set up for the time of the solution of some specific problem. Thus, the Institute of Microbiology was united with the Uzvara Kolkhoz of Bauskiy Rayon in order to develop a technology of the enrichment of fodders for livestock. It is proposed to use the results in animal husbandry of the entire republic.

Pilot production in the system of the Academy of Sciences, as well as at higher educational institutions is being expanded. We are planning, in particular, to build a joint production center of higher educational institutions. At the same time higher educational institutions are seeking closer contacts with enterprises. On the balance sheet of the VEF Production Association, let us assume, there is a scientific research laboratory of a polytechnical institute. The contact in this case is much closer than in case of an ordinary contract. At applied institutes we are striving to set up our own design bureaus and also to strengthen the experimental production base. A unique center for the rental of various instruments has been set up under the aegis of the republic State Committee for Material and Technical Supply. Research groups can rent them for a time, which is both convenient and profitable. We are also thinking of developing further introducing firms like ORIONT.

The joining of science with production depends on the engineering service of enterprises. Today this service is being used inadequately. The obsolete form of the remuneration of engineering labor is in part a hindrance. Your newspaper has written more than once about this. We have studied both the Leningrad and the Ulyanovsk experience. We will try to use it, but it is not ruled out that it will be with modification. The task is to make the remuneration of scientists, engineers, designers and process engineers dependent on the acceleration of scientific and technical progress. I will add: having freed them as much as possible in this case from routine work which does not require specialized knowledge.

We are now introducing a computer-aided design system--CADS. The computer will begin to make all the calculations, to find the optimum combinations and to draw the design of the item in accordance with given coordinates. It is a question, of course, not of fundamentally new items. Here no one will replace the designer. Incidentally, today precisely this creative section--the designing of nonstandard equipment--is most exposed. At the design bureaus surveyed by us the number of designers engaged in this work comes to only 5-6 percent of the need for them.

As you see, no matter what question we examine, everything rests on management. The goal program method of planning has been used in our country already for three five-year plans. One of the programs is the development of the RASU-Latviya automated control system. From five-year plan to five-year plan the computer has been taking in more and more management information. And not only in the area of planning. The movement of buses about the city and the transportation of goods from industry to bases and trade organizations, the availability of medicines at drugstores, the needs of construction projects for construction materials--all this is being put into the memory of computers, which is making it possible to detect bottlenecks quickly and to take steps in good time.

[Question] Yuriy Yanovich! A computer, of course, can count and compute, but all the same people make the final decision. But we will not insure ourselves against their subjectivism by electronics. If, let us assume, the director of a construction trust has, so to speak, not formal contact with his ministry or supplier, he will always get everything necessary before others do.

[Answer] I will not dispute that such a thing is possible. But the point is that the computer helps to decrease the shortage and already thereby to restrict strong-willed interference. It makes it less painful. Moreover, when the optimum algorithm of supply has been calculated, its violation is quite obvious. And, hence, it easily lends itself to control.

In conclusion I would like to speak about another thing. The production of the most complex equipment requires, as never before, a conscious attitude toward the matter. The cost of a mistake has increased extraordinarily. Moreover, more and more specialized knowledge is required for the supervision of workers, and at times it is simply impossible from outside to see a mistake and defective output and to determine how conscientiously one specialist or another is performing his duties. Now it is important to create such conditions so that a person, while sensing himself to be the master at the works, would work without supervision, without urging. And this applies not only to workers, but also to managers. When all inhaling and exhaling are regulated by 1,000 indicators, do not wait for a responsible, creative attitude toward the matter.

In agriculture we intend to change over at last from a large number of plans to plans of the procurement and delivery of agricultural products. For it is not the hectares of land plowed in autumn, not the number of head of livestock and not the quintals of fodders that summarize the final results of agricultural labor, but the quintals of produced grain, milk, meat. In case

of such an evaluation independence and, hence, responsibility will surely
awaken in everyone.

One must also approach the evaluation of the work of industrial enterprises
with a similar standard. Then one will not have to invent intricate stimuli
for the introduction of new equipment and technology.

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ORGANIZATION, PLANNING AND COORDINATION

INTEGRATION OF SCIENCE, PRODUCTION TO SPEED INTRODUCTION

Moscow PRAVDA in Russian 28 May 85 p 3

[Article by Candidate of Historical Sciences I. Makalovich (Minsk):
"Shortening the Time of Introduction"]

[Text] The gravitation of many enterprises toward the solution of minor, local problems of scientific and technical progress is well known. You only have to be interested in finding out from specialists and managers why they rarely introduce innovations which, as the decisions of the April (1985) CPSU Central Committee Plenum require, could increase labor productivity abruptly, and you will frequently see amazed looks.

Assume that in the thermal shop they introduced a development which will vastly increase the speed of the hardening of parts. And what will be next? In 2 hours the thermal shop treats all the products and comes to a halt. Because the related "foundry" is operating in the former mode. So that the economic impact of the innovation would be real, it is necessary to modernize the entire technological chain.

But can some academic institute offer its services in such complete updating of all the technology of an enterprise? No.

A large number of contracts between scientific and production collectives are still aimed at the elimination of bottlenecks. The specialists of enterprises often turn to science as a kind of "first aid" in the patching up of individual gaps.

Practice has found a way out in comprehensive plans of the technical updating of sectors and enterprises with the enlistment of large scientific forces and in the formation of scientific production associations (NPO's). One of the many examples is the Belorussian Scientific Production Association of Powder Metallurgy. Having large scientific forces and production capacities, in 4 years and 4 months of the five-year plan it achieved an economic impact from developments in the amount of about 56 million rubles. The time of introduction was shortened by more than a half. At another scientific production association, the Dorstroytekhnik Association, which includes a

scientific research institute, a planning and design subdivision and an enterprise, the time of the introduction of developments was reduced to five-sevenths, a number of important technical problems on the use of local materials in road construction and the mechanization of operations were solved. While at the Minsk Planar Scientific Production Association the first results, without waiting for the completion of the entire theme, immediately undergo experimental checking and tests, the preparation and production of new items are carried out in close alliance with science.

In Belorussia the voluntary scientific production associations have also given a rather good account of themselves. The scientists of the Belorussian SSR Academy of Sciences are cooperating closely with the workers of the automotive industry in the development of a set of standardized heavy trucks. The voluntary Avtofiztekhn Scientific Production Association, in which a number of institutes of the Physical and Technical Sciences and Physical and Mathematical Sciences departments of the Belorussian SSR Academy of Sciences and enterprises of the BelavtoMAZ Association are included, is participating in this program. The results of the cooperation is the speeding up of the placement of new versions of motor vehicles on the conveyor and the increase of the total kilometers logged by vehicles before overhauling.

The advantages of the named associations lie in the fact that they unite large scientific forces and large production capacities, their weakness is the still insufficiently close integration.

Comprehensive scientific and technical programs have become an effective form of the consolidation of the efforts of science and production. They are included in the state plans and are provided with resources. The main thing is for this new form of integration also to be filled everywhere with a new content. Unfortunately, several higher educational institutions and scientific research institutes, having ostensibly adopted the goal program method, confined themselves to the mechanical combination under a single name of various research themes, but did not change the content and direction of research. The work on minor themes remained as it was.

Today production is setting up more and more its own scientific subdivisions. For example, at the Minsk Motor Works and the Minsk Tractor Plant there are scientific sectors, which perform considerable amounts of research work and train scientists. On the other hand, academic institutions are surrounding themselves with pilot production capacities. Would it not be better to unite scientific and production forces within a complex, at which everyone would do his own work with mutual benefit?

It seems that precisely due to the lack of a stable form of the combination of science and production each party, relying on its own forces, has also begun to develop the missing units. Science is setting up its own pilot works, for without them it is more and more difficult for it to solve new problems. The pilot experimental base makes it possible to offer production workers not bare ideas, but new models of instruments, equipments and accessories. In turn production, not always finding the necessary partners among researchers, while frequently having also learned from bitter experience, often seeks a scientific basis for the solution of urgent problems on its own.

Apparently, the development of design subdivisions, laboratories and groups for patent analysis should be accelerated and they should be turned into large scientific and technical complexes.

I will cite the following example. At the Physical Technical Institute of the Belorussian SSR Academy of Sciences there is a special design bureau with a pilot works. The institute has established stable relations with industrial enterprises and has achieved a large economic impact from the introduction of developments. Whereas during the 10th Five-Year Plan the impact came to 27 million rubles, during this five-year plan it has already exceeded 51 million rubles. This is a direct result of the increase of the influence on the sector.

However, this institute is experiencing a great need for the expansion of the production base. The available pilot works is called upon first of all to support basic research. But with the expansion of the development of new instruments and technologies its opportunities to fulfill this main task are being restricted. Specialists believe that such design bureaus with a pilot works need to be complemented with small-series plants. An integral scientific and technical complex, which will be able to solve research problems more successfully, to expedite the passage of developments from the laboratory to practice and to organize the series production of advanced equipment, will thereby be created. Finally, the opportunity will appear to sell not individual models of machinery, but equipment complete with technology.

Thus, a new form of the combination of science with production, which in one team would aim at high end results of both researchers and production workers, is needed. It would give them equal rights and duties and would cement their alliance with a planning and economic basis. It is a question of the establishment of large scientific and technical and scientific production complexes. In Belorussia, say, such ones as for the development of tractors, motor vehicles and others. The republic has everything necessary for this: a production and a scientific base, personnel. It is a matter of the combining of efforts and the development of an effective form of cooperation.

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ORGANIZATION, PLANNING AND COORDINATION

UKRAINIAN LONG-TERM PROGRAM OF SCIENTIFIC, TECHNICAL PROGRESS

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 9 Jun 85 p 2

[Article by President of the Ukrainian SSR Academy of Sciences Academician B. Paton: "The Guidelines of Intensification"]

[Text] In order to solve successfully the problems of the intensification of production and the increase of the well-being of the people, it is necessary to have scientifically sound guidelines, prospects of technical progress. And, on this basis, prospects of the development of the economy as a whole. It is a question of outlining in advance the basic directions of the use of the achievements of science, of making provision for the necessary resources and of identifying the trends, which one will have occasion to come across in the foreseeable future. For this purpose a long-range comprehensive program of scientific and technical progress and its socioeconomic consequences was formulated in our republic. Encompassing urgent scientific, technical, economic and social problems, it has become the most important preplanning document and the basis for the elaboration of plans of the development and distribution of productive forces and long-range and current plans.

One of the distinctions of this republic program from ordinary programs, which are intended, as a rule for a single five-year plan, consists in the fact that it encompasses a period of 20 years. Moreover, it is, in essence, constantly in effect: being all the time updated and enriched with a new content, the program as if is lengthened by the next 5 years, remaining a 20-year program. Practice shows that such a time, apparently, is close to the optimum. Within it we have the opportunity to look sufficiently far ahead. And at the same time to remain on real ground.

Of course, the prospects of the economic and social development of our republic are inseparable from the progressive changes which are occurring and will occur on the scale of the entire country. In this sense our comprehensive program is as if a regional section of the all-union program. On the other hand, it creates the prerequisites so that our existing republic, sectorial and regional programs would be connected with each other and with the state plans and would be transformed into a well-balanced noncontradictory system, the core of which is the unified long-term concept of scientific and technical progress.

I should stipulate: the content of the comprehensive plan should not be regarded as something frozen, something given once and forever. One must not orient oneself toward yesterday in science, toward routine technology, and incorporate in the program only the solutions which already exist today. Preference should be given in it to advanced solutions, which are now just being developed and will work effectively in the future. The program will conform completely to its purpose only in case of a creative approach and the realization of the principle of the continuity of forecasting. The real, but sufficiently dynamic prospects of the development of sectors and the national economy as a whole should be the basis for the forecasts.

The importance of such an approach is confirmed by practice. About 15 years ago a group of specialists of the Ukrainian SSR Academy of Sciences under the supervision of Academician Viktor Mikhaylovich Glushkov made a forecast of the development in our country and in the CEMA countries of computer technology and its basic applications to 1990. It did not encounter understanding from everyone. At that time such a prospect seemed too remote from current problems. Much persistence was needed in order to defend the advanced principles.

In this forecast such a task as the development of software, which determines both the architecture and the technical principles of new generations of computers, was posed as a particularly priority direction. This made it possible to launch in good time preparation for the production of unique recursive supercomputers. The prototype has now been turned over to the Interdepartmental Commission, and work is being performed on the organization of the series production of such computers, the speed of which comes to 100 million operations a second. The principles, on the basis of which this unique computer was developed, afford unlimited possibilities in the solution of problems of enormous difficulty.

The prediction of the mass use of microcomputers and minicomputers in various spheres of life--for instruction, medical and personal service, even in housekeeping--also completely justified itself. The correctness of this forecast was also confirmed by the trends of the development of computer technology abroad. In the United States, for example, along with the work on the development of powerful and superpower computers, much attention is being devoted to the development and use of personal computers. As specialists believe, by 2000 in the majority of highly developed countries home computers will be used for the keeping of the family budget, educational and other calculations. The phenomenon of these computers in its importance can be compared with the appearance of transistors in electronics, synthetic materials in light industry or ball point pens in everyday use.

Today such a pace, which for the present is inaccessible to other sectors, is being observed in the development of computer technology. On the average every 2 years the number of operations and the memory size per unit of expenditures increase by twofold. This trend has been traced over the past 30 years. And there are no indications that this process will slow down in the foreseeable future.

Consequently, it is possible to expect that the time, when all of society will be provided with individual means of increasing intellectual activity, is not far off. In the opinion of scientists, this will have even more profound consequences than the industrial revolution of the age of steam and electricity. Along with that it will entail an entire chain of radical changes in the designing and engineering of new equipment and technology, as well as in production itself.

The "microelectronic revolution" will continue at an unabating pace. Fundamentally new types of computer technology--optical computers with direct data input through a video channel, supercomputers, the speed of which will be hundreds of times greater than that of the most advanced computers of today--will be developed. New types of extra-large integrated circuits, which make it possible to produce computers the size of a basketball, the power of which will be no less than that of the most productive current computers, will appear.

In the next century it is already possible to expect the development of computers which are close in the organization and means of functioning to the human brain. They will be built on the basis of biological chips, while their memories will be similar to genetic chains. Each such biological chip will be able to contain millions of components about 0.02 micron in size. This is comparable to the size of large molecules of living cells.

The forecasting of the rate of the robotization of technological processes requires special attention. Simple and reliable industrial robots today attend machine tools and forge and press equipment and perform warehousing operations. This is the present day of production. But in the shops they are already waiting for the appearance of complex adaptive robots, which will be able to adjust easily to the rapidly changing conditions of production and will have significantly greater speed. They are necessary for the development of robotized technological complexes and flexible computer-aided manufacturing systems, the extensive use of which is the basic direction of the automation of modern multiproduct industry. Precisely they will make it possible to change over rapidly and without significant material expenditures to new, more advanced technological processes, to carry out modernization and to update the range of products and will ensure a high degree of the automation of labor. A key role in the development of industry of the future will belong to them.

Metal will also remain the most important construction material at the turn of the 21st century. The orientation not so much toward the increase of the volumes as toward decisive changes in equipment and production technology and toward the improvement of the quality and the increase of the assortment of products will be a peculiarity of the next stage of the development of ferrous metallurgy.

The increase of the unit power of assemblies, the intensification of technological processes, the improvement of the qualitative characteristics of metals and alloys, the decrease of the consumption ratios of metal at all stages and points--such are the means of the development of metallurgy. While in the future there are cokeless metallurgy, refining outside the furnace and continuous processes of the production of ferrous metals. And at the same

time there are efficient methods of the use of metal in all the sectors of the national economy. The methods of powder metallurgy, which ensure the saving of materials and the high quality of items, will be used on an increasing scale.

The new types of welding and such advanced methods of the machining of metallic materials as the plasma and electron beam methods merit special attention. The development and use of coatings, which are resistant to various actions, for metallic and nonmetallic materials and of means of their application are providing a large gain. Steps, which are aimed at the extensive use of such coatings for the purpose of strengthening the parts and assemblies for motor vehicles, tractors and agricultural machinery and other equipment, have been outlined in our country. The functions of the main organization for the use of such coatings have been assigned to the Institute of Electric Welding imeni Ye. O. Paton of the Ukrainian SSR Academy of Sciences.

The solution of the complicated problems, which are connected with the development of equipment of the future, is urgently raising the question of new materials which have the desired combination of properties. The appearance of new sources of energy, electronic mechanical systems and cryogenic equipment in many ways will depend on them. Among such most important materials, in particular, are special ceramics, which will find use in the production of advanced motor vehicle engines, gas turbines, high-power generators and other power equipment.

Power engineering governs in many ways the scale and pace of the development of the entire national economic complex. The limitedness of natural reserves of petroleum and coal are urgently posing for mankind the task of seeking alternate energy sources. Among them is the energy of the atomic nucleus and thermonuclear fusion, the sun and wind, sea tides and the earth's depths.

Intense work on the achievement of controlled thermonuclear fusion, with which hopes for energy abundance are connected, is being performed in various countries of the world. The set of research on units like the Tokamak is one of the most promising means. In the opinion of Academician A. P. Aleksandrov, large thermonuclear electric power plants with a rating of tens of millions of kilowatts will enter power engineering during the first quarter of the next century.

Atomic energy will be developed primarily in the direction of the building of powerful fast breeder reactors, which make it possible along with power to obtain more nuclear fuel than the amount of uranium, which is "burned" in so doing. Hence the possibility of establishing power systems which are supplied practically indefinitely with nuclear fuel. But it should not be forgotten: one must not be oriented toward the unchecked increase of power capacities. As forecasts show, it is necessary by 2020 to decrease by at least one-half the total consumption of energy per unit of the world gross national product.

Today a comparatively young direction of scientific and technical progress--biotechnology--is already having a truly revolutionizing influence on a large number of sectors. According to forecasts already in this century its methods

will be used in the production of 25 percent of the products of the pharmaceutical industry, 10 percent of the products in agriculture, up to 5 percent of the products of large-tonnage organic synthesis, as well as in special and fine chemistry.

As specialists believe, in the next century new sectors--ones with low expenditures of natural energy resources--will take a leading role in the world economy. They will be established on the basis of the principles of biotechnology, including the use of microorganisms, biological systems and processes. Along with the obtaining of highly effective medicines and diagnostic means it is also possible to foresee the use of genetically altered microorganisms for the purpose of the concentration and extraction of minerals and metals from ores, the purification of metals and sewage, in the production of paper and in the production and processing of petroleum and coal. Scientists regard as a most important task of biotechnology the development of methods of fixing atmospheric nitrogen, which promise the obtaining of large amounts of inexpensive nitrogen fertilizers. This will provide a radical solution of the food problem.

When formulating the republic comprehensive program, we oriented it as much as possible toward these main directions of the development of science, technology and production and toward the dominant trends and laws of social development. I believe that they should also be taken into account as much as possible when drafting the plans for the coming five-year plan. The preparation for the 27th CPSU Congress should become a stage of the approval of fundamentally new decisions, which guarantee the country a genuine breakthrough to qualitatively new levels of economic and social development.

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ORGANIZATION, PLANNING AND COORDINATION

SECTOR OF GEORGIAN ACADEMY FOR INTRODUCTION OF DEVELOPMENTS

Moscow EKONOMICHESKAYA GAZETA in Russian No 23, Jun 85 p 10

[Article by A. Sepiashvili, chief of the Sector of the Scientific Organization of Partnership Relations of the Georgian SSR Academy of Sciences (Tbilisi): "The Experience of Introducing Scientific Developments"]

[Text] The sector of the scientific organization of business contacts and the introduction of the results of research in the national economy has been operating for nearly 2 years now in the system of the Georgian SSR Academy of Sciences. The sector was established in conformity with the decisions of one of the plenums of the Georgian CP Central Committee, at which the problems and tasks of the acceleration of scientific and technical progress and the strengthening of the contacts of science with production were examined.

What are the basic functions of our subdivision? This is first of all the organization of creative contacts of academic institutes with design and technological institutions and production enterprises, union and republic ministries and sectorial scientific research institutions on questions of the introduction of the developments of the Georgian SSR Academy of Sciences.

The analysis of the results of the research, which has been conducted at the republic Academy of Sciences, the preparation of suggestions for the corresponding organs on their practical use and the monitoring of implementation are also included in the duties of the sector. The sector has also take upon itself the planning of the introduction of the completed scientific research of academic institutes, the monitoring of the fulfillment of the plan assignments, which have been established for them, and the procedural supervision and coordination of the activity of the services of the introduction of scientific developments in the national economy at the institutions and organizations, which are subordinate to the Academy of Sciences. And, finally, one of the basic tasks of the sector is the calculation of the economic impact which was obtained from the introduction of the developments of academic institutions in production.

Whereas until recently in the area of the introduction of the results of scientific research developments the Academy of Sciences cooperated mainly with the republic State Planning Committee and State Committee for Science and Technology, last year a contract on cooperation between the Georgian Academy

of Sciences and the republic Ministry of Finance was concluded. The contract along with other questions also envisages the joint solution of the organizational, economic and financial problems which are connected with the dissemination of advanced forms of the integration of science with production.

The first steps of the new subdivision of the Georgian SSR Academy of Sciences demonstrated the timeliness and advisability of its establishment. The first results also already exist. With the direct participation of the sector 14 scientific research institutions of the republic Academy of Sciences concluded 36 partnership contracts with various enterprises.

One of the initiators of partnership relations--the Institute of Physical and Organic Chemistry of the Georgian SSR Academy of Sciences--concluded 12 partnership contracts, 7 of which are serving the accomplishment of the tasks posed by the Food Program.

With the assistance of the sector a partnership contract was concluded between the Institute of Plant Biochemistry and the republic State Committee of the Tea Industry for the introduction of the technology of obtaining granulated soluble tea and dyeing concentrates of tea. The solution of this problem will make it possible to commit to the production of dry tea concentrates up to 15,000 tons of raw materials which for the present are not in demand. But the main thing, of course, is that the new technology has already been introduced at the Samtredia Tea Combine and the Lanchkhuti Plant for the Production of Tea Concentrates. Such production has been assimilated in our country for the first time.

We recommended for introduction in various sectors of the national economy the technology of the automatic and semi-automatic electric-arc face hardening of parts which operate under the conditions of abrasive wear. The self-protecting powder wire, which was proposed by the Institute of Metallurgy of the Georgian SSR Academy of Sciences, is used for this. This technology is simple, does not require complicated equipment and can ensure an increase of the life of the cutting tools of agricultural machines by more than threefold. The new technology is now being introduced in the Gardabanskiy Rayon Department of the Agricultural Equipment Association.

An important advantage of partnership consists in the fact that it is carried out within the formed structure of the scientific institution. The factor of the creative interest of scientists works more effectively, since the results of scientific developments more rapidly find use in practice.

The material stimulation of the scientists, who take a direct part in the development and introduction of an innovation, is improving. But since material stimulation is carried out only after a study undergoes checking in practice and is actually introduced with the actual, and not the estimated economic impact, the end result of work is coming to the forefront. The amounts of material stimulation are established in direct dependence on the obtained impact.

The share of the final profit, which is received by the scientific research institution from the introduction of a development in production, is quite

significant--it can come to 20-30 percent of the total profit, while the material incentive of the immediate participants in the development amounts to 50 percent of their wage. The remaining assets are transferred to the fund for sociocultural measures and housing construction and to the development fund of the scientific research institution.

In short, partnership relations are becoming one of the most effective forms of the integration of science with production. And for the increase of the return of academic science it is necessary to extend and strengthen them. This is the task of our sector. However, the possibilities of partnership for the present are still being used far from completely. This is explained mainly by the fact that enterprises of union subordination cannot settle independently, without the consent of union instances, the questions of financial interrelations. The drawing up of new legal documents and the improvement of several prevailing legal documents on the financing of scientific research work and on the specification of the forms and methods of the material stimulation of scientific associates, who are working on urgent, long-range scientific and technical problems, are also necessary.

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ORGANIZATION, PLANNING AND COORDINATION

DOCENT CITES METHODS OF INFORMATION DISSEMINATION IN INDUSTRY

Moscow PRAVDA in Russian 6 Aug 85 p 3

[Article by A. Fabrichnyy, docent, Novosibirsk Upper-Level Party School: "Treasure-Trove or Storehouse of Knowledge?: The Acceleration of Scientific and Technical Progress"]

[Text] In the course of a sociological poll, a designer from Novosibirsk gave this example. While developing casting equipment, the designers also worked out a new type of cupola, taking into consideration, so it seemed to this designer, all the latest achievements of science and technology. All at once the cupola didn't work out and wasn't made part of the equipment being developed. It turned out that the cupola furnace's cooling system was taken from old designs, and the designers were simply unaware of progressive manufacturing methods, even there are accounts of them in the specialized literature.

It's a typical example. It reflects, as would a drop of water, the sea of problems which have arisen as a result of the scientific and technical revolution. Among these problems there is also that of perfecting information channels capable of the efficient provision of up-to-date knowledge.

As has been shown by research carried out by the journalism department of the Novosibirsk Upper-Level Party School within the framework of the comprehensive "Party Guidance in the Acceleration of Scientific and Technical Progress" program, about 90 percent of the 626 engineering technical personnel who were polled in six enterprises in Novosibirsk believe that the raising of their level of knowledge had become a vital requirement for them, and what's more that the actual process of production requires that their store of knowledge be constantly replenished. One might say that the very richest soil is available, and only needs the necessary grains of knowledge to be sown in order to have an abundant harvest. But as life shows us, the field often remains unsown. In this case, does this perhaps occur because of an acute shortage of these same grains of knowledge?

It can be said straightforwardly that there are no reasons to complain. The city has the State Scientific and Technical Library of the USSR Academy of

Sciences' Siberian Division at its disposal, where many thousands of books filled with not only domestic, but foreign scientific and technical information are concentrated; the Center for Scientific and Technical Information and Propaganda's Central Scientific and Technical Library as well as the center itself, wherein repose the widest variety of information sources; the well-stocked plant libraries and the Akademkniga and Tekhnicheskaya Kniga bookstores are all found here as well. In just a few of the libraries one will find millions of copies of scientific and technical information articles.

Thus, there is a great demand for knowledge, but there are tremendous banks of available information as well.

The results of our poll show that 1.3 percent of VUZ students are taking training courses, 26.4 percent are taking classes to raise their skill levels, and that 70.9 percent of specialists are raising the level of their knowledge through independent studies. As we see, traditional training forms do not satisfy the demand, and this is why independent training is becoming the primary means by which the specialist replenishes his professional store of knowledge. But this type of training can only be effective where there is an excellent supply of information and widespread use of libraries' facilities and of the TsNTI materials. However, those who use the GPNTB [USSR State Public Scientific and Technical Library] make up only a third of those polled, TsNTB users comprise a tenth and about 90 percent use the plant libraries. It would seem that the overall picture is bright. However, the poll results themselves attest to the fact that the frequency at which the libraries are visited is low. The last few years have witnessed a trend toward a reduction in the number of library visits per person, in spite of the overall growth in the number of readers which has also been noted. Obviously, this situation fails to meet present day needs in light of the accelerated speed at which knowledge becomes obsolete, and cannot satisfy the needs of the independent type of study. The proportion of unused information is tremendous. In the opinion of those polled, there are a number of reasons for this difficulty.

First is the difficulty of finding needed information in the libraries. Over 70 percent of the specialists pointed this reason out, in spite of the fact that a great portion of them have at their disposal a variety of types of catalogs which are intended to facilitate their search for the information they need. It is obvious that the catalogs which have become the most unwieldy turn the would-be readers away, and is not this a situation where the seeds of a psychological barrier might flourish, as might a person's defensive reaction to the difficulty of searching for a needle in a haystack?

Second, there is the remoteness of the information sources and the specialists' small amount of free time. Over half of them gave this as the reason which interfered with their visiting the libraries more often. Indeed, sometimes library trips take up more time than it does to familiarize oneself with the literature. One can judge the extent to which these causes are interrelated and are important by the responses: over 80 percent of the specialists prefer that scientific and technical information be available right at the work place, somewhat less than a third would like to be able to get this information at

home via television, radio, newspapers and magazines, but only 14 percent want to go to the library. Thus, complying strictly with the people's wishes, we see that the sources of knowledge must be brought as close as possible to them. Those questioned also answered the question "What are your primary sources for obtaining valuable information?" Here, magazines and television took first place, with express information service in second place and in third place: TsNTI information leaflets, etc. Books showed up in only 7th place. Thus, in the information-person-production chain, there is no efficient link for the supply of needed information. The following facts attest to this with total obviousness: about 80 percent of the specialists believe it necessary that their local newspapers and radio and television broadcasts provide reviews of new scientific and technical literature, topical selections from various journals be broadcast, as well as brochures on technical innovations etc.

Regrettably, the means by which mass information and propaganda are propagated are not in close contact with the libraries and the TsNTI. They function, but make little contact. At the same time attempts, for example, the attempts by the TsNTI to disseminate this propaganda in collaboration with the equipment used to disseminate mass information and propaganda have resulted in extremely positive and encouraging results. Thus, Novosibirsk radio regularly prepares the broadcast "TsNTI Journal" which, judging from survey results, is listened to by about 80 percent of the engineering and technical personnel.

There is little information of this type in the local newspapers. No matter how paradoxical it seems, it is a fact that the highest percent of use of newspaper materials in practical work is accounted for by central newspaper publications and the lowest percentage by the large-edition plant papers, although it would seem that they ought to do a better job of satisfying the demands of a specific industry or of their readers. An analysis of large-edition city newspapers over a period of four years showed that they have virtually no contact with either the libraries or TsNTI, with scientific institutions or related enterprises. Hence also the extremely poor effectiveness which their publications have along these lines. At the same time, the large-edition newspaper ZNAMYA TRUDA, put out by the Sibselmash [Siberian Agricultural Machinery] Production Association, is an excellent example. Its communication with TsNTI and the fact that it regularly publishes the center's materials about scientific and technical innovations has sharply improved the paper's authority as a source of scientific and technical information. But such examples are isolated.

Television deserves a great deal of emphasis as a means for informing the specialists. Over 70 percent of those questioned noted that "Visual observation and evaluation of the practical merits of innovations is very important."

Several years ago in Novosibirsk Oblast, the grain crops were beaten down as a result of heavy rains and winds. It seemed impossible to harvest them by the usual methods. And so at the height of the harvesting season an innovator from the Altay Kray devised a very simple attachment which made it possible to harvest the grain quickly and with no loss. Word of this innovation was spread along all communications channels, including newspapers. The reaction of the combine operators was extremely guarded. And then it was decided to

show this device at work on television, having notified the combine operators of this broadcast in advance. The result was impressive: in a week the Altay innovator's attachment found widespread use on all the area's agricultural facilities.

In their evaluations of the worth of television, over half of the people polled said that it "makes it possible to see an innovation in action." Thus, the high estimation of television as a source of scientific and technical information is no accident, even though the information beamed out, for example, on Novosibirsk television, makes up less than one percent of the programming time. That is why about 60 percent of the specialists indicated scientific and technical broadcasts when asked the question "What sort of programs are broadcast too little on television?" Television has tremendous potential, and there is an obvious need to be bolder in putting it in the service of industry.

It is impossible to solve the problem of speeding up scientific and technical progress without a high degree of information distributed concerning scientific and technical achievements and advanced experience. And it follows that special emphasis needs to be placed on improving the scientific and technical propaganda system.

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ORGANIZATION, PLANNING AND COORDINATION

USE OF FUNCTIONAL COST ANALYSIS TO HASTEN S&T PROGRESS

Moscow PRAVDA in Russian 31 Jul 85 p 2

[Article by Candidate of Economic Sciences M. Grigoryev and V. Sysun, deputy chief designer of the Elektroluch Association (Moscow): "Functional Cost Analysis--Hence a Saving"]

[Text] Many economic managers usually place the blame for the slow materialization of new scientific and technical ideas on the economic mechanism now in effect. It is difficult to argue with this, our mechanism of management has its defects. But our leading collectives are achieving success under these conditions as well, saving considerable material and manpower resources.

It seems to us that an essential cause of the lag of many collectives lies in shortcomings of the organization of concrete labor, especially of the detachment of many millions of engineers. The obsolete forms of the organization of engineering service are not long capable of encompassing the entire range of innovations, which production now urgently needs. The excessively narrow specialization of scientific directions and their departmental isolation frequently hinder the matter. But the interests of production require their unification. The organization of large and small collectives and of each worker separately is called upon to overcome this contradiction. Its forms in various spheres of activity can be different, but the aim and content should be common: it is the national interest.

The method of functional cost analysis (FSA) affords great opportunities for such organization of labor. It unites together, first, technology and economics, optimizing the correlation between the consumer properties of the product of labor and the expenditures on their appearance; second, all the units of the life cycle of an item: research, design development, the preparation and organization of production, operation, salvaging; third, the actions of the developers, producers and users of new equipment; fourth, it coordinates the work and thinking of people within a single subdivision, the labor of groups of people in the shops and divisions within a large collective. The efficiency of the production and use of items, with respect to which such an analysis has been made, increases substantially.

The mastering of the tools of functional cost analysis forms the very ability to create, which at present many specialists and managers lack. Let us cite the experience of the Ministry of the Electrical Equipment Industry, in which, as was noted at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress, they increased the output of products during the 11th Five-Year Plan without an increase of the consumption of basic materials. It is outlined by the obligations of the collectives of the sector for 1985 to obtain a saving of 30 million rubles from the use of functional cost analysis. In the ministry a procedure has been established, in accordance with which an item is accepted for series production only if it was developed with the use of functional cost analysis. This is a reliable guarantee that the materials-output ratio and, as a rule, the labor intensiveness of an innovation and all its production and operating costs will be less than those of the domestic analogue being replaced or the best foreign examples.

The essence of the method consists in the technical and economic systems study of an item, which is aimed at ensuring the economy of its development and use. The stages of the analysis are the preliminary, informational, analytical, creative, research and recommendation states and the final stage is introduction.

The most critical stage is the analytical stage. Here on the basis of the thorough study of the design, technology, conditions and means of production of the item, their comparison with the leading achievements of science and technology, the comparison of the standard and actual expenditures of resources, the component-by-component analysis of the production cost and the operation-by-operation analysis of the labor intensiveness they identify and classify the functions, which are performed by the item and its components, and determine their interrelations. Precisely such a functional analysis also creates the most favorable conditions for the improvement of existing items or the development of fundamentally new items. The main goal of the stage is to identify the means of optimization, which will make it possible to derive appreciable economic gains.

At the creative stage the researchers and developers either improve the items or develop a fundamentally new one. The proposed solutions are checked at the research stage by special technical and economic calculations, experiments and tests. The ideas, which have proven their suitability, are drawn up in the form of recommendations of the functional cost analysis, which are discussed by experts and specialists of the corresponding subdivisions and with their conclusions are submitted to the management of the enterprise and the scientific research institute for approval for introduction.

The greatest impact is achieved when specialists of different types: a designer, a process engineer, an economist, an engineer for the theme of the development, for accessories, for the organization of the preparation of production and others, are included in the research working group. Such groups are set up temporarily for the period of the solution of the problem or, as was done in the Ministry of the Electrical Equipment Industry, can operate permanently as subdivisions of functional cost analysis, which have been set up at large plants, scientific research institutes, design bureaus or

the base center for analysis of this type. In essence, the working groups for functional cost analysis are one of the most effective forms of the collective contract in the sphere of research.

Precisely the collective interaction of specialists, who are united by a common goal, creates important advantages in the organization of their labor not only at the stage of research or development of items, but, what is especially important, at the stages of the prompt development of recommendations and their introduction. The members of such a working group usually strive to display all their abilities, in order to achieve a good result. The factor of material stimulation is also of no little importance: the recommendations of the group are included in the plan of measures, the fulfillment of which gives the participants in development 15 kopecks from every ruble of the obtaining saving.

Last year more than 60 enterprises and scientific organizations of the electrical equipment industry took part in the sectorial competition for the best works on functional cost analysis. The national economy will derive a saving of more than 30 million rubles just from the realization of the recommendations in accordance with the competitive works. Two-thirds of this amount are a result of the decrease of the product cost. Individual enterprises, for example, the Vilnyuselektrosvarka Association, the Svetotekhnika Association (Saransk), the Elektroluch Association (Moscow), the Alma-Ata Plant of Low-Voltage Equipment and others, by means of measures on functional cost analysis are reducing by 20 to 30 percent the annual production costs.

In the past 7 years this saving has come to nearly 120 million rubles. Labor expenditures, which are equivalent to the work of 6,300 people, were eliminated. The consumption of rolled ferrous metal products was reduced by 42,000 tons and rolled nonferrous metal products by 17,000 tons. These reserves are being put to use with comparatively small expenditures. Every ruble, which is invested in the use of functional cost analysis, yields a saving of 8-10 rubles, and in a number of cases more than 20 rubles.

