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SCIENCE AND TECHNOLOGY POLICY

(FOUO 1/82)

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NOTICE

This new JPRS publication, USSR REPORT: SCIENCE AND TECHNOLOGY POLICY, will appear approximately once a month and will consist of translations from the Soviet central and regional press on the organization and administration of Soviet science and technology. The report will include articles on planning, allocation of funds and resources, management, training, introduction of new technology and establishing economic effectiveness, international cooperation, and regional cooperation and development.

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CONTENTS

PLANNED MANAGEMENT OF SCIENTIFIC-TECHNICAL PROGRESS

Moscow VOPROSY EKONOMIKI in Russian No 8, Aug 81 pp 15-23

[Article by Yu. Yakovets: "Planned Management for Scientific-Technical Progress"]

[Text] Acceleration of the rate and increase in the effectiveness of scientific-technical progress provide the key to the solution of central problems in the economic and social development of the country in the 1980's. In the Summary Report of the CPSU Central Committee to the 26th CPSU Congress, L. I. Brezhnev noted: "The conditions under which the economy will develop in the 1980's make the acceleration of scientific-technical progress still more urgent . . . The decisive, most critical sector today is the introduction of scientific discoveries and inventions into production." The introduction of new, highly effective engineering and technology is the chief precondition for accomplishing the transition of the economy to a primarily intensive path of development, for increasing the effectiveness of civil production, for providing high, stable rates of economic growth, and for strengthening the material bases for steady growth in the people's well-being.

To provide an organic union between the achievements of the scientific-technical revolution and the advantages of the socialist economic system, it is necessary to increase substantially the effectiveness of planned management of scientific-technical progress. This requires working out scientificially substantiated long-range concepts and strategies for managing the development of science and technology, for utilizing their achievements in the economy, and for consistent implementation of this strategy with the aid of an effectively operating mechanism for managing scientific-technical progress.

The chief elements of strategy for managing scientific-technical progress in the 1980's, in our view, are: a sharp turn toward the development and assimilation of conceptually new technology; qualitative progress in the proportions and rates of development of individual constituent elements of the "science--technology--production--consumption" system; increase in requirements for economic effectiveness in new technology and reduction of absolute and relative prices for machines.

The development and assimilation, in compressed time periods and with maximum effectiveness, of conceptually new technology and new generations and systems of machines that reflect the essence of the new stage of the scientific-technical revolution and that respond to the changing conditions for technology application, are tied to the acceleration of the rates and increase in the effectiveness of scientific-technical

progress. "The turn toward effectiveness and quality," noted N. A. Tikhonov at the 26th CPSU Congress, "is organically related by the party to improving production on the basis of up-to-date science and technology. The 11th Five-Year Plan poses the task of accelerating the technical re-equipping of production and of conducting a policy for the most rapid creation and widespread introduction of conceptually new technology and materials and for the application of highly productive energy- and material-saving technology on a broad scale."

The theoretical basis of the policy for assimilating conceptually new technology is the systematic exploitation of the regularity of the scientific-technical cycle. Progress in science and technology is movement, a total struggle by new, rising scientific ideas and technical solutions against old, obsolescent ones subject to replacement, and changes from evolutionary periods of development, when already-known scientific ideas are improved and embodied in all new varieties of technology, to periods of revolutionary breaks with the past and of the establishment and rapid diffusion of new generations of machines and technological principles.

A periodic change between revolutionary and evolutionary periods can be observed in the development of technology: the appearance of a new technical idea, its realization in initially expensive forms of new technology and assimilation into the sphere of production and consumption; rapid, spasmodic growth, increase in the scale of production, the envelopment of new spheres of consumption, and the rapid lowering of production costs and prices; a period of maturity and relatively stable development; and a period of obsolescence and replacement by new, more progressive trends in technology.

The cyclical renewal of technology is accomplished in the form of change in machine generations. Each successive generation employs conceptually new technical ideas and technological principles and provides the possibility for more fully satisfying the industrial or individual consumption with relatively less expenditure of labor. The change in generations is distinctly observed, for example, in computers, lasers, robots, electrical equipment, and so forth.

Scientific literature has thoroughly analyzed in detail the leap in the development of production forces that has resulted from the scientific-technical revolution. It began in the middle of the 20th Century with a breakthrough into the "next storey" of science and technology. The first stage of the scientific-technical revolution was characterized by the rise and fast development of a number of new scientific-technical areas -- atomic energy, electronics, lasers, computers, rockets, space technology, polymer chemistry, and so forth, which made possible the spasmodic growth of labor productivity and sharp expansion in the assortment of use values. However, by the end of the 1970's, the potential of the first stage of the scientific-technical revolution was basically exhausted, and conditions for the application of technology largely changed.

Gradually, the signs of the next revolutionary turnover in science and technology began to accumulate -- a new stage of the scientific-technical revolution, which broadens the horizons for the development of productive forces. "Genuinely revolutionary possibilities," noted L. I. Brezhnev at the 26th CPSU Congress, " are opened up by the creation and introduction of miniature electronic control machines and industrial robots. They must receive wide application. Today, looking forward for five or for ten years, we cannot forget that it is in these years that the economic structure will be planned and created with which the country will enter the 21st Century."

By the end of the 20th Century, we can expect the transition to new generations of machines with mass application of microprocessors and industrial robots, which will provide a sharp reduction in the application of heavy and monotonous labor and a manyfold increase in the productivity of social labor. Great progress will take place in the production and consumption of energy, which will permit greater economy in the utilization of energy resources, the mastery of nontraditional sources of energy, the creation of preconditions for a power revolution, the core of which -- already visible within the bounds of the present century -- will be the industrial assimilation of energy from thermonuclear synthesis. Broad diffusion of waste-reduced and waste-free technology and biotechnology will make possible the fuller utilization of the substance of nature, its transformation by more economical means, and the prevention of environmental pollution. The structure of personal comsumption will change as the result of a wide range of conceptually new everyday machines and istruments and broad application of everyday electronic technology.

It is necessary that the development and assimilation of new generations of machines in shortened periods of time be made the basic contents of special-purpose scientific-technical programs. They should be distinguished by the following: first, by a high technical level, based on the realization of scientific discoveries and great inventions, which permit expanding the types and improving the quality of use values being created, the satisfaction of new needs, and the competitiveness of domestic goods on the world market; secondly, by a substantial economic, social, ecological, and external economic effect and by a manyfold increase in labor productivity and in economies in fuel-energy and raw-material resources. It is important that each such program cover all stages -- from scientific research and experimental design to the organization of serial production of new machine systems and their introduction into the basic spheres of consumption, that it be provided with special-purpose financing (including the necessary amounts of capital investment) and high-priority supply and equipment support, and that there be competent single management. An example is the system of measures on the organization of the development and introduction of industrial robots provided for in the decree of the CPSU Central Committee "On Measures for Increasing the Production and Wide Application of Automatic Manipulators in Sectors of the Economy in View of the Instructions of the 25th CPSU Congress."

The implementation of the course of strategy for assimilation of conceptually new, highly effective technology is tied to changing the proportional rates of development of individual elements of the "science--technology--production--consumption" system. Science and technology determine the "growth curves" in productive forces that pave the way for progress in the structure of production and for replacement of obsolete technology by new, more effective technology. Fundamental scientific research creates a backlog for the development of applied research and experimental-design developments which, in turn, are the basis for accelerating the development of production of technology in comparison with the rates of increase in the production of the total social product.

The growth rates of expenditures for science from the budget and from other sources are outstripping the growth of the total social product (the average rates of yearly growth for 1951 to 1979, respectively, are 10.9 and 7.5 percent). Such a trend is observed in the correlation of growth rates of the number engaged in the sphere of science and science services in comparison with the numbers of workers in the whole economy (6.4 and 2.1 percent, respectively, for the same period). At the same time,

one can note a trend toward a slow-down in rates of growth under the 10th Five-Year Plan: from 1976 to 1979, the average yearly growth in expenditures went down to 3,8 percent, and the number engaged in this sphere to 3 percent.[1]

The all-out development of fundamental scientific-technical research is not always provided for. The proportion of those working in the USSR Academy of Sciences and union-republic academies of sciences in the total number of scientific workers was cut back from 12.1 percent in 1960 to 7.8 percent in 1965 (a large part of the general engineering institutes were transferred from the USSR Academy of Sciences to the administration of ministries and agencies) and thereafter remained basically stable, constituting 7.0 percent in 1979.[2] In the USSR Academy of Sciences, the number of institutes of the general engineering type is not large, and the ministries are orienting the scientific organizations subordinate to them primarily toward applied research and give little attention to exploratory research, especially that of interest to more than one economic sector. The development of an experimental base has also lagged. As a result, prototypes of new technology often enter production without thoroughly developed designs because they did not undergo comprehensive testing, and this leads to large losses.