Functional cost analysis helps to bring large reserves to light and suggests specific means of their commitment to production, freeing items from shortages and from the excessive consumption of resources. Moreover, it is necessary to start with the predesigning technical and economic substantiation of the requirements of the client. Practical experience shows that these requirements are both understated and overstated. In both cases they do harm to the economy.

The method, of which it is a question, forms among specialists the skills of the same economically competent approach to the matter, which many of our engineering personnel still lack. It has a large number of supporters not only in the Ministry of the Electrical Equipment Industry, but also in the Ministry of Power Machine Building, the Ministry of Chemical and Petroleum Machine Building, the Ministry of Machine Building for Animal Husbandry and Fodder Production and a number of other ministries. And still it is a long way to the use of functional cost analysis as an everyday tool. Even in the Ministry of the Electrical Equipment Industry and the Ministry of Power

Machine Building, in which the most work has been performed on the dissemination of the method, only the first rudiments of the functional cost approach to the organization of all aspects of scientific and economic activity have been assimilated.

In a number of other ministries they have confined themselves to the promulgation of orders on the need for the introduction of functional cost analysis, without having backed this step with organizing work. Apparently, many responsible officials of the staffs of the ministries simply do not know the possibilities of the method.

It must be assumed that the assignments on the decrease of expenditures per ruble of commodity production, if it is possible to fulfill them without resorting to functional cost analysis, have been excessively understated on the part of planning organs. And we would like greater activeness from planning organs in the dissemination of the method.

Three years has passed since the CPSU Central Committee by the decree "On the Work of the Ministry of the Electrical Equipment Industry on the Saving of Material and Manpower Resources in Light of the Demands of the 26th CPSU Congress" commissioned the USSR State Planning Committee, the USSR State Committee for Science and Technology, the USSR State Committee for Labor and Social Problems and the USSR Central Statistical Administration to generalize the experience, which exists in the Ministry of the Electrical Equipment Industry, of using functional cost analysis as a tool of increasing the efficiency of the use of material and manpower resources and to elaborate and implement measures on the its dissemination in the national economy. However, the named departments have not yet taken noticeable steps in this direction.

Many problems in this matter, which require solution, have accumulated. The USSR Ministry of Higher and Secondary Specialized Education should see to the training on a state scale of methods experts and organizers of functional cost analysis, specialists in the search for economically efficient technical approaches and to the making of fundamental changes in the programs of the training of future engineers. Serious methods support of the new approaches to work should be developed. The problem of forming an "anti-expenditure" mechanism of management is on the agenda. It is possible and necessary to solve it with the mandatory enlistment of functional cost analysis.

7807

CSO: 1814/242

BUDGET AND FINANCE

GKNT OFFICIAL ON NEW SCIENTIFIC-ENGINEERING NEW PAY SCALE

Moscow EKONOMICHESKAYA GAZETA in Russian No 32, Aug 85 p 7

[Interview with Deputy Chairman of the USSR State Committee for Science and Technology Vladimir Mikhaylovich Kudinov: "The Improvement of the Remuneration of the Labor of the Creators of New Equipment"; date and place not specified]

[Text] At the request of the editorial office Deputy Chairman of the USSR State Committee for Science and Technology V. M. Kudinov comments on the recently adopted decree of the CPSU Central Committee, the USSR Council of Ministers and the All-Union Central Council of Trade Unions "On the Improvement of the Remuneration of the Labor of Scientists, Designers and Process Engineers of Industry."

[Question] Vladimir Mikhaylovich, to what is the adoption of the new decree due and to the achievement of what goals will it contribute?

[Answer] At the June conference in the CPSU Central Committee it was noted that the acceleration of scientific and technical progress requires the cardinal change of the situation which has formed with engineering and technical personnel and scientists. The need to increase the public recognition of science and technical labor was noted.

The decree, which was adopted by the CPSU Central Committee, the USSR Council of Ministers and the All-Union Central Council of Trade Unions, is called upon to increase in every possible way the moral and material interest of scientists, designers and process engineers of industry in the acceleration of scientific and technical progress and in the development and introduction in the national economy of new equipment and technology, which conform in their indicators to the highest world level. The essence of the new document, in my opinion, is that it affords extensive opportunities for this category of workers and aims them at a high end result: the development of highly efficient equipment which corresponds to or surpasses the world analogues. This is the main thing.

It is well known that in the past 5-10 years the party and government have taken many steps on increasing of the wage in various sectors. A situation

had formed, in case of which the level of the remuneration of the labor of the personnel, who directly influence the pace of scientific and technical progress, proved to be significantly less than that of other categories of workers.

[Question] How will the new system of the remuneration of labor stimulate scientific activity?

[Answer] Up to now, in order to provide the highly skilled worker with an adequate wage level, the managers of scientific institutions were frequently forced to resort to the artificial establishment of small subdivisions with highly paid administrative positions: the chief of a laboratory, a department, a sector and so forth. Having taken an administration position, the scientist is obliged to perform during 30, 50, or else all 70 percent of their working time administrative and management functions which are not characteristic of him. Such a "reorientation" of highly skilled specialists dispersed their creative potential and did not promote the achievement of the end result--the development and introduction of highly efficiency equipment.

But the problem was not confined to this. Having granted a high salary to whoever deserves this, the manager had to rack his brains over how to preserve the average wage level in the organization. It was necessary to take on a certain number of low-paid workers (rank and file engineers, laboratory assistants), for whom there was no urgent need. This was done to maintain the level of the indicator of the average wage.

The new decree gives free range to the initiative of scientific organizations. Only the wage fund for the solution of specific problems is planned for them. Now the manager himself, of course, within the established wage fund and limit of personnel, decides how many specialists and specialists of what skill are required for this.

Five positions of scientific associates are being introduced: chief scientific associate, leading scientific associate, senior scientific associate, scientific associate and junior scientific associate.

The former system of the remuneration of labor was insufficiently flexible, which adversely affected the creative growth of personnel. Now a "spread" of 50 to 130 rubles exists within each of the 5 introduced positions. Moreover, the salary of the most skilled and capable workers can be the same as that of the manager of the scientific subdivision.

The managers of design and technological organizations, scientific research institutions, production and scientific production associations and enterprises of industry, the USSR Academy of Sciences and the academies of sciences of the union republics are permitted to establish at the expense of the saving of the wage fund increments for scientists, designers and process engineers for the performance of the most difficult and responsible jobs with allowance made for their personal contribution in the amount of up to 50 percent of the salary and for other highly skilled engineering and technical personnel, specialists and employees in the amount of up to

30 percent of the salary for the period of the planned time of the performance of the jobs or for another period. However, it must be noted that the indicated increments are canceled or reduced in case of the failure to observe the deadline of the completion of a job or its individual stages, as well as in case of violations of labor and production discipline.

All this, in our opinion, will stimulate the fruitful creative activity of everyone at his place and will prompt personnel to further occupational advancement.

[Question] How will the new decree affect the structure of scientific research, design and technological organizations?

[Answer] The standard structure is not affected by the new decree. But here within the institution changes are not only possible, but also desirable. I will recall that in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy," which was adopted in 1983, it is deemed expedient to expand the practice of organizing temporary scientific production subdivisions for the most important national economic problems. The internal structure of scientific research institutes and design bureaus, undoubtedly, will become more universal. Experience of such structural changes already exists. It is a matter of temporary collectives, which are called upon to accomplish specific goals. Their organizational forms can be different. The main thing here is to increase as much as possible the labor productivity of specialists and to speed up the process of saturating the national economy with new equipment.

The multiple-skill creative brigades at the scientific research institutes and design bureaus of Moscow, Leningrad, Ulyanovsk and other cities have shown themselves to advantage. Moreover, the managers of the institutions determine themselves both the quantitative composition of the brigades and the optimum ratio in them of workers of different skills.

[Question] But how does the new system of the remuneration of labor affect those candidates of doctors of sciences, who have already been working for a long time at scientific institutions?

[Answer] The maintenance or increase of the level of the wage of these workers will be decided upon certification. We already have such experience both at scientific institutions and at enterprises.

At present the USSR State Committee for Science and Technology jointly with the USSR State Committee for Construction Affairs, the USSR Academy of Sciences, the USSR Ministry of Higher and Secondary Specialized Education and the USSR Ministry of Justice is drafting a new statute on certification, which will be submitted for approval to the USSR State Committee for Labor and Social Problems and the All-Union Central Council of Trade Unions. Here the goal of the more accurate and objective evaluation of the quantity and quality of the labor of engineering and technical personnel is being pursued. The most competent and authoritative specialists of one specific scientific

organization or another, in whom the trust of the entire collective has been placed, will be members of the certification commissions. They should evaluate the efficiency and quality of the labor of those being certified, the difficulty and timeliness of the performed research and development.

It is deemed expedient to carry out such certification one every 5 years. Here the wage of those being certified can be increased or decreased subject to the specific labor contribution of each person to the common cause. If the state gives scientific organizations great rights in the remuneration of the labor of their associates, it has the right also to make more rigid demands on the skills of these specialists.

The new statute on certification will be ready by the time of the changeover to remuneration in the new way.

It should also be noted that the decree does not affect the prevailing procedure of the competitive filling of vacant positions.

[Question] But what awaits those who will not be certified?

[Answer] Life itself has already answered this question. The experience of the Leningrad experiment showed that at five associations immediately before the certification and during it more than 800 people got their discharge. Many of them became designers and process engineers at the production bases of the same associations. They did not suffer in the least materially. First, the salaries are being increased for designers and process engineers. Here the remuneration of the labor of process engineers is becoming more equable with the wage of designers. Second, all the statutes on the increments, which are envisaged for scientists, are being extended to both the designers and the process engineers, who are employed in industry.

It is difficult to overestimate the moral gain from a transfer to a new place of work. People obtained the opportunity to use more completely their scientific experience on the job, to reveal their abilities more clearly and to make a noticeable real contribution to the acceleration of scientific and technical progress.

[Question] Will there be changes in the remuneration of the labor of specialists, who work at a works and have an academic degree?

[Answer] At one time we gathered in the USSR State Committee for Science and Technology the chief designers of a number of plants. They all spoke about the shortage of specialists--design engineers and process engineers. But the designer and process engineer are the main forces in the implementation of the results of scientific developments, the most necessary and most important unit at the junction of scientific research and production. Precisely here such a problem of introduction, which is urgent for us, is being solved and the end result is being formed. The efficiency and reliability of new designs and technologies depend directly on these specialists. That is why those provisions of the statute, in which the significant increase of the level of

the wage of this category of workers is spoken about, seem important to me. For, let us face it, any designer or process engineer, who in the slightest degree "found his feet" at a works, strove by hook or by crook to move into the sphere of scientific research frequently out of material considerations.

Now a skilled specialist, who has an academic degree and works in industry, in its design and technological subdivisions, can receive a salary at the level of the salaries of the corresponding workers of scientific research institutes.

The decree "On the Improvement of the Remuneration of the Labor of Scientists, Designers and Process Engineers of Industry" takes into account the results of the positive experience, which was obtained from the Leningrad and other experiments, which were conducted in our country. During them the labor productivity of engineering and technical personnel increased significantly, the wage increased scarcely less, the conditions for creative technical work improved, the collective demandingness on those who worked in a slipshod manner increased and, what is the main thing, much less time passes from development to introduction.

[Question] What that is new is the decree introducing in the organization of the stimulation of the labor of workers of the system of the Academy of Sciences?

[Answer] The USSR Academy of Sciences and the academies of sciences of the union republics have been granted the right to permit scientific research institutions and design and technological organizations to form material incentive funds and funds for sociocultural measures and housing construction. These assets are intended for the stimulation of collectives for the successful performance of work in the area of the development and introduction of new equipment and advanced technologies.

However, the amounts of the allocations, which are being deducted for the indicated funds, have been made closely dependent on the specific national economic impact of scientific and technical developments.

The envisaged steps are aimed at the broadening and strengthening of the contact of academic science with production and should contribute to the shortening of the time of the introduction of the results of scientific research in production.

It is important to note that the suggestions and desires of practically all the interested parties: the personnel of scientific institutions and enterprises, workers, who sent us their letters, opinions and the experience of scientists of the fraternal socialist countries, were included in the new document.

As is known, the new conditions of the remuneration of labor will be put into effect starting in January 1986 as the corresponding saving is formed within the stable wage funds which are planned for enterprises and organizations. They will encompass about 2.5 million specialists.

The first reactions show that the decree is regarded as a display of new concern of the party and government for the scientific and technical personnel of the country, who are called upon to make a more significant contribution to the acceleration of scientific and technical progress.

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FACILITIES AND MANPOWER

RIGHTS, FUNCTIONS OF PILOT ENTERPRISE CLARIFIED

Moscow EKONOMICHESKAYA GAZETA in Russian No 23, Jun 85 p 19

[Article: "Technical Progress: The Status of the Pilot Enterprise"]

[Text] In conformity with the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" the State Committee for Science and Technology last year approved the Statute on the Pilot (Experimental) Enterprise, Including the One Which Is a Part of a Production, Scientific Production Association, Scientific Research, Design, Planning and Design and Technological Organization, which was drafted jointly with the USSR State Planning Committee, the USSR State Committee for Labor and Social Problems, the USSR Ministry of Finance, the USSR Ministry of Justice and the All-Union Central Council of Trade Unions.

"What new things does this statute introduce in the rights and functions of pilot enterprises?" the readers of the weekly ask in their letters to the editorial board. In accordance with their requests this is told about in the commentary which was prepared by the Administration of the Organization and Economics of Scientific and Technical Progress of the State Committee for Science and Technology.

Pilot enterprises are playing a significant role in the acceleration of scientific and technical progress. Until recently their subordination, rights, functions and tasks were not clearly specified in enforceable enactments. The ministries and all-union industrial associations settled these questions on the basis of their own ideas and preferences, which did not always affect in the best way the activity of pilot and experimental bases and works in the national economy.

The Statute on the Pilot (Experimental) Enterprise, Including the One Which Is a Part of a Production, Scientific Production Association, Scientific Research, Design, Planning and Design and Technological Organization made pilot enterprises into a special type of enterprises and organizations. It

applies to the pilot enterprises of all sectors of the national economy and reflects the basic directions of their activity and the main tasks.

Pilot enterprises should perform mainly pilot experimental operations, their task is the preparation of the results of the scientific research and development of various sectors for practical use, the production and testing of prototypes, the development of new technological processes and other operations, which contribute to the development and assimilation in the national economy of the achievements of science and technology.

A number of important issues, which are connected with the functioning of pilot enterprises, including the question of their subordination, are settled in the statute.

In necessary cases, for example, in accordance with the decision of a ministry (department) or the council of ministers of the union republic individual independent pilot enterprises can be subordinate to a production association (combine) and a scientific production association. In this case the association acts with respect to them as the superior organ. The scientific research organizations or design bureaus, which have independent pilot enterprises, also act with respect to them as the superior organ.

Such associations and organizations have the right to deliver plan assignments and are authorized to make decisions on the stimulation of the management of the pilot enterprise, as well as to carry out all other actions which are in the competence of superior organs.

The pilot (experimental) enterprise can be a part of a production, scientific production association, institute or design bureau with the rights respectively of a production and structural unit and a subdivision. In this case it is not a legal entity.

The extent of the rights and duties of independent pilot enterprises (the pilot plant, factory, works, farm, sovkhos), which are a legal entity, is specified by the indicated decree. But for pilot enterprises which are not a legal entity (the production or structural unit of an association, the subdivision of a scientific research institute, a design bureau) it is necessary to draft their own statutes, which are approved by the managers of the corresponding associations and organizations. Here the extent of their rights and duties is specified in conformity with the statutes on the corresponding associations, the General Statute on the Scientific Research, Design, Planning and Design and Technological Organization and the Statute on the Pilot (Experimental) Enterprise.

There is another peculiarity. In contrast to the prevailing statutes on production and scientific production associations and the socialist production enterprises in the Statute on the Pilot Enterprise there is no mention of labor productivity and the decrease of the production cost as goals of the activity of pilot enterprises, as well as the planning of the profit, the fee for capital and other categories, which are used in the system of the management of industrial enterprises. The pilot enterprise should have a plan

of pilot experimental operations, and not a plan on the output of commodity production.

The numerous changes in the rights and duties of enterprises, which have been recorded in the enforceable enactments which have been adopted since the time of the issuing of the Statute on the Socialist Production Enterprise and the statutes on the production and scientific production association, are taken into account in the statute.

At the same time the rights of the pilot enterprise as compared with enterprises of other types and associations have been limited somewhat. Thus, the production enterprise has the right to conclude independently contracts for the development of new equipment and production technology, plans of the renovation, mechanization and automation of production and other similar operations. The pilot enterprise can conclude such contracts only with the consent of the superior organ. In the same manner the director of the pilot enterprise can approve the title sheets for the construction, expansion and renovation of all facilities at the expense of the production development fund, the title sheets for the retooling of the pilot enterprise and the internal construction title sheets (in contrast to "ordinary" enterprises, to which the right to settle these questions independently has been granted).

In the area of social development, the construction and distribution of housing, health-improvement, cultural and personal service facilities the rights of the pilot enterprise are identical to the rights of associations and enterprises.

The further improvement of the management of pilot (experimental) enterprises, of course, is not confined to the application of this statute. It is necessary to specify the composition of the plan indicators, which are oriented toward the more complete meeting of the needs of science, to define more precisely the system of the economic stimulation of pilot enterprises and to improve the organization of their material and technical supply.

Such a comprehensive approach will make it possible to improve significantly the activity of pilot (experimental) enterprises and to increase their role as an important unit in the acceleration of scientific and technical progress.

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FACILITIES AND MANPOWER

SIGNIFICANT FACTORS FOR S&T PROGRESS DISCUSSED

Moscow SOTSIALISTICHESKIY TRUD in Russian No 6, Jun 85 pp 7-16

[Article by Doctor of Economic Sciences V. Lebedev: "The Acceleration of Scientific and Technical Progress and the General Laws of the Development of Labor"]

[Text] The socioeconomic policy of the CPSU envisages the profound transformation of all aspects of the life of our society: the qualitative change of the material and technical base of production, the improvement of the system of social relations and the comprehensive development of man himself. It is important that all these changes would occur simultaneously, that is, scientific and technical, organizational and economic, social, personnel and other problems would be solved jointly. For the present the rates of the intensification of the economy and the introduction of the achievements of science and technology are less than our possibilities. The advantages of mature socialism and the formed conditions, which require new approaches and solutions, are not being taken fully into account. It is a question of the need for a more thorough knowledge of the peculiarities of the present stage of scientific and technical progress, so that the mechanism of management, which is being developed on this basis, would conform more completely to the needs of social production and would ensure its all-round and most efficient intensification. Here constant attention should be devoted to the development of labor, which, as K. Marx put it, is the creative substance of wealth.¹

The Content of the Process of the Acceleration of Scientific and Technical Progress

By the acceleration of scientific and technical progress there are most often understood the increase of the degree of the increment of new knowledge and the more rapid introduction of new equipment with respect to the past period, the planning directives or the level of other countries. At times it is recommended here also to take into account the growth rate of the skills of workers. It seems that all these principles are important. At the same time it is advisable, in our opinion, to supplement them with descriptions of the goal, structure and stages of scientific and technical development, as well as the means being used for this. Only then will we get a more and less complete

idea of the economic content of the acceleration of scientific and technical progress, the scale and nature of its problems.

It is clear that all this is being done for the purposes of the more rapid solution of socioeconomic problems, the improvement of mature socialism and the achievement of victory in the economic confrontation of the two systems.

The acceleration of scientific and technical progress affects all the stages of scientific and technical development: from the scientific idea to the mass introduction of an innovation, it is accompanied by the appearance of new forms of the organization of production and labor and by a change of the motives and stimuli of labor activity. In the literature the acceleration of scientific and technical progress is interpreted at times as the elimination of the formed lag with the introduction of innovations in some sectors of the national economy. Of course, one cannot do without such "pulling up" of the lagging sections. But the main content of the problem of the acceleration of scientific and technical progress now consists in realizing more fully the possibilities of the scientific and technical revolution and the advantages of mature socialism. Therefore it is now legitimate to regard such acceleration not simply as the correction of the shortcomings and omissions, which were previously allowed, but as an objective law of expanded reproduction of the intensive type at the stage of mature socialism.

Some researchers, by using exceptional data, assert that during the years of the 10th Five-Year Plan and the first half of the 11th Five-Year Plan a decrease of the pace of scientific and technical progress and its return occurred. Let us note that a similar decrease to one degree or another occurred in many countries of the world. One of the main reasons for this is the difficulties of the historical transition from the traditional technological mode of production to a fundamentally new mode which is based on the latest achievements of the scientific and technical revolution. Of course, one must not disregard the difficulties of extracting raw materials or the difficulties of a demographic order. But still the need for fundamental changes in the material and technical base of production is of decisive importance.

At present the intensification of production is still being accomplished primarily on the basis of the evolutionary achievements of science. They are more practicable, since their use does not require very large expenditures of assets. However, the economic possibilities of the evolutionary forms of intensification are limited. The analysis made by us showed that the efficiency of the majority of machines in a number of leading sectors of industry is approaching the potential limit. The modernization of such equipment is frequently accompanied by a decrease of the economic impact per unit of additional expenditures of labor. The changeover to new equipment, which is developed on the basis of the modern achievements of the scientific and technical revolution, requires significantly more resources and time, the substantial increase of the level of training of personnel and the improvement of the very nature of their education.

Without denying the inexcusable red tape when introducing a number of innovations, it is important at the same time to appreciate the emergence of

fundamentally new sectors and works and especially the accumulation of fundamental knowledge of a strategic nature. If we take into account the theoretical reserves of the scientific and technical revolution, it is possible to assert that today the tendency to accelerate has already appeared in scientific and technical progress. It is becoming to one degree or another more significant first in one, then in another sector of production. The acceleration of scientific and technical progress depends on the interaction of an entire set of factors. Among them we consider it useful to single out specially two, the use of which on the basis of the advantages of socialism can improve substantially the national economic results. The first is the increase of the scientific level of the decisions being, particularly in the area of the assimilation of capital investments and their structure. It is well known that on the scale of the national economy the annual "net capital investments" alone in scientific and technical progress exceed 100 million rubles (11-fold more than during the entire 1st Five-Year Plan). In approximately 8-10 years half of the fixed capital is "replaced." However, so far the proper increase of the impact has not been obtained.

The main reason for this lies in the fact that the novelty and the scientific level of the equipment being developed are inadequate, and the rate of the updating of production equipment by current standards is slow. In individual sectors more than 40 percent of the new equipment does not conform to the highest world standards, while the productivity of the equipment being put into operation is only 10-20 percent greater than that of the operating equipment. Hence, the bulk of the technical equipment is being reproduced at the level of traditional scientific achievements and is not being significantly updated. Therefore, today for the appreciable acceleration of scientific and technical progress it is possible and necessary to focus attention first of all on the introduction of the highest achievements of science and technology. It is possible to call such introduction of innovations the revolutionary form of intensification.

The scientific content of the process of the acceleration of scientific and technical progress naturally consists in the knowledge of the laws of the microcosm and macrocosm and the means of their technological use. Among the more specific, technical forms of such use are: in power engineering--nuclear, thermonuclear electric power plants, the direct conversion of energy; in metallurgy--the technology of the furnaceless production of steel, plasma smelting, fluidized bed furnaces; in chemistry--the production of qualitatively new materials, chemical "assembling," active catalysts; in metalworking and machine building--explosion machining, laser, electrochemical and rotary conveyor equipment, matrix "assembling," robotics; in transportation--jet and rocket engines, pipelines; in management and communications--computers, the videotelephone, holography; in agriculture--compound fertilizers, herbicides, artificial climate installations, biosynthesis.

For the retooling of the already established sectors and enterprises it is very important to use skillfully microelectronics, robots, flexible manufacturing systems (GPS's), advanced physical chemical and biological technologies. Precisely the technical updating of the capital, the replacement of the former capital with the most efficient capital, and not

simply the increase of the number of good, reliable, but already obsolete machines act today as the second basic factor of the acceleration of scientific and technical progress.

How, by what means it is possible to achieve more rapidly the retooling of sectors and first of all machine building? Apparently, here it is impossible to do without special specific programs of rapid retooling, without the clear specification of the time of the achievement of the world levels. For the present in machine building and metalworking the placement of new equipment into operation exceeds by approximately fivefold the retirement (elimination) of obsolete equipment, which adversely affects the pace of scientific and technical progress and the efficiency of the national economy. It is useful to channel into the updating of technical equipment the entire amortization fund and a significant portion of the accumulations.

Regularly conducted general inventories of the capital both at scientific organizations and at enterprises and the extensive development of the process of the certification and rationalization of workplaces help to streamline the updating of equipment. They will make it possible to determine reliably the forms and time of the placement into operation and, what is very important, the retirement of equipment regardless of which solution will yield the greatest national economic impact.

The conception of the reproduction of the latest equipment is based on the need to ensure the quickest "breakthrough" of the basic achievements of science into production. In particular, it is necessary, in our opinion, to envisage the availability of reserve capacities, as well as the more dynamic development of pilot experimental production. It is possible to develop such works and following them an entire system of flexible manufacturing structures by various means. For example, at large scientific centers a scientific institution (like the Institute of Electric Welding of the Ukrainian SSR Academy of Sciences) can act as the organizer of the introduction of innovations. In the absence in regions of such centers it would be useful to form special introducing organizations.

In case of the planned management of the processes connected with the acceleration of scientific and technical progress, of course, they base themselves on the fact that it is necessary not as an end in itself, but in order to obtain at each stage the maximum result in relation to the possibilities of the national economy.

In case of the use of equipment and technology of a more and more advanced type a substantial increase of the economic impact occurs owing to the enormous speeds and flexibility of machining, the continuity and the small number of operations of the processes, the concentration and intensification of the action on the properties of the materials being processed. The analysis of the results of the experimental use of units of this type, particularly flexible manufacturing systems, leads to the conclusion that they are 5- to 10-fold more productive as compared with traditional equipment.

As to long-range evaluations, it is possible to formulate an expert, prognostic idea of the nature of the acceleration of scientific and technical

progress and the amount of its return in accordance with the data of Siberian researchers. Thus, highly reliable technological systems, of which integrated machines based on electronic adapters are a part, as well as automatic lines ensure, if we compare them with the ordinary mechanization of operations, an increase of labor productivity by 9- to 12-fold. In case of the changeover to a highly reliable technology with few operations and with cybernetic control labor productivity increases by 37- to 48-fold, while by means of systems which are based on the best achievements and discoveries of the basic sciences--by 50- to 80-fold.²

Thus, the acceleration of scientific and technical progress appears as stages of the mastering of more and more significant achievements of the scientific and technical revolution. And the higher their level is, the greater (other conditions being equal) the efficiency of scientific and technical progress is.

The Features of the Revolutionary Form of the Intensification of Production

The acceleration of scientific and technical progress at the present stage is distinguished from the preceding stages by its revolutionary nature. This is connected with the fact that more and more significant and diverse forces of nature are being committed to the economic turnover, the time has come to use the laws of the microcosm and macrocosm, which are distinguished from the so-called classical laws by their greater "power" and enormous speeds of interaction. Such a form of intensification is more dynamic; leaps in development here are not an exception, but the rule. All this requires a new organization for the accomplishment of scientific and technical progress. And, perhaps, one of the main principles of such an organization is its comprehensiveness, the coverage of all the phases, levels of reproduction, starting with the stage of its scientific preparation. And one must not, in our opinion, underestimate the preconditions of intensification, which have been accumulated at the stage of its scientific preparation.

It is well known that this stage is now a large scientific complex, the bulk of which is included in the process of expanded reproduction and is capable of providing all its phases with improved scientific developments. The total expenditures on science amount here to approximately a fourth of the entire amount of capital investments. The science intensiveness of the national income has increased substantially. As compared with 1950 the expenditures on science have increased by 26-fold with an increase of the national income by 9.3-fold.

While regarding comprehensiveness as an attribute of the revolutionary form of intensification, it should be borne in mind that this is a process which encompasses basic, ancillary and service works, economic, social and other relations. For its successful occurrence it is important for the socialization of production to achieve a high level. Its present state, when a unified national economic complex has been established in the country, satisfies this condition.

What is the peculiarity of the resources which are necessary for the intensification of social production on the basis of the highest achievements

of scientific and technical progress? First of all scientific, that is, universal labor of a special content on the use of basic ideas should be included in these resources (in the economic sense). It is well known that the implementation of the basic achievements of science now requires approximately two- to threefold more expenditures on their applied development as compared with the costs of scientific research and not less, but significantly more on their introduction.

According to our rough estimates, in 30 years 70-100 billion rubles have been spent on the formation of the basic achievements of the scientific and technical revolution. Consequently, in the future the corresponding assets will be needed for applied developments and the comprehensive, balanced training of the creators of new equipment and people who are capable of mastering it and using its efficiently.

In what will the economic impact find expression? The decrease of the cost of a unit of output will be achieved by means of the simultaneous reduction of the expenditures of living and embodied labor with the increase of the proportion of the latter. As the data of experiments and the forecasts of the use of fundamentally new equipment show, the capital-output ratio of a unit of many use values being obtained will decrease in the future, that is, the higher form of intensification will contribute to the formation of a capital-saving type of expanded reproduction.

As to the role of living labor, a number of new features are also appearing here. Intensification with the use of robots and automated systems of machines changes qualitatively the functional content of labor. And it is a question not only of a decrease of the share of physical labor and an increase of the share of mental labor. The creative nature of labor is becoming a more and more necessary condition of its efficiency. The highest technical level of production requires this with the exacting nature of a technological law.

All the above-noted features of the revolutionary form of the intensification of production attest to its great potentials, the use of which makes it possible to achieve a radical change in the increase of the efficiency of the economy. The complexity of the solution of the coming problems suggests a comprehensive approach to the planned determination of the long-range and current tasks and a substantiated transition from one stage to another.

The Problems of the Organization of National Labor Under the Conditions of the Scientific and Technical Revolution

The accomplishment of intensification on the basis of the acceleration of scientific and technical progress is inconceivable with the constant improvement of the functions and organization of socialist labor. Such functions of labor as the socioeconomic planning of scientific and technical progress and the scientific, technical and social creativity of the masses have emerged and are being developed. It must not be forgotten that precisely the broad masses of the working people, who, according to the definition of V. I. Lenin, are the first productive force of society, accomplish scientific and technical progress.

The organization of labor in the national economy of the country now has many traits which are equal to mature socialism. Given the high level of the socialization of production its goal orientation toward the obtaining of the overall result as the basis of the increase of the personal well-being of each person is being ensured; a high level of the social homogeneity of society has been achieved. The overall level of education and the specialized training of staffs of workers, kolkhoz farmers and engineering and technical personnel have increased substantially.

But modern production with its complex expensive equipment and the very nature of the labor on the servicing of new equipment are making incomparably greater demands on everything that is called "the human factor" in the economy: the cultural and technical level, occupational skill, creativity and discipline of workers. Without this it is impossible either to increase labor productivity drastically or to improve product quality substantially. However, a portion of the workers in social production for the present are still engaged in unskilled, difficult physical labor. And among the workers of nonphysical labor there are many such workers who perform primarily monotonous operations.

Therefore, under present conditions in case of the preparation of any goal programs on scientific and technical development, the decrease of the use of manual labor and so forth it is important to have as a necessary component of each of them a section which ensures organizationally the conformity of the material and technical base and "the human factor." But for this clarity in the understanding of such most important categories as applied to the stage of mature socialism as "the need for labor," "the creative nature of labor," "the social maturity of labor," "material and moral stimuli," "the productive force of labor" and others is needed in the science of labor. Thus, it is possible to group with the basic problems, which so far have not been completely solved, the determination of the features of the effect of the laws and regularities of the functioning of productive labor in connection with the development of the scientific and technical revolution. It is appropriate to note that some researchers deny the necessity of identifying and using the laws which are inherent in the system of labor as a productive process. In their opinion, this is a matter of the technical, and not the economic, sciences. Meanwhile, precisely the study of the essence and internal contradictions of the development of labor is the basis for the theory of labor value of Marx.³

Under the conditions of socialism the analysis of the content of labor enabled a number of researchers to identify such regularities of its functioning as the conformity of manpower and the means of labor, the increase of the creative, particularly the management functions of labor, the increase in it of the proportion of mental, scientific activity, the lead of the increase of skills as a prerequisite of the efficient use of new equipment and others.

An integrated view of the mode of production as the unity of the system of living and embodied labor and their social collectivistic form (production relations) is very importance, since in case of such an approach attention is focused on the dialectic interaction of its basic elements. Thus, the analysis of the laws and peculiarities of the reproduction of manpower and the means of labor under the conditions of the scientific and technical revolution

merits the closest attention, since due to the discrepancy in this area society loses both in production efficiency and in the effectiveness of the remuneration of labor and stimulation. The question of the optimum time and scale of the updating of equipment from the standpoint of the greatest yield of living and embodied labor also requires settlement. In practice the laws of the development of productive forces are merely mentioned in scientific literature and await their researchers, since the opinion exists that the economic sciences should deal only with social production relations.

And since the saving of both living and embodied labor is important for the increase of labor productivity and production efficiency (and embodied labor is also accumulated in equipment), it is necessary to increase the degree of the thorough scientific substantiation of the plans of new industrial projects and the development of the corresponding social infrastructure. Definite experience has been gained in the country in the development of previously uninhabited regions, the formation of territorial production complexes and the extensive reconstruction of old regions. But this experience also attests to large, untapped reserves. Thus, the appraisal of 11,000 plans, which was made comparatively recently, established that approximately one-third of them in some parameters or others are not the best and, what is the main thing, do not take into account the increased possibilities of the entire national economy. The "price" of such insufficient consideration of the scientific and technical potential came to 5 billion rubles.

It would be useful, in our opinion, to discuss major plans extensively before their adoption in the press and scientific collectives, while special groups of specialists, which are set up on an interdepartmental basis, could issue responsible conclusions on them. Of course, here it is important to develop and improve the methods of comparing the possible versions in the direction of the more complete consideration of all the types of the impact and expenditures for the entire service life of machines and apparatus, equipment and structures and so on. The achievement and even the exceeding of the prevailing technical parameters or simply the improvement of the indicators in relation to the previous level cannot be regarded as the only characteristic of the soundness of the use of capital investments. Under the conditions of mature socialism the achievement of the greatest economic and social impact in the national economy should become the criterion of the optimum version.

It is necessary to make the wage and other forms of the material and moral stimulation of workers more dependent on the national economic efficiency. The experiments, which are under way at present, have as a goal to ascertain how sound the proposed forms of the increase of the interest and responsibility of collectives and individual workers for better results at enterprises, sections and workplaces are.

It seems to us that the connection of the increase of the wage and other forms of stimulation with the increase of the efficiency of social production for all workers, including the workers of organs of economic management and the nonproduction sphere, should be strengthened at all levels. It is important to eliminate resolutely leveling, departmentalism and the waste of resources, including the expenditures on wages. The dynamics of the wage should conform

more completely to the real increase of the national economic impact, while the pay of each worker should conform more completely to the results of labor. In this sense, in our opinion, it would be useful to disseminate more extensively the principle of the coefficient of labor participation, which is characteristic of the collective form of the organization and remuneration of the labor of workers--to extend it to all levels of management. Such an approach will make it possible to ensure the utmost development of the collective creative force of labor, the basic increase of its efficiency and the achievement of the highest world level. An economic mechanism, which is equal to the possibilities and historical tasks of the stage of mature socialism, is needed for this.

The development of the first productive force--workers, that is, the subject of production, which is capable of creative meaningful living labor, as is known, is a decisive factor of the acceleration of scientific and technical progress and the increase of production efficiency. Such a nature of labor at the same time is the most important condition of its social appeal and a means of the all-round development of the individual. In order to solve these problems, one should first of all increase to a new level the general education and skills training of all detachments of the working people and eliminate difficult physical and monotonous types of work. The urgent need has arisen to have in all the long-range programs of the socioeconomic progress of the country special sections on the development of the creative meaningfulness of labor and on its material and moral stimuli.

The process of creative production work should be viewed in the state plan as a necessary element of the reproduction of manpower and the formation of the aggregate worker at a qualitatively new level. From the standpoint of the saving of labor it is important to evaluate more specifically the new, greater demands on skills. It is clear that under the conditions of the acceleration of scientific and technical progress the skills of a worker or specialist should be increased. But the most distinctive feature of the moment does not lie in this. Workers of broad specialization, moreover, ones who are capable of dynamically and opportunely adding to their occupational skills knowledge, experience and skills, are needed more and more often and on a larger and larger scale. And, finally, what is no less important, they should be willing and able to work most efficiently under the conditions of the collective forms of the organization of labor. Hence it is clear that in conformity with the different stages of scientific and technical progress long-term programs of the qualitative increase of the skills of the working people with allowance made for the new level of development of technology and the new functions of workers are needed.