The disproportions that have evolved in the sphere of scientific-research and experimental-design work are holding back scientific-technical progress and the introduction of its results into mass production and are engendering undesirable trends in the dynamics of the end indicators of development in the sphere of scientific-research and experimental-design work -- the number of prototypes of new technology that have been created and also the number of inventions and rationalizers' proposals that have been introduced into production. The average yearly number of prototypes of new technology from 1961 to 1965 grew relative to 1951 to 1955 by a factor of 5.3 (including instruments, automation hardware, and computer technology -- by a factor of 17), and during the years of the 10th Five-Year Plan compared with 1961 to 1965, the number fell off by 20 percent (including instruments -- by 30 percent). Rates of growth in the quantity of inventions and rationalizers' proposals used in production slowed down: from 1951 to 1960, the number increased by a factor of 3.9, by 35 percent in the next ten years, and by 17.7 percent from 1971 to 1979; the average yearly rates of growth were 14.5, 3.0, and 1.8 percent, respectively.[3]

To create a reliable and extensive scientific and technical reserve, it is necessary to overcome backwardness in the development of a number of areas of fundamental scientific-technical research and experimental bases and to provide for their all-out development. In order to set up the production of new generations of machines in a short time and to create conditions for massive replacement of outdated technology being used in the economy, it is necessary to accelerate the development of machine building.

In recent years, the development of a number of machine-building sectors has slowed down. Thus, there has been a reduction of the average yearly rates of growth in products in power machine building, the electrical equipment industry, chemical and polymer machine building, and in lifting-transporting, tractor, and agricultural machine building. As a result, the possibilities are narrowing for replacing obsolete technology, and ineffective capital repair is expanding excessively. For example, the proportion of written-off machines and equipment (in percentage of their cost at the beginning of the year) in industry was reduced from 3.1 percent in

1965 to 2.4 percent in 1979 (including machine building and metal working, from 2.3 to 2 percent). Amortization deductions for capital repair for the whole economy grew by a factor of 2.9 and reached 27.8 billion rubles, with the total sum of capital investment in the development of machine building of 11.1 billion rubles in 1979.[4]

A great deal of attention was given to the expansion of machine building, to the renewal of basic stock, and the technical re-equipping of various spheres of the economy at the October (1980) Plenum of the CPSU Central Committee and at the 26th CPSU Congress. "The union of science and production," said L. I. Brezhnev at the Plenum, "and the influence on it of progressive ideas takes place through a machine or a technology. Hence, there is nothing comparable with the role of machine building in the development of the economy or in raising labor productivity."

The natural result of scientific-technical progress is expansion in the assortment of products and improvement in their quality -- the means of production determine the objects of consumption -- for the satisfaction of the growing demand from society. This process flows unevenly: it grows stronger in periods of revolutionary leaps in the development of technology and becomes somewhat slower in periods of evolutionary development.

The end result of technical progress is the economy of social labor "The aim of introducing machines," wrote Marx, "is in a very general way, the reduction of cost and, consequently, the price of goods, and its lower price, that is, the reduction of workers' time, is necessary for the production of units of goods."[5] This aim is achieved by two methods: by lowering the costs and prices of technology already being manufactured (absolute price reduction) and by replacing it with new, more effective technology and therefore costing less per unit of manufactured products (relative price reduction).

Absolute price reduction with respect to machines takes place as the result of lowering the costs of production and list prices of technology being manufactured in proportion to expansion in the scales of its production (up to the optimum), rise in the level of workers' qualifications, and utilization of reserves for growth in production effectiveness.

The essence of relative price reduction for machines was revealed by K. Marx as follows: "By relative price reduction for machines, I mean a situation where absolute cost of an applied mass of machines increases but not to the same degree as the mass of these machines also increases its effectiveness."[6] In relative price reduction is found the expression of the effectiveness of technology renewal.

The rates of relative price reduction, as also of absolute price reduction, differ according to economic sector and subsectors and are uneven in cycle phases. They are higher during periods of replacement of old generations of machines by conceptually new ones and slow down during periods of smooth evolutionary diffusion of a given technology generation.

The need to lower price levels in calculating units of useful effect based on utilization of scientific and technical achievements was formulated in the "Basic Directions for the Economic and Social Development of the USSR for 1981 to 1985 and for the Period to 1990," adopted by the 26th CPSU Congress: "To increase the

individual capacities of machines and equipment to optimum limits with simultaneous reduction in their size, metal content, energy consumption, and lowering of the cost per unit of useful end effect."

Absolute and relative price reduction for machines are inseparably linked. Lowering the prices of technology being manufactured causes relatively lower price levels of new technology for two reasons: first, the lowest priced analog or lowered level of prices of similar items of a parametric series is assumed as the basis in calculating price limits; secondly, as a result of lowering the price of constituent subassemblies and components used in creating new machines. At the same time, the appearance of new, more effective and cheaper (per unit of useful effect) machines forces more rapid lowering of production costs and prices of technology being manufactured. Through relatively lower pricing of machines, a two-fold result of scientific-technical progress is expressed: raising the technical level and quality of products being manufactured is effective when it is accompanied by lowering the expenses and prices in calculating useful effect per unit.

The trends in the dynamics of economic effectiveness of scientific-technical progress, which are reflected in the rates of absolute price reduction for machines and, to a certain extent, in changes in return on funding, are contradictory. On the one hand, list prices for machines, instruments, and equipment are periodically revised on the lower side. On the other hand, there are data that indicate slowing rates of absolute and relative price reductions for machines and, in a number of instances, their price increase.

According to data of the USSR State Committee on Prices, in 1973 the wholesale prices for products in machine building and metal working were lowered by 8 percent. The total sum of the reduction of wholesale prices for 1969 to 1972 (with deductions of their increase for products of light industry, ferrous metallurgy, coking coal, and iron ore) was 27.5 billion rubles, primarily on account of an absolute price reduction of technology being manufactured. The index of warehouse prices for enterprises in machine building and metal working estimated by the USSR Central Statistical Administration and reflecting only changes in list prices, went down from 1967 to 1979 by 25 percent.[7] At the same time, from 1970 to 1979, additional profit from the introduction of measures for new technology in industry per 1000 rubles' expenditures went down by 14 percent, and the number of workers hypothetically released, by 16.3 percent; in the calculation for one released worker in 1979, the expenditure was 15,000 rubles. For comparison, let us remember that the average yearly money wages of an industrial worker that same year was 2164 rubles.[8] The rates of absolute and relative cost reduction for machines are slowing down in a number of instances as a consequence of price increases in raw materials, other materials, and energy, and also of relatively high rates in the growth of wages, which sometimes surpass the rates of growth in labor productivity.

The lowering of return on funding also indicates the lack of effectiveness in technical progress. Thus, in the economy as a whole from 1970 to 1980, in comparable prices, the cost of basic production funds grew by 116 percent, the gross social product by 67 percent, and the national income, utilized for stockpiling and consumption, by 55 percent. For each ruble of basic funds now there is 28 percent less national income. If the return on funding had stayed at the 1970 level, there could have been an additional 166 billion rubles more national income to use for consumption and stockpiling, which exceeds by 24 percent the total sum for capital investment for that year.

One of the reasons for reduction in the return on funding is the inadequate effectiveness of new technology and its frequent price rises in calculations per unit of productivity. In addition, such factors as decreased effectiveness and growth in cost of capital construction must also be noted. Thus, from 1965 to 1979, uncompleted construction at state and cooperative enterprises and organizations increased by 76.8 billion rubles (a factor of 3.6) with a growth in capital investment by 67.7 billion rubles (a factor of 2.4). The index of actual cost of construction and assembly work, which went down between 1966 to 1975 by 5 points, went up during four years of the 10th Five-Year Plan by 2 points. The profit of contractor construction organizations increased from 1651 million rubles in 1965 to 8487 million in 1975 and decreased to 7907 million rubles in 1979, but its ratio to cost, went from 6.1 percent to 15.9 and 12.5 percent, respectively.[9] Increase in profit and increase in profitability took place in many instances because of rising estimated construction costs

It must also be taken into account that the methods used for determining the effectiveness of new technology are oriented basically toward cost-accounting effect, which is reflected in the costs and warehouse prices of enterprises. This does not take into account the additional effect received by society as a whole as a result of economies in labor and natural resources and expansion in the export of technology that is competitive on world markets. As a result, effectiveness is reduced and the economic boundaries are narrowed in the application, first of all, of conceptually new technology which, in large measure, reflects changing conditions in the application of machines.

Under the conditions of the transition to a new stage of the scientific-technical revolution, requirements are sharply growing for economic effectiveness in new technology and for rates of absolute and relative price reductions for machines. The effectiveness criterion must be decisive in the economic incentive system for the evaluation of long-range trends in the development of science and technology, for verifying plans and special-purpose programs, and for determining prices for new items. Preference must be given to engineering and technology that provides sharp reduction in the expenditure of manual, heavy, and monotonous labor, multiple increases in labor productivity, energy economies, complex processing of natural raw materials, the introduction of waste-reduced and waste-free technology, and prevention of environmental pollution.

The growth of economic effectiveness must also find expression in substantial rise in the technical level of machines, equipment, and instruments that are being assimilated and manufactured. There should be an orientation toward surpassing the highest world levels in a number of areas of technology and in short time set up mass production and expand export of pioneering technology and, on this basis, to raise significantly the proportion of machines, equipment, and transportation hardware in the export structure: in 1975 it was 17.5 percent in the USSR (as against 21.5 percent in 1970), 44.7 percent in Bulgaria, 34.2 percent in Hungary, 55.8 percent in the GDR, 26.2 percent in Romania, and 51.1 percent in Czechoslovakia.[10]

The system for the management of scientific-technical progress is being reorganized to conform to new strategic tasks. The basic areas of this reorganization were formulated in the decree of the CPSU Central Committee and USSR Council of Ministers "On Improving the Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Effectiveness and Work Quality." In consideration of the

measures outlined in this decree and adopted in the decisions of the 26th CPSU Congress in the field of scientific-technical progress, a number of first-priority tasks must be accomplished. First of all, the goal-directed character of management for scientific-technical progress must be strengthened, with consistent orientation of all links and levers of management toward the implementation of special-purpose complex programs that provide for the assimilation of new, highly effective generations of machines and technological processes.

It is necessary to concentrate resources on the b sic, decisive areas of scientific-technical progress, to make them the basis for special-purpose programs and planning tasks, to intensify the motivation, and also sense of responsibility, of planning and management bodies, scientific-research institutes, design bureaus, enterprises, and associations and their workers, for the achievement of end results, and to strengthen planning discipline in this field. The 11th Five-Year Plan provides for the implementation of 160 complex and special-purpose scientific-technical programs. They should become the basis for goal-directed management of the development of science and technology and the introduction of their achievements into the economy.

A differentiated approach must be provided for the management of scientific research and for the assimilation of new technology, with consideration for the degree of their novelty and economic effectiveness. In planning, in financing, and in statistical accounting for scientific research and technical developments, it is necessary to clearly distinguish the following: fundamental, exploratory research, directed toward the discovery and mastery of new laws of nature and means for their technological application; applied research, including and detailing new engineering ideas and technological principles; experimental-design and introduction work, which materialize these ideas and principles in prototypes of new technology, in machine systems and technological processes.

Distinguishing the stages of scientific-research and experimental-design work during planning, in our view, allows substantiated proportions among them not only at academy institutes and VUZ's, but also at ministerial institutions. This requires the development of clear criteria for categorizing research and development as to type and specific indicators that characterize the end results at each stage.

In planning, statistical accounting, price formation, and the establishment of economic incentives, a differentiated approach is needed toward new items with consideration for the degree of the novelty and technical level, distinguishing the following: conceptually new technology that represents new generations of machines and that makes use of scientific discoveries and important inventions and that provides, with time, for a rapid growth in effectiveness (pioneering technology that surpasses the world scientific-technical level deserves special attention); improved technology -- new models that permit more effective use of already known scientific-technical ideas with consideration of the experience of producing and applying existing generations of machines (here the expenditures are less and the effect is achieved more rapidly, although it is relatively smaller than in the previous case); modernized items, in which some parameters are improved.

The calculation of time and effectiveness in this are not identical. It is necessary to give attention to the difficulty of development and assimilation of conceptually new technology and to create more favorable economic conditions for its developers, producers, and consumers. Effectiveness in this case can usefully be determined by

consideration for the results of lowering expenditures that result from increasing the scale of production and consumption during the period of rapid diffusion of a given technology.

An important task is the complex coordination of all the links and levers in the management of scientific-technical progress. For this, the following should be done: expand the role of special-purpose program planning as the core of management; provide for special-purpose financing and high priority supply and equipment support for scientific-technical programs and tasks; strengthen the interaction between the plan and prices in creating favorable economic conditions for assimilating and expanding the production of conceptually new technology in combination with strict and timely sanctions (lowering prices, discounts) for output of obsolescent or outdated products; intensify material incentives and sense of responsibility on the part of collectives and workers of scientific-research and planning-design organizations, enterprises, and associations, for the development and assimilation of new, highly effective technology and removal of old technology from production; and to improve statistical accounting and analysis of the rates, proportions, and effectiveness of scientific progress in all economic sectors.

The emergence of contradictions and the lack of coordination among individual links in the system for managing scientific-technical progress lowers the effectiveness of management. Fundamental research and development (especially that pertaining to more than one sector) does not have steady sources of financing. It seems advisable to form, from the state budget at the disposal of the State Committee for Science and Technology, a special-purpose fund for fundamental scientific-technical research and inter-sector development, using it basically for financing special-purpose complex programs. The problems of all-out development of scientific instrument making, the provision of up-to-date instruments, equipment, and materials to scientists are not solved. Considering the specifics of this type of activity and the rise of new demands, the existing supply system needs to have a separate subsystem of supply in the sphere of scientific-research and experimental-design work, to guarantee its priority, and to make it more flexible and efficient.

In the substantiation of price limits and warehouse prices, the degree of novelty of an item is not considered sufficiently, and prices for old machines are lowered too slowly. The formation of funds for economic incentives and rewards are poorly related to the fulfillment of planned tasks in the field of scientific-technical progress and to its effectiveness.

The economic incentives for the development and assimilation of new technology must be accomplished with consideration of its novelty and economic effect. A number of measures in this direction are being carried out in accord with the decree on improving the economic mechanism: increments to warehouse prices have been increased for highly effective items, especially if they have been based on discoveries and inventions; discounts have been increased on prices for old items; and prizes have been increased for important achievements from the united fund for the development of science and technology. Ministerial scientific-research institutes are being transferred to the cost-accounting system of planning and stimulation with consideration for the end result.

It is advisable to develop scientific bases for the economic mechanism that provide real incentives and sense of responsibility to collectives and workers operating

under cost accounting for lowering expenditures and improving the quality of products on the basis of continuous improvement in the engineering and technology of production and the introduction of highly effective innovations. The theoretical basis for this mechanism can be the revelation and distribution of differential scientific-technical income (loss) -- the size of deviation of an individual cost from social cost under the influence of technical progress. Collectives that have achieved lower individual expenses than the socially necessary ones (fixed in prices) as a result of utilizing scientific and technical achievements, can receive a guaranteed share from the additional effect.

Scientific-technical progress must be given a leading role in planning. This means, first of all, enlarging the role of the summary plan for the development of science and technology within the structure of the economic plan and in the plan system at all levels of management. Proceeding from the task of accelerating and increasing the effectiveness of technical progress, the following should be distinguished: the structure of capital investment, progress in balancing among economic sectors (providing all-out development to more progressive sectors), tasks for the growth of production effectiveness and labor productivity, economies in materials and natural resources, and financial plan indicators.

The economic mechanism for managing the development of science and technology must create a "green light" for the accelerated introduction of more effective technology, reflecting the highest achievements of the scientific-technical revolution. This is the most important precondition for successful realization of long-term economic and social strategy of the party formulated at the 26th CPSU Congress.

FOOTNOTES

1. Calculated from the statistical yearbook "Narodyoye khozyaystvo SSSR v 1967 g." [The National Economy of the USSR in 1967]. "Statistika," 1968, pp. 55, 491, 647, 649, and 888; "Narodnoye khozyzystvo SSSR v 1979 g." [The National Economy of the USSR in 1979], "Statistika," 1980, pp. 54, 312, 387-388, and 555.

2. "Narodnoye khozyaystvo SSSR v 1960 g." [The National Economy of the USSR in 1960], Gosstatizdat, 1961, pp. 782 and 787; "Narodnoye khozyaystvo SSSR v 1965 g." [The National Economy of the USSR in 1965], "Statistika," 1966, pp. 709 and 714; "Narodnoye khozyaystvo SSSR v 1979 g." [The National Economy of the USSR in 1979], pp. 107 and 109.