The integrated system of the training and advanced training of personnel, which ensures the reproduction of skilled manpower in conformity with the needs of the rapid development of production and its constant technical updating, should be designed so as to influence each worker during his entire labor career. Each stage is called upon to be a continuation of the preceding stage, providing the worker the opportunity for advancement and the optimum choice of such an occupation which would conform to the greatest extent to his capabilities and the needs of production.

The scientifically sound planning of the training and assignment of personnel under the conditions of intensification presumes the streamlining of and great agreement between all the phases of the reproduction of manpower: training--assignment--use. As to the organizational forms which ensure proportionality at the "junctions" of the different phases, the development of interdepartmental relations would apparently be useful. It is important to make the results of the certification of workplaces directly at enterprises the basis of the work on the drawing up of more sound orders than before for skilled workers and specialists and to take them into account when organizing vocational guidance in some region, sector and farm or another.

The improvement of the training of workers and specialists under present conditions, when the sectorial structure and profile of many occupations and specialties are changing rapidly and drastically, is impossible without the substantial improvement of the vocational guidance of young people and of workers in general. It is called upon to identify the capabilities and aptitudes of a person and to help to realize them with benefit for oneself and society. Such work is necessary with respect to both new and old occupations, which with the change of the material and technical base substantially changed their nature.

With allowance made for the significant nonuniformity of scientific and technical progress two trends are being observed at present in the occupational development of the working class: the first is characteristic of the bulk of young people, who in a certain sense have excess education, the second is characteristic for the present of a small number of occupations, which were in the zone of the strongest influence of scientific and technical progress. Here the vocational training is less than the demands which the most modern equipment and advanced technology make. The schools of the system of the USSR State Committee for Vocational and Technical Education should make a turn toward the training of workers of precisely such new occupations and specialties. For the present it is frequently possible to observe that they are training at them workers of traditional mass occupations, with which in practice the enterprises themselves can also cope with the same success.

It seems that in the next 15 years a knowledge of new technical systems--sets of equipment like flexible manufacturing systems, machining centers with robots and computers--and the mastering of advanced technologies, which in turn involves the training of new detachments of researchers, designers, planners and organizers of a qualitatively new level, should be the main new features in the vocational training of personnel.

The national long-term program of the formation of modern scientific and technical personnel and a regular labor force should encompass all level of training, starting with the school. Thus, the decree of the CPSU Central Committee and the USSR Council of Ministers, in which the introduction starting with the new school year at all secondary educational institutions of the country of the course "The Principles of Information Science and Computer Technology" is envisaged, was adopted in conformity with the Basic Directions of the Reform of the General Educational and Vocational School and the national program of the creation, the development of the production and the efficient use of computer technology and automated systems. Moreover, it was

decided to conduct an extensive experiment on the use of computers in teaching, in connection with which it is planned to develop the course training of the teachers necessary for this. Computer technology will be used extensively in extracurricular forms of work with students, in case of the organization of creative technical work and in the activity of clubs, houses of Pioneers and palaces of culture.

At educational institutions of specialized secondary and higher education, as well as directly in production it is necessary to increase sharply the attention to the study of the modern achievements of world and domestic science and to the stepping up of creative scientific and technical work at all levels. It would be useful to use competitive principles more extensively in the choice of the most effective and promising solutions in the main priority directions of scientific and technical progress.

The urgent need has arisen to organize the mandatory familiarization in accordance with a special program of all management personnel of ministries, departments, enterprises, kolkhozes and construction projects with the general, fundamental achievements of the scientific and technical revolution and with the more specialized ones for the corresponding sectors. To introduce their certification, as well as the certification of scientific associates and engineering and technical personnel with respect to the questions of their specific participation in the implementation of the achievements of the scientific and technical revolution, in inventing and efficiency promotion.

At the same time the more extensive use of such forms of the stimulation of the creative potential of workers as the organization of analytical flexible collectives--brigades, laboratories, centers for the solution of individual major problems, particularly the retooling of production, the assurance of its greatest efficiency and the evaluation of the systems of stimulation, is advisable. I would like to emphasize that for the increase of the creative role of the working people in the acceleration of scientific and technical progress it is necessary to form even more actively modern economic thinking and to support resourceful, economically competent workers.

The workers of the organs of economic management have a special responsibility. It is well known that the solution of economic problems predominates among the functions of the management personnel of associations, kolkhozes, ministries and departments. Meanwhile, a significant portion of the managers are inadequately adding to their knowledge in the area of forecasting, the optimization of the use of resources and modern control systems. Therefore, it is necessary to organize the study by the management personnel of ministries, enterprises and kolkhozes of not only the achievements of the scientific and technical revolution, but also the methods of their optimum use, namely the methods which would yield the optimum economic and social impact.

At present it is often still possible to encounter the advice to introduce that equipment, which simply saves living labor, relative to the costs of its production, or that equipment which merely conforms to the standards of efficiency, while saving embodied labor.

It is well known that in the five-year and annual plans the assignments on the development and the assimilation of the production of new types and the modernization of existing types of machines, instruments and equipment and on the removal from production of obsolete equipment are established on the basis of differentiated, but often not the most advanced standards. But their quality is not always at an adequate level.

It seems that this work already now can be carried out in many cases at a higher scientific level, namely on the basis of the comparison of the possible versions and the finding of the best ones for society as a whole among those which comply with the advanced standards. Therefore, an inventory should be made of the known achievements of science, technology and advanced know-how from the standpoint of their potential economic impact; a procedure of submitting to planning organs the plans of the development of sectors and the retooling of production only on the basis of the comparison of all the versions and the selection of the best ones for society as a whole should be established. At present the choice of the most effective directions of the development of the national economy and the leading units, which make it possible to advance the economy of the country rapidly along the intensive path, is one of the urgent problems of the improvement of planning and management.

Hence it can be seen that the main task is to formulate a clear program of means, which guarantee the rapid development of creative scientific and technical work and the transformation of the scientific potential into an economic reality. Here man and his labor should remain at the center of attention in case of all reforms and improvements in the overall organization of social production. And therefore the forms of the improvement of the organization of labor and its conditions, which come from below, starting with the workplace, also merit close attention. The certification and rationalization of workplaces are an effective, comprehensible and easily understood method which ensures a scientific approach to the achievement of the coordination of the personal and material components of the productive forces.

It is characteristic that the development of the certification of workplaces is occurring at the same time as the extensive dissemination of the collective forms of the organization of labor and as a whole is contributing to the decrease of the losses of working time, to the increase of the intensity of labor to the socially normal level and to the concentration of the available personnel on the attendance of more advanced and productive equipment. Unfortunately, there is too little information in the press on what happens in this connection with the norms and the wage.

Much has been said and is being said about the inadequate cost accounting interest in the development and use of new equipment. Here I would like to note that the large-scale economic experiment helped to clarify better many questions of the economics of enterprises and to improve several aspects of their work. Thus, the fulfillment of the plan of deliveries of products in conformity with concluded contracts was essentially set up, a decrease of excessive manpower occurred, product quality increased, labor discipline

improved. The initial increased costs of new equipment often are completely covered by means of the general accumulations.

At the same time the prevailing system of the stimulation of work on new equipment, as well as several "new" suggestions to a significant extent are oriented not toward the increase of the efficiency of new equipment, but toward its quantitative expression--the number and the time of the production of new units. In the systems being experimented on, in our opinion, the share of the incentives for the development and use of fundamentally new equipment and for the increase of its efficiency is too little. For the present enterprises do not bear economic liability for the use of new equipment at a level less than the rated level. The differentiation and increased incentives for the creation of scientific developments and equipment of the world level and for the exceeding of it are not envisaged.

It is possible to eliminate these shortcomings quickly, if material stimulation is linked with the extent of the achieved national economic result from the use of the equipment. It is time to combine all these changes more completely with new forms of moral stimulation. For example, the titles of laureates of the scientific and technical revolution or the names of inventors and developers of equipment should be conferred on new important units, control systems and systems of the organization of labor, which considerably exceed the indicators of world achievements.

It is useful to introduce in the republics and oblast centers Books of Honor of the founders of new directions of science and technology, the best inventors, as well as the collectives which have surpassed the world level.

All this creates new realistic prerequisites for the cardinal increase of the efficiency and social meaningfulness of labor.

FOOTNOTES

1. K. Marx and F. Engels, "Soch." [Works], 2nd edition, Vol 26, Part III, p 265.
2. V. S. Muchnik and E. B. Golland, "Ekonomicheskiye problemy sovremennogo nauchno-tehnicheskogo progressa" [The Economic Problems of Modern Scientific and Technical Progress], Novosibirsk, 1984, p 218.
3. K. Marx and F. Engels, "Soch.," 2nd edition, Vol 25, Part II, p 448; Vol 47, p 461.

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FACILITIES AND MANPOWER

EFFECTIVENESS OF NEW ENGINEERING CENTER AT UKRAINIAN INSTITUTE DISCUSSED

Moscow EKONOMICHESKAYA GAZETA in Russian No 35, Aug 85, p 13

[Interview with Sergey Ivanovich Kuchuk-Yatsenko, corresponding member of the UkSSR Academy of Sciences and deputy director of the Electric Welding Institute imeni Ye. O. Paton, by an Ekonomicheskaya Gazeta correspondent; date and place not specified]

[Text] A great deal of attention at CPSU Central Committee meetings on the topic of accelerating scientific and technical progress was directed toward improving organizational and economic means of integrating science, technology and production. The experience of the Electric Welding Institute imeni Ye. O. Paton in creating engineering centers to facilitate the introduction of scientific inventions received a positive evaluation.

[Question] The Electric Welding Institute imeni Ye. O. Paton is known to be working in close cooperation with collectives from many enterprises around the country and it coordinates the CEMA's efforts to develop the science, technology and special metallurgy of welding. How did the idea of engineering centers come about? What tasks do they carry out?

[Answer] The idea of creating engineering centers was suggested by experience. It came up during the search for ways of speeding the introduction of finished, large-scale scientific innovations. The Electric Welding Institute is a large scientific and technical complex which includes scientific research departments and laboratories, a prototype design office, experimental production facilities and three pilot plants.

Institute workers carry out their own testing of new machines, devices and advanced technology. They translate designs into metal, create prototypes, develop them into operational units and offer what you might call "personal service" to interested sectors, associations and enterprises.

It would seem that everything is in place for rapid introduction of developments into production. However, let us take a look at the situation that often arises.

A unique and promising machine which scientists have developed and shown to be effective through prototype testing must quickly find widespread application

in industry. For widespread use the prototype needs to be duplicated on a massive scale. The plants which can do this are not under the management of the Academy of Sciences or the State Committee for Science and Technology but are controlled by another agency. Usually when a product is submitted to an interagency committee, the developer/scientists are taken away from their primary duties for an extended period of time. They have to travel to all parts of the country to visit the sector enterprises and organizations represented on the interagency committee, submit nearly every component on the machine for approval, check compliance with standards and then prepare the documentation.

Meanwhile time is flying. Sometimes the progression from prototype to mass production took 3-4 years. In effect, the machine became obsolete and needed to be updated with the latest scientific and technical advances, but the plants, just starting mass production, were not interested in making any type of changes. This was the case until recently, so much so that innovations were ordered for the sake of methods which were not in accordance with the rational load and utilization capabilities of high-volume production machinery.

This entire series of problems was beyond the scope of activities of scientists. The engineering centers immediately took on their solution.

[Question] Just what is an engineering center?

[Answer] It is a new means of joining the efforts of scientists and production personnel to obtain the best possible effect from speeding the introduction of innovations. For example, one of the engineering centers was based on a pressure welding department staffed by a group of scientists and investigators. They conduct investigative research and develop new welding equipment as well as control systems.

Elsewhere in the engineering center equipment prototype development, production and finishing work is being carried out by other specialized personnel who are capable of introducing new technology on an efficient, large-scale basis. They are organized in design, technology, finishing and testing departments.

The center has its own production base. All this allows it to minimize the time between the concept, creation of the prototype, prototype testing and final work under production conditions. Active participation by the engineering center also solves all the problems involved in transmitting documentation, organizing mass production of the equipment at various agency enterprises and introducing innovations on a broad basis.

Personnel for the engineering centers are selected according to their professional interests. There are specialists transferred from our own departments and laboratories as well as personnel drawn from other enterprises and organizations. The institute and the engineering center share the same scientific management organization which apportions its activities according to cost agreement themes within the scope of the prototype design engineering office.

[Question] What tasks are being carried out by the engineering center?

[Answer] Even before our institute was very involved in the technical refitting of various branches of industry. However, the way in which new products were introduced prevented scientists from carrying out their primary research work for extended periods of time. Progressive ideas translated into machines, devices and technologies did finally manage to get out the door, but the process of distribution into production could have been much faster. Conditions have changed now. The engineering center works in cooperation with interested customers.

After a piece of machinery is built, the next important task is to get it into reliable hands and to determine where it can be logically used and which sectors can get the best use out of it. A link between science and industry, such as the engineering center, also creates conditions for continuous improvement of machinery during the mass production process and thus helps to maintain its competitiveness on the world market.

The success of any venture, especially one like the introduction of a new technology, where innovative specialists of various disciplines are required, depends on the personnel involved. The engineering center has organized a system of courses to train specialists in the various means of electric welding.

[Question] Has the initiative of the institute's personnel been supported by other UkSSR Academy of Sciences institutes?

[Answer] Engineering centers have been created at the Cybernetics Institute and at the Superhard Materials Institute. The Electric Welding Institute has six centers covering the most important scientific and technical problems. While they are being developed with initiative and enthusiasm, they are at the beginning of the road. We hope that they will receive proper recognition as cost accounting subunits of science and production. It is essential to also confirm a corresponding position governing financial and economic activity. Questions of technical supply and staffing/finance determinations for engineering center personnel remain to be answered.

I want to emphasize that engineering centers cannot arise in a vacuum just at the whim of scientific research organization management and without practical considerations. In our opinion they will be effective and will well serve the cause of speeding scientific and technical progress in those areas where the fundamental sciences have a strong background and form the basis of developments whose introduction to mass production is capable of producing, if not a revolution, at least a fundamental breakthrough in raising labor productivity and quality.

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FACILITIES AND MANPOWER

LASER RESEARCH CENTER OF VILNIUS STATE UNIVERSITY

Vilnius SOVETSKAYA LITVA in Russian 29 May 85 p 4

[Article by R. Chesna: "The Mysterious World of the Laser"]

[Text] The Scientific Center of Laser Research of Vilnius State University imeni V. Kapsukas. In the laboratories there are tens of unique units which originated here. Some of them do not have analogues not only in the country, but also throughout the world.

"This is far from a complete 'collection' of the lasers which have been developed by us," Doctor of Physical Mathematical Sciences Algis Piskarskas, manager of the center and USSR State Prize winner, remarks. "Many of them are already operating at large scientific research centers of the country and at scientific and technical associations. Thus, the Institute of General Chemistry and the Institute of Radio Engineering and Electronics of the USSR Academy of Sciences have acquired the laser spectrometers produced by us."

And here is one of the latest jobs of the scientific center--the first picosecond parametric laser in the world. In external appearance it scarcely differs from the predecessors, but specialists are devoting exceptional attention to it. Owing to the use of such equipment scientists are penetrating more and more deeply into such areas which up to now were unknown. By means of parametric lasers it is possible to study the ultra high-speed stages of photosynthesis or the changes which occur in substances when exposed to laser radiation. The process of research by the picosecond laser has been completely automated. A computer controls it.

The latest word in laser physics is the femtosecond laser complex which was developed at the center. It focuses on a target powerful light pulses, the duration of which it is even difficult to imagine. Whereas the picosecond laser "shoots" pulses lasting a picosecond, which come to a trillionth of a second, the femtosecond laser shoots pulses lasting hundreds of times shorter. By means of such devices newer and newer secrets of the microcosm are being revealed and the most difficult problems of the use of solar energy for the needs of man are being solved.

The basic theoretical research, which is being conducted at the center of laser research of the university, soon will also acquire the same basic

practical importance. These are just a few new "earthly" occupations of the laser, about which the manager of the center told. Thus, the all-penetrating beam of the laser is also beginning to work in systems of optical fiber communications, which are capable of increasing by hundreds of times the volume of information transmission and of increasing its speed. It would seem that computers of the new generation work very quickly--up to 1 million operations a second, but optical computers, in the development of which the laser will serve, will operate thousands of times more rapidly. The equipment developed at the center will find extensive application in the metrological service in various national economic sectors.

The works of Vilnius scientists have received extensive recognition. Last year's USSR State Prize was awarded to Algis Piskarskas, manager of the center of laser research, together with a group of associates of the Institute of General Physics and the Institute of Applied Physics of the USSR Academy of Sciences, the Institute of Electronics of the Uzbek SSR Academy of Sciences, Gomel University and several scientific production associations.

"Quantum electronics is one of the fields of science, which is laying the foundation for further scientific and technical progress," Algis Piskarskas said. "Therefore we will henceforth also develop the basic research of lasers in the area of physics, chemistry, biology and medicine. We will perform a portion of the work in accordance with the USSR goal program between higher educational institutions 'Lasers,' which Lenin and Nobel Prize winner Academician A. Prokhorov is managing, as well as in accordance with other union goal programs."

Algis Piskarskas is a scientist of the young generation, he is only 42 years old. The son of teachers from Kedaynyay studied physics at Vilnius and then Moscow university and was a graduate student of Moscow University. After returning to Lithuania he defended in 1969 his dissertation for the degree of candidate of sciences, then his doctoral dissertation. Since the day of the founding of the Scientific Center of Laser Research of the university A. Piskarskas has managed this center, which, incidentally, tens of this students are also already working. He is frequently invited to give lectures and reports at world famous scientific centers. Thus, A. Piskarskas has given reports at the International Conference of Quantum Electronics in Boston (the United States) and lectures at the University of Leiden (Holland), Jena [Friedrich Schiller] University (the GDR), Prague [Charles] University (Czechoslovakia) and the University of Munich (the FRG).

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FACILITIES AND MANPOWER

TOMSK POLYTECHNICAL INSTITUTE'S NEW AUTOMATION R&D COMPLEX

Moscow IZVESTIYA in Russian 13 Aug 85 p 3

[Article by Professor V. Yampolskiy, director of the Kibernetika Educational Scientific Production Complex of Tomsk Polytechnical Institute: "One's Own Among One's Own"]

[Text] The other day I met a graduate who had been assigned to the Kontur Association. He had been working here only a few days.

"Have you had time to get accustomed?" I ask.

"What is there to get accustomed to?" he was surprised. "What I was dealing with I am continuing to deal with. There are polytechnical students around. You go about the shop like a faculty."

Yes, we have friendship of long standing with the association, which produces NC devices for metal-removal machine tools. We are constantly supplying the enterprise with specialists in computer technology, the automation of designing and applied mathematics. And I met precisely a mathematician. An entire group of them has now been sent to the Kontur Association. Nearly everyone did practical production work here and performed practicable graduation projects. Once again I was convinced of how useful it is both for production and for the young engineer, when he comes to the plant with a clear idea of the job. And it is even better when he come with some reserve of his own.

What is necessary for this? It is necessary to combine training with scientific research for industry. I remember how many hopes production workers linked with the first computers. And how quickly these hopes were ruined in case of the unsuccessful attempts to realize them. The causes of the failures are various. The general one among them is the lack of practical skills in communicating with computers, and more precisely, of engineers who know how to use them. There is an entire chain of causes here. One of them is the material and technical supply of the higher school. It receives new machinery and equipment third or fourth and in extremely small quantities. How is one to achieve here the training of engineers, which leads or if only keeps pace with production? "Correspondence" training by illustrations leads

either to a gap between the reserve of knowledge and ability or more often to low skills.

We understood that plants expect capable engineers in technical cybernetics. It was necessary to seek a way out in the establishment of business contacts with economic sectors. Life suggested new forms of the organizational structure of the educational and training process. These are educational scientific production complexes. They are a bridge between training, science and production. Opportunities are also afforded for the development of the institute by means of orders of industry. We are no longer asking for assets, equipment and staffs--we are earning them. The Kibernetika Educational Scientific Production Complex of the polytechnical institute appeared as one of the first in the country--in 1976. At first it operated as a voluntary service. Then the RSFSR Ministry of Higher and Secondary Specialized Education gave it the status of an authorized subdivision. Now it unites the Automation and Computer Technology Faculty, a large scientific subdivision, the computer center and several joint laboratories with the sector. In essence, this is an institute within an institute with independent rights and finances. More than 600 associates are employed at it, nearly 2,000 students are being training in such important directions as computers, robotics, automated systems of information and the control of technological processes and the automation of designing and scientific research.

The studies also became different. When studying the course of programming, for example, we rejected the traditional division into lectures and practical and laboratory work. They have been combined and are conducted in the display rooms of the computer center. The students conduct a dialogue with the computer. In a semester they have time to perform 40-50 assignments each, 8- to 10-fold more than in case of the traditional method. In 5 semesters of studies, as is envisaged by the curriculum, the future engineer thoroughly masters the computer as a tool of creative technical work.

About 200 students work daily at the computer center. We have an impressive stock of large computers of a single series and several tens of miniprocessor and microprocessor computers. Access to them is provided by 130 display terminals. Nearly all the electronic equipment was turned over to us by the leading sectors of the national economy. With what are we paying?

The laboratories and divisions of the complex, and there are about 100 doctors and candidates of sciences in them, annually perform research worth 3.5 million rubles on the basic and applied problems of automation. They are concentrated within comprehensive goal programs--all-union, sectorial and regional. For two of them, "The Automated Control System of the RSFSR Ministry of Higher and Secondary Specialized Education" and "The Model Automated Control System of the Higher Educational Institution," we act as the main scientific organization.

The research on the automation of management at the higher school is universal and suitable for many sectors. The proposed base information-computer system makes it possible on the basis of computers to set up an automated data bank. The economic impact of its introduction is 200,000 rubles. It is already

being used at many plants and in the Automated Management System of Tomsk Oblast.

I will amplify. The base system is the fruit of 3 years of labor of 25 programmers of very high skill. The largest enterprise is not capable of such a thing. There is also nowhere to buy it. The Kibernetika Educational Scientific Production Complex to some extent filled the gap between science and industry.

The public student research and design bureaus are participating without fail in all the operations. One of them has done much for the automation of the management of the marketing of finished products at the Tomsk Plant of Cutting Tools. The students did not simply turn their system over to the production workers. They came through assignment to the plant, actively introduced it and now are improving it. We have five student bureaus. In them landing parties are formed, which we then send to plants which are assimilating flexible automated manufacturing systems and automated control systems for various purposes. This is precisely the case when young engineers bring with them completed innovations and actually become bearers of technical progress.

The work of students alongside experienced scientists helps them to master the most advanced methods of the use of electronics. I will cite one example. Traditionally a computer serves one client. But this is just the same as transporting a single container of bricks in an enormous KamAZ truck. When a separate client "leases" a computer, the powerful electronic brain is utilized just as little. It is capable of thinking for tens of users simultaneously. It is necessary merely to separate and order their inquiries. We developed such an automated system of the planning and accounting of the resources of computers, and it is being used at 50 computer centers of the country. Of course, our center was the first to assimilate it. Otherwise we would also not have been able to conduct lessons simultaneously with tens of students. And our graduates, not matter where they are sent, are convinced of the advantages of the multiple-program use of computers. True, organizational barriers must also be eliminated a little more rapidly: the innovation is not envisaged by instructions and price handbooks for computer time.

The scientific orientation of the complex is enabling us to check both the quality and type of training and to open new specialties in good time. At times on the requests of industry and without waiting for permission and approval from above. That is what happened with mathematician-programmers. After receiving timely training, they left for enterprises without the appropriate entry on the diploma. However, this did not worry our partners, the plants. They believed in the skills of the young specialists. It was also not necessary to entreat the RSFSR Ministry of Higher and Secondary Specialized Education. We did not need either material support or staffs for the new specialty. The sectors allocated them. They are also interested both in scientific developments and in the training and advanced training of personnel. The ministries are also agreeing to the expenses connected with this. Especially if it is possible to share assets and resources legally. Under the conditions of the educational scientific production complex joint educational scientific laboratories are helping out. The sector allocates the

staff and the latest equipment. Our contribution is highly skilled personnel and space. Naturally, they also expect a specific scientific result from us.

It is very important that the laboratories and divisions, when developing mathematical programs on the orders of sectors, immediately make their subroutines--for the instruction of students and the advanced training of personnel. Without them we would not convert the educational process into intensive technology.

For several years now a city school for optimization methods, computer operating systems and data banks has existed under the Kibernetika Educational Scientific Production Complex. Many plant engineers have improved their skills at it. An educational consultation center for robotics was opened a year ago. We are helping schools and vocational and technical schools in the study of the new subject for them "The Principles of Information Science and Computer Technology." We have carried out the course training of teachers.

For young engineers the ability to program and to work at a computer is becoming just as mandatory a component of general technical training as, for example, the ability to use a slide rule. Every chair and every instructor should teach their pupils what it is possible to do with the aid of a computer in their occupation and how. Are instructors prepared for this? For the present far from everyone is. The Faculty for the Improvement of Skills for scientists of Tomsk and other Siberian cities has been operating at the educational scientific production complex for 3 years.

I cannot imagine how the faculties and computer center would have developed one at a time, how we would have conducted research in the most difficult directions of automation given the traditional structure of the higher educational institution and the former, purely formal relations with industry. Even given the ideal version, if we had been able to get some subsidies out of the Ministry of Higher and Secondary Specialized Education for scarce cybernetics and cyberneticists, we would not have achieved today's results. Here is why I am speaking about this. Many problems of the higher school should be solved by the more complete mobilization of its internal potential--the improvement of management and the organizational structure and the expansion of contacts with industrial ministries. I am confident: educational scientific production complexes suggest the way, by which one should reform the training of personnel for the national economy.

The Collegium of the RSFSR Ministry of Higher and Secondary Specialized Education approved of the experience of the first educational scientific production complexes. But for the present they exist as independent organizations on a voluntary basis. Therefore, many of them are also not able to show their worth. And it is a pity. Perhaps, no one laments so fervently the slowness of the advance of everything new into practice as the scientists of higher educational institutions. It would not be a bad idea for the USSR Ministry of Higher and Secondary Specialized Education to show how one must treat useful ideas which have justified themselves.

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AUTOMATION AND INFORMATION POLICY

PROBLEMS OF SCIENTIFIC JOURNALISM

Moscow ZHURNALIST in Russian No 6, Jun 85 pp 32-34

[Article: "The Precious Truth and Cheap Sensations"]

[Text] The problems of scientific journalism--such is the theme of the discussion which is conducted by Academician V. Goldanskiy, chairman of the Commission of Contact With the Means of Mass Information and Propaganda attached to the Board of the All-Union Society for Knowledge and a section of the Coordinating Council for Information on the Achievements of Science attached to the Presidium of the USSR Academy of Sciences and the State Committee for Science and Technology; Ya. Zasurskiy, chairman of the Commission for the Training and Advanced Training of Journalism Personnel of the Board of the USSR Union of Journalists and dean of the Journalism Faculty of Moscow State University; and O. Moroz, chief of the Science Department of LITERATURNAYA GAZETA.

Why Is the Interest Declining?

O. M.: Scientific journalism, in my opinion, is now going through difficult times. Mainly the generation, which came here in the 1960's and first half of the 1970's or even earlier, is working in this area, but there is no worthy reinforcement. Why is it happening that way? How is the situation to be corrected?

Ya. Z.: Indeed, the situation with the training of scientific journalists is not very good. By the third year, when the question of specialization arises, students more readily choose sports, industrial economic and agricultural themes and turn to moral and ethical problems. We have, as you know, a special department for the training of international affairs journalists. It is difficult for our students to go into scientific journalism: they lack the knowledge and, what is the main thing, enthusiasm.

V. G.: But why is there not enthusiasm precisely in this area?

Ya. Z.: Here it is possible to express various hypotheses. Here is in what, it seems to me, one of the reasons lies: at present not only the enormous

positive influence of scientific and technical progress on all economic and social life, but also its considerable costs and the harm, which is being done to the environment, the animal world, the air, the water, forests and fields, are becoming more and more visible. I am not speaking of the danger of a nuclear war. This danger, if you mean the technical aspect of the matter, also arose, after all, owing to science. And its negative image is being created in the conception of some people. Not everyone is capable of seeing that all the good things, which we now have, also arose owing to it, to science.

V. G.: I am also, of course, conscious that at present the interest of young people in the natural sciences has declined somewhat. This is first of all noticeable from the decrease of the competition during admission to the natural faculties. But I see the reason, in particular, in the fact that unjustifiably great hopes were placed in science. In Ilf's notebooks there is the following phrase: "In science fiction novels the main thing was the radio. With it the happiness of mankind was expected. Now the radio exists, but there is no happiness." So it also is with science. To some extent disillusionment has set in: it has become evident that in themselves the successes of the natural sciences, although they are enormous and indisputable, are not capable of solving all human problems.

However, science it not to blame here. To a considerable extent the very promotion of various imaginary sensations, which promised ostensibly on behalf of science what science could not and cannot give, is to blame here.

O. M.: I agree that the interest in science is now less than it was, assume, 10-15 years ago. Today they more willingly read about ESP, the Bermuda Triangle, the "snowman" than about the achievements of one laboratory or another (and in general the organs of the press are forced to take this into consideration--they exist, after all, not in a vacuum). But all the same, it seems to me, the main reason for the decline of interest in scientific themes among young journalists is different: the bread of a scientific journalist is difficult. But now at least among a portion of the young people the tendency to choose a job, which is a little easier and a little more profitable, has gained the upper hand. A little more profitable not only in the sense of the wage, but also in the sense of prestige.

V. G.: But this aspiration also existed earlier.

O. M.: Now the pragmatic approach to life, in my opinion, is being felt more strongly than before. Let my colleagues not take offense at me, but, in my opinion, any other journalistic specialization is easier than the scientific specialization, although each, of course, has its own difficulties. Almost every time the scientific journalist should start "from zero" and go into the "next" science, scientific problem, about which he intends to write. But they are all now unusually complicated, several have reached the limit, beyond which a popular account of them in general is impossible (take, for example, the quantum-relativistic physics of elementary particles). You should get to the bottom of the group of problems with which the given science deals; you should find a specialist who will tell you in the best way about what specifically interests you; you should find a popular equivalent of this,

write, get approval from the same specialists. And then this is terribly unrewarding work, because, as often happens, no matter how well you write, all the same at the editorial office they will say to you: it is boring, while in the scientific environment you will here: you wrote superficially. But tomorrow a new science, a new problem awaits you.

It is somewhat easier for the contributors of popular science journals--there some specific science or set of sciences is attached to each one, so that everyone to some extent feels like a specialist. But at the newspaper, on radio and television the journalists, who are in charge of scientific themes, should be, as a rule, all-round specialists. At several editorial offices there is not even a special science department--scientific themes are combined with industrial economic themes, themes of higher educational institutions, cultural themes.

I, just as several other journalists of my generation, who are now, let us say it this way, are between 40 and 50, have devoted my life to scientific journalism. And it is disturbing to me that we do not have a replacement. We, for example, for long years have not been able to find a commentator for the science department of LITERATURNAYA GAZETA. The matter reached the point that about 3 years ago we placed an advertisement in VECHERNAYA MOSKVA on competition for the filling of this position. This was, as far as I know, an unprecedented case in the central press. Among journalists there was a great deal of talk with regard to this. They predicted that we would be swamped with applications. In reality there were only about 15 people who wanted to take part in the competition. But the main thing is that among them there was not one who if only roughly satisfied our requirements.

Who Is to Write About Science?

V. G.: I would like to cite the following analogy. It often happens that a person knows a foreign language splendidly, but does not know the subject about which he must speak. As a result he proves to be helpless. Here in scientific journalism it is extremely important that the ability to write would be combined with a knowledge of what you are writing about. It is clear that two dangers lie in wait here: the first is that what has been written will actually be too boring, that no one will read this, even if this is absolutely correct; the second danger is that this will be very interesting, but there will no longer be anything left there of the science. That is, this will be at best a flight of fancy. I will not hide it from you--and you are yourselves perfectly aware of this--the rollicking, sensational "scientific" reports, which, as they say, are concocted and from time to time appear in our press, irritate many scientists. On the other hand, depressingly boring articles of scientists themselves, which have been written, moreover, in bureaucratic language, are published not that rarely on the pretext of popularization. Therefore the question arises: Who should write about science--the journalist or the scientist? Until recently it seemed to me that this question reduced to another: Which is easier--to teach a subject to a person, who knows a language, or to teach a language to a person, who knows a subject? And I believed that it is easier to do the latter, that is, it is easier to teach a scientist to write in an interesting way about his work than to teach a journalist the subject of a science.

O. M.: Moreover, there are many subjects, we have already spoken about this. The scientific journalist, as a rule, is an all-round specialist. What subject do you intend to teach him?

V. G.: This is true, there are many subjects, but it is completely mandatory that the journalist would know all the subjects thoroughly, the main thing is that a proper methodological approach, a sense of what science is, of what is possible and what is impossible would be developed in him.

You here have complained that now they more readily read about ESP than about something serious. I do not see anything bad in this. In itself one theme or another cannot be reprehensible. It is important that it would be covered with a correct position. It seems to me that your articles in LITERATURNAYA GAZETA, which are devoted to various manifestations of pseudoscience, are useful.

O. M.: Since you have begun to speak about this, do you believe that it is sufficient for a person to have "the sense of science," "the sense of scientific truth," which you mentioned, in order, without being a narrow specialist, all the same not to allow the possibility of the existence, say, of such a phenomenon as "Philippine surgery"?

V. G.: I think that it is sufficient. But this must not be confused with the formal existence of a natural science education. Many holders of diplomas are today enthusiasts of pseudoscience. That is exactly why its verbal environment--the use of scientific concepts, terms and so on--today is developed as never before.

But let us return to what I was talking about: Who should write about science? In my opinion, publications on scientific themes should originate as a result of close contact between the scientist and the journalist. Thereby by the journalist, who has a keen feeling of what science is. Such contact must be developed in every way.

O. M.: This is now the most prevalent approach. Interviews, conversations and dialogues are encountered more often in scientific journalism than in any other journalism. Moreover, at every step such interaction existed in veiled form: the journalist writes in his own name about what specialists have told him.

I want to add that it is also necessary to develop in scientists, who are contributing to or intend to contribute to the press, radio and television, a sense of what is interesting to the reader, the listener and the viewer. In some this sense is completely absent.

V. G.: Among the regular authors of LITERATURNAYA GAZETA is Professor A. I. Kitaygorodskiy. I know that his articles arouse among many people--both in the scientific environment and outside it--disagreement, even irritation, which at times is quite understandable to me. However, you would in no way call him a boring author.

O. M.: I regard this author as one of the best scientific journalists who combine journalism with professional scientific work. Although I, like many others, do not always agree with him. Nevertheless his publications actually always arouse great interest among the readers--precisely because he has the sense which I mentioned: he writes pointedly, polemically and controversially. Unfortunately, there are few such authors among scientists.

Ya. Z.: The development of the sense, about which you are speaking, would be greatly promoted, if we were able to introduce the teaching of the principles of journalism in other faculties of the university. This has been discussed for a long time. We believe that a short journalism course, for 40-60 study hours, should be given in all faculties. First, it would be good for every person with a higher education to learn to present his ideas in a literary manner, to be able to write for a newspaper, a journal and to enter into contact with the editorial office. This is exactly the training of a nonstaff aktiv, a group of authors, the lack or meagerness of which editorial offices lament so often. Second, perhaps, precisely among these students, who are studying in other faculties, we will find talented scientific journalists.

Organization and Stimuli

O. M.: Yassen Nikolayevich, how many people from each of your graduating classes go into scientific journalism?

Ya. Z.: A few, two or three people. In addition to this, we have an editing and publishing department, many graduates of it are sent to work in scientific and technical information divisions and in the end through these divisions get to know scientific journalism. But there are also few such people.

O. M.: Apparently, at other universities the situation is approximately the same.

Ya. Z.: Yes, as far as I know, the most interesting experience in the training of scientific journalists has been gained at Leningrad, Lvov, Rostov and Tbilisi universities. But the insufficient interest of students in this area is a common phenomenon.

O. M.: It seems to me that so that the student, the future journalist, could consciously choose scientific journalism, it is necessary from the first courses to orient him in this area and to give if only an elementary idea about it.