3. Calculated from the statistical yearbooks: "Narodnoye khozyaystvo SSSR v 1965 g." [The National Economy of the USSR in 1965], p. 67, and "Narodnoye khozyaystvo SSSR v 1979 g." [The National Economy of the USSR in 1979], p. 111.

4. "Narodnoye khozyaystvo SSSR v 1979 g." [The National Economy of the USSR in 1979], pp. 159, 368, and 552.

5. K. Marks and F. Engel's, "Sochineniya" [Works], vol. 47, p. 351.

6. K. Marks and F. Engel's, "Sochineniya" [Works], vol. 26, part III, p. 228.

7. Calculated from the statistical yearbook "Narodnoye khozyaystvo SSSR v 1979 g." [The National Economy of the USSR in 1979], p. 164.

8. Ibid., pp. 112 and 393.

9. Ibid., pp. 363, 375, 382, and 539.

10. See "Statisticheskiy yezhegodnik stran--chlenov Soveta Ekonomicheskoy Vzaimopomoshchi, 1980 g." [Statistical Yearbook for CEMA-Member Countries, 1980], "Statistika," 1980, pp. 337- 339.

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PROBLEMS IN ORGANIZING SCIENTIFIC RESEARCH IN SIBERIA

Moscow VOPROSY FILOSOFII in Russian No 8, Aug 81 pp 21-35

[Article by V. A. Koptyug (Novosibirsk)]

[Excerpt] The Siberian Department was created for the purpose of broadly expanding fundamental research and work on applied problems with priority for Siberian interests. But how can academy and regional interests be tied together? Research on the basic laws of the movement of matter at various levels of its organization is of general significance. But in itself the selection of fundamental research topics, the institutes' ties to individual regions, and the choice of objects on which to conduct the study and verification of natural laws that are discovered, permit the reflection of regional characteristics and interests. Indeed, in examining the scientific orientation of many institutes of the Siberian Department of the USSR Academy of Sciences, one sharply senses the responsibility and motivation of our scientists in developing the Siberian region, so important for the whole country.

Thus, the Yakutsk Affiliate of the Siberian Department of the USSR Academy of Sciences is investigating the flow of cosmic particles and their interaction with the Earth's magnetic field and upper layers of the atmosphere. Why is it useful to conduct such research at Yakutsk? Because astrophysical phenomena occur at high latitudes more clearly and because they have a substantial effect on radiocommunications over a wide territory of the North. Or, for example, the study of the behavior of materials under low temperatures: this is an extremely general scientific task and it is of interest to many fields of science. But in the North this problem is felt every day and very intensely; for in deep cold, metal becomes brittle; this leads to breakage and accidents and causes machinery to stand idle. The Institute of the Physical-Technical Problems of the North, which was created in Yakutsk, works on the accomplishment of tasks relating to this problem.

An important means for concentrating attention and effort on Siberian tasks and for forming a unified complex of research has been the large-scale "Sibir'" program, within the framework of which central scientific problems relevant to balancing the development of this immense region are being solved. The first stage of formulating the program consisted of scientific-technical and party-management conferences and meetings in 1977 and 1978 of leaders from the oblasts, krays, and autonomous republics of Siberian, at which were discussed economic and scientific-technical tasks that were urgent for these regions. During the next stage, analyses were conducted of existing scientific work at academy institutes, ministerial organiza-

tions, and higher educational institutions that corresponded to these tasks. Coordinated plans were then drafted for scientific research and for utilization of its results in the economy. Thus gradually evolved a complex of 30 special-purpose scientific programs devoted to problems in the study and effective utilization of fuel-energy, mineral raw-material, and biological resources, environmental protection, and the complex engineering and technology problems of Siberia.

Work on the "Sibir'" program, the framework for which presently unites the efforts of specialists from over 400 scientific-research and experimental-design organizations of various agencies, primarily of the Siberian region, brought about during the 10th Five-Year Plan a new step in strengthening relations between science and the economy.

Work is now being completed on the submission of the "Sibir'" program to the State Committee for Science and Technology for inclusion among the important scientific-technical programs in the complex long-term program for scientific-technical progress of the country.

Comparing the results of our work with the tasks posed by the party to the country for the next five-year plan and for the long term, we can state that the basic areas of research of the Siberian Department of the USSR Academy of Sciences, including that within the framework of the "Sibir'" program, are in the mainstream of the strategic areas of development of the country and its eastern regions. At the same time, in a number of important areas, our fundamental and applied work must be substantially strengthened and expanded. This pertains, for example, to the problem of producing liquid fuel from coal and gas and to the social aspects of transferring part of the drainage from Siberian rivers to southern regions of the country.

In the process of the work, a deepening of purpose took place in the program: whereas at the beginning it was oriented basically toward the utilization of existing developments, it gradually became clear that some kind of additional scientific base was necessary for the solution of some large problems. In conformity with this, the Siberian Department of the USSR Academy of Science is taking measures for the expansion of fundamental and applied research, even the creation of new scientific institutions. Thus, the Institute of Chemistry and Chemical Engineering has been organized in Krasnoyarsk; its purpose is to provide the scientific base for creating new technology in the fields of nonferrous metallurgy and coal chemistry in close relationship with the development of the kray's productive forces. A new Institute of Mining in the North is operating successfully in Yakutsk and, in Kemerovo, the foundation has been laid down for a complex institute, the work of which should aid in accomplishing the mining-geology and chemical-ecological tasks of the Kuzbass region and partly of the Kansk-Achinsk Fuel-Energy Complex. The problems of the Udokan deposits will be central for the complex institute being created in Chita. New "extension" sections and laboratories have been created in Omsk, Barnaul, and Kyzyl.

However, the formation of the network of academy units cannot be considered complete. An urgent necessity has arisen for the creation of a strong academy scientific base in Tyumen'; large investments are required by the Altay Experimental Farm (Genetic Center) being organized; new units that have already been organized are in need of personnel, financing, and equipment support. The strategic policy of the Siberian Department of the USSR Academy of Sciences in the next few years is to strengthen its affiliates and new academy units as much as possible.

The 26th CPSU Congress has posed the task of sharply reducing the time required in the introduction of scientific achievements into practice. "The decisive and most urgent sector today," noted Comrade L. I. Brezhnev in the Summary Report of the Central Committee to the party congress, "is the introduction of scientific discoveries and inventions into production."*

The Siberian Department of the USSR Academy of Sciences possesses a large potential for developments that have good prospects from the point of view of the economy. Ministerial scientific-research institutes and industrial enterprises are introducing the following works created by the Siberian Department of the USSR Academy of Sciences: applied program packages and automatic control systems, a number of new up-to-date instruments for various purposes and hardware for the automation of research and technological processes, microelectronics systems, means for making catalysts, substances with predetermined characteristics and medical preparations, methods for useful-mineral exploration, progressive labor-saving technology for metal processing, and much more. The USSR Council of Ministers has noted the work by our scientists in the interests of industry by two prizes in 1981.

A multilevel system of interaction between science and practice has evolved during the past years in the Siberian Department of the USSR Academy of Sciences. The "highest" level is the submission to USSR Gosplan of technical-economic reports on larger developments that promise significant economic effect on a national scale. At the end of 1979, the Siberian Department of the USSR Academy of Sciences entered that level for the first time and submitted about 20 such reports to Gosplan. As the result of work conducted in sections of USSR Gosplan and the State Committee for Science and Technology and also in the respective ministries and agencies, noticeable progress was achieved with a number of proposed developments toward their introduction into the economy.

The submission of technical-economic reports to USSR Gosplan on larger developments by the Siberian Department of the USSR Academy of Sciences opens up the possibility for an outlet into the economy of the country as a whole, which is especially important for problems that have significance for more than one economic sector. No less important is the circumstance that the inclusion of the respective tasks in the economic plan can be assured.

The second level consists of coordinated programs with 22 ministries and agencies for research and introduction of innovations into production. Here, the Siberian Department has been successful in developing many new forms, finding a number of new channels for interaction with economic sectors, and creating an efficient system for conducting surveys and developing new plans and for exchanging new information on the achievements of science and the needs of the respective sectors of industry. These ties are very important and fruitful.

The Siberian Department of the USSR Academy of Sciences is continuing to form mutual ties with the belt of ministerial scientific-research institutes and design bureaus around the Novosibirsk Akademgorodok. As a whole, this is a very effective form for carrying the results of fundamental research from academy institutes rapidly into industry. The economic effect from the introduction by these organiza-

* "Materials of the 26th CPSU Congress." Moscow, 1981, p. 43.

tions of joint developments has been over 250 million rubles during the 10th Five-Year Plan. But we still have not completely worked out many aspects of our joint work both in the area of scientific-technical and personnel policies and in the area of solving social questions in the life of Akademgorodok. Here a further search is necessary for mutually acceptable solutions.

One of the most important links in the system for introducing new technology consists of direct ties between the Siberian Department of the USSR Academy of Sciences and Siberian industrial and agricultural enterprises. A large amount of aid in this work is given us by councils for the support of scientific-technical progress that have been organized under a number of Siberian obkoms and kraykoms. We were very pleased that L. I. Brezhnev, in his speech to the congress, noted the work of the Novosibirsk party obkom in increasing the effectiveness of relations between science and production. A plenum of the Novosibirsk party obkom that took place recently stressed again the necessity for the broadest utilization of the achievements of science and technology, including that of the Siberian Department of the USSR Academy of Sciences, in the oblast's industry and agriculture.

Novosibirsk industry has given a start in life to many of our scientists' developments. Examples are automated control systems and automated systems for technological process control, welding and explosive punching, the manufacture of complex types of products by pressing sheet metal in a creeping mode, the creation of vibration-resistant tools and machines, and many others. We will expand and strengthen such ties wherever possible in all our scientific centers, widely depending for this on the assistance of the Councils for the Support of Scientific-Technical Progress under the oblast and kray party committees.

Moreover, within the framework of programs of cooperation with ministries and ties with enterprises, problems of interest to a single economic sector will still be successfully dealt with. At the same time, the introduction of works of interest to more than one economic sector, the proportion and significance of which are constantly growing, are encountering very great difficulties, since often no ministerial organizations undertake them. To accomplish such tasks, it is especially important for academy institutes and scientific centers to have their own experimental production base. If the Institute of Nuclear Physics had not had its own first turn at experimental production, we would hardly have today the institute's accelerators in several sectors of the economy. Therefore, heeding the instructions of the congress on the necessity of developing experimental-production bases for science, we will give this area very serious attention.

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REPORTS FROM L'VOV CONFERENCE ON INTEGRATING SCIENCE AND PRODUCTION

Introduction and Background

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 8, Aug 81 pp 35-37

[Introduction, including opening remarks by Academician V. A. Kotel'nikov, vice-president of the USSR Academy of Sciences, to an all-union seminar organized by the USSR Academy of Sciences, the UkSSR Academy of Sciences and its Western Scientific Center, and the L'vov obkom: "The Integration of Science and Production Under the Conditions of Developed Socialism"]

[Text] The fact that science in our day has become a direct productive force creates an imperative need for close interrelationship between science and production. Their more complete integration will be one of the basic means for exploiting the possibilities of developed socialism and for uniting its advantages with the achievements of the present scientific-technical revolution. The "Basic Directions for the Economic and Social Development of the USSR for 1981 to 1985 and for the Period to 1990," approved by the 26th CPSU Congress, states the following: "In the 11th Five-Year Plan, the development of science and technology should be still more subordinated to the solution of the economic and social tasks of Soviet society, to the acceleration of the transition of the economy to the path of intensive development, and to increasing the effectiveness of civil production."

The decisive and most complicated sector of this work is the real embodiment of scientific discoveries and inventions in life. It is important to provide for the most rapid utilization of the results of finished scientific developments and to shorten the time for creating and assimilating new technology. "Scientific-research and planning-design work must come together more closely -- economically and organizationally -- with production," said CPSU Central Committee General Secretary L. I. Brezhnev at the 26th CPSU Congress. "Everything must be eliminated that makes the process of introducing what is new difficult, slow, or unhealthy. Production must be vitally interested in more rapid and better assimilation of the fruits of the thought and the fruits of the labor of scientists and designers."

The documents of the congress point to the necessity for improving the organization of the whole system of scientific research, for making it flexible and mobile, and intolerant of unproductive laboratories and institutes. A large role here is played by the coordination of scientific work, which the USSR Academy of Sciences has been called upon to bring about. Substantial steps have already been taken in this field. The activities of the union republic academies of sciences are being

systematically coordinated. The USSR Academy of Sciences has conducted joint sessions with the Academy of Medical Sciences and with the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, as the result of which extensive plans for scientific research have been drafted. Academy institutes are improving their interaction with ministerial institutes and are strengthening ties with VUZ science.

The unification of efforts and the delineation of prospective areas helps increase the effectiveness of scientific investigation and its practical yield both in the country as a whole and on the scale of individual regions. In this connection, first and foremost, comes the task of optimum combination of the economic-sector and regional principles of managing scientific-technical progress. Experience of this type has been accumulated by many scientific and production organizations working in various regions of the country: in Moscow, Leningrad, Novosibirsk, Sverdlovsk, Belorussia, Moldavia, and the Ukraine. The study and generalization of the experience and improvement in the forms, methods, and directions for the development of integration processes of science and production were the subject of the All-Union Seminar held in L'vov 13 to 15 January and organized by the USSR Academy of Sciences, the UkSSR Academy of Sciences, its Western Scientific Center, and the L'vov obkom of the Ukrainian Communist Party. Over 200 people -- leading scientists, managers of party, state, and public organizations, and workers of enterprises and VUZ's participated in the seminar. Vice-President of the USSR Academy of Sciences, Academician V. A. Kotel'nikov, opened the seminar.

In his introductory remarks, V. A. Kotel'nikov dealt with the existing possibilities for accelerating scientific-technical progress that are offered by the socialist system of management. He also thoroughly analyzed the deficiencies in this sphere, especially stressing the slow implementation in industry and agriculture of the latest achievements of science and technology, the presence of barriers between economic sectors in the diffusion of advanced experience, and the poor coordination of the activities of various scientific and administrative organizations in the solution of the urgent problems relating to increasing the productivity of civil labor. The USSR Academy of Sciences, he said, is very concerned about this situation and is taking measures to correct it. In 1980, the academy presidium discussed the work of the Western Scientific Center of the UkSSR Academy of Sciences in increasing the effectiveness of scientific research and utilizing its results in practice and in improving methods for regional management of scientific-technical progress. The discussion showed that the Western Scientific Center of the UkSSR Academy of Sciences had achieved certain successes. It was decided, therefore, to hold a seminar in L'vov, inviting participation by representatives of other republics where other means for solving urgent problems are being applied.

After pointing out the broad significance of the work undertaken, V. A. Kotel'nikov noted, at the same time, that it is not intended that a single prescription will be worked out for all regions. There should be an exchange of opinions as to what could be obtained from whom and who specifically should adopt something from others. With all the difficiencies in the known organizational forms for integrating science and production, however, we have something in common. Where party organizations participate actively in the work of councils, commissions and other bodies that are created locally for the coordination of scientific research and for accelerating scientific-technical progress, things go well. In a number of instances, these bodies were even created on party initiative.

Four reports were heard at the seminar, and a discussion of them also took place. All of these materials, in abridged form, are printed in this issue of VESTNIK.

In the recommendations adopted by the All-Union Seminar, it was noted that the mutual exchange of information that took place at L'vov and the utilization of the accumulated experience will help to strengthen further the relationships between science and production and will permit more successful accomplishment of the tasks placed before Soviet science by the 26th CPSU Congress.

It was recognized to be expedient to organize a regular exchange of experience in the work of republic academies of sciences, scientific centers, and branches of the USSR Academy of Sciences on questions of regional management of scientific-technical progress and, no less often than once every two or three years, to conduct conference-seminars in various regions of the country.

The Seminar proposed that the Council for the Coordination of the Scientific Activities of the Union-Republic Academies conduct work on generalizing and disseminating the experience of the UkSSR Academy of Sciences, other republic academies of sciences, the Siberian Department and scientific centers and branches of the USSR Academy of Sciences on the interaction of academy scientific institutions and production organizations of ministries and agencies.

Dobryk on Party Leadership

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 8, Aug 81 pp 37-41

[Report by V. F. Dobryk, first secretary of the L'vov obkom of the Ukrainian Communist Party: "Party Management of the Science-Production Integration Process of the Region"]

[Text] L'vovskaya Oblast has been known for its successes in the development of industry, science, and culture. Owing to the continuous concern by the party and government and with active assistance from the fraternal peoples of the Soviet Union, one of the once backward outposts of Polish fiefdom has turned into an industrial oblast of the Ukrainian Soviet Socialist Republic.