Ya. Z.: This probably must be done back in school. We in our times began a very just campaign for the equality of occupations--no occupation is humiliating and disgraceful. But a certain distortion occurred here: in promoting the training of personnel for various sectors of the national economy, we began to direct somewhat less attention to the development of the intellect of school children, to belittle its importance, but this, apart from other things, is the basic "tool" which is necessary for scientific work. The promotion of working class occupations has now been organized well in our country. A need is actually being felt for such personnel. But at the same time, so it seems to me, in the eyes of school children the difficulties

connected with the occupation of a scientist stick out too much. Therefore the prestige of scientific work is also declining--both as a whole among young people and among young journalists and those who are training to become them.

Now, when the reform of the general educational school has begun, it is precisely necessary, apart from other things, to restore the prestige of studies as knowledge, if you wish, to instill a passion for knowledge. And further in the higher school such a strategy should, of course, be continued.

V. G.: I agree: in order to interest young people in something, it is necessary to organize and direct this interest. When, for example, soon after the war the need for physicists was great, not only popular scientific articles, which were specially intended for this, "worked" for the promotion of the achievements of physics--even the simple newspaper news item worked in this direction. And when school children opened newspapers and turned on the radio (at that time television was not yet that widespread), they saw what a significant place physics holds in the life of the state and mankind. And this automatically made them interested in this science. Assume that biology has now become the main direction of the advance of the front of knowledge (all this, of course, is quite hypothetical), but so far there is no such active promotion of the achievements of biology.

Ya. Z.: Here a closed circle is forming: scientific journalism is insufficiently strong, therefore the promotion of scientific achievements is also insufficiently strong. But, in turn, scientific journalism is working not at full force because at some moment we relaxed the attention to the promotion of science.

O. M.: Yassen Nikolayevich, what specifically is being done at your place in order to give students an idea of modern science?

Ya. Z.: Perhaps the most interesting thing that we are doing is that we invite scientists from natural science faculties to give lectures. The late Nikolay Petrovich Naumov, dean of the Biology Faculty, and Rem Viktorovich Khokhlov, who at that time was rector of the university, gave lectures very well at our place. The mathematician Boris Vladimirovich Gnedenko and the geographer Andrey Petrovich Kapitsa spoke. That is, precisely those people who, without going into detail, can reveal the very essence of science. We hope that Academician Anatoliy Alekseyevich Logunov, the current rector, will also speak.

O. M.: For what year are these lectures given?

Ya. Z.: For the fifth.

O. M.: But specialization at your place begins with the third year.

Ya. Z.: Here we are posing a slightly different task--to give students an idea of where one science or another has gone since they studied it in school. But, apparently, we actually should hold such lectures earlier, in the second and third years: precisely to interest them in, to attract them to scientific journalism.

V. G.: Oleg Pavlovich, allow me to ask you a question of, so to speak, a personal nature: How did you yourself take up this area of journalism?

O. M.: I graduated not from a journalism faculty, but from a technical higher educational institution. For several years I worked in the specialty and at the same time wrote and published. But when I decided to become a professional journalism, for me there was no question of what field of journalism to choose, since science and technology were exactly the sphere in which I found my bearings best of all. I know many scientific journalists who came to this field in the same way.

V. G.: This, it seems, is the most promising way. It seems to me that the scientific journalist should receive a basic scientific and technical education. And then, if he feels the calling, he should become a scientific journalist.

Ya. Z.: Incidentally, we can help him in this. We have a 2-year day and a 3-year evening department for people with a higher education.

O. M.: Who is now studying in these departments?

Ya. Z.: People of the most different specialties--physicians, agronomists, lawyers. They work at various editorial offices, and the editorial office sends them for training, while keeping them on the payroll (in the evening department they, of course, combine studies with work).

O. M.: And what is the size of these departments?

Ya. Z.: In the day department 20 people are studying, in the evening department--25-30. But we could accept more, if the corresponding organizations had the desire.

O. M.: And is the Academy of Sciences taking part in this?

Ya. Z.: Unfortunately, it is not. For the present it is not taking this opportunity.

O. M.: Hence, these will again not be scientific journalists?

Ya. Z.: No, they will work on different themes--the ones which the editorial office which sent them needs.

O. M.: Indeed, it is strange. This is at variance with the beneficial trend which has become established in recent years. The State Committee for Science and Technology and the USSR Academy of Sciences in recent years have begun to direct incomparably more attention to scientific journalism than before. New publications such as the journal NAUKA V SSSR and a yearbook by the same name have appeared.

V. G.: Incidentally, has the time perhaps come to think about the publication of an official newspaper which is devoted to science? Are we perhaps ripe for this?

O. M.: A rather good model of such a newspaper exists--ZA NAUKU V SIBIRI, the organ of the Siberian Department of the USSR Academy of Sciences.

V. G.: I believe all the same that if it is comes to a specific discussion of the establishment of such a newspaper, this should be an extradepartmental publication.

O. M.: In addition to new publications, which are aimed at the promotion of the achievements of our science, in recent times various councils and commissions attached to the Presidium of the Academy of Sciences and to the Board of the Society for Knowledge, which coordinate the work of scientific journalists and help them in the choice of themes and authors, have been formed. In short, the comprehension of a simple truth has, at last, arrived: in order to maintain the great prestige of our science within the country and abroad, scientific achievements in themselves are not enough--the mighty, professionally organized promotion of these achievements is needed.

Now it would probably be logical to take the next step--to extent the concern of "scientific departments" to the training of scientific journalists, especially as the university (and probably not only Moscow University) offers such an opportunity.

V. G.: I believe that this question may interest both the Coordinating Council for Information on the Achievements of Science and the All-Union Society for Knowledge.

At the same time it must be borne in mind that in recent times much has been done for the stimulation of the work of scientific journalists. As is known, the competition of the Society for Knowledge for the best work of popular science literature is held every year. It is proposed to establish the annual M. D. Millionshchikov Prize for the promotion of the achievements of Soviet science. It will be awarded not only for popular science books, but also for articles in the periodical press.

Ya. Z.: This would be a very important matter from all points of view.

V. G.: Apparently, it would also be worthwhile for the Union of Journalists to think about the founding of one or several prizes for the popularization of science and scientific journalism. It would be possible to give the proposed prize, let us assume, the name of any of the prominent scientists who made a large contribution to the matter of popularizing scientific knowledge--S. I. Vavilov, O. Yu. Shmidt, A. Ye. Fersman, D. I. Shcherbakov. Or the name of a well-known writer who worked in this area.

Ya. Z.: As you see, it is possible to imagine quite a large number of stimuli for compensating for the difficulties which the work in scientific journalism involves.

O. M.: And all the same the main stimulus is internal. Scientific journalism, although a difficult job, is an interesting job. When you write

about science, the feeling that you are involved with "the rational, the good and the eternal" does not leave you. It is important that young journalists would realize and sense this.

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PATENTS AND INVENTIONS

NEW PATENT LAW IN GDR

Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 5, May 85 p 25

[Article: "A New Patent Law in the GDR"]

[Text] The new law on the legal protection of inventions, which succeeded the law of 1950, took effect in the GDR in 1984.

The law defines an invention as a technical approach which is characterized by four attributes: novelty, industrial applicability, a progressive technical nature and the achievement of the inventor. All four attributes are interpreted in the law.

A technical approach, which was not known to an undefined group of people with such details so that it would be possible to use it, is recognized as new. The approach, which can be implemented in some sphere of the national economy, is industrially applicable. The approach, which leads to the obtaining of such an impact which meets better public needs, is technically progressive. Finally, the achievement of the inventor is considered realized, if the proposed technical approach does not obviously follow from the known level of technology.

In the GDR chemical agents, food additives, flavorings and medicines were never protected by patents. The new law enlarges the list of objects which can be protected. Substances, which have been obtained by microbiological means and by nuclear disintegration and nuclear fusion, at present are also not patented. Methods of the diagnosis, prophylactic treatment and treatment of people and animals, strains of microorganisms, computer programs and so forth are not recognized as inventions.

The GDR introduced a system of deferred appraisal of applications back in 1963. The new law confirmed this practice. Initially the application undergoes preliminary appraisal, which establishes only the correctness of its drawing up. If the application has been drawn up correctly, a patent is issued immediately. If the invention is not used, the matter also ends with this. But when the invention has been introduced, the application undergoes a thorough appraisal, including a check for world novelty. Here different versions are again possible: after thorough appraisal the previously issued patent either is declared void (is revoked), is confirmed only in part or

remains completely in force. It should be noted, however, that in special cases, which stem from the interests of the national economy, the Office for Inventions and Patents can also make a thorough appraisal of those inventions which are not being used.

The law establishes the liability of the manager of the socialist enterprise and the manager of the patent bureau for the correctness of the drawing up of the application. If the preliminary appraisal reveals that the application does not meet the demands being made, they order the enterprise, which is the applicant, to eliminate the noted shortcomings within a specific time. If in this time the application has not been corrected or has been corrected, but again improperly, the manager of the enterprise or patent bureau is given a reprimand or they receive a fine in the amount of 10 to 500 marks (at the official exchange rate around 3 to 150 rubles). If the application has been drawn up correctly, the confirmation of the department of this is the basis for the payment to the author of the invention of an incentive (this feature was not included in the law, but was stipulated by a special instruction). The incentive is not paid, if the application was submitted not on behalf of an enterprise or organization, but from a home address.

The law establishes three types of patents--the economic patent, the patent of exclusive right and the secret patent. The secret patent is a special matter, but as to the first two, the applicant can freely choose by precisely what kind of patent he would like to protect his invention.

The economic patent is close in its nature to the Soviet certificate of authorship. It protects mainly those inventions which have received the unofficial name of "work" inventions. The author of an economic patent has the right to a moral and material incentive. Any socialist enterprise can freely use the invention without any prior permission.

The patent of exclusive right gives the inventor the opportunity to produce, use or sell the subject of the invention himself. The possibility of the cancellation of such a patent or its partial restriction is envisaged, if the need has arisen to use the invention in the interests of the national economy, but the patent holder hinders this. Only the president of the patent office can cancel or restrict the patent of exclusive right, and in this case the corresponding reward is paid to the patent holder.

The secret patent, as is obvious from the name, is issued for inventions, which are of a defense nature or affect special state interests. The protection and use of such inventions are carried out in accordance with special rules.

The term of validity of all types of patents is 18 years.

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PATENTS AND INVENTIONS

INVENTORS URGED TO MAKE BETTER USE OF LAW

Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 5, May 85 pp 6-7

[Article by Candidate of Juridical Sciences K. Raytses, member of the Moscow City Collegium of Lawyers: "The Inventor and the Court"]

[Text] The situation, unfortunately, is frequent--the enterprise, which did the introducing, does not want to pay the inventor, as the law requires. In such instances the court can settle the question. But this is a matter which involves much trouble and takes considerable efforts and time. The author of the article notes that it would be possible to avoid a court hearing in many cases, if the prosecutor's office would monitor more thoroughly the execution of the law.

The quite obvious disproportion between the unrealized rights of inventors and the very small share of the legal disputes of inventors in the total number of civil cases does not cease to astonish me.

It seems to me that the false morals, which have formed in the inventor's environment, and the peculiarly interpreted "code of honor" play no small role in this paradoxical situation.

This finds expression in arguments of approximately the following type: "Turn to the court? Somehow this does not befit me, a serious, respected, creative person. And is it ethical to lodge in court complaints against an enterprise, a ministry? Rather than having the reputation of a litigious person, having spent a large amount of time, it is far better to use it to develop a new invention. This is indeed for the better! But if you start 'to shake rights,' it is still not known where this will lead you."

And here is what is noteworthy. The very people, who in all other instances, when, for example, there a dispute about the procedure of using the dacha plot, about the division of living space, about the violation of labor rights and even about quite close questions--the obtaining of royalties for publications and other types of creative activity--turn to the court quite calmly, think and act that way.

You begin to understand the reasons for such behavior by observing during court sittings the behavior of the representatives of the defendant. They also present in court the views on the payment of royalties of inventors, which contrary to the law have received more or less wide circulation. It must be assumed that precisely such views subconsciously also bring a certain psychological pressure to bear on the inventor.

Their essence reduces to primitive, but persistent notions: "He made, they say, the invention at work, receives a wage from the state, but now also wants to fleece it!" The supporters of such views, so it seems to them, are rising to the defense of the state.

The arsenal of tried means is put to use. Included here are the failure to include the used invention in the statistical report, the denial of the fact of use, when introduction has been recorded in the report, and the claim that another invention was introduced.

When the conversation turns to the amount of the payment, the heat of passions reaches a climax. It is typical that all the refinements in the economic calculations, which are submitted for the consideration of the court, are aimed at understating the reward.

At one time I had to deal with the case of a group of inventors, whose innovation gave the RSFSR Ministry of Local Industry an annual saving of about 142,000 rubles. The ministry denied the fact of the use of the invention. When this was proven in court (incidentally, it turned out that the invention was being used at tens of enterprises), protracted disputes about the positive impact began. About 5 years were spent on them.

Eventually the court arrived at the decision on the payment of the reward in the full amount. But for this it was necessary to go through tens of court sittings, to use up a heap of paper, to waste the time of the court, experts, the lawyer and the inventors themselves and to consume a large amount of nervous energy. And all this is in the name of the establishment of the truth, which was quite obvious to the defendant.

It seems to me that in instances of this sort the defendant should bear punishment for his tendentious bias. No one should be permitted to violate the law. The punishment of officials, who have done harm to the rights and interests of citizens, which are protected by the law, is envisaged by the Criminal Code. And this, after all, is fully applicable to the situations, of which it is a question!

In the Statute on Discoveries, Inventions and Efficiency Proposals it is also stated: "The intentional violation of the right of the inventor and the efficiency expert to a reward entails in conformity with prevailing legislation the liability of the guilty officials."

But, unfortunately, not only are these norms not being used in practice, but even in all my many years of bar activity I do not recall an instance when the court made a special ruling with the respect to deliberate defaulters who have intentionally provoked a protracted dispute.

Whoever through ignorance and malevolence (the hand, they say, is not raised to pay) ventures to violate the law, should bear responsibility.

Our law enforcement organs have to play a large role here. First of all, of course, the court. The Soviet court not only establishes the truth, it also performs an educational function. It should not only restore the violated rights of the inventor, but also punish those who violate them--cultivate respect for the observance of invention law and the immediate following of it in administrative and economic practice.

Here it is also up to the prosecutor's office, which is called upon to oversee the observance of the rule of law. Given its active stand many cases might not reach the court.

I had to conduct one case, in which the economic impact of the invention, as the appraisal established, could be calculated quite simply. However, the enterprise, which had done the introducing, insisted that the reward be calculated according to its real value. The situation was so obvious that the intervention of the prosecutor's office was enough to put everything in its place and to dispense with the court consideration of the case.

I will cite another case. The author made an invention, it was introduced for the first time in Turkmenia. The inventor turned to one of the Moscow courts with a suit for the recovery of royalties, since he regarded as the defendant in the case the USSR Ministry of Mineral Fertilizer Production. This was substantiated by the fact that the invention was also being used at other enterprises of the ministry. The court was able to obtain on demand the necessary documents, which is envisaged by procedural requirements. However, instead of trying the case in Moscow, where there is an expert scientific and laboratory base, it sent the case for consideration to a remote rayon of Turkmenia. If the prosecutor's office had reacted promptly and decisively in this instance, not only would it not have been necessary to appeal the ruling, which was subsequently made by the court, but, perhaps, the need for the court examination of the dispute would have completely disappeared. The necessity of the payment of the reward to the inventor would have been explained simply.

Fairly often one has occasion to come across such a violation of the law as the nonfulfillment by the enterprise of the obligation prescribed to it--to notify the authors of the use of their invention.

It seems that the number of such violations could be reduced significantly, if the prosecutor's office with the participation of the organs of the People's Control and the councils of the All-Union Society of Inventors and Efficiency Experts would make checks of the fulfillment of this norm of the law.

I am far from the opinion that sharp conflicts, which also can only be settled in court, do not arise in the process of inventors' activity. But the court must intervene only in those instances when it is a question of a controversial situation, which requires serious study, and not of an indisputable situation. Definite efforts should also be exerted so that inventors' cases in the courts would be considered at the proper level. They are extremely rare, and judges do not have the daily need to look deeply into

this area. When it is all the same necessary to look into it, the encountering of many difficulties is inevitable. The best judges overcome these difficulties, some do not grasp the gist of the case and its sometimes subtle nuances. And this is not their fault. The necessary knowledge is simply lacking.

The question of setting up special patent courts for the review of inventors' disputes has been repeatedly raised in the press. Perhaps, with time such courts will also appear, but this, obviously, is a matter not of the immediate future. Inventors' cases must be settled today, now at the proper level. And it seems that all the means exist to prepare for this a special corps of both judges and lawyers.

The Central Institute of the Improvement of Skills operates under the USSR State Committee for Inventions and Discoveries. It provides knowledge in the area of invention law and other aspects of inventors', patent and license activity. It seems that both the judges, who are commissioned to hear inventors' cases, and the lawyers, who participate in them, need such knowledge. The USSR Ministry of Justice, in our opinion, should see to this.

The councils of the All-Union Society of Inventors and Efficiency Experts can do much to facilitate the review in the court of inventors' disputes. The defending of the rights of inventors and efficiency experts is their task. And if with the assistance of the active members of the All-Union Society of Inventors and Efficiency Experts justified conclusions are prepared for the court and qualified experts are chosen, if the representative of the All-Union Society of Inventors and Efficiency Experts speaks in court in a well-reasoned manner in defense of the inventor (but this, unfortunately, for the present happens extremely rarely), the task of the court in establishing the truth in an inventor's dispute will be facilitated to a great degree.

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PATENTS AND INVENTIONS

INVENTORS FACE DIFFICULTIES IN IMPLEMENTING DISCOVERIES

Moscow IZOBRETATEL I RATSIONALIZATOR in Russian No 5, May 85 pp 10-11

[Article by IZOBRETATEL I RATSIONALIZATOR special corresponding G. Kushner: "This We Are Now Organizing"]

[Text] How was it before? Yu. R. Voytsekhov is "one who knows his job, capable"; "under his supervision a number of scientific research and experimental design operations, which were successfully introduced in production, were carried out"; "he skillfully supervises the work of subordinates"; "an active inventor, is capable of solving independently difficult technical problems"; "he enjoyed well-deserved authority." All this is from references, the last one is from 1983.

And how is it now? Yu. R. Voytsekhov "devoted inadequate attention to the management of the sector and to work with associates, shows disrespect, is lacking in self-control and is not always objective"; "in his publications on the themes of the sector he does not include as coauthors the associates who were the immediate performers."

Is the man changing? Or the opinion about him?

For 10 years in a row Voytsekhov has been elected chairman of the council of the All-Union Society of Inventors and Efficiency Experts of the scientific research institute, which without the support of the management, the party organization and the trade union, to all appearances, is impossible; he is awarded the titles "Best Chief of a Sector," "Winner of the Socialist Competition in Honor of the 60th Anniversary of the Formation of the USSR" and so on. And suddenly he turns out to be a stupid person and troublemaker.

While looking into the causes of the metamorphosis, I talked with many managerial and nonmanagerial associates of the institute. And here is what I found out.

While Voytsekhov engaged in inventing (and the certificates of authorship, which were received by him, amount to a fourth of all the inventions of the institute), he made his contribution to the strengthening of the prestige of the firm and, of course, the management. Much was written about his developments, including by IZOBRETATEL I RATSIONALIZATOR (No 7, 1971, first

page of the cover; No 8, 1971, p 13; No 2, 1976, p 6). The promise of the works was noted by the ministry. The inventor was awarded certificates. The management took care to make easy for Voytsekhov the preparation of his dissertation: in 1982 in accordance with the decision of the scientific and technical council they granted him creative leave, gave positive conclusions and references.

When did everything collapse? This moment is important, and I sought it. Here is when everything collapsed: when the inventor began to speak in earnest about the introduction of his own development. By the order of the ministry precisely the inventor's own institute was obliged to bring the development up to series production. Here everything also changed. The institute--the applicant for nearly 40 inventions, it would seem, the leader in this area--having obtained all the means to realize its own scientific developments, suddenly began to exert incredible efforts to cut the themes.

True, at this time the director of the institute was very busy. Precisely at that time his talent as a builder and organizer developed. Dining rooms, cafes and passageways were built by the forces of the firm. The pilot works was engaged in the production of crosses. Having a modern base, here they cast crosses of different size, put patina on them to "make them look old" and marketed them somewhere. When they caught the operators in the act and a major scandal became imminent (the procurator's office for some reason never dealt in earnest with the case, although the underground firm operated for about 2 years), the management of the institute appointed a commission which in the certificate instead of crosses noted "the production of souvenirs." Everyone was satisfied, so was the main administration in Moscow.

Then the director organized the Troyanda Dacha Cooperative--exclusively for war veterans. But veterans found out about the existence of the cooperative entirely by chance. There was a new scandal. When the party committee discussed the actions of the director of the institute, the deputy for scientific work proposed to punish the chief in a most strict manner. But.... They eliminated the cooperative, while the deputy--incidentally, the only doctor of technical sciences at the institute--lost his position.

But this is by the way. While for the inventor the events developed in the following manner. The election for the position of chief of the sector, which Voytsekhov held for more than 20 years, was fixed ahead of time. The competition committee sent letters and telegrams to Leningrad, where the defense of the dissertation had drawn near. Even the scientific secretary was specially sent with the request to return a positive reference for Voytsekhov. But the Leningraders did not attach importance to all this: the scientific council, of which nine doctors of sciences are members, unanimously awarded Voytsekhov the title of candidate of technical sciences. And what is more, the Leningrad colleagues sent to the Higher Certification Commission a special ruling regarding the unsightly actions of the management of the institute at which Voytsekhov works. Then the director of the institute on his part ordered a letter sent to the Higher Certification Commission with the "appropriate" certification of his associate.

I am in the office of the director of the institute. I ask him to tell about the essence of the conflict.

"But what do you know about it?" my companion replies with a question.

"Almost nothing."

"This we are now organizing," the director roused himself and pushed the call button. "Here are the members of the commission which dealt with the investigation of the complaint of Voytsekhov, they will tell you everything in an impartial manner. I will not impose my own opinion. I am tired, you know, from the slander and groundless accusations!"

The members of the commission and I went into another room. They introduced themselves: the chief of the patent division, the scientific secretary, the chief of another division. They told me briefly about the transgressions of Voytsekhov: he is interested only in himself and his inventions, writes false reports to all instances, worries for no reason, did not have the right according to all the data to occupy any longer the position of chief of the sector. The chief of the patent division showed me the report: as of December 1983 Yuriy Romanovich Voytsekhov had submitted 137 applications, had received 83 certificates of authorship, the amount of the incentive for certificates of authorship is 2,490 rubles. Do you think this is good? You are mistaken. Here is what is said further in the report. Of the 83 certificates of authorship 1 invention, which is not creating a saving, was used. I quote: "The expenditures by the author on the drawing up and registration of the materials of one application of a proposed invention come to 96 man-hours, or 12 man-days, not counting the time for the drawing up of replies and correspondence on the refusals to issue certificates of authorship. Thus, Comrade Yu. R. Voytsekhov spent 1,644 man-days of official time just on the drawing up of applications and the obtaining of certificates of authorship, which did not yield an economic impact. Chief of the Division of Information and Patent Studies V. V. Ponomarenko."

After rereading this document, I looked at Ponomarenko. With what is the division, which was entrusted to him, dealing then, if the authors are completely on "self-service"--draw up applications, conduct correspondence with experts? I was interested in who proposed to prepare the report and why; the management, the chief of the patent division declared, proposed it and then used it as an argument against the inventor.

Due to the interference of the management of the institute the Higher Certification Commission never approved the defense of the dissertation. The complaints of Voytsekhov were returned to the institute. Voytsekhov and his wife--M. M. Chernyakova, a worker of the same institute, the author of several tens of inventions, a portion of them in joint authorship with Voytsekhov--asked various instances to look into the essence of the conflict and to check the presented facts. Replies either did not come at all or came from the main administration or from the immediate management, about which they had complained.

As the conflict became heated, signed and anonymous statements, in which previously unknown aspects of the activity of the management of the institute were revealed, began to arrive at various organizations. People recalled the banquets, which were organized in connection with the arrival of guests, "exposed" several workers of the dining room, who were on the staff of the institute.

"The conflict with Voytsekhov was the mistake of the management," the chief engineer admits. "I spoke about this immediately. But it is also my fault that I took a vague position. I should not have been silent, when I did not agree."

"I understand my fault in this conflict," the former deputy for science said. "Any manager is obliged to find in himself the courage to change the situation for the sake of the common cause. I am now prepared to support the inventors in any instance."

After returning to Moscow, I appealed to the chief of the main administration:

"How do you assess the situation in the collective of the institute?"

"These are the intrigues of the couple Voytsekhov and Chernyakova."

"But letters are arriving at various organizations, specific people, by no means the couple Voytsekhov and Chernyakova, signed them."

"They put them up to it."

"But here the chief engineer and the deputy for science believe...."

"Let them mind their own business!"

"But the opinions of the secretary of the party committee...."

"He is still young, inexperienced. The director is in good repute with us, his services in the development of the institute are incontestable."

A meaningful look at the clock. The conversation is over, it is time to say goodbye.

Many violations have now been revealed by the party commission and the People's Control. The director received party punishment and the stoppage of pay to cover the deficiency. But the attitude toward the inventors did not change. Having barely recovered from the shock, the director decided to put an end to the incident at once, having freed himself from all the people who had complained.

The editorial office sent the minister a letter, in which the results of the business trip of the correspondent to the institute, as well as his conversation with the chief of the main administration were presented. The chief of the main administration wrote the reply to the editorial office. He "regrets" that the editorial office of the journal, "without having looked

into the essence and results of the checks by commissions... and basing itself on the superficial impression of its correspondent and the unverified assertions of the people who had complained, in an intolerably harsh form is advancing groundless accusations directed at the director... and... the chief of the main administration."

The party punishment, the stoppage of pay to cover the deficiency--are all these "groundless accusations"? The collective of the institute hears the report on the results of the checks, in which their manager appears in, to put it mildly, an unsightly light and which contains more pointed facts than we had the opportunity to cite in this article, while the chief of the main administration regards the appeal of the editorial office as groundless harsh words.

Since the letter of the editorial office never got to the addressee, let this article be an open letter of appeal. How else is one of look into this incident? This is especially important as after all the events the inventor Voytsekhov is in the hospital, while his wife, the inventor Chernyakova, has been fired.

Moreover, in the heat of the struggle for its authority the management of the institute somehow forgot the theme which is protected by several tens of certificates of authorship, about the development which the national economy needs and on which much money has already been spent. They intend, to all appearances, to curtail it on the quiet. Is no one really going to stop them?

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PATENT, LICENSING SERVICE OF UKRAINIAN HEALTH MINISTRY DETAILED

Moscow SOVETSKOYE ZDRAVOOKHRANENIYE in Russian No 6, Jun 85 (manuscript received 29 Aug 84) pp 29-34

[Article by P. M. Perekhrestenko and N. V. Makarova, the Main Administration of Scientific Research Work of the Ukrainian SSR Ministry of Health, the Patent and Licensing Service of the Ukrainian SSR Ministry of Health (Kiev): "The Improvement of Inventing, Patent and Licensing Work"]

[Text] The USSR Ministry of Health has posed for the ministries of health of the union republics and the USSR Academy of Medical Sciences the task of increasing the quality and level of medical assistance to the population on the basis of the consistent implementation of the unified scientific and technical policy, the further development of scientific research, the intensification of the integration of science and production and the extensive and rapid introduction in the practice of medical and preventive treatment institutions of the country of the achievements of science, technology and advanced know-how. The accomplishment of this task today is inconceivable without the development and timely use of advanced highly efficient technical decisions which are based on competitive inventions. Therefore, medical inventors are called upon to develop objects of medical equipment and technology, medicines and materials, the technical and economic indicators of which would not be inferior to the best domestic and foreign examples and would ensure their highly efficient use in medical practice.

In the system of the Ukrainian SSR Ministry of Health all the conditions have been created for the successful accomplishment of the posed tasks. More than 1,000 scientists and science teachers work in the sector. About 6,000 medical workers annually take part in the inventing process. In recent years considerable work has been performed on the stimulation of inventing activity in the sector.

A system of the planning and management of the process of developing and introducing inventions, which orients the creative research of inventors toward the solution of the basic problems of health care and medical science, has been introduced with the participation of republic problem commissions.

At the majority of institutions of the Ukrainian SSR Academy of Sciences qualified permanent subdivisions, which ensure the timely identification, the

acquisition of protective rights and the use of inventions, the increase of the patent standards of the developers of new directions in science and inventions and the moral and material stimulation of inventors, deal with inventing work.

Steps have been taken on eliminating the premature publication of inventions in the open press and ensuring their timely foreign patenting for the purpose of the commercial sale of the protective rights, a centralized system of the preliminary advertising and commercial study of promising inventions and other achievements of medical science and technology for the purpose of determining the expediency of foreign patenting has been organized.

The Ukrainian SSR Ministry of Health is devoting much attention to the organization of patent work when carrying out scientific and technical cooperation between the USSR and the CEMA member countries.

Work is being performed centrally on the assurance of the use of promising inventions in the practice of medical and preventive treatment institutions. For this purpose all inventions, which have been developed by subordinate institutions, undergo testing in a planned manner with the subsequent discussion of its results at meetings of the Bureau of the Presidium of the Scientific Medical Council of the Ukrainian SSR Ministry of Health and with the determination of the level and extent of the use of each invention.

Two experimental design bases, which have already gained positive experience in the assimilation of new equipment, have been set up under the ministry for speeding up the introduction of inventions and efficiency proposals which pertain to items of new medical equipment.

Sectorial efficiency promotion, which is making it possible to ensure the use everywhere of useful solutions with local novelty, is being developed extensively.

Serious attention is being devoted to the material and moral stimulation of inventors and efficiency experts. A permanent commission for rewards for inventions and efficiency proposals has been operating successfully in the system of the ministry since 1976. During the 11th Five-Year Plan alone about 200,000 rubles have been paid to authors. Moreover, over 250,000 rubles are being allocated annually for the development of invention in the system. Many medical personnel have been awarded the honorary titles of honored inventor and honored efficiency expert of the Ukrainian SSR.

The organization of the socialist competition of creative collectives in the form of reviews, contests of young inventions and the fulfillment of increased socialist obligations is being used in the system of the Ukrainian SSR Ministry of Health for the purpose of stimulating the creativity of scientists and workers of health care. The Ukrainian SSR Ministry of Health is taking part in the All-Union Review on the Maximum Use of Inventions and Efficiency Proposals in the National Economy, which was organized by the Central Council of the All-Union Society of Inventors and Efficiency Experts jointly with the USSR State Committee for Inventions and Discoveries.

The implementation of the indicated organizational measures made it possible to improve significantly the basic indicators of inventing, patent and licensing and efficiency work: whereas during the 10th Five-Year Plan 3,538 applications for inventions were submitted, 1,295 certificates of authorship were received and 898 inventions and 21,009 efficiency proposals were used, in just 3.5 years of the 11th Five-Year Plan 3,822 applications for inventions were submitted, 1,938 certificates of authorship were received and 1,499 inventions and 18,452 efficiency proposals found application in the national economy. Moreover, during the 11th Five-Year Plan 300 efficiency proposals, which were approved by the ministry as sectorial efficiency proposals, were accepted for extensive use in the republic. The patent and licensing activity of the institutions of the Ukrainian SSR Ministry of Health has intensified. As of 1 July 1984 54 inventions were patented abroad for the purpose of protecting the export and sale of licenses--highly effective medicines (pyramidant, isodibut, prolotion), a synthetic substitute of a dense culture medium for the growing of microorganisms, microcultivation and other medical purposes; a soft contact lens based on polyacrylamide gel; electrosurgical and cryo-ultrasonic surgical instruments, dental prostheses which are obtained with the use of the Bulat device for the application of coatings, a number of immunomodifying and antitumor compounds. For the past 7 years the Ukrainian SSR Ministry of Health has been a constant fulfiller of the State Plan of Economic and Social Development of the Ukrainian SSR with respect to the section "License Themes Which Are Permitted to Be Sold and the Assignments on the Assurance of the Readiness of the Subject of Licenses." Assignments on the receipt of currency from the sale of licenses abroad have been established for the Ukrainian SSR Ministry of Health since 1983. For the fulfillment of the complicated tasks set for it the Ukrainian SSR Ministry of Health is performing purposeful work on the assurance of the technical level, the patentability and competitive ability of the results of scientific research, which is inseparable from inventing activity. Inventing constitutes at scientific institutions one of the mandatory stages of research and development. First of all the problem of organizing the effective information and especially patent information support of scientific research was solved: a sectorial patent collection, which is unique in completeness and size and contains descriptions of inventions and current awareness information on the USSR, the CEMA member countries and the seven leading capitalist countries for a period, which is sufficient for any types of patent research, including the appraisal of the novelty and patent cleanness of developments in the field of medicine, has been established in the republic; patent information collections on the basic directions of medical science and health care are being made up at subordinate scientific institutions. Such an organization of information activity makes it possible to promptly inform developers about the latest achievements, to use this information for the evaluation of the level and trends of the development of medicine and the conditions of the market of items of medical technology, medicines and materials and to decrease the unproductive expenditures on seeking and developing already known and effective solutions. At the same time the information on the technical, economic and commercial situation on the market of items, which are similar to those being developed in the republic with allowance for market conditions and their forecasts for the next 5-year periods, is still limited. The foreign trade associations, which deal with the advertising and commercial study of inventions in the field of medicine, are inadequately informing the interested

ministries and departments about the state of the market and its changes. The fragmentary information, which is obtained by developers and representatives of the ministry at talks with foreign firms, and the advertising documents of firms, which participate in international exhibitions, trade fairs and symposiums, which are held on the territory of the USSR, are insufficient. The solution of the problem of the centralized supply with market information of the ministries, which are taking part in patent and licensing work, by the organs of the USSR Chamber of Commerce and Industry, the Ministry of Foreign Trade and so forth is one of the untapped reserves of the increase of the efficiency of patent and licensing activity in the field of medicine.

For the purpose of increasing the effectiveness of patent and licensing work in the system of the Ukrainian SSR Ministry of Health in recent years the questions of the patent support of scientific research on a number of problems ("Cardiology," "Oncology," "Allergology," "Anesthesiology and Reanimatology"), as well as on the development of individual blocks of inventions which are patented abroad have invariably been examined at the meetings of the Presidium of the Scientific Medical Council. Both scientific questions and questions of the industrial assimilation and introduction of objects of patenting, advertising and commercial analysis, the choice of foreign firms, which are interested in cooperation, the conducting of comparative studies of foreign analogues and so forth are undergoing serious analysis.

One of the means of increasing the efficiency of patent and licensing work is close cooperation with the foreign trade associations of the USSR Ministry of Foreign Trade. The efficient cooperation of the Litsenzkhim firm of the Litsenzintorg All-Union Association and the Ukrainian SSR Ministry of Health made it possible in a short time to bring up to a high level of advertising and commercial analysis such license themes as "The Technology of Obtaining Polyacrylamide Gel for Medical and Biological Purposes and Its Use," "The Antiphlogistic Nonsteroid Compound Pyramidant," "The Compound Isodibut for the Treatment of Complications of Diabetes," "The Set of Cryo-Ultrasonic Surgical Instruments" and a number of other developments, on which technical and commercial talks with foreign firms are now being conducted. At the same time the possibility of the independent advertising and commercial analysis of items being patented, which is made available to ministries and departments, is still being used inadequately. The Ukrainian SSR Ministry of Health plans to use more extensively for this work foreign business trips of Soviet specialists, the receiving of foreign specialists by subordinate scientific institutions for questions of the exchange of advanced know-how and the training of foreign specialists along the lines of the Medeksport All-Union Association. Moreover, it is proposed to expand the notification of specialized foreign firms about the achievements of medical inventors of the Ukraine at international congresses, conferences and symposiums, as well as the direct sending of advertising documents to interested firms through the foreign relations department of the ministry.

Scientific and technical cooperation with the CEMA member countries is expanding with each year. This cooperation in the field of medicine, as a rule, has the nature of the free exchange of information on the results of scientific research, including on inventions. In spite of the fact that Decree No 652 of the USSR Council of Ministers, which makes it incumbent to

change scientific and technical cooperation over to a commercial basis, was adopted on 9 July 1981, the free transfer of special knowledge, advanced know-how and inventions is still occurring. The Ukrainian SSR Ministry of Health plans to establish starting in 1985 the special control of the patent service over the formulation of the plans of joint scientific research within the framework of international scientific and technical cooperation for the purpose of the timely identification of potential objects of inventions and the placement of such cooperation on a contractual basis.

One of the basic sections of inventing, patent and licensing and efficiency work is the organization of the use of inventions and efficiency proposals. As was indicated above, in the system of the Ukrainian SSR Ministry of Health this work has been placed on a serious planning basis. At the stage of the planning of scientific research when filling out the thematic cards the development of inventions in accordance with scientific research works which can be protected, as well as the level and forms of the use of the anticipated results are envisaged. After obtaining legal protection all the inventions are included in the republic plan of the testing of inventions, pharmaceutical compounds and items of medical technology, the fulfillment of which is the preliminary stage of the use of the most efficient proposals which have received official recognition. In accordance with the results of the testing of new methods of prevention, diagnosis, treatment and investigation procedural documents are published for their introduction by health care organs. The materials of items of new medical technology and medicines, which have been approved by the Scientific Medical Council of the Ukrainian SSR Ministry of Health, are turned over to the Administration for the Introduction of New Medicines and Medical Technology of the USSR Ministry of Health for the consideration of the possibility of their clinical application and industrial assimilation. The ministries of health of the union republics have only the right to preclinical tests of inventions and efficiency proposals, which pertain to new medical techniques, with the subsequent submitting of the materials of such proposals for consideration by the appropriate administrations of the USSR Ministry of Health. The strict choice of the most valuable proposals for introduction in the sector and the centralization of the settlement of questions of the assimilation of inventions and efficiency proposals, obviously, are the goal of such a procedure of introducing inventions and efficiency proposals. However, the practice of applying the statute on introduction attests that the amounts of inventing and efficiency activity in the union republics exceed significantly the possibilities, which the sector presently has on the level of the assurance of the full-fledged testing of proposals and the timely issuing of recommendations with respect to the levels and forms of their introduction only by the forces of central scientific institutions. It seems advisable to solve at the union level the problems of the introduction of the most efficient, major proposals of sectorial importance, having reserved for the ministries of health of the union republics the right of the independent consideration of inventions and efficiency proposals, which pertain to negligible modifications of already existing solutions. This would make it possible to ensure the timely introduction of proposals of local importance and would not check scientific and technical progress in health care of the union republics.

The guarantee of success in solving the problems of the introduction of inventions and efficiency proposals in the sector of health care, which does not have its own production base, lies in timely integration with the institutions of industrial ministries and departments, to which the tasks of assimilating inventions which apply to medicine have been assigned by the corresponding decrees of the government. Practical experience shows that such integration should be carried out at the early stages of development or at the stage of the planning of scientific research work.

An important factor of the acceleration of the use of inventions and efficiency proposals by health care organs and institutions is the increase of their interest in introduction. A powerful lever of the management of this process is the payment of bonuses for the promotion of the use of inventions and efficiency proposals. The experience of the centralized solution of the problems of introduction and the payment of rewards for it, which has been gained by the Latvian SSR Ministry of Health, attests to the progressive nature of such a practice and the advisability of its extension to other republics. However, the positive solution of this problem is being delayed. Meanwhile, the introduction of such a practice, particularly in the Ukrainian SSR, does not require additional expenditures and organizational measures, while it would contribute to the cause of accelerating scientific and technical progress in health care of the republic.

One of the effective forms of the acceleration of the use of inventions and efficiency proposals on individual problems is the holding of all-union and republic seminar schools on the use of inventions. The experience of the holding in Kiev in 1984 of the All-Union Seminar School on the Use of Inventions in Neurosurgery confirms this conclusion and merits dissemination. The forms of introduction, which are traditional for medicine, especially the training of specialists in courses of apprenticeship and information, must be used more extensively.

The problems of increasing the skills of medical scientists and physicians in the area of patent science and invention remain urgent for the system of the Ukrainian SSR Academy of Sciences.

In the system of the Ukrainian SSR Ministry of Health the patent subdivision of the ministry as of 1985 has been conducting scientific research work on the development of a unified system of the management of the obtaining of results of scientific research work, which can be protected, for the purpose of preparing recommendations on the increase of the efficiency of invention and patent and licensing work.

The forecast of the development of invention in the system of the Ukrainian SSR Ministry of Health for the 12th Five-Year Plan attests that some very serious work has to be done on the improvement first of all of the sale of licenses. The search for means of increasing the efficiency of patent and licensing work on the basis of specific tasks, the achieved results and the available potentials lies ahead.

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PATENTS AND INVENTIONS

PROBLEMS OF INTRODUCING ESPECIALLY IMPORTANT INVENTIONS

Moscow TRUD in Russian 15 Jun 85 p 2

[Article by V. Rassokhin, senior scientific associate of the Institute of State and Law of the USSR Academy of Sciences (Moscow): "The Regime of Acceleration"; passages rendered in all capital letters printed in boldface in source]

[Text] It is well known: only a third of the officially registered inventions are assimilated in the national economy. This figure is cited as evidence of the trouble in the matter of technical progress. But it is worth pondering: But how many should be? Half or two-thirds? And is there in general a point in such a calculation? From the practice of Japan, for example, we know that scarcely a tenth of the patented inventions are introduced in production there, but meanwhile the experience of this country is not by chance considered instructive.

It is a problem, thus, not of the fact that the percentage of new ideas, which are assimilated by the national economy, is small, but of **PRECISELY WHAT** is being introduced--major achievements, which can provide an appreciable stimulus to the intensification of the economy, or minor improvements, which in principle do not influence the nature of technology and the level of labor productivity.

In our country the saving, which is obtained from the introduction of efficiency proposals, exceeds by several times the economic impact which the use of inventions yields. Thus, during the 10th Five-Year Plan efficiency proposals provided a saving of 20.7 billion rubles, while inventions provided a saving of only 8.5 billion rubles. This is extra evidence of the fact that not major achievements of science and technology, but minor improvements are mainly being used in the national economy.

Meanwhile precisely inventions, especially fundamentally new ones, are capable of yielding a colossal impact which lends itself with difficulty to exact calculation. "...With a sense of satisfaction we are discovering," F. Engels wrote, "...that just one such fruit of science as the steam engine of James Watt brought the world in the first 50 years of its existence more than the world from the very start spent on the development of science."

What should be grouped with the especially important achievements of science and technology? First of all the research and development which open fundamentally new directions in the development of equipment and technology, give the most effective solution of key problems and ensure the abrupt increase of labor productivity.

Pneumatic container systems--a fundamentally new type of transport, the methods of powder metallurgy, the disintegrator technology of the working of materials, which makes it possible to increase their useful properties sharply, the system of the hydraulic mining of coal and catalytic heat generators, for example, could be grouped with them. The introduction of these discoveries and ones similar to them into practice, without reliance on a priority procedure which has been specially organized by the state, was confronted and is being confronted up to now with enormous difficulties and obstacles.

In this respect the history of one of the outstanding achievements of domestic science and technology--the hydrostatic extrusion of metals--seems typical to us. This method--pressure by a fluid--makes it possible to shift from cutting to waste-free technologies of plastic deformation. Hydrostatic extrusion can change radically the entire nature of the machine building process. At one of the plants an automatic hydrostatic extrusion unit replaced an entire shop with 100 metal-cutting machine tools. A special hydrostatic unit for the waste-free production of large, complicated parts is capable of performing the work of a 25,000-ton general-purpose press the size of a 10-story building. The unit itself weights only 25 tons, while its cost is recovered in 20 minutes of work. But although the efficiency of this technology is obvious, not one department up to now has organized either the series production or the large-scale industrial use of automatic machines and units for the hydrostatic extrusion of metal. As paradoxical as it is, the machine builders were not interested in the innovation, and narrow departmental interest won.

The introduction of major, fundamentally new discoveries and inventions can change beyond recognition the economic and technological base in a broad zone of production and hence, as was stated at the conference in the CPSU Central Committee on questions of the acceleration of scientific and technical progress, can ensure the real intensification of the economy. But precisely such fundamentally new achievements of science and technology also encounter the greatest difficulties in the way of advancement into the national economy. There are objective reasons for this: the need for the complete reorganization of production, and frequently also radical changes in the structure of the formed sectors, and, hence, the long period during which the use of an innovation is unprofitable. Here it is difficult to achieve success only on the basis of cost accounting relations at the "institute--plant" level.

A special priority regime and the direct influence of the state itself are needed in order to facilitate the advance into the national economy of especially valuable inventions. The establishment of a STATE REGISTER OF ESPECIALLY IMPORTANT ACHIEVEMENTS OF SCIENCE AND TECHNOLOGY, the need for which has already been written about, would be the legal basis of this special

regime. The USSR Academy of Sciences, the State Committee for Science and Technology, the USSR State Planning Committee and the USSR State Committee for Inventions and Discoveries could jointly carry out the official recognition of inventions as especially important and their inclusion in the state register. The achievements of science and technology, which have been included in the register, should be developed and introduced in the national economy in a priority manner. And, consequently, should be taken into account in advance in the state plans of economic and social development, as well as in the all-union comprehensive goal programs. The State Committee for Science and Technology could carry out the monitoring of their immediate use.

However, this is insufficient for the successful introduction of technical innovations. Economic sanctions against those who do not want to update equipment are also needed. The need arose long ago to introduce such a system of responsibility, which would operate constantly, automatically, regardless of the interests of the organs, enterprises and organizations, to the activity of which it applies. But the introduction of an ECONOMIC AND LEGAL REGIME OF OBSOLETE PRODUCTION would be extremely important for this.

What could this regime be? First of all a well-developed set of special taxes "for technical backwardness." The establishment in the early 1970's of discounts, which are deducted for the state budget, on the price of those types of products, which were not certified as being of the highest or first quality category, was the first attempt at the introduction of such a tax. However, in real life these discounts, which strike the economic interests of enterprises which are the producers of obsolete products, were hardly used. Such a procedure of using similar discounts, which should turn them into a mandatory measure of influence, is envisaged in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" of 18 August 1983.

Now, it seems, the discounts on the price of obsolete items should be supplemented by taxes, to which technologies, which do not conform to the current level, would also be liable. Financial organs would have the right to levy the tax for technical backwardness. But they were guided here by the decisions of not sectorial departments, but the USSR State Committee for Science and Technology or the State Committee for Standards. The right of the USSR State Planning Committee and the State Committee for Science and Technology to exclude from the indicators of the total volume of produced output the output, which has been recognized as obsolete, could become an effective means of the regime of obsolete production. But the introduction of exclusive powers of the State Committee for Science and Technology could be envisaged for several special cases.

The functions of the USSR State Committee for Supervision of Safe Working Practices in Industry and for Mine Supervision, which has the right on its own authority (regardless of the prospect of the upsetting of the plan indicators or "objective reasons") to ban the use of some device or equipment, if its further use threatens an accident, have been customary for us for a long time. Why is it impossible at times also to act in this way with respect to obsolete production? For the situation, in case of which the most important

achievements of science and technology, which are ready for introduction, do not find use for years, is fraught with losses which are hardly less than major accidents or natural disasters.

The problems connected with environmental protection are no less important. It is hardly possible to hope that the bans of public health physicians will ever become an adequate means of influence on large enterprises and departments, which violate the requirements of ecological cleanness: here the "weight categories" of the sides are too unequal. Precisely the State Committee for Science and Technology could take practicable steps in accordance with the representations of the organs of public health inspection. But here it is impossible not to consider that the pollution of the biosphere and technical backwardness are two sides of the same medal.

Thus, in case of the gross violation of the requirements of ecological cleanness due to the "nonintroduction" of the achievements of science and technology in production, as well as in several other exceptional cases, for example, the upsetting of the basic scientific and technical programs, it would be advisable to grant the State Committee for Science and Technology the right to halt obsolete production. In such quite rare situations the mighty system of intradepartmental responsibility would also begin to operate automatically. For such a stimulus is sufficient for it to begin to operate independently, with ever increasing acceleration and inevitable scope, encompassing a more and more extensive group of workers--from managers of the staff to specific performers at enterprises. Even just one warning on the part of the State Committee for Science and Technology about the halting of production would inevitably force the enterprise and the department which manages it to engage in earnest in the introduction of new equipment and technology.

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PATENTS AND INVENTIONS

INSTITUTE'S ROLE IN OBSTRUCTING NEW INVENTION DESCRIBED

Moscow IZVESTIYA in Russian 18 Aug 85 p 3

[Article by I. Dementyeva, special correspondent for IZVESTIYA, under the rubric "Assignment by Readers' Request": "The Method: How Scientific Formulations Perish in Unscientific Controversies"]

[Text] In a certain scientific research institute a strange, even fantastic case occurred. M., a young engineer, destroyed the almost finished manufacturing instructions for an experimental design project, the labor of a whole collective and the single existing handwritten copy. When people came into the room, everything was over: of the 700 pages all that was left was a pile of torn up paper. Natasha M. was sitting at her desk lazily picking at a bunch of grapes and reading a detective novel. The project supervisor, senior research associate Chernyakova, was bending over to pick up the scraps of paper from the floor to see if they could be glued back together. An elusive Mona Lisa smile strayed across Natasha's rosy face.

This story takes place in our time, but the beginning was at the end of the nineteenth century. The Danish physicist Kristiansen, having mixed ground glass with a transparent liquid, expected that it would become invisible. Instead, he observed that the mixture suddenly colored into a pure blue and another mixture turned red. Then Kristiansen decided to manufacture color filters in this way. But nothing came of it for him. The color filters changed color with the fluctuation of temperature.

The scientist published his failure in a substantial, but now ancient German journal. And almost 100 years later the journal caught the eye of engineer Voytsekhov.

Inventors' minds are organized so that they see the shortcomings of an item in terms of its useful qualities. Voytsekhov thought that Kristiansen's failure was worth deepening and developing. If the color filters change color depending on the temperature, then they should be used... for measuring the temperature. In this idea was a new method of heat monitoring. Meanwhile, at home, engineer Voytsekhov and physicist Chernyakova began to grind glass in a mortar; they sifted, measured refraction coefficients and made charts. In a while they were convinced that what was turning out was a basically new temperature sensing device. In the scientific research institute where

Voytsekhov and Chernyakova worked, the new method was met with understanding. A research field was opened, and chief engineer Chernyakova became supervisor of the scientific research work within it. In the neighboring section, Yu. Voytsekhov had his own scheduled project, but this section took part of the new project upon itself.

Toward the end of the research work it became apparent that the new method of remote thermal measurement was not only a success for the inventors but a success for the institute. The method of nondestructive, secure monitoring could further progress in many fields of technology, and in radio engineering alone it would mean a savings of 5 million rubles. There was nothing like it abroad and for that reason it had a prestige value as well. At the sector exhibit, specialists wrote down technical data in their notebooks, noting the elegance and low price of the instruments and estimating the potential of the devices which were made in the form of pellets, films and even pastes.

In 1980, by ministerial decree, M. Chernyakova, who had by then defended her candidate dissertation, was named supervisor of the experimental design project on isooptical thermometry. For a while the work moved from one point of the schedule to the next, but its completion faded off into the mists of annual quarters; everything followed the well known rule: Who needs it, you? Then you open up the way. Chernyakova opened it up. In one scientific research institute they began to make transparent rubber, in another diffraction gratings, and a plant was found for manufacturing the instruments. All that was left was to arrange somewhere for the output of the isooptical devices themselves. For awhile Chernyakova and her group made them themselves, but the primitive setup could not provide for series production. The central board decided to organize an industrial section in the scientific research institute itself. The new section promised new annoyances: the procurement of materials, including raw materials, the nomenclature schedule, the gross output plan, the possibility of complaints and other nuisances familiar in plants but extremely unwanted in scientific research institutes.

At that point, as the reader has rightly guessed, the happy state of affairs was to explode. Four years passed. Senior research associate Chernyakova was dismissed from the institute for inadequate qualifications. Voytsekhov was dismissed from section management. And, most notably, the method for isooptical thermometry was acknowledged hopeless and all work on it was stopped.

It is not the journalist's business to go into the subtleties of technology; there are other authorities for that. What interests me is the "human factor in scientific and technical progress" -- that is, people.

Everything that happens to us has at the time the appearance of coincidence. The new deputy director of the science section of the scientific research institute, I. Konoplev, a recent professor of mathematics at an institution of higher education, suggested, and possibly not without reason, that the scientific research institute had no general direction and that they needed to start strengthening and re-evaluating the subject matter of research. A talented but hot-tempered and wilful person according to general opinion, Konoplev immediately spoiled relationships with his "underlings" and soon with

his superiors as well. But still he was taking stock of the state of affairs. Everyone was looking askance at the new section, and Konoplev promised to close it.

But no, they objected to me in the scientific research institute and central board, warning me of the error into which the journal IZOBRETATEL I RATSIONALIZATOR (Inventor and Innovator) apparently fell in its May issue when it came out for the creators of the isooptical method. In fact it all began not with isooptics but with Voytsekhov's personal grudge.

Voytsekhov was for some reason the first (and apparently the only) one not to enroll in the reorganization. For 20 years he had headed the section, was the "best subdivision chief," was considered one of the most experienced apparatus specialists in the institute, and he had some 100 certificates of invention and over 100 scientific works. In the interests of technological progress he was demoted from section chief to head engineer. But the scientific and technical council recommended that he be restored to his duties or be made a senior research associate. The obstinate council made a few other decisions unwelcomed by the administration until it was substantially "tightened up."

But let us continue the series of casual coincidences. The next decree dismissed Chernyakova from theme administration, and named division chief V. Prokhorov head designer. Chernyakova became his assistant.

The head designer set energetically to work, using his right to make and, very importantly, not to make decisions. All correspondence on thematics now went through him. The specifications for the transparent rubber for the devices arrived. The head designer put the documents in the safe and... went on vacation. While correspondence regarding the lost specifications continued, time went on as well.

After his vacation, the head designer banned specialists from being sent on assignment to the plants where their devices were to be adopted. Experimental, "kitchen" samples were manufactured in the institute. So that the reader doesn't form the opinion that V. Prokhorov's behavior was dictated by some kind of secret motivation, I will clarify: before being named head designer, he was a man known to be the fierce opponent of the isooptical thermometry method.

However, there are completely accidental events, like a bolt of lightning. Remember? Young specialist M. destroyed the manufacturing instructions. But only the place where the lightning strikes is accidental. A simple explanation was finally found for the unpredictable behavior of engineer M.: a nervous breakdown. The girl had grown sick to death of the tedious calibrations. But it was also true that she had worked in a threatening atmosphere where, sooner or later, something had to happen. The behavior of the administration was more surprising. A "Report on the Case of the Destruction of Manuscript Documents for the Experimental Design Project" was compiled, containing two practical recommendations as murderous as they were unexpected: curtail all work on isooptics, and raise the question of Chernyakova's qualifications to hold her present position. There was no longer any doubt: they were prepared to use the "case of destruction" to destroy connections with the isooptical method and its

inventors.

It did not appear possible to restore the documents M. had destroyed; it would be necessary to produce and submit them anew. But from that day, for those cooperating on the project there was no plan. For us the plan is law. If there is no plan for the work, that means it is "outside the law."

Understanding the practical inequality of forces, more cautious people would have given up. That is, they would have let go of the isooptics and tried to "enroll" in the reorganization. The fact that they, Chernyakova and Voytsekhov, were husband and wife made it considerably easier. No matter whom you hit, it hurts them both.

Voytsekhov's dissertation was just appearing. There is no more vulnerable creature than a dissertation writer before its defense. He is like a crab shedding his shell -- until the new one grows back anyone that wants to can eat him. It turned out that someone wanted to. I would like to go into details, but it is the method that is important here; we need to know that.

Voytsekhov's dissertation took place in the Leningrad Institute of Exact Mechanics and Optics (LITMO). The academic secretary of LITMO told me afterwards that as far as was known the situation was this: often the dissertation writer presents a work based on a method that is new to the world and defended by some 50 certificates of invention. However a couple weeks before the meeting, a letter arrived over the signature of the deputy director of the science section of the scientific research institute, I. Konoplev, and then two telegrams with a request to postpone the defense. Leningrad tried to call the institute, but did not receive any clear explanation. And inasmuch as they had among the papers a conclusion from the scientific research institute that was more than positive and an evaluation report that had been put out only two months earlier rating the scientific and civic achievements of the aspirant as excellent, the defense at LITMO was conducted and Voytsekhov was awarded a candidate degree. Unanimously.

The dissertation went to the Higher Certification Commission for confirmation, but a new letter from Konoplev was already rushing to intersect it, this time informing the commission that the dissertation writer's certificates of invention had no practical significance and that not one of the theses of the dissertation work had been implemented.

Recovering from the stab in the back, the aspirant presented documents. And then it began! Later it would turn out that the institute changed its mind three times about the contents of its conclusions regarding the dissertation, twice about the evaluation of implementation results, twice the conclusion itself and four times the evaluation report!

The unbelievable happened: Doctor of Technical Sciences I. Konoplev himself suddenly admitted that his accusations had been unfounded and abruptly began defending the isooptical method. Not only that, he sent a new letter to the Higher Certification Commission and to the ministry refuting himself! And all you had to do was glance into Chernyakova's room to see the model for the

instruments and work out the method at last. But the banner from the battle with isooptics that fell from his hands was raised by V. Prokhorov, head designer of the isooptical project. So that the reader again is not plagued by doubts concerning the motives for this person's actions, I will clarify: Voytsekhov's "personal affair" became Prokhorov's personal affair from the moment it became the general affair of the institute administration.

The Higher Certification Commission's council of experts twice confirmed the high scientific value of Voytsekhov's dissertation. And the same commission was to return the dissertation papers twice to Leningrad for a "re-defense," to clarify the moral character of the dissertation's author. Now the academic council of LITMO had to sort out how many marriages the aspirant had had, how many times he had failed to serve duty in the people's patrol, and why -- whether it was from a heart attack or for some other reason.

When at the third defense fresh material from the institute was read that compromised the aspirant, one of the members of the academic council exclaimed: "They seem to want to draw us into a squabble!..."

Even V. Prokhorov, who had arrived for the defense, was forced to admit that in this situation the scientific technical council of their institute looked, as he put it, "exceptionally rotten."

So then what? The academic council of LITMO for the third time confirmed its previous decision -- to confer upon the aspirant the degree of candidate of technical sciences. And V. Prokhorov sent off another letter to the Higher Certification Commission...

How does one overcome an incomprehensible, inexplicable opposition to common sense? How does one explain the meaning of work, the meaning of one's existence? How does one prove that one is right? By work? The fate of many inventors attests, alas, that this is not enough.

Voytsekhov appealed to the ministry in a letter. He received a response from the central board. The board totally supported the administration of the scientific research institute, about which it informed the deponent. Voytsekhov truly resented this and did not write to anyone else. But Chernyakova pulled out all the stops!

The agreement of opinions between departments and institutions within their jurisdiction, to which every self-respecting department aspires, is all the more convenient in that it seriously simplifies checking on complaints. Chernyakova was angry: on someone's signal a commission arrived (there were about 40 of them in the institute during the year), studied the financial and economic activity of the institute and paid no attention at all, it seemed to her, to her letters. She had made a mistake.

When it arrived at the designated deadline for turning in the experimental design project, the ministerial commission observed: upon examination the sensing devices were covered with frost, which creates large errors; a glass in one of the devices burst during testing; the manufacturing instructions look

like a rough draft, etc. The commission did not accept the project.

This was followed by a meeting of the work collective of the division who demanded that the scandalmongers and slanderers be fired. One should pay full attention to this meeting.

What did the working collective vote against? Against slanderers and scandalmongers. Against a project that nobody needs.

Who of us would not be against such obvious things? Nobody. The collective was right.

There is only one doubt. Proof was needed that it was really the scandalmongers and slanderers who were standing in front of the collective. It is true that only Chernyakova, one out of the three defendants, was there. Voytsekhov was in the hospital and Poltavchenko, the former head engineer who had been connected with the first two because he also wrote to some instance, went on vacation after he recovered.

Chernyakova had to defend herself alone and in her brief appearance was unable to respond to the long speech of the accuser. The accuser was the chief of all those sitting in the hall, V. Prokhorov. He referred to selected passages from the letters in which each of the three appealed to the ministry, the obkom [oblast party committee] and other institutions. He referred as well to anonymous letters, which turned out to have also been written by these three.

Voting at the meeting, the employees of the division decided not only the fate of the inventors, but indirectly the fate of the isooptical thermometry method ("an empty waste of money," "an economic diversion"). We are accustomed to treating the opinion of the majority with respect. And still, I take the liberty of pointing out that scientific problems are not decided by vote. "In science one person may be more competent than one hundred... Voting here is unacceptable -- otherwise we would still be thinking that the earth is flat." That is from the book, "Problems of Organizing Scientific Research."

Can 150 people be wrong? Yes, they can, if they are misled.

Still, we won't hurry. After all, the decision to terminate the work on isooptics was made by the scientific and technical council of the institute. And we have no right to suspect this organ of incompetency. Simultaneously, the council announced that Chernyakova was not qualified for her position. Maybe not all the council members voted against isooptics and Chernyakova, but the majority was against.

And this must also be taken into consideration. If it weren't for the hurry in which the decisions were made. If it weren't for the inexplicable extremity of the formulations. The work on isooptics continued for 13 years. Every stage of the way was approved by the same council. For 13 years the scientific research institute fulfilled its plan in this area and received prizes. For more than 20 years Chernyakova was the best developer in the institute, received gratitude and encouragements and brought the institute 80 certificates

of invention.

Could less categorical decisions have been possible?

Professor G. Dulnev, an acknowledged authority on thermal systems of radioelectronic instruments, considers the isooptical method to be promising. This opinion is shared by the Central Council of the All-Union Society of Inventors and Innovators, the USSR State Committee for Inventions and Discoveries, and the USSR State Committee for Science and Technology. At the beginning of this year, at a joint sitting of the permanent commission on instruments, means and systems of nondestructive control of the USSR State Committee for Science and Technology and the "Radio-Wave Thermal and Optical Methods" section of the USSR Academy of Sciences, a report by candidate of technical sciences M. Chernyakova was heard and her conclusions were examined by 16 organizations. The sitting recommended: "To approve the completed work and consider isooptics a promising method for long-distance thermal measurement as the basis for a new direction in nondestructive thermal monitoring."

Let us sum up.

We buy a device abroad for checking thermal fields while in our country devices have been invented -- in the opinion of competent people -- that are not only comparable but in some ways superior to the imports. They are many times cheaper, and they are ours. We could have sold them ourselves to other countries, but instead we closed down the field of research, curtailed an almost finished product and eliminated the inventors.

Why? Why is it for almost every method of accelerating scientific and technological progress there is a method for slowing it down? Why do "local" difficulties connected with the finishing and implementation of a new project, various personal and ambitious motives, brought to conflict, take precedence over competent opinion, good sense, economic advantage, the interests of science -- in the final analysis, the interests of the state? Isn't it because the department, as before, appears as judge in such scientific and technical discussions, and it, as a rule, itself becomes a party in the conflict, taking advantage of the rights of the strong. This right should be determined only by a clear interdepartmental system of selection and planned implementation of the most viable inventions and innovations, guarding them from every kind of "contingency" and "coincidence."

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PATENTS AND INVENTIONS

PROBLEMS IN SELECTION, USE OF INVENTIONS

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 5, May 85 pp 43-48

[Article by Deputy Chairman of the State Committee for Inventions and Discoveries Yu. Pugachev: "Problems of the Selection and Planned Use of Inventions"]

[Text] The Communist Party and the Soviet Government are constantly devoting much attention to the organization of creative inventing work. After the adoption of the decree of the CPSU Central Committee and the USSR Council of Ministers "On the Further Development of Inventing in the Country, the Improvement of the Use in the National Economy of Discoveries, Inventions and Efficiency Proposals and the Increase of Their Role in the Acceleration of Scientific and Technical Progress" (August 1973) inventing activity was stepped up considerably. Whereas in 1970 32,500 certificates of authorship were issued, in 1975 more than 44,000 were, while in 1984 over 74,000 were. In all during the years of Soviet power the number of inventions at the beginning of 1984 exceeded 1 million. This in many ways has contributed to the fulfillment of the assignments of the five-year plans of USSR economic and social development.

During the current five-year plan the total number of inventions being used comes annually to over 50,000. In 1984 the economic impact from their introduction came to 3.1 billion rubles; as compared with 1975 it has increased by more than 3.3-fold, while in 1980 it increased by 7 percent. Another positive impact, which is not definable in value terms, was also obtained in such areas as health care, the protection of labor and the environment, culture and daily life.

On the basis of domestic inventions and discoveries fundamentally new highly efficient types of new equipment and technology--the continuous teeming of steel, liquid self-hardening mixtures, spindleless spinning and bobbinless weaving, automated coal mining complexes, new substances, catalysts and so on--have been developed and are being used in the national economy. This is increasing significantly the technical level of production, labor productivity and the efficiency of the economy.

The successes in the area of invention are predetermined by the socialist system. Back at the dawn of Soviet power V. I. Lenin emphasized the enormous

role of invention for the building of a communist society. His words "we should have a new technical base for new economic construction"¹ are assuming under the conditions of mature socialism even greater meaning. The principle of the right of the state to use inventions, which are national property, is among the basic traits of inventing in our country. Such a principle obliges state institutes, enterprises and organizations to ensure the introduction of inventions.

In the present structure of the national economy with its extensively developed division of labor, under the conditions of the complication of the development of new equipment and technology a new trait of invention--not only its mass nature, but also the collective nature of creative work--is appearing. At present about 90 percent of all inventions are generated in the process of scientific research and experimental design work, that is, by way of the fulfillment of planned official assignments. A specific collective of authors, on the average four to six people, takes part, as a rule, in these inventions.

Our country holds leading places in the development of space, thermonuclear energy, the building of unique complexes of hydroelectric and thermal electric power plants, a number of machines, equipment and technologies, which are revolutionizing production processes in various sectors of the national economy.

There are many inventions based on discoveries, which not only have made a contribution to domestic and world science, but have also led to the efficient use of their results. These are, for example, inventions which are connected with the discovery of "ionospheric communication" and the discovery of processes of the formation of cement silicates, which make it possible to reduce the specific expenditures of fuel by a third and to increase the productivity of rotary kilns by 40 percent with the simultaneous increase of the brands of cement.

In attaching enormous importance to the sharp increase of the rate of economic development, the CPSU Central Committee and the USSR Council of Ministers by the decree "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" specified that in the next few years the output of products and the introduction of advanced technologies, which in their technical and economic indicators conform to the highest world level, should be ensured by our industry. Priority in the area of scientific and technical progress should be given to fundamentally new, truly revolutionary scientific and technical solutions which are capable of increasing labor productivity by many times. It is impossible to accomplish such a task without the development and use of inventions, which not only embody the most advanced technical innovations, but also predetermine the means of scientific and technical progress.

The existing rate and scale of the use of inventions do not conform to the level of the current tasks on the increase of the efficiency of social production. Frequently even important inventions for a long time are not used in production and become obsolete, as a result of which their potential economic impact is lost. The development of a fundamentally new technological

process of the cleaning of the surface of materials and items--needle milling, which replaces the processes of chemical pickling, which are expensive, labor-consuming and harmful to the health of people and the environment, and abrasive machining and shot blasting--serves as an example of this sort. At the same time firms of the United States, Japan and the FRG have purchased Soviet licenses for needle milling units and have begun their production.

The scale of the introduction of a number of advanced technologies, which were developed on the basis of inventions which have received world recognition, is inadequate. These are, for example, machines of the pulse cutting of metal, pneumatic pipeline container transportation and others.

The new equipment, which is being assimilated by ministries and departments in accordance with the state and sectorial plans, for their most part do not contain inventions. Several machines, materials and technological processes are technically and economically defective and are not competitive on the world market. A portion of the developments on new equipment are unpromising, with insignificant innovations and an insignificant economic impact.

Ministries and departments often connect the rejection of the assimilation of new equipment and technology, which are based on the extensive use of innovations, with the "existing" potentials of enterprises, the difficulties of their reorganization, which requires additional capital and labor expenditures, the influence of assimilation on the decrease of the basic indicators of the plan and accordingly the decrease of the incentive funds and production risk.

An essential cause of such a situation with introduction is the underestimation by developers and planning organs of the role of inventions in the acceleration of scientific and technical progress. The established procedure of the planning and stimulation of scientific and production activity does not stimulate ministries and departments to apply the plan for the purpose of using in new equipment the most advanced technical solutions--inventions. It does not provide the objective conditions, under which the aspiration for the development in objects of new equipment of effective inventions should appear.

The frequently arising difficulties with the sale of licenses and the expansion of the export of industrial products and their inadequate competitive ability mainly stem from the fact that the available inventions, in which an interest is being displayed abroad, are not being assimilated in good time by industry.

The problem of the timely use of inventions is multidimensional. The determination of priority is one of the main questions, since it is impossible for quite valid reasons to implement every invention. In their importance they are different--some solve local problems, others solve national economic problems.

The bulk of the inventions being used (more than 50,000) annually provide an economic impact of more than 2.5 billion rubles, but in terms of one of them the latter comes to only 50,000 rubles. Statistical data show that only about

7 percent of the inventions in case of their use each annually generates an economic impact of 100,000 rubles and more, while its total share exceeds 60 percent of the total amount. Thus, the majority of inventions being used have a relatively low national economic importance and are not aimed at the accomplishment of the basic tasks of the acceleration of the rate of economic development.

This, in particular, stems from the fact that several organizations, which are the developers of new equipment and technology, confine themselves mainly to minor improvements and modernization. It is possible to group with the causes of such a situation the fear of the risk of increased labor for the constructive solution of what is new and the apprehensions connected with the difficulties of its material embodiment in case of production. It is no secret that a number of developing organizations act with circumspection to the existing technological potentials of the producer enterprises, while ministries do not always agree to the breaking of established traditions, regarding as less troublesome the carrying out of the "permanent modernization" of the equipment being produced instead of the assimilation of truly new products.

The passive stand of the ministries, which are the users of the equipment, is another cause. Frequently they prefer to receive what they are given instead of what they need. In spite of some broadening of the rights of the user ministries in the area of the development of new equipment for them in accordance with the system of supply orders, their rights are still insufficiently complete. The producer ministries (developing organizations) have great opportunities to dictate their own terms to the client, and at times reject his demands, advancing a large number of "objective" reasons (the increase of the duration of the development and assimilation of equipment, the lack of the capacity, material supply and so on).

The closed circle of the interrelations of the producer and user is paradoxical. The order for new equipment is often turned down, since it is not being produced, but is not being produced because there are no orders. An example of such a closed circle is the development of equipment for the process of needle milling, which was mentioned by us. For more than 15 years the Ministry of the Machine Tool and Tool Building Industry has not been meeting the needs of a number of sectors of the national economy for this equipment, which forced the USSR Ministry of Ferrous Metallurgy, the Ministry of the Shipbuilding Industry and other ministries to produce it on their own or to purchase it abroad. The situation is also similar with such inventions as the production of hydrogen peroxide by the atraquinone method, which makes it possible to obtain it in a high concentration with low costs; the PMG track machine, which ensures the proper maintenance of the railroad track system and frees a large number of workers who are engaged in difficult manual labor.

It is necessary to increase the proportion of the use of the scientific and technical potential of scientific research, planning and design organizations, which develop equipment at the highest world level, and to expedite its large-scale use in the national economy. Ministries have to select and introduce significantly more extensively the most important inventions which constitute the basis of objects of new equipment and technology. At present this is the

function mainly of the developing organizations, and therefore is susceptible to subjective and market influences.

Thus, the need is arising for the objective evaluation of the national economic importance of an invention and the level of its use in the new equipment and technology which are being developed. An important role in this belongs to expert appraisal.

The main task of state scientific and technical appraisal, which is carried out by the All-Union Scientific Research Institute of State Patent Examination, consists in determining the novelty and utility of the technical solution being presented. The main thing in case of the consideration of an application is the establishment of the novelty. As for the utility, here the requirements, as a rule, reduce to the determination of its presence, that is, industrial applicability, and not its extent--the degree of the increase of the technical level of that object of equipment or technology, in which the invention will be used. Any application, which satisfies these requirements, is considered an invention. The expert appraisal, while having recognized a technical solution as an invention, does to predetermine its national economic utility, being content with the technical and economic substantiation which was drawn up by the applicant.

It is possible to regard it as justified that the expert appraisal for novelty requires narrow specialization in specific fields of technology. Nevertheless the national economic importance and the promise of use cannot be separated from the essence of an invention, for only this combination determines its social utility.

A knowledge of the means of development of world technology and the ability to forecast them and to purposefully inform the sectors of the economy about this are important for state scientific and technical appraisal. One of the versions of the solution of this problem is the improvement of the institution of state scientific and technical appraisal by the formation of a specialized subdivision in the All-Union Scientific Research Institute of State Patent Examination, in the functions of which there would be included: an orientation in the directions of the development of technology in the world; the evaluation and selection with the necessary recommendations of inventions for their use in objects of new equipment and technology; the objective evaluation of the effectiveness of inventions and their advantages in case of the development and introduction of innovations; goal-oriented recommendations on the elimination of bottlenecks in the national economy.