Here are a few statistics: the territory of the oblast is 21,800 square kilometers, the population is 2,592,200, the population density is 118.9 persons per square kilometer, and the city population is 54 percent.

Before 1939, 80 percent of the enterprises around L'vov consisted of small, semi-primitive shops where only one out of seven workers was employed. Every third or fourth person capable of working was unemployed. Out of the 9 million people populating the western oblasts of the Ukraine, only 250,000 were employed in industrial production.

Today, this is a region of instrument making, machine building, petroleum refining, and chemical industry. Industrial giants have been built here, such as the Rozdol and Yavorov "Sera" industrial associations, 12 mines in the L'vov-Volyniya Coal

Basin, the Nikolayev Cement-Mining Combine and the Stebnik Potash Plant, the Sokal' Artificial Fabric Factory, and many other enterprises. The whole country is familiar with the products of the L'vov "Elektron," "Kineskop" imeni V. I. Lenin, "50-Letiye Oktyabrya" and "Mikropribor" associations.

On oblast territory, there are over 300 large industrial enterprises, including 60 associations, which are responsible for 66.3 percent of the total gross output. In all, 5.5 billion rubles' worth of industrial goods are turned out in a year. The L'vov area occupies the leading position in the republic in the production of fork-lift trucks (100%), crane trucks (98.8%), busses (98.7%), overhead conveyors (100%), light bulbs (92.8%), television sets (47.5%), gas ranges (44.9%), and press-forging equipment (38.4%).

Oblast industry fulfilled its plans under the 10th Five-Year Plan by 12 December of last year. Over 300 million rubles' worth of products above the plan were realized and their output rose by 30.2 percent. Today, oblast enterprises put out products of only the first and highest category of quality, and the proportion of the latter grew from 8.7 to 27.1 percent during the 10th Five-Year Plan.

Higher and secondary special schools are on the rise. There are 74,500 persons studying in 12 VUZ's and 48,600 persons studying in 42 technicums and other schools. The board of the USSR Ministry of Higher and Secondary Specialized Education approved the work experience of the L'vov VUZ center for the development and introduction of a complex system for training quality-control specialists.

Problems in the development of fundamental and applied sciences occupy 36 of our scientific-research institutions, including 12 institutions of the UkSSR Academy of Sciences, 12 VUZ's, and 19 planning-design units, where a detachment of scientists 10,000 strong are fruitfully laboring, including 15 active and corresponding members of the UkSSR Academy of Sciences and specialized academies, 325 doctors of sciences, and over 3200 candidates of sciences. New laboratory buildings are being constructed; the laboratories are being furnished with up-to-date scientific equipment, and the housing and living conditions of scientific workers are being improved.

All this taken together will also allow dealing widely with the question of uniting the advantages of socialism with the achievements of the contemporary scientific-technical revolution really widely and practically.

The accomplishment of the task of putting the economy on the intensive development path requires the unification of the creative efforts of scientists and producers. Even in the process of developing and introducing complex product quality control we have encountered widespread separation of their interests and actions, with barriers among agencies and among economic sectors. There has been no body in the oblast that could solve questions of interaction between sectors in the interests of scientific-technical progress.

Mutual relations between scientific institutions and production organizations based on so-called cooperation agreements, and this is no secret, have not turned out to be very effective. We often have discussed this problem at the party obkom bureau at its plenums and meetings of party leaders, and we have come to the conclusion that, to increase the effectiveness of production, the party obkom and party

committees should actively include in this process the coordination and direction of scientific and production collectives.

This is the prehistory of the question of improving the management of scientific-technical progress in the region on the basis of combining the principles and interests of regions and economic sectors.

We began by working out a complex plan for the development of science and supporting scientific-technical progress in L'vovskaya Oblast for the 10th Five-Year Plan. In 1976, the party obkom bureau approved this plan, which was prepared by the Western Scientific Center of the UkSSR Academy of Sciences and the council of rectors of the VUZ center. At this stage, we were successful in coordinating the operations of academy and ministerial scientific-research institutions and higher educational institutions and in directing their efforts toward the accomplishment of important tasks in machine building, instrument making, exploration and extraction of mineral raw materials, and agriculture.

For practical implementation of the plan, we started to form, on the basis of socialist cooperation, interagency special-purpose scientific-production associations and complexes that were based on carrying out scientific-technical programs. In this way, we achieved the expansion of inter-sector and interagency cooperation, and this allowed improvement in the mutual exchange of scientific developments, acceleration in introducing the most progressive of these into production, and support of a unified technical policy at enterprises of appropriate economic sectors in the oblast.

At the beginning of the five-year plan, four complexes were created -- machine building, instrument making, geological-geophysical, and agricultural -- which brought together 12 scientific-production associations. The associations included 6 institutions of the UkSSR Academy of Sciences, 17 ministerial scientific research and planning-design institutes, 5 VUZ's, 24 production enterprises, and 12 organizations of other oblasts of the republic. In addition, we had educational-scientific production associations (UNPO) marked out at VUZ's.

Scientific-technical councils of the associations and boards of the complexes began to direct the functional activities. Leading scientists became the heads of the scientific-technical councils and boards. To provide aid to these bodies and increase their authority, we considered it essential to bring into them the heads of party obkom sections for economic sectors as deputy chairmen of the boards.

Created also was a council of the secretaries of the party organizations of scientific institutions, VUZ's, planning-design organizations, and production organizations that make up the associations and complexes. Komsomol and trade-union organizations also found their place in determining scientific-technical programs. Socialist competition was organized among associations and complexes, banners and pennants were approved, and positions on incentives for collectives and individuals were developed.

The experience of oblast party organizations and the Western Scientific Center of the UKSSR Academy of Sciences in organizing inter-sector scientific-production associations and complexes and in further improving the management of scientific-technical progress in the region received high praise from Comrade L. I. Brezhnev at the

October (1976) plenum of the CPSU Central Committee. The Ukrainian Communist Party Central Committee, having approved our activities, adopted in 1979 the decree "On the Experience of the L'vov Obkom of the Ukrainian Communist Party and the Bureau of the Western Scientific Center of the UkSSR Academy of Sciences in Accelerating Scientific-Technical Progress at Oblast Enterprises." A large amount of aid is being given us by the presidiums of the USSR Academy of Sciences and the UKSSR Academy of Sciences and by the presidents of these academies, A. P. Aleksandrov and B. Ye. Paton.

To be sure, the new form of joint activity by scientific and production organizations has significant advantages. It creates favorable conditions for agreement on the solution of the complicated problems relating to the manufacture of machines, instruments, and equipment in which many enterprises participate, and it helps utilize the whole scientific-technical potential. This form provides the academy, academy institutes, and VUZ's the opportunity to be more active in introducing the results of fundamental and applied research into production; it provides scientific-teaching workers of VUZ's, who often do not have the necessary scientific supply and equipment base, with access to laboratories of scientific-research institutions furnished with the latest equipment; it provides design and technological organizations with the broad opportunity to implement scientific ideas and their developments, with faster application of the latter; and it provides industrial enterprises with the creation of conceptually new technology, the assimilation of modern technology, and better quality and reliability in the products manufactured.

The utilization of the scientific-technical potential of the oblast has been significantly intensified: whereas, at the beginning of the 10th Five-Year Plan, 442 scientific-technical workers participated in the activities of the complexes, there were 1651 in 1980. The financing of scientific research for complex programs also increased: during the five-year plan it grew to 6 million rubles, or by a factor of 10.

A number of important scientific-technical solutions were achieved. Among them, the following must be noted.

In the machine building complex, there was the creation of induction equipment for heat treatment of high-strength heavy balanced drill pipe, which was introduced at the Drogobych Experimental and Mechanical Special Equipment Plant, which allowed the reduction of time required for organizing large serial pipe production by seven years and reduction in the volume of capital investment by 7.5 million rubles. The output of pipe using the new technology just in two years saved the plant 39 million rubles.

As a whole, the activities of the machine-building complex helped in the introduction of 8 new technologies and 10 types of new products, and authors' certificates were received for 150 developments.

In the instrument-making complex, there was an original, updating of the design for the 61LKZTs color kinescope which, calculated for 1 million items, provided an economy of 1000 tons of glass, enough for the production of 100,000 kinescope tubes; at the same time, there was a 10 percent increase in output of good items.

In the geological-geophysical complex, there was the discovery of natural gas deposits and the introduction of new effective technology for extracting residual petroleum from depleted strata.

In the agricultural complex, there was the development and introduction of a shop-flow system for milk production and of effective methods for livestock breeding and reproduction; and the creation of new breeds, pedigreed groups, and strains of large-horned cattle in response to the needs of highly mechanized farms and complexes.

In the social-economic complex, there was the reduction of manual labor, the mechanization and automation of high labor-content processes (the "Trud" association), the planning of organized recreation using the natural resources of the Carpathians and the Carpathian Piedmont (the "Rekreatsiya" association), and the creation of complex systems for quality control over training (the "Education" association).

In the "Health" complex, there was the creation of a large cardiological center (the "Kardiologiya" educational-scientific-production association), the synthesis of new medical preparations and their transfer to the pharmaceutical industry (the "Sintez" educational-scientific-production association), the use of lasers in medicine (the "Lazer" educational-scientific-production association), and the development of up-to-date medical equipment (the "Medelektronika" educational-scientific-production association).

But perhaps our greatest success was in the creation of stable collectives of scientists and producers of various scientific and technical areas, in the achievement of mutual understanding by the partners united by a single purpose, in their joint discussions of prospective problems, and in the break-up of barriers between agencies and economic sectors.

At the same time, we do not consider these forms of science-production relations or the mechanism for controlling them to be perfect or complete. They need further revision and development.

Improvement in the management of scientific-technical progress must be continued under the 11th Five-Year Plan. A plan has already been formulated for the development of science and the support of scientific-technical progress in the oblast in 1981-1986; a number of new scientific-production and educational-scientific-production associations have been created; and the sphere of their activities has been expanded.

Many problems must still be solved. In particular, the problems have not been solved that relate to the allotment by individual ministries and agencies, production associations, and enterprises of specified funds for long-range complex research and for the creation of appropriate problem laboratories and laboratories oriented toward economic sectors. To further improve the forms and methods for managing scientific-technical progress in the region, the level of planning and developing regional programs should be raised and the existing methodologies for forecasting scientific-technical progress should be improved. It would be useful to introduce scientifically based recommendations relative to further development of the forms for regional interagency scientific-technical cooperation and to do more work on existing standardizing and methodological documents to provide for the standard functioning of special-purpose interagency scientific-production associations and complexes.

Difficulties in coordinating our work with a number of ministries and agencies that are still insufficiently informed about the functions of complexes and associations and about the problems being worked on, bring about the necessity for attracting to

it the attention of USSR Gosplan, the USSR State Committee for Science and Technology, and all-union, union-republic, and republic ministries and agencies.

A high evaluation of the work by party organizations, scientists, and producers of the oblast obligates us in the future to allot unremitting attention to the questions concerning the training of scientific personnel, the development of science, and the improvement of the mechanism for managing scientific-technical progress. The accomplishment of these tasks is a guarantee for the successful fulfillment of the five-year plan and the decisions of the 26th CPSU Congress.

Sytnik on Coordinating Research

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 8, Aug 81 pp 41-45

[Report by K. M. Sytnik, vice-president of the UkSSR Academy of Sciences and an academician of the UkSSR Academy of Sciences: "The Coordination of Scientific Research in the Ukrainian SSR Academy of Sciences"]

[Text] In speaking of the organization and coordination of scientific work, one must keep in mind the large complex of questions having to do with improving the effectiveness and quality of research and accelerating the utilization of its results in the economy. The most important component of the complex is provision for the optimum combination of fundamental and applied research. In this connection, one must assume that without fundamental research, the development of which represents the chief task of academy scientific institutions, we cannot count on the appearance of scientific discoveries and scientific advances that are really significant in their consequences. Fundamental research allows one to see more clearly what the future of production will be and it opens up new opportunities for scientific-technical and social progress. And finally, the active participation of scientists, including associates of the UkSSR Academy of Sciences, in the solution of today's practical problems is the result of the development of fundamental research in recent years and recent decades.

The UkSSR Academy of Sciences utilizes various forms of relations with production. First of all is the participation of its institutes in the fulfillment of scientific-research programs confirmed by the USSR Sate Committee for Science and Technology and the republic Gosplan. These programs reflect the urgent requirements for progressive types of products, complex automation of production processes in industry, agriculture, construction, and transportation. Substantial presence in these programs, as a necessary element, is the stage of introduction into production; this makes them a real instrument for accelerating the practical utilization of the latest scientific-technical achievements.

In the 10th Five-Year Plan, scientific institutions of the academy, together with ministerial research organizations and industrial enterprises, participated in the fulfillment of 94 programs and 10 plans for scientific research and experimental-design work. For five of these, UkSSR Academy of Sciences institutes were head organizations in the country. Advanced positions in the solution of scientific-technical problems on a national scale were occupied by the institutes of electrical welding, problems of materials sciences, casting problems, cybernetics, and superhard materials.

New forms of relationships between science and production, which have also appeared at our academy, are directed toward reducing the length of time between the origin of an idea and its introduction into production; they have already achieved positive results in practice. One of these forms is the organization of joint work by the academy and individual ministries on complex plans for scientific research and introduction of new technology. After careful study of the substance of a task and elucidation of mutual capabilities, a plan is put together which permits specifying both timely completion of scientific research and the preparation of the necessary plant conditions for introduction (the appropriate capacities, supply and equipment support, personnel, and calculation of consumer needs) and permits substantially raising the level of mutual responsibility on the part of scientists and producers.

Such plans have now been put together and are being successfully implemented jointly with the republic ministries of ferrous metallurgy, geology, health, food industry, and others. Almost 700 tasks were planned. A significant portion of them have already been fulfilled.

The successful influence of science and the acceleration of its technical re-equipping is aided significantly by a form which is arising on the initiative of the UkSSR Academy of Sciences and the AvtoZIL association for organizing applied research and introduction of tew technology, such as work on complex scientific - technical programs of the UkSSR Academy of Sciences, ministerial scientific institutes, and production collectives. Academy scientists are participating in the fulfillment of 20 complex programs of interest to large production associations and enterprises, such as the "Artemugol'" association, the L'vov "Koneskop" scientific-production association, the Krivoy Rog mining-enrichment combine, the Chernomorskoye shipping industry, and others. In the course of work on these programs, there have been created conceptually new technological processes, machines, instruments, equipment, and materials, the practical utilization of which made a noticeable contribution to the improvement in quality and reliability of manufactured products, the reduction of their materials content, and an improved level of mechanization and automation of production processes.

The development of fundamental research in areas needed by the economy and the growth of effectiveness and quality of production are aided by the organization within the academy of scientific-research problem laboratories oriented toward economic sectors. They are created at an academy institute or institute or enterprise of a USSR ministry. Their activities are financed by a ministry, but the scientific and methodological management is accomplished by an academy institute. There are 40 such laboratories of 22 USSR and republic ministries functioning under institutions of the UkSSR Academy of Sciences. The organization of these laboratories is usually related to the lack in ministerial scientific resources of a capability in certain areas of fundamental and applied research developed in the academy. This form of relationship between science and production is especially important in case of the necessity for mass introduction of highly effective scientific developments.

The academy is not trying to aggressively expand the number of these laboratories and makes their creation dependent on institutes' achievements in fundamental research that has to be developed in applied research and experimental design development and then effectively introduced into separate sectors of the economy.

Agreements for socialist cooperation with individual enterprises are widely used in the academy. Over 1300 of these agreements have been concluded.

In selecting prospective scientific areas, we take into consideration the previous results and the presence of specialists and an experimental base. As has been stressed many times, our academy is not trying to duplicate the USSR Academy of Sciences, but is concentrating scientific efforts and material resources on those problems, in the solution of which we occupy or can occupy the leading position and can bring the greatest benefit. With this aim, necessary changes are made in the subject matter of the work; nonpriority research is curtailed; and the released resources are transferred to more promising areas. The formulation of scientific and scientific-technical programs at various levels provides for clear statement of tasks, the selection of optimum ways and means for their implementation, the organization of operational management of the research process, and an efficient system of control over its fulfillment.

An important role in correctly choosing areas for scientific research is played by the 78 problem councils of the UkSSR Academy of Sciences, which coordinate research in their respectinve branches of science and analyze plans for scientific research done by academy and ministerial institutes and VUZ departments. The councils also give a signiticant amount of attention to the introduction of the results of completed projects in the natural and social sciences. They have submitted over 1300 recommendations to the directive bodies of the republic, and to appropriate ministries and agencies, for the utilization of the results of scientific research in the economy.