The selection and recommendations of the most effective inventions, which are being carried out in the State Committee for Inventions and Discoveries, are of a quite large scale. Thus, up to 1,500 of their descriptions are proposed annually for various sectors of the national economy, and about a third of them are for use in the objects of equipment and technology, which are envisaged by the assignments of the State Plan of USSR Economic and Social Development. At the same time suggestions on the use of inventions are being prepared for the plans of ministries and departments, as well as the program of the State Committee for Science and Technology and the state plans of the union republics.

A large economic or other positive impact, an orientation toward the accomplishment of such key tasks of the Soviet economy as the Food and Energy Programs, the increase of labor productivity and the saving of material resources, sociocultural issues and environmental protection are the basic criteria for selection. In particular, 779 inventions were proposed for the implementation of the Food Program, 683--for the implementation of the Energy Program and 154--for environmental protection.

The procedure of preparing suggestions on the use of inventions in the national economy envisages several sources. Among them the information, which is received from the All-Union Scientific Research Institute of State Patent Examination, the applications of developing organizations, as well as other materials of patent information hold the basic place. In the past 2 years the materials, which come to the committee from the Central Council of the All-Union Society of Inventors and Efficiency Experts, have been added to these sources.

A special role belongs to the information on the inventions of academic institutes. Those of them, which require the conducting of experimental design development, are sent to the State Committee for Science and Technology, while the inventions, on which it has already been carried out jointly with sectorial organizations, are recommended at different levels of the plan.

As a rule, all the suggestions of the State Committee for Inventions and Discoveries are sent to the appropriate ministries during the year preceding the year being planned for the purpose of their timely study in the sectors for inclusion in the plans. However, the ministries give conclusions only on 65-70 percent of these suggestions, but accept about 20 percent for planned use. Here formal references to the lack of conclusions on the acceptance of developments for production are frequent, although they are implemented in a planned manner and at a specific time, that is, the fear for the timely completion of the development and its high quality fulfillment appears. The reference to the lack of production capacities serves as another reason, although they are often found for the production of obsolete equipment.

The analysis of the annual State Plans of USSR Economic and Social Development for 1981-1984 showed that the number of assignments in them on the assimilation of industrial products and technological processes with the use of inventions is decreasing (disregarding the assignments on the assimilation of purchased licenses). In 1981 their share came to 36 percent, in 1982--36 percent, in 1983--33 percent and in 1984--28 percent. This attests that there are serious shortcomings in the system of the selection and use of inventions, on the basis of which new equipment and technology should be developed. All ministries, the State Committee for Inventions and Discoveries and the All-Union Society of Inventors and Efficiency Experts, the State Committee for Science and Technology and the USSR State Planning Committee should take part in their elimination.

The basis of the advance of socialist society is the saving of socially necessary labor, which finds expression first of all in the increase of its productivity on the basis of advanced equipment and technology and the sharp

decrease of manual and poorly mechanized labor. This is the general line of the development of productive forces in the country.

Against the background of the unfavorable demographic situation the mechanization, automation and robotization of production processes are assuming particular importance. A sharp decrease of the amounts of manual labor is possible mainly by means of not simply its mechanization, but its mechanization at the highest level--automation and robotization. It is clear that such a goal is not to be achieved without the thought of inventors.

The active role of the All-Union Council of Scientific and Technical Societies as the initiator of the solution of specific problems of the mechanization of manual labor at the highest level under the real conditions of the operation of enterprises should appear in this matter.

In order to fulfill this task completely, without duplication and primitive independence, it is necessary to use more extensively the available scientific and technical information, including patent information. But its amounts are now such that it has become very difficult to select the information needed for specific goals.

The information system, in spite of its slight rearrangement in specific directions, has a passive role, inviting those interested to seek out in its enormous volume "rational kernels." Therefore its reorganization in the qualitative respect--the increase of the share of analytical problem-synthesized information and an orientation toward the most urgent problems of the acceleration of scientific and technical progress--is required. It is important to give it an active role in the accomplishment of urgent tasks and to orient it more distinctly toward the comprehensive solution of the problems of increasing the technical level of production.

It is necessary to change fundamentally the approach to the planned assimilation of inventions. The establishment by the USSR State Planning Committee jointly with the State Committee for Science and Technology and the State Committee for Inventions and Discoveries of a specific procedure of submitting suggestions on their use and official registration is insufficient. A comprehensive approach of each of the participants in this process and a more responsible attitude of ministries toward the development of new equipment on the basis of inventions are required. Now, on the threshold of the formulation of the plan for the 12th Five-Year Plan, a number of measures, which are aimed at their planned use, should be immediately implemented.

The drafts of the plans of ministries on the development and assimilation of new equipment and technology should ensure the priority inclusion in them of innovations in essence, and not in name. The question of the concept "new equipment" became imminent long ago. The Method (Basic Principles) of Determining the Economic Efficiency of the Use in the National Economy of New Equipment, Inventions and Efficiency Proposals, which was approved in February 1977 by the USSR State Planning Committee, the State Committee for Science and Technology, the USSR Academy of Sciences and the State Committee for Inventions and Discoveries, interprets this concept in such a way that it

makes it possible to recognize (rather, to pass off) any modernization as "new" equipment and technology.

The drafts of the plans of ministries should be examined in the sectorial departments of the USSR State Planning Committee with the mandatory participation of specialists of the State Committee for Science and Technology and the State Committee for Inventions and Discoveries, with allowance made for their suggestions on the use of inventions. A commission, which is formed from workers of the USSR State Planning Committee, the State Committee for Science and Technology and the State Committee for Inventions and Discoveries, with the enlistment of responsible representatives of the user ministries should discuss the arising differences. It is also advisable to charge this commission with the making of decisions on the use of inventions of intersectorial importance.

It is very important to increase the role of the executive committees of the soviets of people's deputies, trade union organs and the councils of ministers of the union republics in the timely introduction of inventions. Wherever proper attention is being devoted to this, there are rather good results. As an example it is possible to cite the experience of Leningrad and Rostov-on-Don, where special organs for the selection and introduction of inventions have been formed. They are attaching great importance to such questions in the Ukrainian, Latvian, Estonian and Armenian SSR's. The Central Council of the All-Union Society of Inventors and Efficiency Experts with the support of the All-Union Central Council of Trade Unions is improving the work on the selection and use of inventions. This initiative merits extensive development, since it breaks the narrow regional, market approach and ensures the success of invention.

It would be advisable to organize the implementation of innovations, which have been developed by individual inventors, by means of the performance of experimental and experimental design work at the expense of the formed reserve in the ministries, which is placed at the disposal of the State Committee for Inventions and Discoveries.

The further improvement of the moral and material stimuli not only for inventors, but also for those who contribute to the development and introduction of new equipment and technology, is also necessary. The prevailing system of stimulation envisages more formal prohibitions and does not conform to the tasks of today.

Thus, the problem of the selection of the most important inventions for the national economy and, what is the main thing, their timely implementation are closely linked with a large number of questions. It is necessary to settle them together, in a systems and comprehensive manner.

FOOTNOTE

1. V. I. Lenin, "Poln. sobr. soch." [Complete Works], Vol 40, p 108.
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PATENTS AND INVENTIONS

PROBLEMS IN ASSIMILATION OF DOMESTIC DEVELOPMENTS DISCUSSED

Moscow IZVESTIYA in Russian 6 Aug 85 p 2

[Article by R. Lynev under the rubric "Rational Management": "Having Lost, We Will Pay, or The Fantastic Fate of Some Domestic Scientific and Technical Developments Which Have Received International Recognition"]

[Text] Instead of dallying, we will name the theme of the article right away: the introduction of inventions.

We can begin with a single, and in my opinion outstanding, development. The idea is as simple as it is imbued with genius: in a special purified room, a furnace is heating up quite well, and the stones which have been placed on it are getting hotter. They are heating the air temperature up to 100 degrees and more. Anyone inside the room (in the thermal chamber, to speak scientifically) is soon observed to perspire actively, thus aiding them in cases of chill, fatigue and trauma. Thermal regulation is improved as is the tone of the organism. The quenching effect of these procedures has been noted as well. Their effect is more pronounced if water is splashed onto the heated stones, and the exposed body is then acted upon with a broom-like bundle of

The procedure is an ancient one. It has been used for the many centuries prior to the organization of the Institute for the Examination of Patents, GKNT [State Committee for Science and Technology] and Gosstandart [State Committee for Standards], which established a specific sequence for the assimilation of technical innovations, beginning with the research work, correlation and approval of the technical assignment, the sequence for providing preliminary and working designs....

Nevertheless, passing these stages, the above-described steam room was introduced and found widespread use, especially by two neighboring peoples: the Russian and the Finnish. And if the question of the priority of the idea itself is difficult to solve, then in connection with its realization, both successful and, of course, profitable, our neighbors are presently in the lead. The sauna they manufacture, based on its uncomplicated manufacture, has conquered the international market.

So what of it; we will render our neighbors their due for their skill and enterprise. But in our turn we will ask why we didn't accomplish the same results with our own similar steam bath?

The version of the steam room developed by the Moscow engineer and war veteran P. Belousov under the appellation Sukhovey is well known. Ten inventor's certificates have been issued for this unit.

The developmental path taken by the inventor met with approval even in Finland, this having been pointed out in a letter to Belousov from a major expert in the bath-house business in Helsinki, Professor Kharald Teyr. And our own country's specialists, headed by Academecian A. Minkh, of the USSR AMN [Academy of Medicinal Sciences], evaluated the Sukhovey as an extremely useful, improved version of the traditional steam room. The positive evaluation stems from the unit's ventilation system, its purification system and the air ionization system in the thermo-chamber. And there are two other factors which are of no little import: the first Sukhovey prototypes have turned out to be one third the price of saunas, and they require only one-thirteenth the electric power.

What would seem to be the problem? We should start up production of these steam rooms and place them in stadiums, tourist centers, sanatoriums and hospitals (in the past, zemstvo hospitals always had steam rooms), in shops, in shops, especially in hazardous surroundings, and even in regular baths along side Russian steam rooms and along with saunas.

Along roughly the same lines of reasoning, S. Zmeul, who is the deputy chairman of the USSR State Committee for Civil Construction and Architecture, attached to USSR Gosstroy [State Committee for Construction Affairs] wrote a letter as far back as 1974 to the Committee for Physical Culture and Sports, attached to the USSR Council of Ministers, to RSFSR Minzhilkomkhoz [Ministry of Housing and Utilities] and to USSR Minzdrav [Ministry of Health], saying: "In order to put the new progressive Sukhovey steam room equipment into production as quickly as possible...development needs to be initiated so that a prototype can be built in 1975 and its effectiveness can be studied, and so that series production can be started in 1977."

So, that's the business-like approach. And business-like responses were forthcoming from three of the addressees. All three were in favor of the innovation. The author of the first response--Deputy Sportkomitet [Committee for Physical Culture and Sports] Chairman A. Kolesov suggested that he continue his research into the Sukhovey's useful features. V. Semin, former deputy minister of Housing and Utilities assured Zmeul that his firm was prepared "to take part in testing the unit, and should the results be positive, to participate in resolving the problem of the widespread use of the equipment". The author of the third response--chief of the main general health service administration, which is part of USSR Minzdrav, I. Shatkin informed Zmeul that the Central Scientific Research Institute for Balneology and Physiotherapy had been charged with further testing of the Sukhovey.

Two years' of tests in Moscow's Medical and Physical Culture Clinic No 15 on groups of both healthy and ill patients also indicated that the Sukhovey could be useful in the cure of asthma, chronic pneumonia, osteochondritis [osteokhondroz] and other ailments. USSR Minzdrav Collegium members I. Shatkin and V. Kovshilo officially confirmed that the Sukhovey could be introduced.

So everything returned once again to the main department over baths, their design and construction: to RSFSR Minzhilkomkhoz. But it looked as though the people in this ministry had forgotten or lost the previously-mentioned promise to "participate in resolving the problem" and replied to Deputy Minister V. Fedorov with a formal letter, the sense of which lay in the fact that they had received only a very few authorizations from the medical people, and they said that they needed some more special recommendations regarding use of the innovation.

One year was used for the development, correlation and confirmation of the recommendations USSR Minzdrav institutes, but this stage, too, was surmounted when once again everything came back to RSFSR Minzhilkomkhoz. Now all they had to do was make up their minds. But the ministry had kept one more snag in reserve during all these years: where were the norms for the innovation's design? There are none? Then, get out of the way!

Practice teaches us that when the approach to an endeavor is interesting, there are sufficient temporary norms. But where the approach is bureaucratic, and the norms are permanent, there are only excuses, and nothing else. The result has been three years of red tape. And here this question arises: won't it turn out that ten years down the road someone will suddenly realize "Bah! This candy is being made somewhere by someone, and it has to be paid for promptly in foreign currency."

And this very candy is filled--with our filling.

However, if not with ours, then with the sort which will be surprising at times: where did our major institutes and departments look? Why should their neglect, sluggishness and then their simple irresponsibility be paid for out of the common pocket? Let the red tape artists pay!

Somewhere in the Minzhilkomkhoz system itself they know quite well why they had to go shopping for imported pavement-removal equipment. It was because this process has been firmly delayed down in the departmental warrens. Nevertheless, this "delaying device" operates in fairly trouble-free fashion in other sectors as well. Only some of the most recent were among those chosen as examples.

Several years ago, when A. Stakhov was a young scientist from Vinnitsa, he defended his doctoral dissertation. The essence of his work was the significant improvement in electrical measurement instruments--the ATsP's [analog-to-digital converters], used in the most diverse technical sectors, where computers find use. The scientist truly found the "golden root", which, having given off shoots in ever newer and newer realms, already had not dozens but hundreds of inventor's certificates registered for it.

Minelektronprom [Ministry of the Electronics Industry], Minpribor [Ministry of Instrument Making, Automation Equipment, and Control Systems], Minradioprom [Ministry of the Radio Industry] and the USSR Ministry of the Communications Equipment Industry were all interested in the work. USSR Minvneshtorg [Ministry of Foreign Trade] allocated a great amount of assets to get it patented.

Patents were obtained in foreign developed nations. But what, intrinsically, is a patent? It is, so to speak, the right to a spot in the marketplace. To pay for this spot, and not be a trader, constitutes a destructive absurdity. And just when do the goods themselves--the equipment, and technology--finally begin to be sold? We should remember that the other side is well aware of its advantage in these affairs.

So, it never would turn out that Stakhov's ideas would be incorporated into the "candies", for which the government would have to pay again. Also, it would be too late by then to find and call the present-day parties who are guilty of procrastination, to account. They ought to be called to account, and quickly, so that the fate of the well-known method for casting steel is not repeated. This method, which almost became a classic example of the sluggishness of Minchermet [Ministry of Ferrous Metals] and Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], who lost both time and initiative.

It looks, however, as if neither ministry has drawn any conclusions from this story. This, in the sense that through their fault the procrastination is now being repeated with regard to another type of progressive production method: the "rolling-drawing" method, developed in the Chelyabinsk Polytechnical Institute imeni Lenin Komsomol as far back as 1966. This method has received widespread acclaim, but has as yet not been assimilated in industry. The method for using extremely few people to mine coal from sharply-inclined seams suffered a similar fate, as did a procedure for extracting a universal whitening agent--concentrated hydrogen peroxide--from the air.

Inasmuch as we are leading in the development of these and a number of other progressive ideas, and since we are pace-setters in science and technology, is it fitting that we play second and even third fiddle in production methods?

Finally, a scandalous example turned up, it appears, on...what theme would you have guessed? In typography, where these lines were cast and set, and where this issue was printed. As far back as the 60's a group of specialists from the publishers of IZVESTIYA, working in collaboration with scientists, designed a piece of automatic equipment which counts off the copies of the finished paper, stacks and packs them, thus eliminating heavy and unskilled labor for a great many people. This equipment is also patented in a number of leading countries. Even the license for this unit has been marketed. However, the 17-year-long fruitless struggle waged by the automatic machine's originators with Soyuzpoligrafmash [All-Union Industrial Association for the Production of Printing Industry Equipment for USSR Minlegpishchemash (USSR Ministry of Machine Building for Light and Food Industry and Household Appliances)] which has been conducted with varying degrees of success, has inflicted, as the reader will have guessed, only damage on the entire business. But the winner turned out to be a third party--who sold our own idea to us, only it had already been realized in metal.

The machine has been purchased, and is duly in operation in the IZVESTIYA printing shop. It is giving our designers, and indeed all of us, melancholy food for thought.

What conclusion is to be drawn from this? In principle it was pointed out during the memorable June talk in the CPSU Central Committee on speeding up scientific and technical progress, when it was stated that in order to put a halt to the squandering of our national wealth, be it raw materials, currency or ideas, we need to introduce an antiexpenditure economic mechanism into our national economic system. This mechanism has to become the most important of all innovations. No one is going to devise such a mechanism for us.

And then, for all I know, we may hit upon the idea of acquiring bath-house flail brooms through Minvneshtorg.

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INDUSTRIAL AND MILITARY APPLICATION

SCIENTIFIC RESEARCH AT MILITARY POLITICAL ACADEMY

Moscow KOMMUNIST VOORUZHENNYKH SIL in Russian No 8, Apr 85 pp 70-75

[Article by Doctor of Philosophical Sciences Professor Major General of Aviation V. Serebryannikov: "In the Interests of the Increase of the Quality of Research"]

[Text] Under present conditions the role of the social sciences is increasing. They are called upon to make their contribution to the improvement of mature socialism, the increase of the spiritual potential of society, the raising of the consciousness of the masses to a qualitatively higher level and the development of their activeness and historical creativity. The Communist Party is aiming social scientists at the increase of the effectiveness of scientific research and the concentration of efforts on the constructive elaboration of methods and means of speeding up our progress.

The demands on research in the area of the social sciences are clearly formulated in the materials of the June (1983) CPSU Central Committee Plenum. This research should proceed from the reality which exists, with all the pluses and minuses, should reveal more thoroughly the objective laws of social development, should be concentrated more efficiently and flexibly on new phenomena and processes, should "detect" in good time the gathering trends, should provide experienced workers with high quality recommendations and forecasts and should help them more in solving the current and long-range problems of improving all the spheres of mature socialism. And the most important thing is that the social sciences are obliged to steadfastly be guided by revolutionary theory and to use skillfully the tried Marxist-Leninist methodology of scientific research.

Military social scientists, in implementing the instructions of the CPSU Central Committee, are focusing their attention on the elaboration of the questions of the need for the reliable defense of socialism under the conditions of the increase of the aggressiveness of imperialism and for the increase of vigilance and combat readiness. The enrichment and development of Marxist-Leninist teachings on war and the army, the defense of socialism, the theory and practice of party and political work in the USSR Armed Forces, the moral, political and psychological training of personnel are based on a thorough knowledge of Lenin's military theoretical legacy and party documents

and on the improvement of the planning and organization of scientific research work.

More than 200 scientific research jobs are completed annually at the Military Political Academy imeni V. I. Lenin. The majority of them are devoted to urgent themes and are distinguished by a profound content, and serve the improvement of the educational and training process at higher educational institutions and party political work among the troops. These are, for example, the books published in recent years: "KPSS--organizator zashchity sotsialisticheskogo Otechestva" [The CPSU Is the Organizer of the Defense of the Socialist Homeland], "Problemy voyny, mira i zashchity zavoyevaniy sotsializma v svete resheniy XXVI syezda KPSS" [The Problems of War, Peace and the Defense of the Gains of Socialism in Light of the Decisions of the 26th CPSU Congress] and "Partiyno-politicheskaya rabota v Vooruzhennykh Silakh" [Party Political Work in the Armed Forces], the series of 12 works "Resheniya iyunskogo (1983 g.) Plenuma TsK KPSS--v zhizn" [The Decisions of the June (1983) CPSU Central Committee Plenum Into Life] and many others. Several scientific works of the social scientists of the academy were commended with prizes of the USSR Ministry of Defense and the Ministry of Higher and Secondary Specialized Education.

The headquarters personnel and the Political Department are devoting much attention to the supervision of scientific research work (NIR). During this school year alone the council of the academy discussed such questions as "The Tasks of Improving Scientific Research Work in Light of the Decisions of the June (1983) CPSU Central Committee Plenum, the Requirements of the USSR Minister of Defense and the Chief of the Main Political Directorate of the Soviet Army and Navy," "On the State of and Measures of the Improvement of the Ideological and Political, Scientific and Methods Training of Military School Graduate Students and Degree Seekers," "On the Improvement of the Military Science Work of Students," "On the Results of the Comprehensive Scientific Research Work on the Problem of Improving the Methods of the Education and Training of Students" and others. The fulfillment of the decisions, which were adopted by the council, is serving the further increase of the efficiency of scientific work at the academy.

The questions of the scientific activity of social scientists are discussed at meetings of the party aktiv and seminars of the secretaries of the primary party organizations. Individual and group discussions with leading scientists of the higher educational institution on various directions of the improvement of scientific research work are being used more and more often in practice. For example, on the urgent tasks of scientific research work at the academy, which follow from the materials of the All-Union Applied Science Conference "The Improvement of Mature Socialism and the Ideological Work of the Party in Light of the Decisions of the June (1983) CPSU Central Committee Plenum" and the conference of ideological workers of the army and navy, which was held in December 1984. The study of the opinions and suggestions of leading scientists made it possible to clarify thoroughly and comprehensively the ways and means of a certain reorientation of social consciousness as applied to the educational, training and scientific research process, to correct the plans and to see new prospects of the activity of social scientists in connection with the preparation for the 27th CPSU Congress.

The party organizations of the chairs of the history of the CPSU, the history of the international communist and workers' movement, scientific communism and party political work have gained definite experience in increasing the efficiency and quality of scientific research work.

The party buros, in which Colonels D. Poznanskiy and A. Popov and Lieutenant Colonel Yu. Ryabko are the secretaries, regularly hear the reports of the communist directors of collectives of authors, military school graduate students and doctoral candidates on the implementation of the plans of research and on ideological, political and occupational advancement. The sharing of the experience of the high quality performance of scientific work is constantly carried out here.

It seems that the solution at the academy of several problems of improving the material and technical base of scientific research is of interest. For computer technology, information science and automated systems are influencing more and more strongly the forms, methods and quality of the work of scientists. An outside computing and data processing center with the use of computers has been set up at the academy. It interacts with the automated information system of the Institute of Scientific Information on the Social Sciences of the USSR Academy of Sciences. This is increasing the research potential of the Military Political Academy, is enlarging substantially the amount of information being used, is shortening the time of its receipt and processing and is enriching the methods and means of cognitive activity.

The conducted sessions of connection to the all-union information system aroused great interest among instructors, military school graduate students and students. And this is understandable: under the conditions of the "information explosion" the quality of scientific work depends more and more on the ability to use and process enormous amounts of information. Such experience already exists. Trial research with the use of computers is being conducted by sociologists of the academy jointly with scientists of the military chairs. Captains 1st Rank L. Yegorov and V. Nikulin, Colonel A. Dorozhkin, Captain 2nd Rank B. Shvedin and others are displaying innovative activeness in this matter. The study by professors, instructors and military school graduate students of the principles and methods of the use of applied mathematics and computers in research on the social sciences has been organized at the academy. During the next school year a number of themes on the use of computers in party political work, concrete sociological research and the psychological training of personnel are being introduced in the program of the instruction of students. In the use of computers in scientific research at the higher educational institution they are basing themselves on the new things which have appeared at the Academy of Social Sciences attached to the CPSU Central Committee, at the humanities faculties of Moscow State University and in the political organs of the Armed Forces.

The development of the active preparation for the 27th CPSU Congress and the successful fulfillment of the plans of scientific research work require the thorough analysis of the gained experience, the development of everything positive and the determined overcoming of what is hindering progress.

The demands of the CPSU on the development of the social sciences and the analysis of research work are bringing to the forefront the task to increase the quality of the scientific works of social scientists and to achieve a significant increase of their ideological and theoretical level, the depth of penetration into the life of the army and navy and the practical importance of forecasts and recommendations. Its accomplishment is one of the most urgent problems facing social scientists. For many weak works, which prove what was proven long ago and bear the stamp of haste, superficiality and at times simply inadequate scientific conscientiousness, are still appearing. In several of them it is described what must be done on one problem or another, but little is said about who must do it and how. Unfortunately, for the present methods for commanders and political personnel on specific questions of educational activity are rarely being elaborated, advanced know-how is being poorly generalized. Such conclusions were recently drawn with respect to a number of articles which were prepared by military school graduate students for a scientific collection. Objective criticism was heard at the meeting of the editorial board with respect to the works of Lieutenant Colonel R. Podol and Major A. Okhlopkov. Their shortcomings are poor reliance on the works of the classics of Marxism-Leninism and the latest documents of the Communist Party, isolation from the life of the troops, the lack of new generalizations and significant recommendations and carelessness in editing. There were also similar remarks with respect to a number of other articles, which were returned to the authors for revision. The editorial board drew the conclusion that in scientific work several military school graduate students are still taking inadequately into account the demands of the June (1983) CPSU Central Committee Plenum and the decrees of the party. And this is in spite of the fact that each scientific article passed through the corresponding subject methods commission, was reviewed by scientists, was discussed in the chair and was approved by the scientific supervisor of the military school graduate student.

Unfortunately, we have not yet seen to it that all dissertations, which are submitted for defense to the specialized councils, would fully satisfy the present requirements. Not that long ago a doctoral dissertation on the psychological aspects of technical training was considered. At the defense much that was good was said about it. At the same time it was explained that the theoretical significance and practical utility of the dissertation could have been significantly greater, if it were not for the inadequate study of a number of underlying methodological questions.

Another doctoral dissertation "The Category of Proof (On the Basis of the Experience of Military Science Knowledge)," while being distinguished by the thoroughness of the historical philosophical analysis, as was noted at the defense, relied poorly on military science knowledge and was inadequately connected with the practice of ideological work.

In several textbooks on philosophy and other social subjects the proportion of materials, which duplicate all-union textbooks, is significant, too little attention is devoted to the revelation of the new principles and conclusions, which are contained in party documents, and to the generalization of the achievements of science, the specialization of the academy is not always taken into account. In short, the shortcomings, which were indicated at the June

(1983) CPSU Central Committee Plenum and are characteristic of a portion of the scientific works in the area of the social sciences: an ideological, theoretical and methodological level, which does not fully satisfy present requirements, a shallow penetration of the essence of social phenomena, an absence of a creative approach and the extension of knowledge, speculation and descriptiveness, a predominance of long known truths, isolation from practice, scholastic theorizing and imperfection of the style and language, are still being slowly overcome.

What are the ways of overcoming these shortcomings? How is one to solve the difficult and multidimensional problem of increasing the quality of scientific works? The search for answers to these questions makes it possible to formulate a number of conclusions.

The new demands on the social sciences have not yet settled with sufficient depth and specificity in the consciousness of a portion of the social scientists and, hence, so far they have not become criteria of the evaluation of activity and the quality of the scientific works being carried out. The following experiment confirms this. The authors of a number of works were asked the questions: How did they ensure a higher ideological level of work in conformity with the demands of the June (1983) CPSU Central Committee Plenum, what is the novelty of the content of the scientific work, how were the requirements on high quality practical recommendations and forecasts embodied? It turned out that in the understanding of these questions there were considerable subjectivism, speculation and arguments at the level of everyday notions. Strange things also occurred, when individual comrades suggested: some requirements or others, they say, apply to what is called "institute," "school" science, but not to academic science, which with respect to all parameters satisfies the highest requirements.

It is clear that correct criteria of the evaluation of the quality of scientific works should be elaborated not by each researcher separately, but by the efforts of scientific teaching collectives. Here it is necessary to apply the party demands specifically to each social science with allowance made for its peculiarities.

The headquarters personnel approved of the initiative of the Chair of the History of the CPSU, which had drawn up a number of scientific methods documents: "The Criteria of the Novelty of the Results of Dissertation Works," "The Criteria of the Introduction of the Results of Dissertation Research in Practice" and others.

A methodological seminar for the directors of the scientific subdivisions was set up for the elaboration of unified, sound criteria of the evaluation of the quality of works. Such themes as "The Criteria of the Evaluation of the Quality and Efficiency of Scientific Works," "The Means of the Significant Increase of the Ideological and Theoretical Level of Scientific Works in Light of the Demands of the June (1983) CPSU Central Committee Plenum," "The Methods of Evaluating the Practical Significance of Scientific Works and the Quality of the Recommendations and Forecasts Contained in Them," "The Ways and Means of Introducing the Achievements of the Social Sciences in Practice" and "The Goal Program Approach to the Planning and Organization of Scientific Research

Work" were envisaged in the plan of the work of the seminar. The already conducted lessons played their role in the specification of the general requirements as applied to the conditions of the academy. On the basis of their materials it is proposed to elaborate practical recommendations on the evaluation of scientific research in various directions.

It should also be emphasized that at times demandingness at all the stages of the passage of scientific works, thorough and fundamental criticism, creative discussions, and sometimes also simply a responsible attitude on the part of reviewers to the analysis of works and on the part of the authors to the elimination of the shortcomings and the implementation of the suggestions and advice, which were stated at the discussion of dissertations, are still lacking. But scientific criticism is called upon to give an objective, realistic and exacting evaluation of a work, to identify the deep sociopolitical significance of the results of the study, to boldly support innovative ideas and at the same time to reveal frankly and in a well-reasoned manner the erroneousness of some assumptions or others.

The immediate control of the creative process needs further improvement. This is a delicate matter, in which petty guardianship, the imposition of one's own approaches, fussiness and overorganization are intolerable. The main thing, which we are striving for here, is to help the scientist or collective to rise to a higher ideological and theoretical level, to achieve progress as compared to what has already been achieved, to comprehend thoroughly the phenomena and processes in military science and to ensure a high practical return from scientific labor. A system has been formed at the academy for providing such assistance--the collective examination of the theme, the idea, the goal and the prospectus, the discussion of the intermediate and final results of scientific developments at meetings of the collectives of authors and the subject methods commissions of the chairs and at interchair conferences and seminars. A group of reviewers and editors works with each scientific work.

Much is being done in order to improve the activity of the specialized councils for the defense of doctoral and candidate dissertations. In the councils a large amount of responsible and complex work is being performed on the certification of science teachers, experience, which received a high rating of the Higher Certification Commission (VAK) attached to the USSR Council of Ministers, has been gained. However, in speaking about what is positive in the activity of the councils, it must be noted: new efforts are needed in order to raise even higher the demandingness on dissertations and to ensure their more thorough analysis on the part of chairs, official opponents, other reviewers and all the members of the councils. The problem of increasing the role of the specialized councils in the implementation of the valuable conclusions and recommendations, which are contained in dissertations, remains not completely solved.

Preliminary defenses, which are organized without fail and are now held for all doctoral dissertations, are playing a greater and greater role in the campaign for the quality of scientific works. A special statute on the preliminary defense of dissertations, which has received the endorsement of the Higher Certification Commission and has been recommended for extensive dissemination, was drafted at the academy. The preliminary defenses of

doctoral dissertations, which are held at meetings of the corresponding chairs and interchair meetings with the invitation of prominent scientists and workers of the political directorates of the army and navy, help to evaluate thoroughly and comprehensively the performed work, to support valuable innovative research and to erect a reliable barrier against dissertations which are weak and incomplete and do not satisfy the requirements of today. Good experience in the organization of the preliminary defense of dissertations has been gained in the chairs of the history of the CPSU, military pedagogy and psychology and party political work.

The increase of the quality of scientific research in many ways depends on the persistent mastering by scientists of Marxist-Leninist methodology. The skills of scientific research are developed in the process of work, at methodological seminars, during the discussion of scientific works, at meetings of collectives of authors and during the study of the experience of leading scientists. On this level the elaboration of urgent methodological problems in the chairs for the individual social sciences is of great benefit.

Apparently, the opinion: a certain lag has emerged in the elaboration of urgent methodological questions, which are connected with the development of military science, the training of the Armed Forces, the increase of the spiritual factor, the intensification of the ideological struggle and the increase of the role of party political work in the maintenance of great vigilance and combat readiness of the troops, to some extent is correct. This requires the stepping up of the scientific research of philosophers, historians, military educators and psychologists and scientists, who deal with the theory and practice of party political work. At present four scientific research methodological seminars, which are called upon to evaluate what was done in the past and to determine the prospect and main directions of the further elaboration of urgent problems of military theory and practice, are active at the academy.

The further increase of the quality of scientific works also involves the mastering by scientists of new means, methods and techniques of perceiving social processes, including the methods of concrete sociological research.

One of the reserves of the improvement of the quality and the increase of the practical return of scientific research work is the effective use in it of the creative potential of the military science society of students. The experience of the chairs of party political work, pedagogy and psychology and others shows that the participation of students in the elaboration of urgent problems yields a good educational impact. The participation of students in scientific labor jointly with instructors is one of the most effective means of the familiarization of young specialists with creative work, the conveyance to them of the experience of mature scientists, their provision with methods and techniques of research work and the cultivation in them of adherence to principles and initiative. Of course, provided that in the supervision of the work of the military science society there are no petty guardianship, overorganization and overcautiousness on the part of the chiefs of the educational subdivisions and chairs. The basic task here is to instill in the students the need for and skills of the independent thorough study of the problems which will face them in the troops.

The effective use of the scientific potential of the chairs of the social sciences, of each scientific collective and scientist to a significant extent depends on the high quality formulation of the themes of research, the concentration of the efforts of social scientists on the elaboration of urgent problems of the Marxist-Leninist theory of war and the army, the defense of socialism and current military development, the improvement of party political work, moral, political and psychological training and the increase of the vigilance and combat readiness of the troops. Work on minor themes, duplication and the dissipation of a portion of the works, especially candidate dissertations, adversely affect the theoretical level of research. The council of the academy examined specially the question of the improvement of the work on the determination of the themes of the scientific research of military school graduate students and degree seekers. The collective elaboration of the themes in each chair and their examination in the council of the academy for each regular enrollment of full-time and correspondent graduate students were recognized as the basic method. The strengthening of centralized principles, which are the key to the high quality formulation of the themes of research, is being accomplished by the timely orientation of the scientific subdivisions concerning the goals and common tasks of the work for the next year or for the more long-term future, the thorough analysis of the plans of the chairs and the elaboration of decisions on all-academy scientific research programs.

The goal program approach to the planning and organization of scientific research work is one of the effective means of uniting the efforts of scientists for the solution of urgent problems and the overcoming of work on minor themes and dissipation. In contrast to the traditional method of formulating the themes of research by collecting suggestions from individual scientists and collectives of science teachers the goal program approach presumes the centralized specification of a number of priority themes, to the elaboration of which the efforts of many scientists, military school graduate students and degree seekers are subordinate.

The essence of the goal program approach consists in the precise specification of the ultimate goals of scientific developments, which it is necessary to achieve, as well as in the specification of a set of measures which ensure this. Thus, the comprehensive goal program "The Improvement of Mature Socialist Society and Its Armed Defense," the fulfillment of which was planned by the Chair of Scientific Communism, includes the elaboration with respect to various aspects of this theme of about 20 candidate and several doctoral dissertations and a number of works of a monographic nature and the holding of scientific conferences and methodological seminars. A basic final work will be produced on the basis of the materials of this research.

The goal program approach serves the solution of the problem of increasing the practical significance of research. It presumes the more specific determination of the subject of research, the address of destination and the forms of reporting on the results. The research programs purposefully specify on what problems practical recommendations will be formulated, forecasts will be made, new methods will be developed and practical tasks will be accomplished. The goal program approach to the planning and organization of

research work is also aimed at the strengthening of cooperation between the chairs of the social and military sciences.

Our scientists are devoting special attention to the thorough study of the problems of party development, party political work in the Armed Forces and the moral, political and psychological training of the troops.

Today at the academy efforts are being concentrated on the utmost increase of the quality of scientific works, the intensification of the activity of scientists and collectives, the increase of the influence of party organizations on the research process, the improvement of the methods and technique of research and of the planning, organization and management of scientific research work and the improvement of the cooperation of science with practice. The efficient use of the scientific potential of the chairs of the social sciences is called upon to ensure the more significant contribution of scientists to the further strengthening of the defensive might of the country and the increase of the combat readiness of the Soviet Armed Forces.

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SOCIO-POLITICAL FACTORS

UKRAINIAN PARTY PROMOTION OF SCIENTIFIC, TECHNICAL PROGRESS

Moscow PRAVDA in Russian 5 Jun 85 p 2

[Article by Secretary of the Ukrainian CP Central Committee A. Titarenko: "By the Paths of Acceleration"]

[Text] Now, when the efforts of the party and people are concentrated on the assurance of a decisive turn in the changeover of the national economy to the path of intensive development, particular attention is being devoted to increasing the role of party committees in accelerating the introduction of the achievements of science in production.

Guided by the instructions of the CPSU Central Committee, the party organization of the Ukraine is aiming the communists and all the workers of the republic at the key directions of the development of the economy. And this is yielding significant results. Thus, in just 4 years of the current five-year plan the production of more than 4,100 types of industrial products was assimilated in the Ukraine. Some 11,000 works, shops and sections were completely mechanized and automated, 9,700 mechanized flow and automatic lines were put into operation. The plans of the transfer of workers from manual to mechanized labor were exceeded. An economic impact in the amount of about 4 billion rubles was obtained from the introduction of scientific and technical measures. The result, as we see, is significant. However, time is posing new problems and requires bold solutions and energetic actions.

The successes in this most important section of work in many ways depend on the increase of party influence and the use of both its already tried methods and new forms of the work of communists in the direction of the increase of production efficiency. Among the latter the councils for the promotion of scientific and technical progress attached to the party committees have taken an important place in our republic. They are making it possible to analyze the state of affairs more thoroughly and skillfully, contributing to the broadening of intersectorial and interdepartmental cooperation and the overcoming of departmental barriers.

The establishment of the councils for promotion supplemented well the state structure of the management "vertically"--along the line of ministries and departments--of the interdepartmental system which operates "horizontally" on the scale of the region. It is helping to link local interests more closely with state interests and to conduct more actively the search for internal possibilities for the rapid solution of the most important statewide problems.

Thus, the party committees of the Donbass and the Dnieper River region, relying on the councils for promotion and the scientific centers of the USSR Academy of Sciences, are persistently solving the urgent problems of the development of the coal and metallurgical industries and environmental protection. The questions of the increase of the technological level of production hold a decisive place in the work of the party organizations of Kiev, the questions of the assurance of the increase of the output of industry without the increase of the number of workers and the additional consumption of the basic types of resources hold a decisive plan in Kharkov Oblast. In Dnepropetrovsk, Donetsk, Lvov and several other oblasts a comprehensive, systems approach to the solution of the problems of the decrease of manual labor, the certification and rationalization of workplaces and the increase of product quality is being developed.

But do the councils for promotion always act to full effect? Life has posed the need for the coordination of their work and the purposeful dissemination of the best experience. For this purpose the council for the promotion of scientific and technical progress attached to the Ukrainian CP Central Committee, which First Secretary of the Republic CP Central Committee V. V. Shcherbitskiy heads, was established.

It would be possible to say a lot about the work of the new organ. The decisive directions of scientific and technical progress, which determine the increase of the efficiency of social production, are at the center of its attention. The council is directing special attention to additional measures on the decrease of the materials intensiveness in all sectors and, in particular, in capital construction. For a significant amount of material resources is consumed annually in the sector: the saving of just 1 percent of them would make it possible to save about 50 million rubles.

The recommendations formulated by the council suggested to the party committees, as well as the corresponding ministries and departments means of the more complete use of scientific developments, the improvement of the process of designing and the improvement of the technical and organizational level of construction work in the republic. Their implementation is already yielding rather good results.

Republic goal, sectorial and regional scientific and technical programs, the accomplishment of which made it possible to speed up considerably the solution of a number of most important national economic problems, were formulated on the initiative and under the direct control of the Ukrainian CP Central Committee, the oblast committees and Kiev city committee of the party. The accomplishment of the assignments of the republic program "Labor," for example, made it possible in 4 years of the five-year plan to convert 885,000 people from manual to mechanized labor. The new capacities at nuclear

electric power plants, which were put into operation in conformity with the program "The Energy Complex," made it possible to free for the national economy more than 32 million tons of organic fuel.

The extension of the goal program approach to the planning and organization of work in the area of scientific and technical progress has become the most important direction of the activity of the councils for promotion. Now the task is to combine the republic, sectorial and regional programs into an adjusted, efficiently operating unified system. The republic comprehensive goal programs "The Materials Intensiveness," "Metal," "The Energy Complex," "Transportation," "Labor" and "The Agricultural Complex" and the scientific program "Biotechnology" will become its key component.

Now 151 programs are being formulated in the oblasts of the Ukraine and 118 are being formulated in republic ministries and departments. Recently the council for promotion attached to the Ukrainian CP Central Committee heard the corresponding report. It was noted that the formulation of republic scientific and technical programs for the most part is being completed. The possibilities of their more active use have been identified. It has been deemed necessary to revise in light of the instructions of the April (1985) CPSU Central Committee Plenum a number of indicators which were included in the drafts. The objective conditions are present for the accomplishment of more intensive indicators. It is a matter of the purposeful updating and improvement of the use of the already available scientific and technical potential.

At the meeting of the council, in particular, the serious errors, which planning organs of the republic, its ministries and departments are committing in solving the problems of the mechanization and automation of production, were criticized. Thus, the use of robots, manipulators and microprocessor equipment was frequently carried out in isolation of the entire set of modern means of automation and mechanization, first of all NC machine tools and other advanced equipment. As a result the use of robots has begun to turn into an end in itself and is not having a substantial influence on the increase of the technical level of production and the growth of labor productivity. In this connection the necessary corrections had to be made in the formulation of the program "Labor."

As the analysis shows, the scale of the retooling of enterprises of the republic in recent years has decreased, which is aggravating the problem of the aging of productive capital in a number of such leading sectors as ferrous metallurgy, the coal and chemical industries, machine building and electric power engineering. Unfortunately, the Ukrainian SSR State Planning Committee, many ministries and departments of the republic and managers of associations and enterprises frequently do not take a firm position in the matter of the retooling of production. This is leading to serious losses. An example of this is the delay of the start of the renovation of byproduct coke plants, as a consequence of which enterprises of ferrous metallurgy are failing to produce a significant amount of metal products. The fact that many proposals of scientists, which have been confirmed by practice, are being used at only one or two enterprises or become obsolete before they find production "registration," is also causing anxiety.

The April CPSU Central Committee Plenum indicated that in the majority of sectors scientific and technical progress is still proceeding sluggishly, primarily by means of the improvement of prevailing technologies and the partial modernization of machines and equipment. Clear guidelines in this direction have been given to the party committees. The task of retooling sectors by the changeover to fundamentally new technological systems and to equipment of the latest generations, which provides the greatest efficiency, has been set.

The bases of fundamentally new technological processes, which are capable in the future of literally revolutionizing production, have been developed by science. But everything rests on the mechanism of their practical assimilation, first of all departmental barriers, the lack of an effective system of the choice of developments for extensive introduction, the imperfection of the economic stimulation of collectives and the weakness of the pilot experimental base. That is precisely why, for example, the methods of diffusion, vacuum and plasma spraying, vacuum molding, tungsten-free materials and other advanced developments of scientists, which have confirmed their usefulness in practice, for long years have not found more extensive use in the republic.

Much still needs to be done so that the introduction in production of everything new and advanced would be of a really planned, large-scale nature. This requires the significant stepping up of the activity of scientists and specialists in the solution of urgent problems and the strengthening of the contact of science with production.

And, as life suggests, emphasis on not only the vocational, but also the psychological preparation of personnel for work under the new conditions is necessary. For along with production difficulties the introduction of innovations at times is also checked by what is called a "psychological barrier," the fear or inability of production specialists to assimilate new technological processes and equipment. Many workers, having come up against difficulties of the introduction of innovations, at times give in and sacrifice to intradepartmental interests and current affairs the questions of the updating of production. Here the plans on new equipment are frequently filled with insignificant measures or measures which were already assimilated long ago.

One also has occasion to come across such cases when individual managers spend a large amount of energy in order to acquire expensive computers or NC machine tools, but then this equipment stands idle, is used inefficiently or becomes unfit for use.

We also have to eliminate a certain diversity in the level of work of the party committees and their councils for the promotion of scientific and technical progress. A number of councils remained too long at the stage of formation, they will in no way shift from the discussion and posing of tasks to concrete, constructive deeds. Setting to work at times on a large number of tasks, they are not able to distinguish the main directions and to set up the monitoring of the implementation of recommendations.

In preparing for the 27th CPSU Congress, the party organization of the republic is increasing its efforts on the strengthening of the economic and defensive might of our state and the improvement of the well-being of the people on the basis of the rapid development of science and technology and the utmost intensification of production.

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CSO: 1814/200

CONFERENCES AND EXHIBITIONS

MEETING ON INTERNATIONAL MARKETING OF AzSSR PRODUCTS

Baku BAKINSKIY RABOCHIY in Russian 26 Jul 85 p 2

[Article by Azinform: "Strengthen the Bonds with Enterprises"]

[Text] Tasks for offering cooperation by enterprises and organizations in the development of scientific and technical progress were discussed in the light of the decisions of the April, 1985 Plenum of the CPSU Central Committee at the expanded meeting of the soviet of the AzSSR Chamber of Commerce. Leaders of the ministries, departments and enterprises, of research and planning institutes and of other organizations--members of the chamber--participated in it.

In the report of the president of the presidium of the Chamber of Commerce, K. A. Guseynov, and in speeches, it was noted that definite work has been conducted recently on strengthening connections with members of the chamber. The forms of collaboration with them have been enriched, and the information service has been improved. Research symposia to be conducted within the scope of international and foreign trade fairs in the republic and to be organized by the chamber were recommended as an effective form of cooperation in the solution of technical and technological problems. They promote acquaintance with a wide circle of specialists of different branches of industry and agriculture with the newest achievements of science and engineering of other countries. At present, 130 members of the chamber are exhibitors at international trade-fairs abroad and participate in the republic's arrangements. The variety of exhibitors has expanded considerably in separate divisions of the republic at the trade-fairs. In addition, Azerbaijan export opportunities are not sufficiently publicized. At the trade-fair, samples of production occasionally are found which do not reflect the latest achievements of the republic in the field of scientific and technical progress. The quality of accomplishment of exhibitors and the design of prototypes and conversions do not always correspond to the requirements of international shows.

At the meeting, the necessity for showing enterprises more effective assistance in advertising and in the field of patent-licensing, development of trademarks and provision of high-quality translated scientific and technical information was emphasized. It is important to strengthen the influence of the chamber on the improvement of the technical and esthetic level of production proposed and raise its competitiveness, activate the work with enterprises by members of the chamber who determine scientific and technical progress.

The first deputy of the president of the presidium of the USSR Chamber of Commerce, V. P. Pletnev, and chief of the trade section and domestic service of the Azerbaijan Communist Party Central Committee, M. A. Nazarov, attended the meeting.

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CSO: 1814/276

CONFERENCES AND EXPOSITIONS

UKRAINIAN SCIENTISTS HOLD CONFERENCE ON IMPLEMENTING S&T

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 7, Jul 85 pp 95-96

[Article by L. Omelchenko and I. Yegorov: "The Problems and Means of Accelerating Scientific and Technical Progress"]

[Text] The experience gained in our republic of improving the regional mechanism of implementing the unified scientific and technical policy in light of the decisions of the 26th CPSU Congress and the subsequent decisions of the party and government on questions of the acceleration of scientific and technical progress were discussed in October 1984 at the republic applied science conference "The Problems and Means of Accelerating Scientific and Technical Progress," which was organized by the Ukrainian Republic Board of the Economic Science Society, the Scientific Council for Economic Problems of the Scientific and Technical Revolution of the USSR Academy of Sciences, the Scientific Council "Systems Studies of Organizational Management Problems of Science and Technology" of the Ukrainian SSR Academy of Sciences, the Center of Studies of the Scientific and Technical Potential of the Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences and the Republic House of Economic, Scientific and Technical Propaganda of the Ukrainian SSR Society for Knowledge.

Chairman of the Ukrainian Republic Board of the Economic Science Society and Deputy Chairman of the Ukrainian SSR State Planning Committee G. V. Dzis opened the conference. He noted the importance of the problems being discussed for the further acceleration of scientific and technical progress in the republic and in the country as a whole and wished those who had gathered success in the matter of solving them.

Academician of the Ukrainian SSR Academy of Sciences I. M. Fedorchenko, the representative of the Presidium of the Ukrainian SSR Academy of Sciences for Kiev, told about the experience of using scientific and technical developments. The speaker dwelled on the positive features in the relations between the industrial enterprises and scientific and technical organizations of the capital of the republic and cited examples of the fruitful cooperation of science and production. Meanwhile it was noted that many problems of the integration of science and production remain unsolved. This concerns the procedural, organizational and resource support of city programs and the reliability of the forecasts of the scientific and technical development of

the organizations of the city for the long-range future. The mechanism of ensuring the integration of the efforts of the various performers of the programs--to counterbalance the now widespread practice of simply adding up the plan indicators of the participants--needs significant improvement. There also exists the need for the assurance of the prompt circulation of the results of research and development and the creation of opportunities for the more flexible combination of sectorial and regional planning.

The report of Doctor of Economic Sciences G. M. Dobrov, deputy chairman of the Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences, was devoted to the regional mechanism of the implementation of the unified state policy in the area of science and technology. The disintegration of the sector "science and scientific service," which appears most clearly in the affiliation of scientific institutions with different ministries and departments, was noted. This is complicating substantially not only the process of day-to-day management in the sector, but also the coordination of the goals of the scientific and technical development of the country and the region. The conception of the formation of a hierarchy of goals was elaborated--on the basis of the goals of all-union programs (assignments), the goals of the most complete use of the available resources and the goals proposed by the regions. Two groups of criteria: criteria, which are connected with the use of indicators of the effectiveness of the use of the potential of the region, and criteria of the integration of the different components of its potential, were proposed for the integration of these groups of goals into a single system. Within such an approach the use of problem-oriented evaluations of the scientific and technical potential seems fruitful.

The report of Corresponding Member of the Ukrainian SSR Academy of Sciences A. G. Ivakhnenko (Institute of Cybernetics of the Ukrainian SSR Academy of Sciences) was devoted to the methods of forecasting complex processes. Having indicated the shortcomings of the now widely used procedures of the expert appraisal, simulation modeling and several others, the speaker appealed for the more active use of the methods of the group consideration of arguments (MGUA), the implementation of which on computer makes it possible to obtain the most accurate and reliable results.

Doctor of Economic Sciences Yu. M. Kanygin (Institute of Cybernetics of the Ukrainian SSR Academy of Sciences) drew the attention of those who had gathered to the increasing role of information science in the processes of the generation of scientific knowledge and the management of the national economy and told about the latest directions of "computerization" and several consequences of it for society.

The statement of Doctor of Historical Sciences I. V. Bestuzhev-Lada (Institute of Sociological Research of the USSR Academy of Sciences), who touched upon a wide range of economic, scientific and technical problems, showing their influence on the social development of society, as well as emphasized the need for the development of a set of measurable indicators (indices) of the state of the objects being studied, was greeted with much interest.

Doctor of Economic Sciences Ye. A. Oleynikov (Moscow Institute of the National Economy imeni Plekhanov) told about the method of drafting the section "The Development of Science" in regional programs of scientific and technical progress and proposed to develop a system of passports, which would unite the passports of scientific and technical institutions and the passports of the problems which are being analyzed with the object of their inclusion in the program. The speaker indicated the need for an address nature of the programs and the increase of the accuracy of the statistical information which is used when formulating them. Candidate of Economic Sciences B. G. Saltykov (Central Institute of Economics and Mathematics of the USSR Academy of Sciences) shared his experience with the preparation of the sections "The Development of Science" in the Comprehensive Programs of Scientific and Technical Development of the USSR. Among the most important problems, with which the developers were faced, one should note the lack of exhaustive and standardized data (this especially applies to the sectorial sector of science) and the imperfection of the set of indicators of the evaluation of scientific activity. The development of three or four versions of the forecast of the development of science, the close coordination of the all-union and regional programs and the use of the principle of the special-purpose financing of programs are proposed.

Doctor of Economic Sciences V. P. Aleksandrova (Institute of Economics of the Ukrainian SSR Academy of Sciences) told about the influence of scientific and technical progress on the change of economic indicators. Candidate of Economic Sciences V. S. Tarasovich (Scientific Research Institute of Economics of the Ukrainian SSR State Planning Committee) noted that the effectiveness of scientific developments frequently proves to be low due to the inadequate scale of their circulation. Many components of the economic mechanism are not oriented toward the acceleration of scientific and technical progress: in particular, in preplanning studies the amounts of capital investments and the expenditures on science are not interconnected. Candidate of Physical Mathematical Sciences I. K. Tsikunov (Institute of Cybernetics of the Ukrainian SSR Academy of Sciences) proposed the conception of the "industrial production" of forecasts, for the realization of which a developed system of data banks, which contains information on the current and long-range standards for new equipment, is necessary. Doctor of Economic Sciences G. A. Samoylov (Institute of Cybernetics of the Ukrainian SSR Academy of Sciences) in his statement touched upon several problems of the development of scientific and technical progress at the present stage. Doctor of Economic Sciences V. I. Tereshchenko (Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences) told about advanced forms of the organization of the labor of scientists.

Doctor of Economic Sciences V. P. Shatikhin (Kiev Technological Institute of Light Industry) presented a paper on the application of the principles of systems analysis to the solution of scientific and technical problems. Doctor of Technical Sciences V. G. Gmashinskiy (Moscow) gave a report on models of the forecasting of the development of technology on the basis of patent information.

The joint report of associates of the Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences and the

Kiev Institute of the National Economy imeni D. S. Kotorchenko on a set of studies of the mechanism of the intensification of scientific and technical progress was of particular importance. A. A. Savalyev, A. V. Skofenko, B. A. Malitskiy, V. I. Karpov, V. L. Kolchanov (Council for the Study of Productive Forces of the Ukrainian SSR of the Ukrainian SSR Academy of Sciences) and M. I. Moldavanov (Kiev Institute of the National Economy) reported on the method and results of the scale studies being conducted under the supervision of Professor G. M. Dobrov. A large portion of the presented results already have successfully undergone practical checking. It is planned to use several developments of scientists of the Central Institute of Scientific and Technical Progress, as Candidate of Economic Sciences V. V. Valyukov (USSR State Committee for Science and Technology) noted, when formulating the scientific and technical policy of the USSR.

The results of theoretical methods research and the practical experience, which were reported on at the conference, made it possible to elaborate recommendations on ensuring the increase of the role of science in the technical and socioeconomic development of socialist society.

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CONFERENCES AND EXHIBITIONS

EXHIBITION OF SCIENTIFIC, TECHNICAL ACHIEVEMENTS IN MOSCOW

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Jun 85 p 1

[Interview with USSR Minister of Instrument Making, Automation Equipment and Control Systems Mikhail Sergeyevich Shkabardnya by SOTSIALISTICHESKAYA INDUSTRIYA corresponding G. Lomanov: "By the Route 'Science to Production'"; date and place not specified]

[Text] Today the exhibition "Scientific and Technical Progress-85" opens at the Exhibition of USSR National Economic Achievements. At the request of our correspondent G. Lomanov USSR Minister of Instrument Making, Automation Equipment and Control Systems M. Shkabardnya, deputy chairman of the organizing committee, tells about it.

[Question] Mikhail Sergeyevich, perhaps we could begin with an imaginary tour through the pavilion.

[Answer] I am afraid a good deal of time would be spent on this--for in just its halls the exhibition is spread over approximately 12,000 m², while the outdoor sites near the pavilion, on which the largest exhibits, such as the MI-26 giant helicopter, tractors, grain harvesters and heavy trucks are located, take up twofold more area. At the exhibition it is possible to see a set of miniature instruments for microsurgery and the Salyut space station, to familiarize oneself with computer-aided design systems and to find out about the operation of a unique device for the drilling of the superdeep well on the Kola Peninsula.

In all more than 3,000 exhibits are displayed at the exhibition, and the majority of them deserve not cursory examination, but close study, comprehension and extensive introduction.

[Question] And still at the exhibition there are 20 sections, in each there are the most interesting, key exhibits--could you name if only several of them?

[Answer] If you speak about the exhibits of our section, already upon entering the exhibition visitors encounter an automated information system, by

means of which it is possible to obtain information on the exhibits of the exhibition and their location.

Control computer complexes for various purposes, automated workplaces of planners and designers, as well as other means of computer technology, which are produced by enterprises of the sector, are extensively represented in the section "Computer Technology, Communications." There is not, most likely, one section of the exhibition, in which products of the sector are not exhibited: instruments and automation equipment, which make it possible to develop automated systems for the control of technological processes and to automate processes in scientific research, services and the sectors of the agroindustrial complex.

Visitors will acquaint themselves with flexible, rapidly readjustable manufacturing systems based on robotized complexes, automated transportation and warehousing equipment. This is a prototype of plants of the future, for robots together with other modern equipment are opening the way to rapidly readjustable production modules--the basic units of automated sections, shops and entire enterprises, which are controlled by computer.

The tungsten-free hard alloys, which were developed at the Ural Scientific Center of the USSR Academy of Sciences, and the developments of the Institute of Superhard Materials of the Ukrainian SSR Academy of Sciences and the Belorussian Scientific Production Association of Powder Metallurgy are of great interest--you would simply not name everything.

[Question] However, several regularities are also already traced in this enumeration--you are naming primarily achievements which radically change customary technological processes.

[Answer] Not by chance is so much attention devoted to modern technologies and their introduction in practice. When we speak about the annual assimilation of new machines, instruments and equipment, the count runs into the thousands. Many fewer technological processes--especially fundamentally new ones which revolutionize production--are being introduced, here the count runs already in the tens. But precisely they, in paying for themselves on the average in just a year, yield the greatest economic impact.

[Question] Several of the developments named by you are quite well known, the newspapers have written more than once about them. Does this mean that the exhibition is a kind of report on what has been done in past years?

[Answer] To some extent, yes. But at the same time this display is a look at the future. Of course, among the exhibits there are also such ones which have received deserved recognition, but not proper dissemination. While only the appropriate scale of introduction ensures the efficiency of any advanced development. And the exhibition does not simply display the potential of our science and technology, it shows the means of its use.

At the March CPSU Central Committee Plenum Comrade M. S. Gorbachev said: "We have to achieve a decisive change in the changeover of the national economy to the path of intensive development. We should, are obliged in a short time to

reach the most advanced scientific and technical positions, the highest world level of the productivity of national labor." But for this it is necessary to solve a large number of important organizational problems. The means of their solution were given concrete expression in the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures on the Acceleration of Scientific and Technical Progress in the National Economy" and in the conversation of M. S. Gorbachev with managers of industrial associations and enterprises, kolkhozes and sovkhoses and production brigades, specialists and scientists. Precisely these concepts were incorporated in the basis of the exhibit, which not only shows modern technologies and advanced equipment, but also tells about effective principles of the organization of the "science-production" process and the forms of science-production integration, which makes it possible to shorten the time of development and of the introduction of innovations.

[Question] Hence, is it intended first of all for specialists?

[Answer] Let us say more precisely: designers, process engineers, engineers and organizers of science will find here much that is useful. But the ordinary visitor will also hardly get bored at the exhibition. Here are just a few examples. The party posed the task of the extensive introduction of computers in the educational process. For children, who this year will go to the first grade, the electronic calculator or specialized computer for instruction will become with time just as customary as, assume, the fountain pen became for us. Will it not be interesting for their parents to look at a standard room for the study of computer technology or a display class, in which the students of a vocational and technical school are mastering the principles of programming, being trained for the control of robotic complexes? Will not the "metro" for freight transportation--systems of underground pipeline transport--not attract the attention of any visitor of the exhibition? In short, the exhibit is very representative and diverse, while this is a guarantee that it will be interesting and instructive for every visitor.

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INTERNATIONAL S&T RELATIONS

FOREIGN CONTACTS OF KAZAKH SCIENTISTS

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 1 May 85

[Interview with Vice President of the Kazakh SSR Academy of Sciences Shavkat Shigabutdinovich Ibragimov by a KAZAKHSTANSKAYA PRAVDA correspondent: "Scientists Are for Cooperation"; date and place not specified]

[Text] The cooperation of scientists of different countries and their business contacts are playing a large role not only in the development of the sciences, but also in the strengthening of peace on earth. At the request of our correspondent Vice President of the Kazakh SSR Academy of Sciences Shavkat Shigabutdinovich Ibragimov tells about the foreign contacts of Kazakh scientists.

[Question] Alma-Ata is becoming more and more often a capital of international forums of scientists. Which conferences of recent times are especially memorable?

[Answer] It is worth recalling the international symposium "The Prospects of Molecular Biology and Biochemistry," which was held last year at the base of our Academy of Sciences. This was a conference of the Federation of European Biochemical Societies, which scientists of 24 countries represented. A Soviet-American symposium on problems of modern Asia, a Soviet-Bulgarian symposium of philosophers and a Soviet-Polish seminar on economics were held here. Representatives of 12 countries took part in the All-Union Conference on Nuclear Spectroscopy. We have conducted geological tours for scientists of 18 countries. Last year 12 representatives of foreign firms visited our institutions for negotiations and the repair of scientific equipment. The Ambassador of India to the USSR N. Hasan and Counselor of the Embassy of Japan to the USSR N. Watanabe were received in the Presidium of the Academy of Sciences. These and numerous other measures actually were only of a practical business nature. Scientists, for their most part people of a special incorruptible objectivity, having visited in our country, take away true information about our country. But on the basis of the example of Kazakhstan, "a former outlying district of Russian," the successes of the building of communism can be seen especially clearly.

[Question] During last year's symposium of biochemists it was possible to be convinced that the questions of peace and cooperation are not leaving scientists indifferent. After the scientific meetings during the minutes of relaxation, in a friendly atmosphere which is conducive to openness, they were raised more than one.

[Answer] Yes, and this is natural. Under present international conditions, which the American administration is trying more and more to complicate, the contacts of scientists are difficult. Several colleagues of ours came to the conference on Mossbauer spectroscopy, having overcome all sorts of obstacles on leaving for the Soviet Union. Encountering more than once in the USSR unparalleled cordiality and benevolence, they were convinced long ago: no one intends to "win over" them, the main propaganda of our communist ideas is our deeds, while they are aimed at peace and at the prosperity of all mankind. Precisely this is also broadening the circle of our friends, the circle of foreign scientists who are striving for cooperation with us.

[Question] One must probably also not disregard the fact that the research results of Soviet scientific institutions, including Kazakhstan institutions, are arousing interest abroad? For in the majority of fields Soviet science holds leading positions.

[Answer] Last year alone five patents were received from foreign patent departments for works of Kazakhstan scientists. The Litsenzintorg All-Union Association concluded several agreements with foreign firms just on a development of our Institute of Metallurgy and Ore Dressing. Research results, which are of interest for foreign countries, were obtained at a number of institutions of the Kazakh SSR Academy of Sciences, including the Institute of Chemical Sciences. Now, for example, the question of the cooperation of the Institute of Chemical Sciences with the Institute of Energy and Jet Propulsion Research of Italy and on the performance of joint work on the theme "Chemical and Thermal Problems in a Solid" is at the stage of study. Three seminars on questions of the processing of paper pulp were held jointly with Finnish scientists from the University of Helsinki. At these seminars proposals were made: to reach an understanding on joint research on the use of scraps of wood for the production of polymeric compounds.

[Question] In concluding newer and newer such agreements the relations of scientists of the socialist countries, apparently, can serve as an example of fruitful mutually advantageous cooperation. For here joint research is being conducted in many directions and successfully.

[Answer] And you would not immediately list all the examples of that. Our Institute of Soil Science and the Institute of Soil Science and Agrochemistry of the Hungarian Academy of Sciences are jointly developing a method of forecasting on computer the processes of salt transfer on irrigated lands. Our Institute of Seismology is cooperating fruitfully with the Institute of Excavation Safety of the Main Mining Administration attached to the GDR Council of Ministers. Kazakhstan zoologists and physiologists are maintaining working contacts with institutions of the Czechoslovak Academy of Sciences. Associates of the Main Botanical Garden of the Kazakh SSR Academy of Sciences are helping in the establishment of such a garden in Ulaanbaatar. Cooperation

with the academies of the socialist countries is being carried out on 51 themes, among them are especially large-scale ones which are included in programs along the lines of CEMA. Of course, such multilateral cooperation is yielding good fruits, it is making it possible to differentiate directions for various scientific directions, to coordinate forces and to make good use of the available resources, ensuring the main strategy of science--to serve progress and the increase of the cultural level and well-being of the peoples.

[Question] In fulfilling their international duty, Soviet scientists are also giving much assistance to developing countries. This is another piece of evidence of our good goals, our aspiration for peace and cooperation. What is the participation of Kazakhs here?

[Answer] First of all it is necessary to note the enormous opportunities for scientific research activity, which the institutions of the Academy of Sciences of Kazakhstan afford young people from developing countries, who are studying at higher educational institutions of the republic. The achievements of Kazakhstan science at international exhibitions, our participation in which is constant and representative, is arousing the valid interest of representatives of these countries. Such exhibitions also play, of course, a propaganda role. For example, the exhibitions "The Science, Technology and Economy of the Kazakh SSR" in Afghanistan, "Soviet Inventions" in the GDR and many others contributed to the conclusion of contracts which are advantageous for developing countries. In contrast to American "aid" they do not place their economy under crippling terms. The hundreds of Kazakhstan scientist-specialists, who are helping to build plants in these countries, to prospect for mineral resources and to develop new technologies for emerging industry, are there not only honest advisers and competent consultants, but also envoys of peace, friendship and cooperation.

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AWARDS AND PRIZES

TURKMEN SSR STATE PRIZES IN SCIENCE, TECHNOLOGY FOR 1984

Ashkhabad TURKMENSKAYA ISKA in Russian 30 Apr 85 p 1

[Article: "On the Awarding of the Turkmen SSR State Prizes of 1984 in Science and Technology"]

[Text] The Central Committee of the Communist Party of Turkmenistan and the Turkmen SSR Council of Ministers resolve:

To accept the suggestion of the Committee for Turkmen SSR State Prizes in Science and Technology attached to the Turkmen SSR Council of Ministers on the awarding of the 1984 Turkmen SSR State Prizes in Science and Technology to:

1. Mukhammet Meredov, doctor of physical mathematical sciences, professor, corresponding member of the Turkmen SSR Academy of Sciences, rector of the Turkmen State Pedagogical Institute imeni V. I. Lenin; Sapar Ashirov, candidate of physical mathematical sciences, professor, dean of the Mathematics Faculty of the Turkmen State University imeni A. M. Gorkiy; Sapargeldi Atdayev, candidate of physical mathematical sciences, docent of the Chair of Mathematical Analysis of the same institute; Dovran Bazarov and Amangeldy Torayev, candidates of physical mathematical sciences, docents of the Chair of Higher Mathematics of the Turkmen Polytechnical Institute; Amangeldy Garadzhayev, candidate of physical mathematical sciences, docent, senior scientific associate of the Turkmen Agricultural Institute imeni M. I. Kalinin--for the series of works "The Theory of Boundary Problems for Equations of the Mixed and Mixed-Compound Type."

2. Byashim Karakhanovich Balakayev, candidate of technical sciences, deputy director for scientific work of the Turkmen Scientific Research Institute of Hydraulic Engineering and Land Reclamation of the USSR Ministry of Land Reclamation and Water Resources--for the series of works on hydraulics and the regulation of the operation of pumps on the Kara-Kumy Canal imeni V. I. Lenin.

3. Nikolay Fedorovich Rodyakin, doctor of medical sciences, professor, chief of the Chair of Skin and Venereal Diseases of the Turkmen State Medical Institute, director of the work; Petr Vasilyevich Kozhevnikov, doctor of medical sciences, professor, corresponding member of the USSR Academy of Sciences (posthumously); Shaykhrazy Mukhamedovich Karimov, doctor of medical sciences, professor, chief of the Chair of Pathological Anatomy of the Turkmen

State Medical Institute; Mamed Ereshovich Ereshov, doctor of medical sciences, professor, deputy director for scientific work of the Turkmen Scientific Research Institute of Skin Diseases of the Turkmen SSR Ministry of Health; Regina Stefanovna Dobrzhanskaya, doctor of medical sciences, chief of the Dermato-Venereology Department of the same institute--for the applied scientific elaboration of the problem of cutaneous leishmaniasis (questions of clinic, diagnosis, pathomorphology, immunity, treatment and specific prevention).

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CSO: 1814/203

AWARDS AND PRIZES

PARTICLE ACCELERATION RESEARCH AWARDED USSR PRIZE

Moscow PRAVDA in Russian 12 Aug 85 p 2

[Article by Academician Ye. Velikov: "Atomic Beam Professions; At the USSR State Prize Competition"]

[Text] Many specialists in the practical use of electron beams--X-ray and television tubes, electron tubes and cathode-ray welding equipment--have permanently entered modern engineering and technology. It is less well known that ion beams--fluxes of charged atomic particles--have also been utilized for a rather long time.

A quarter of a century ago, in connection with the intensive development of work on controlled thermonuclear synthesis, on acceleration equipment, and also on a number of applied problems, the need arose for powerful beams of positive and negative ions and also for high-speed atoms with particle energies of tens and hundreds of kiloelectron volts and with small angles of deflection--1-2 degrees. Work began to unfold on the development of powerful ion sources and atomic injectors. They were organized on the basis of the coordination of the endeavors of scientists of a number of leading institutes of physics. After more than 20 years, their research has led to impressive results.

The scientists were required to develop qualitatively new, highly-effective gas-discharge and surface-plasma emitters of positive and negative ions of hydrogen, deuterium and several other gases. At the same time, detailed studies were conducted on the physics of gas discharge, and the fine properties of ion formation in plasma and on a solid surface were studied. A surface-plasma mechanism was proposed for the origination of negative ions, and a method was developed for generating them which has received world-wide recognition. The physical processes which take place during propagation of intensive ion and atomic beams were studied, and their transport to the necessary states have been determined.

On the basis of the studies conducted, very precise sources of positive ions were developed. The power of a beam produced by such a source reaches several megawatts, which is comparable to the power of the first atomic power plant. The source of negative ions produced by the use of the volume-plasma method for obtaining them and working in a continuous system surpasses foreign analogs in economy. The use of the surface-plasma method enabled sources of negative ions to be developed which have served as a prototype on which foreign laboratories were oriented in the development of their designs.

The fast-atom injectors developed by Soviet scientists were used also to obtain the heating of plasma in such thermonuclear devices as the OGRA and Tokamak-11 [expansion unknown] in experiments from which important results were obtained, which introduced an important contribution to the understanding of processes taking place in high-temperature plasma. Even more powerful injectors for new devices are being constructed, primarily for the very large-scale Soviet Tokamaka T-15 [expansion unknown]. The sources of negative ions found use in the newly constructed high-energy accelerators of intensive beams, the so-called "meson factories." A number of specialized ion systems have been built, in particular for ion beam welding of metals by alloying and ultrasonic treatment of a welded seam.

The examples enumerated far from exhaust all the possibilities which are concealed in beams. In the very near future, we may become witnesses of the formation and development of new branches of engineering and technology related to their use.

The advancement of the cycle of the work "Development of High-Power and Long-Life Ion and Atomic Beams" at the competition of the USSR State Prize is the merited recognition of the contribution of the collective of researchers at the Atomic Energy Institute imeni I. V. Kurchatov, the Nuclear Physics Institute of the Siberian Oblast of the USSR Academy of Sciences and the Physics Institute of the UkSSR in the acceleration of scientific and technical progress.

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CSO: 1814/266

GENERAL

MOLDAVIAN ACADEMY PRESIDENT ON REPUBLIC S&T PROBLEMS

Kishinev SOVETSKAYA MOLDAVIYA in Russian 1 Aug 85 p 2

[Article by A. Zhuchenko, corresponding member of the USSR Academy of Sciences and president of the Moldavian Academy of Sciences: "Practice and Problems in Scientific/Technical Progress: Cumulative Acceleration"]

[Text] Converting the national economy to fast-track development requires decisive improvement in the organization of scientific research, concentration of scientific potential on critical problems in the national economy and wide-spread, rapid introduction of the achievements of advanced scientific and technical concepts into manufacturing. The Academy of Sciences has a decisive role in this connection since, as underscored at the April (1985) Plenum of the CPSU Central Committee, the matter involves re-equipping all branches of the national economy with the latest achievements in science and technology. A practical solution to this problem can only be based on advancing growth in fundamental scientific research.

The realization of such a complex mass of tasks requires not only the applicable scientific potential but also precisely tuned and detailed tactics for its use.

The Academy of Sciences rightfully occupies a leading place in the structure of the four branches of sciences (academic, institutions of higher learning, sector and plant) operating in the republic. One fact speaks for its capabilities: in the last ten years alone the volume of research in the Academy system has tripled. This has provided the capability of obtaining new basic knowledge in physics, mathematics, biology, chemistry, biophysics and other fields whose application in the current five-year plan alone allowed the introduction of more than 550 new technologies, material and tools into the national economy. This infusion tripled the economic effect as compared to that of the previous five-year plan.

Additionally, Academy scientists understand that their influence in accelerating the rate of scientific and technical progress can and must be incomparably higher. How should work be organized today? What are the

principles that should serve as the basis for planning and organizing research and for introducing finished developments into practice?

Any activity, including science, achieves optimum results primarily when it has a distinct, specific orientation. With this in mind, the Academy of Sciences Presidium, the party committee and scientists on institute boards first thoroughly analyzed scientific research topics and then selected measures whose implementation satisfies the primary thrust of CPSU Central Committee meetings on questions of speeding scientific and technical progress. In specific terms this means orienting academic institutions toward technologically targeted research and toward increasing their role and responsibility in the creation of theoretical bases for innovative equipment and technologies for the republic's industries and agricultural/industrial complexes.

We do place such emphasis on this orientation? Because in the next 15 years high industrial capability growth rates will allow the industrial production to account for 60-65 percent of the republic's revenue and will assure stable growth of the national economy as a whole. This trend requires special attention to development of the technical and physical sciences as well as greater participation by Academy institutions in the growth of industry in the republic. We intend to significantly strengthen the close ties between institutes, ministries and the enterprises they control, such as Mezon, Schetmash, Signal, the Volna production association and the Mikroprovod scientific production association. We are expanding the scope of research in fields such as flexible automated systems, robotics, microelectronics and electronic and construction materials.

Further, we are concentrating efforts on solving problems in land reclamation and water management construction, the effective use of nonmetallic minerals, the storage and processing of vegetable resources as well as adaptive intensification of the agroindustrial complex. These programs are organized around problem-oriented interagency planning of research and practical design work, allowing the highly effective use of scientific potential and more rapid introduction of final products.

This determination of priority goals for academic science in the acceleration of scientific and technical progress is due to specific prevailing economic conditions in the republic and to the party's strategic purpose in the area of economic intensification: to achieve more while using comparatively fewer resources in production.

We know that at present imported resources comprise some 27 percent of the republic's economy. The ecological situation is strained to the limit as well. Moldavia is known to have the highest population density, a high level of human demand on the ecological system and a low water supply. Therefore our process of industrial intensification must be based exclusively on resource-conserving and environmentally safe technologies which provide the most efficient use of land, water, raw materials and energy. In other words, in addition to labor productivity and product quality, resource conservation and environmental protection must become primary criteria for the scientific and technical level of new types of equipment and technology.

In addition to further development of the research and coordination roles of academic science, there are plans for the strengthening and full utilization of its forecasting capabilities. As we know, the gosplans of the union republics and republic academies have the responsibility for developing long-term composite regional programs for scientific and technical progress. This type of program has been developed for the period ending in 2005 and will be updated with each future five-year plan.

The decisive orientation of science to industry and of industry to science requires a major change in the system used to introduce new technologies. It is obvious that a study of the characteristics of "scientific production" and of the specific scientific potential available is in order. For example, poor development in the republic of sector research in the area of highly scientific equipment requires not only the strengthening of these capabilities in the Academy system but also the creation of corresponding experimental production facilities, including the organization of scientific and technical complexes in cooperation with major industrial enterprises and broader incorporation of ministry and departmental resources to these ends. The latter action is especially important since more than half of the scientific research establishments in the republic do not have their own experimental production facilities.

In examining future problems facing academic science in the industrial area, special attention should be drawn to the still inadequate use by ministries and departments of results already obtained. The introduction of Elitron and Plazmoliz units is a typical example of this. Estimates show that widespread use of Plazmoliz units would give the republic additional production equivalent to the crop from 2500 hectares of gardens and vineyards. It is not hard to imagine the economic effect of introducing a machine for electroalloying metal surfaces considering the fact that the annual cost of maintaining the agricultural machinery fleet alone amounts to nearly 25 percent of the cost of the machinery itself.

Unfortunately, at this time it is easier to achieve mass production of new equipment required by one specific ministry than it is to produce a technology or unit required by all. The USSR Ministry of Instrument Making, as an example, has already arranged the production of Elitron units, but only for its own needs. At the same time, the republic's Ministry of Land Reclamation and Water Resources, Ministry of Highway Construction and Maintenance and Ministry of Agriculture, who would seem to be in special need of these units for widespread application, have managed to obtain a total of one each.

In order to speed the implementation of developed scientific innovations and to improve the structure of the economic plan, in which the "introduction" section should be the leading area rather than secondary in importance, special attention must be devoted to the implementation of scientific recommendations of an interdepartmental nature. In our opinion, the need for further improvements in the structure of the republic's agencies responsible for controlling scientific and technical progress suggests the question of the suitability of concentrating agriculturally oriented scientific research institutes within the Ministry of Agriculture's system. This would allow more

effective implementation of a single scientific and technical policy in the agroindustrial complex.

Production orders based on cost agreements play an important part in the introduction problem. How is this problem being solved today? Unsatisfactorily, to speak plainly. For example, only five percent of the five million rubles of Academy of Sciences cost agreement work is awarded at the ministry or departmental level. The main reason for this situation is that at this time 18 of the 28 ministries do not have their own scientific and technical development fund. As a result, 95 percent of the contracts in the republic are made with individual enterprises, and more than 50 percent of the total amount is generally over budget. Thus it is no accident that the growth in republic ministries and departments due to the introduction of new technology is 4-5 times less than that of national enterprises.

Accelerating the pace of scientific and technical progress requires the creation of leading enterprises in each sector, broader implementation of the innovations achieved by scientific centers in other republics, primarily the Ukrainian and Belorussian, significant improvement in the field of science involving plant operations and improvement of the ties between scientific institutions and design institutes, a matter of special importance in restructuring of existing enterprises. In other words, all the links between science, technology and production must be systematically and steadily strengthened. As Marx stated: "the efficient development of society involves not only the growing power of science but also the degree to which science is already considered as a basic element of capital."

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GENERAL

KAZAKH S&T PROGRESS, ACHIEVEMENTS ENUMERATED

Alma-Ata NARODNOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 7, Jul 85 pp 7-10

[Article by Candidate of Economic Sciences Ye. Sagimbayev, chief of the Science and Technology Department of the Kazakh SSR State Planning Committee: "The Reserves of Science Into Action"]

[Text] "As the main strategic lever of the intensification of the national economy and the better use of the accumulated potential," General Secretary of the CPSU Central Committee Comrade M. S. Gorbachev noted at the April (1985) CPSU Central Committee Plenum, "the party is bringing to the forefront the cardinal acceleration of scientific and technical progress."

During the 11th Five-Year Plan the sectors which govern scientific and technical progress--the fuel, power, machine building, chemical and radio engineering industries, nonferrous and ferrous metallurgy--have been developed rapidly.

The material and technical base of the sectors of the agroindustrial complex is being radically updated and strengthened. During the years of the current five-year plan 300 modern industrial enterprises, shops and works, including the Ekibastuzskaya GRES-1, the tin shop of the Karaganda Metallurgical Combine, the Chilisayskiy Phosphorite Mine, the Taldy-Kurgan Plant of Lead Batteries, the Shevchenko Plastics Plant, the first section of the Ust-Kamenogorsk Kaztyazhpromarmatura Plant, the second section of the Novo-Karagandinskiy Cement Plant, the Chimkent Petroleum Refinery and other facilities, which are furnished with advanced equipment and technology which do not have analogues, have been put into operation.

The placement into operation of fixed production capital worth 36.4 billion rubles, as well as the performed renovation and retooling decreased the average age of the installed industrial equipment to 9 years.

At the production associations and industrial enterprises of the republic there are about 4,000 completely mechanized sections, shops and works, 6,000 mechanized flow and automatic lines, 38,000 units of automatic and semi-automatic equipment, 318 manipulators and industrial robots.

During the past years of the five-year plan alone in republic industry 809 sections, shops and large works were completely mechanized and automated, 1,154 mechanized flow, completely mechanized, automatic and completely automatic lines and 9,973 units of highly productive equipment are installed.

The scale of the work on the retooling and renovation of operating works is increasing from year to year. Whereas during the years of the 10th Five-Year Plan about 15 percent of all the capital investments for production purposes were allocated for these goals, in 4 years of the current five-year plan the share of investments came to 20 percent. In individual sectors retooling and renovation have become the main directions of production development. Thus, the enterprises of nonferrous metallurgy, light and the food industries during the current five-year plan have allocated for these purposes from 50 to 60 percent of the earmarked capital investments.

By means of renovation and retooling in the coal industry of Kazakhstan the stability of underground mining has been achieved, the growth rate of the production of fuel in open-cut mines has been accelerated. In nonferrous metallurgy it was possible to change over to the mining and processing of ores with a lean metal content. The retooling of the Pavlodar Aluminum Plant with its changeover to the processing of highly carbonaceous bauxites and the renovation of the Zyryanovsk Lead Combine and other enterprises are under way. The machine building base of the republic is being reequipped. The renovation of the Machine Tool Building Plant imeni XX-letiya Oktyabrya, the Tselinogradselmash Production Association and a number of other large enterprises is being completed.

The strengthening of the scientific potential of the republic is occurring at the same time as the creation of a modern industrial base.

In 4 years of the current five-year plan the number of scientists and science teachers increased by 5.5 percent, including doctors of sciences--20.3 percent, candidates of sciences--16.7 percent.

At present in the republic there are hundreds of scientific institutions and higher educational institutions, at which a large detachment of scientists works. The Kazakh SSR Academy of Sciences, to which 34 institutes and institutions, which are conducting research in all the most important directions of modern science, belong, is the main headquarters of republic science.

The scale of plant science is growing. Research and pilot operations are being performed directly at the works. Specialists have at their disposal hundreds of laboratories, design bureaus, pilot experimental works, shops and sections.

New forms of the contact of science with production are being introduced. The conclusion of contracts on the creative cooperation of scientific institutions with enterprises and organizations, the approval of plans of the joint research of academic institutes and higher educational institutions with ministries and departments, the establishment of sectorial laboratories directly at scientific institutions and the consolidation of a number of

industrial and agricultural enterprises as the base enterprises for the conducting of pilot and pilot industrial tests of the developments of scientists are being used in practice.

Higher educational institutions with each year are expanding one of the effective forms of the strengthening of the interconnection of the educational and research process with practice--educational scientific production associations. In 1984 two new associations were set up, while their total number reached 26. They are working on the basis of 15 higher educational institutions of the republic.

As a result of the intensive integration of science with production the institutes of the Kazakh SSR Academy of Sciences alone jointly with various sectors of the national economy during 1981-1984 introduced in practice 775 scientific developments with an economic impact of 339.5 million rubles.

As a whole during 1981-1984 more than 80,000 scientific and technical measures were introduced in the national economy of Kazakhstan with an economic impact of 523.7 million rubles. This made it possible to conditionally free 45,300 people, which is equivalent to the increase of labor productivity (by means of the introduction of new equipment) by 3.4 percent.

More than 50 percent of the total increase of labor productivity in the republic was provided by the introduction of scientific and technical measures.

During 1981-1984 USSR State Prizes were conferred on 15 specialists and scientists of the republic and 138 people were awarded Kazakh SSR State Prizes for outstanding achievements in science and technology. The introduction of scientific developments contributed to the improvement of the use of production capacities for the output of many types of industrial products. In 1984 the capacities for coal mining, the output of alumina, agricultural machinery, machine tools and cotton fabrics and the production of many food products were used at the rated level. The use of capacities for the production of steel increased by 0.3 percent as against 1983 and came in 1984 to 96 percent, zinc--1.2 percent (84.7 percent), tractors--6.8 percent (96.4 percent), silk fabrics--11.8 percent (85.6 percent) and leather footwear--1.1 percent (98.6 percent).

Last year the entire increase of commodity production (396.4 million rubles) was obtained by the more complete utilization of production capacities and the introduction of new equipment.

Steps are being systematically and purposefully taken on the timely updating of the assortment of items being produced and the removal from production of obsolete products. In 4 years of the five-year plan 790 new types of items were assimilated, including 140 for the first time in the country. During this time 116 descriptions of unmarketable products were removed from production. All this ensured an increase of the production volume and the share of products of the highest quality category from 11.2 percent in 1980 to 13.3 percent, in 1984 more than 5,000 items were marked with the State Emblem of Quality.

In republic industry the introduction of comprehensive systems of product quality control (KSUKP's) is being completed. More than 1,700 enterprises are working on their development, while this system has already been introduced at 920. On its basis 640 enterprises and individual sectors as a whole have begun the introduction of the comprehensive system of the increase of production efficiency and work quality (KSPEiKR).

In the report of Member of the Politburo of the CPSU Central Committee and First Secretary of the Kazakhstan CP Central Committee Comrade D. A. Kunayev at the 16th Kazakhstan CP Central Committee Plenum there was noted "...the particular need for the significant acceleration of scientific and technical progress in all the spheres of our multisectorial economy, the fundamental retooling of a number of sectors, the increase of their technical, economic and engineering level."

The work on technical progress in the republic brought a number of sectors with respect to many indicators up to the leading levels.

In nonferrous metallurgy of Kazakhstan the extraction of copper from mineral raw materials exceeds by 3.5 percent the average sectorial indicator for the country, molybdenum--by 4.3 percent. The subdivisions of the republic Ministry of Geology have achieved the highest level of labor productivity in the country in deep drilling.

In local industry of the Kazakh SSR twofold more new items are assimilated in a year than in this sector in Belorussia, threefold more than in Kirghizia and fivefold more than in Azerbaijan.

The capital-labor ratio and the power-worker ratio of the workers of agriculture of Kazakhstan are nearly 1.5-fold greater than on the average in agriculture of the USSR.

As a whole for the national economy the capital-labor ratio increased from 13,700 rubles per worker in 1980 to 16,600 rubles, including in industry from 18,600 rubles to 23,000 rubles, in construction from 4,500 rubles to 6,000 rubles, in agriculture from 11,800 rubles to 13,900 rubles and in transportation and communications from 24,500 rubles to 28,800 rubles.

The level of the mechanization and automation of production processes in republic industry has exceeded 46 percent. During 1981-1984 alone 115,500 people were converted from manual to mechanized labor, here in the leading sectors: in the Ministry of Nonferrous Metallurgy--5,090, in the Ministry of Power and Electrification--6,900, in the Ministry of Local Industry--6,090 and in the Ministry of Light Industry--4,030.

In industry the proportion of workers, who perform manual operations, decreased by 3 percent and came to 33.4 percent, respectively in construction by 3.7 percent (58.2 percent) and in agriculture by 1.6 percent (51.5 percent).

The increase of the technical level of production and the decrease of the share of manual labor contributed to the increase of the creative activeness

of engineering and technical personnel and workers. In 4 years of the current five-year plan 7,050 inventions and more than 569,000 efficiency proposals were used in the national economy of the republic. The economic impact from their use increased as compared with this period of the preceding five-year plan by 22 percent and came to 1,114,300,000 rubles, in addition the economic impact from the use of inventions increased by 1.9-fold.

The improvement of the management of the sectors of the national economy, production associations, enterprises and organizations was accomplished by the extensive use of the computer hardware of automated control systems.

In 4 years of the five-year plan tens of computers were put into operation on the basis of general-purpose processes.

In all 77 automated control systems for various purposes were put into operation, of them 23 are automated systems for the control of technological processes of the Ministry of Power and Electrification, the Ministry of Nonferrous Metallurgy, the Ministry of Light Industry, the Ministry of the Construction Materials Industry, the Ministry of Motor Transport of the republic and others.

The economic efficiency from the introduction of computer technology and automated control systems during the past years of the five-year plan came to 85.6 million rubles, including more than 4 million rubles in power engineering, 8.5 million rubles in nonferrous metallurgy, 9.1 million rubles in light industry, 10 million rubles in motor transport, 1.1 million rubles in geology and so on.

The extensive use of the goal program method is one of the directions of the improvement of the national economic planning of scientific and technical progress. Its use makes it possible to concentrate forces and physical assets on the achievement of the end results, to ensure the comprehensiveness of the solution of the posed problems and the continuity of the implementation of the necessary measures and to expedite the practical use of the results of scientific research and development.

The scale of the use of the goal program method of planning the development of the sectors of the national economy of the republic is increasing. At present about 190 enterprises and organizations and 55 ministries and departments of Kazakhstan are taking part in the implementation of 709 assignments (stages) and 93 all-union scientific and technical programs which were approved for 1981-1985.

In all 38 stages and assignments of 8 republic scientific and technical programs are also being implemented, 12 ministries and departments and 28 enterprises, organizations and scientific and technical institutions are taking part in this.

At present the formulation of 18 republic scientific and technical programs, the assignments of which will be included in the State Plan of Economic and Social Development of the Kazakh SSR for 1986 and the 12th Five-Year Plan, is being carried out.

The scale of the influence of technical progress on production efficiency and work quality in the republic is significant, but a number of unsolved problems and organizational questions are checking the pace of the introduction of everything new and advanced in practice.

Individual assignments of the State Plan of the Development of Science and Technology are being included by union ministries for republic sectors without study and consultation with the republic Council of Ministers or State Planning Committee. They are, as a rule, not balanced with the availability of material, technical and financial resources, as well as production capacities. Thus, union organs establish annually for the Kazakh SSR Ministry of Land Reclamation and Water Resources an assignment on the use of laser equipment in the construction of the collecting and drainage system without the availability of the appropriate production capacities and industrial equipment. The situation with the volumes of the union assignments on reinforced concrete components, with the use of solar energy and with the use of superplasticizers is much the same.

As a result of such an approach of the union ministries to the volumes of the assignments, which are established for republic sectors, the systematic nonfulfillment by them of the approved plan or its frequent adjustment (without the consent of the republic State Planning Committee) occurs, which adversely affects the development of scientific and technical progress in the region. In 1984 alone 13 ministries and departments corrected through union organs the plan on 60 assignments (24.1 percent), including: the Ministry of Procurement--7 (70 percent), the Ministry of Rural Construction--16 (57.1 percent).

The indicators of the plan of the development of science and technology have not been included in the basic evaluation and fund-forming indicators of the production activity of enterprises. This gave managers an excuse to treat the plan as an auxiliary plan. As a result a number of sectors (the Ministry of Construction of Heavy Industry Enterprises, the Ministry of Rural Construction, the Ministry of the Construction Materials Industry, the Ministry of Land Reclamation and Water Resources, the Ministry of the Meat and Dairy Industry, the Ministry of the Fruit and Vegetable Industry, the Ministry of Motor Transport, the Ministry of Power and Electrification and the Ministry of Nonferrous Metallurgy of the republic, the Kazakh SSR Main Administration of the River Fleet and others) during the current five-year plan are not fulfilling the plan.

In individual sectors there are no precise criteria for the inclusion of assignments in the plan of the development of science and technology. The urgency of the assignments being included in it and the reliability of the calculations of their economic efficiency are not evaluated. Analytical work on the coordination of the plan with material and technical supply does not always precede its formulation. Due just to the lack of supply of resources (the insufficient supply of materials and equipment, the shortfall of assets, their quarterly breakdown which is incommensurable with the plan) 18 sectors of the national economy of the republic did not cope with the plan of the development of science and technology for 1984.

At the same time the proportion of the enterprises, which introduced measures on scientific and technical progress, for the republic as a whole in 1984 came to only 66 percent, including for the State Committee for the Supply of Production Equipment for Agriculture--42 percent, the Ministry of Procurement--42.4 percent, the Ministry of the Fruit and Vegetable Industry--38.9 percent, the Ministry of Land Reclamation and Water Resources--76.9 percent and the Ministry of Motor Transport--57.5 percent.

The efficiency of the new equipment being introduced is directly dependent on its further use. At the same time 55 percent of the mechanized flow lines and 38 percent of the automatic lines were not used at the rated capacity. Nearly 1,900 mechanized flow lines and 310 automatic lines operated without a full load. The mechanized lines were not used sufficiently at full capacity (from 40 to 66 percent) at the enterprises of the Ministry of the Food Industry, the Ministry of Construction of Heavy Industry Enterprises, the Ministry of Rural Construction, the Ministry of the Timber and Wood Processing Industry, the Ministry of the Fruit and Vegetable Industry, the Ministry of the Construction Materials Industry and the State Committee for the Supply of Production Equipment for Agriculture. Moreover, of the total number of checked enterprises means of the complete mechanization and automation of production were not available at all at 40.6 percent.

In industry the rated capacities of enterprises, shops and works, which are being newly put into operation, are being assimilated late. In all 28 most important facilities were put into operation and renovated in the republic during 1981-1984, but the rated capacities to date have not been assimilated at 18. These works--the Chimkentshina Association, the Shevchenko Plastics Plant, the Novodzhambulskiy Phosphorus Plant, the Karaganda Plant of Industrial Rubber Items and a number of others--in case of the timely achievement of the rated capacities could produce additional output worth more than 25 million rubles a year.

There are hitches in the renovation and retooling of production. Thus, as a whole for the republic the assignments on the assimilation of capital investments for the renovation and retooling of production in 4 years of the current five-year plan were fulfilled by 95 percent. The rate of the assimilation of the allocated assets is low at the Kazakh enterprises of the USSR Ministry of the Chemical Industry (78.5 percent), the USSR Ministry of Mineral Fertilizer Production (79.4 percent) and the republic Ministry of Nonferrous Metallurgy (91 percent). The Kazakh SSR Ministry of Power and Electrification, for example, is allocating just 5.8 percent of all the capital investments for retooling and renovation, and only 80 percent of them are being assimilated.

The introduction of nonprogressive types of new equipment and the underutilization of capacities and means of mechanization and automation are decreasing the technical level of production of a number of sectors. The proportion of the mechanization of production reached, for example, at enterprises of the republic Ministry of the Meat and Dairy Industry 32 percent, the Ministry of Housing and Municipal Services--43.8 percent, the Ministry of the Fruit and Vegetable Industry--42 percent, the State Committee

for the Supply of Production Equipment for Agriculture--43.1 percent and the Ministry of Power and Electrification--49.6 percent.

In the suggestions of the USSR State Committee for Science and Technology on the removal from production in 1985 of obsolete machine building products products of enterprises of Kazakhstan are also indicated: coiling machines (NK-12, NK-24) produced by the Alma-Ata Plant of Heavy Machine Building, the N-3222 crank sheet shears of the Chimkent Production Association of Forge and Press Equipment, the ESA-12G electric shears of the Aktyubinskselemash Plant, the IRMG-4 machines for the application of mineral fertilizers to the soil of the Tselinogradselemash Production Association and so on.

For the intensive development of all the sectors of the economy it is necessary that new equipment and technology exceed the achieved level. However, as the results of the spot check by the State Commission of Experts of 318 designs show, more than half of them, which previously had undergone departmental appraisal and were approved, were returned for modification due to low technical and economic indicators, an unreliable estimated cost, gross violations of the construction norms and regulations, unsound design approaches and other serious shortcomings.

The Kazakh State Institute for the Planning of Nonferrous Metallurgy Enterprise, the Kazakh Scientific Research and Planning Institute of Motor Transport and the Kazakh Planning, Design and Technological Institute of Local Industry are allowing many discrepancies in designs.

The KazNIIgiprosfor Institute when designing the pellet factory of the Karatau Chemical Plant due to the poor arrangement of production on the site, inefficient design approaches and other miscalculations allowed the excess consumption of 150 tons of reinforcing steel, 100 tons of rolled metal products, more than 2,000 tons of cement, 7,000 tons of standard fuel and the increase of the cost of construction to 300,000 rubles.

Too little attention is still being devoted to the development in the republic of experimental bases and pilot works. The weak experimental base and interdepartmental "barriers" are not enabling the sectors and scientific institutions of the republic to speed up the introduction in production of a number of completed effective scientific studies.

For many years the Kazakh SSR Ministry of the Construction Materials Industry has not introduced the technology of obtaining Portland cement on the basis of electrothermal phosphorus slags, which was proposed by scientists of the Karaganda Institute of Chemistry and Metallurgy.

For a number of years the volumes of the introduction of the technology of obtaining protein-fat concentrate from production scraps have not increased at the meat combines of the republic Ministry of the Meat and Dairy Industry. But this technology has been patented in five foreign countries, the sale of licenses to foreign firms is being organized.

The Kazakh SSR Ministry of Agriculture is not taking steps on the increase of the volumes of the introduction of highly efficient technologies which have

already been assimilated at individual farms--the use of dry bacterial ferments, the cultivation of nutrient yeast and the development of alkaline lands.

The solution of the problem of the complete use of the ores of the Lisakovsk deposit with the obtaining of helenite slurry for the output of alumina at the Pavlodar Aluminum Plant is being dragged out. According to the estimate of the Scientific Research Economics Institute of Planning and Norms attached to the Kazakh SSR State Planning Committee the saving here would come to more than 200 million rubles.

The problems of the increase of the intensification of production in close connection with the tasks of the increase of the role of planning, the consolidation of cost accounting and the further acceleration of the integration of science and practice need thorough study. The problems of the ratio of the plans of production and new equipment, planning and competition, sectorial and territorial plans, physical and value indicators, cost accounting and commodity-money relations and so on require close attention.

For the further increase of the efficiency of social production it is necessary that all the sectors of the national economy of the republic achieve the leading levels of science and technology. Scientific and technical progress is becoming a component of intensification, its introduction is becoming the dominant factor of the changeover of the economy to the path of its intensive development and the leading unit in the system of production for the 12th Five-Year Plan.

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GENERAL

PROBLEMS IN DEVELOPMENT OF NEW MACHINES

Moscow PRAVDA in Russian 10 Jun 85 p 2

[Article by Vyacheslav Goncharov: "Becomes Known in Comparison"]

[Text] We live in a world of machines. By means of them people produce food, shoes and clothing, make the most diverse products--from nails to the most complex spacecraft. And how important it is that in complete conformity with the demands of the April CPSU Central Committee Plenum this equipment would be based on the most advanced scientific discoveries and would be highly efficient and revolutionary.

There have been set for the developers of equipment the most difficult tasks, which require of them a creative approach, the maximum exertion of effort and efficiency. And it is necessary to create for them the appropriate conditions for this. Already today one should carefully observe what is preventing them from working to full effect, why innovations, which are oriented not toward tomorrow, but toward yesterday, are still coming to light. Several problems, which were begun in the survey "The Circulation of Experience," will also be discussed.

In the Shadow of the "Firm"

A designer got his discharge from the Donetsk State Scientific Research Planning Institute of Coal Machine Building. One of the main reasons for his leaving was the following: there is no moral satisfaction with the job, it is not that in the local and even in the wall newspaper the names of developers of coal cutter-loads at times are not mentioned. And a good specialist left for the system of personal services.

But at one time it was not that easy to get a job at the Donetsk State Scientific Research Planning Institute of Coal Machine Building. Many mining engineers dreamed of going through its creative school. And how! Excellent machines, many of which are known far beyond the country, originated and got a start in life here. Here at one time they also developed the first series-produced coal cutter-loader in the world, to the pioneers of the assimilation

of which a monument was even erected in the mining city of Torez. In the Donbass they also remember to this day the names of its developers--designers A. Sukach and V. Khorin.

But today the authors of new machines actually remain as if in a shadow. Hardly anyone in the basin knows, for example, that V. Raspopov, a talented engineer, is the chief designer of the UKR and Temp cutter-loaders, which mechanized operations in steep seams.

Unfortunately, not only at this institute, but also at others it has become the rule: to conceal specifically individual creative developments behind the name of the "firm," the plant, the design bureau. But in all sectors there are their own talented Korolevs and Tupolevs, who, incidentally, wish that they would know about their successes not only in the design bureau, but also in the sector, that there would also be honor according to labor.

The decline of the prestige of creative engineering labor has led not only to the turnover of personnel even in well-known collectives, but also to the fact that today many design bureaus in practice have become women's design bureaus. Excellent performers of a specific job, the representatives of the fair sex, unfortunately, rarely rush into a fight for a bold idea, a daring view: there is enough domestic trouble as it is.

The decree of the CPSU Central Committee, the USSR Council of Ministers and the All-Union Central Council of Trade Unions on the improvement of the remuneration of the labor of scientists, designers and process engineers was recently adopted. It is aimed exactly at the increase of their material and moral interest in the development of the most efficient equipment and in the acceleration of scientific and technical progress. It is now necessary more quickly to overcome psychological barriers and to improve the work. Machines, machine tools, automatic lines and other items with the stamp "Made in the USSR" long ago won popularity in the work. Now last year nearly half of the assimilated new technical products in their indicators correspond to the best domestic and foreign models or even surpass them. But it is also impossible to shut one's eyes to the fact that many machines are still excessively heavy and far from the current requirements of design, and, moreover, at times are also inferior to the best models in productivity. Here is an example.

The Cherkassy Plant of Special Technological Equipment of the Ministry of the Electrical Equipment Industry aimed at the production of a new robot which was developed at the VPTIelektro [not further identified]. How does it "look" against the world background? Let us put it mildly, not advantageous. As compared with its foreign colleague it is 2.5-fold heavier. Why? The electric drive is positioned in not one, but three cabinets. The Ministry of the Machine Tool and Tool Building Industry supplied gear boxes of a long obsolete design, which are heavy.

"Will such a heavyweight robot attract the attention of foreign specialists, if it is shown at an international exhibition?" they ask A. Yelizarov, deputy director of the VPTIelektro, and V. Skredenias, chief engineer of the Soyuzelektrotekhnologiya All-Union Industrial Association.

"No," they reply, not a bit embarrassed.

Emulate What?

The developers of equipment always have two paths. Some immediately threaten the world level. Others move ahead in small, cautious steps--they take the path of the partial modernization of an old design.

Of course, the first path is difficult and not always covered with roses. But then what opportunities there are for daring attempts, the discovery of talented people, of whom there are plenty in our country, and creative zeal! Precisely it leads to revolutionary changes--the development of fundamentally new technological systems and equipment of the latest generations, which provides the greatest productivity, the need for which was spoken about at the April (1985) CPSU Central Committee Plenum. An example of this is the Ivanovo Machine Tool Building Association imeni 50-letiya SSSR. Back 10 years ago its general-purpose machine tools were sold even through advertisements in the newspaper: the products did not have a market. But today its machining centers are well known throughout the world, eminent firms are stocking up with them.

In a comparatively short time the plant, which hardly anyone knew, under the management of V. Kabaidze, a talented production organizer, joined the leaders of domestic machine tool building. At first they assimilated here NC machine tools, then in just a year organized the production of machining centers and now are producing highly efficient equipment for flexible automated manufacturing systems, for which V. Kabaidze and the group of their developers in 1983 were awarded the USSR State Prize. And the other day the title of Hero of Socialist Labor was conferred on General Director V. Kabaidze and A. Pryakhin, the leader of a brigade of machine tool operators, for outstanding successes in work. Many machine tool builders have been awarded orders and medals. Honor according to labor.

Here is where a real school of advanced know-how should be set up! And there should be promptly put through it not only the managers of large machine tool building and machine building plants of the country, but also ministers and the executives of several state committees, who are involved in the development of equipment, the organization of labor and production and competition.

Everything, after all, becomes known in comparison. Experience. And one's own omissions, miscalculations. And the novelty of innovations. Precisely because of this many readers of PRAVDA propose to determine the technical level and quality of new machines and equipment only in comparison with the best analogues in the world, depending on the extent to which the new model surpasses its analogue, and also to establish the sizes of bonuses and the incentive price markups. This would become a good stimulus of creativity and a motive force of progress.

But first of all it is necessary to free the developers of equipment from the magical influence of the "gross." The unjustified replacement in pursuit of an increase of the sales volumes of even successful inexpensive models of

equipment with more expensive ones was spoken about at the meeting in the CPSU Central Committee on 8 April. The manager of one of the farms related that instead of a reliable and easily serviced stacker the workers of the countryside have begun to receive a machine, which is less successful in design and more expensive. Unfortunately, there are many such examples. Frequently the labor intensiveness of innovations increases. Expensive metals are used generously in them without particular need. A safety margin, which no one needs, is being created by the use of heavy rolled metal products. But then the wholesale price increases, the growth rate stays level.

Here it is for the USSR State Committee for Prices to decide. Incidentally, it has already set to work on establishing order. In recent times due to unjustified labor and material expenditures the wholesale prices for the KLM-500 belt conveyor for the Berezovskaya GRES, which was produced at the Aleksandriya Plant of Materials Handling Equipment of the Ministry of Heavy and Transport Machine Building, the mill of wet self-grinding of the Syzran Turbine Building Plant of the Ministry of Power Machine Building, the seine drawing unit of the Mariinskiy Posad Prommekhanizatsiya Pilot Experimental Plant of the Ministry of Machine Building for Animal Husbandry and Fodder Production and so on were reduced significantly.

But all these facts were discovered during special appraisals and checks. How is one to force the machine builders themselves to fight effectively not in words, but in deed for the decrease of the material and manpower resources per unit of output? For, it would seem, all the conditions have already been created for this. From the replacement of more expensive materials by inexpensive ones the prices remain unchanged until the end of the five-year plan. All of them already from the stage of designing have been rigidly connected with the efficiency of the future innovation. Incentive markups on new high quality products and price reductions for products to be removed from production are in vogue. The share of the profit is determined as a ratio to the production cost less the material expenditures. And it is not that simple today to "sign" the wholesale price itself. First prove it by calculations. Incidentally, the same new heavyweight robot was not approved precisely in the USSR State Committee for Prices.

But not all innovations rise to such a height of checks. This honor is only for the most important equipment. The others are approved at the sectorial or republic level, and even by the producer plants themselves, where the interests of the gross are openly visible. Who, tell me, will act to his own detriment? Is that not why at many enterprises obviously overstated rates of consumption of materials are zealously protected? But precisely they, these rates, also determine today the socially necessary expenditures, which are incorporated in the basis of pricing.

It is necessary to neutralize the gross, which today has become one of the main obstacles of scientific and technical progress, and to find for enterprises such a set of indicators, which would aim them at increasing the national income and would not lead to the development of awkward, but expensive heavyweight machines.

As to equipment itself, many people believe that it is necessary to legalize the specific materials intensiveness, say, per unit of its power, speed and productivity and to introduce this indicator in the standard technical specifications. In such a case not only the weight and size of the innovation will be visible. The degree of economy or extravagance of machine builders will also immediately appear.

You Do Not Pass By

In what does the value of this idea lie? In the public checking of the efficiency of equipment. Imagine the following. Every innovation is not ignored. On some stand they will put a photograph of your machine and then and there will report that it is in all respects the best in the country and, perhaps, even in the world and that its use in the national economy promises such and such a saving. Or, on the country, that you built neither one thing nor another--only the state loses. And without fail the names of the developers. Will it have an effect? And how!

This is a stimulus of creativity, a form of education and one of the methods of increasing the prestige of designers. In many republics such exhibitions are already in operation. They have also been opened in a number of oblast centers of the RSFSR. The USSR State Committee for Material and Technical Supply acted here as the initiator.

The Ukrainian exhibition is especially significant for its effectiveness. Here the pluses and minuses of the economic life of the republic are shown close up. The executives of sectors, ministers and economic managers visit it. Responsible officials of the Ukrainian CP Central Committee and the republic Council of Ministers are often present. Not one exhibit is ignored. Innovators are glad that their labor is also in view of people. The developers of unsuccessful machines clutch their heads. They do not let anyone off.

For example, they criticized here the Odessapochvomash Association for the allowed excessive consumption of metal. A report on the taken steps recently arrived: order has been established, last year alone 1,600 tons of metal were saved. But the following also happens: the managers of the Krinichki Repair Plant of the State Committee for the Supply of Technical Equipment for Agriculture and the Krasnaya Polyana Zhivmash Plant from Donetsk Oblast learned with surprise from the stands that different rates of consumption of metal for the same product--conveyors--had been established for them. The difference is significant--51 kg. Now this discrepancy is being eliminated.

At one of the stands I read that the overhead cranes, which are produced by the Kharkov and Aleksandriya plants of materials handling equipment and the Zaporozhye Power Machine Building Plant, in metal content are higher than similar foreign ones. I am interested in the taken steps. It turns out that the people of Zaporozhye and Aleksandriya sent mere formal replies. They say that their products are within the norm. While A. Pustovoytenko, chief engineer of the Kharkov plant, reported that the cranes will be made lighter only in 1988.

They did not agree here with such replies. The formal replies will be exhibited for general review. The organizers of other similar exhibitions should also have such persistence.

Every year many innovations, which bring honor and glory to our industry, appear in the country. And really talented people develop them. And it is necessary to promote their achievements more extensively and to tell about them in the newspaper. But perhaps their names should be conferred on the developed machines? Let little boys dream about becoming designers.

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