A new impulse was given to the work of problem councils by the creation in 1977 of the Republic Council for the Coordination of Scientific Research in the Natural and Social Sciences, in which the academy was allotted a leading role. The Council delineates prospects for the development of scientific research in the ministries and agencies of the republic, forms complex scientific programs and complex plans for fundamental research, accomplishes control over their fulfillment and, jointly with the presidium and departments of the UkSSR Academy of Sciences, directs the work of problem councils. It regularly hears reports by republic ministries and agencies on the development status of complex scientific research and practical utilization of its results.

The purposeful and systematic work of the Republic Council with ministries and agencies, VUZ's, and ministerial scientific-research institutes has led to the improvement in the coordination of research between agencies and within agencies and to the increase of their share of complex scientific projects; this has permitted increasing the meaning of the latter in fulfilling the tasks of the republic five-year plan for the most important projects in the natural and social sciences. Now, a number of republic ministries and agencies fulfill these projects along with the UkSSR Academy of Sciences.

To provide for scientific research in the economic regions of the republic on the most important problems in the natural and social sciences and to strengthen the relationship between science and production, and to improve the coordination of scientific research conducted by institutions of the UkSSR Academy of Sciences, ministries, agencies, and VUZ's, six scientific centers have been created within the academy system. These centers comprise 56 institutions of the UkSSR Academy

of Sciences (together with departments and branches of institutes and the like), and they spread their influence to 156 ministerial scientific-research institutes, 162 planning-design organizations, 112 VUZ's, and a significant number of industrial enterprises.

The scientific centers have become a dependable support for Ukrainian Communist Party obkoms and oblast councils of people's deputies in the solution of the scientific-technical tasks most essential for a region and in establishing new forms for uniting science and production. In a majority of the oblasts of the republic -- even in those where there are no academy institutions -- scientific-coordination councils (branches) of scientific centers have been organized with the help of the obkoms. In this way, relying on the high scientific authority of the republic Academy of Sciences and with active support by party obkom bureaus, the bureaus and councils of the scientific centers of the UkSSR Academy of Sciences have actually taken on the functions of interagency bodies for scientific coordination which have been allotted extremely broad powers. They are practically engaged in the formation of special-purpose scientific-technical programs being fulfilled in the interests both of individual industrial enterprises and of regions as a whole, and they formulate complex plans for cooperation with producers among the collectives of academy and ministerial institutes, as well as of VUZ's, and they exercise control over progress in implementing plans. On the basis of organizing cooperation between science and producers, the scientific centers are developing new effective forms for such cooperation.

The successful accomplishment of tasks for the increase of effectiveness of science depends to a significant degree on the coordinated operations of the republic academies of sciences. For many years, there have been fruitful scientific relationships among the academies of sciences of the Ukrainian, Belorussian, and Moldavian SSR's. Interrepublic coordination councils are being created, which formulate programs for joint work and provide for their fulfillment. Already created and being implemented are seven interrepublic programs for the development of atomic energy; the search for useful minerals; the loss of agricultural products during storage, transportation, and processing; the rational utilization and conservation of the waters of the Dnepr, Pripyat', and Dnestr river basins; and a number of others. An important feature in the coordination of the work of the three academies has been the regular meetings of their presidents.

We think that the further development and deepening of cooperation among republic academies is a real factor in the progress of the whole of Soviet science. An important role in expanding this interrelationship belongs to the USSR Academy of Sciences' Council for the Coordination of the Scientific Activities of the Union-Republic Academies.

Practice shows that individual aspects of the application of the special-purpose program method in science is still insufficiently worked out. Certain difficulties arise in the formulation of programs and in their supply and equipment support; in a number of instances, there seems to be a passion for creating scientific and scientific-technical programs without the necessary substantiation of their advisability. Therefore, it seems useful to organize, under the direction of the Council for Coordination, a regular exchange of information, the generalization of practice in applying the special-purpose program method, and the working-out of certain practical recommendations.

It is known that the successful organization and coordination of scientific research in a very direct manner depends on supply-and-equipment support. In the system that has evolved for supporting science, its needs for experimental facilities and materials are far from being fully satisfied. In our academy, we have been forced to find the way out of this difficult situation by increasing the volume of contractual work; we had to watch out, however, lest these projects negatively affect the fulfillment of fundamental research.

Especially large difficulties in supply-and-equipment support are experienced by the academy organizations that operate under cost accounting, where scientific-technical innovations are carried forward to the stage of serial production. They generally do not enjoy the advantages of centralized supply and are forced to go the self-support route of direct ties with interested enterprises, which often also do not have the required materials and constituent parts. It seems expedient for the Council for the Coordination of the Scientific Activities of the Union-Republic Academies of Sciences, on the basis of a comprehensive study of the situation that has evolved, to develop specific proposals for the improvement of support for scientific research in the union republics.

Life shows that it is necessary to give a great deal of attention to the study and exchange of experience in the work of republic academies. Good opportunities for this are opened up by seminars like ours, which should be conducted regularly. And the main role in their preparation should be played by the USSR Academy of Sciences' Council for the Coordination of the Scientific Activities of the Union-Republic Academies of Sciences.

Podstrigach on Program-Goal Approach

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 8, Aug 81 pp 46-49

[Report by Ya. S. Podstrigach, chairman of the Western Scientific Center of the UkSSR Academy of Sciences and an academician of the UkSSR Academy of Sciences: "The Special-Purpose Program Method for Managing Scientific-Technical Progress in a Region"]

[Text] Our region has a rather large scientific potential, but it is dispersed among various agencies. It can be utilized effectively only if efforts and resources are concentrated on those areas where it can have the maximum effect. All large contemporary scientific-technical problems have a complex character that requires the uniting of highly qualified specialists of various kinds, and this can be provided only within the framework of interagency cooperation. Thus, interagency scientific and scientific-technical cooperation serves as a basic precondition for forming a regional system of managing scientific-technical progress.

What are the principles that lie at the base of our system?

The preservation of the administrative and legal independence of the organizations that build up mutually advantageous cooperation on a nongovernmental basis. The coordinated utilization of the supply-and-equipment and personnel resources for the development of the most important scientific-technical problems. The special-purpose program approach, which provides for interagency planning, continuous

through all phases, of scientific developments and introduction into production. Optimum utilization of existing organizational links and forms that earlier had a positive influence on the development of scientific-technical progress. All-round strengthening of party influence and activation of societies in the solution of problems relating to the management of scientific-technical progress.

The basic components of our regional system and its structure are as follows.

General regional management is accomplished by the council of the Scientific Center, which is composed of leading scientists of the region, independent of their subordination, including managers of councils of rectors of VUZ zones, and also responsible workers from oblast party and Soviet bodies, and managers of large enterprises. In each oblast, there is a branch of the council of the scientific center, which organically merges with oblast councils for scientific-technical progress that are headed by secretaries of party obkoms; the directors of branches of the council of the scientific centers are members of the bureau of the scientific center. Subject-matter management of fundamental research has been taken over by the sections of the scientific center; and for scientific-technical developments, by the interagency special-purpose scientific-production associations (MTsNPO), which operate on a nongovernmental basis, and complexes.

The aim of management is the development and fulfillment of complex plans for the development of scientific research and the support of scientific-technical progress for the five-year plan for the oblasts of the region. These plans are developed on the basis of proposals from scientific-technical institutions, production enterprises, scientific-technical societies, are examined and approved at bureaus of Ukrainian Communist Party obkoms, and have an interagency character. In them are represented the basic areas of fundamental and applied research of interest to the oblast and to the region as a whole and tasks for training scientific personnel for organizational and material support to the development of science, for the exchange of experience, and for the popularization of scientific achievements.

For the fulfillment of the applied tasks of complex plans, special-purpose scientific-technical programs are formulated and, to provide for their implementation organizationally, MTsNPO's are created. The organizational and legal bases for the association are the Agreement and Regulations on the MTsNPO. The Agreement, which is concluded between organizations that participate in the development of the program, determines the purpose of the association, as well as the head organizations for scientific-research, experimental-design development, and introduction into production. The Agreement, the Regulations, and the special-purpose program are approved by the ministries and agencies of the association's head organizations. The activities of the association are managed by the scientific-technical council. It decides questions relating to material and scientific-technical support, continuous planning of projects from scientific research through the introduction into production, it creates joint laboratories for the solution of urgent program problems, and it organizes the work of scientific-technical seminars and meetings.

An MTsNPO sets as its goal the integration of efforts for the solution of urge complex scientific-technical problems of interest to one or several enterprises under the jurisdiction, as a rule, of a single ministry. During the 10th Five-Year Plan, 15 scientific-technical programs were fulfilled within the framework of the associations including, in particular, "The Quality of Electron-Beam

Instruments," "The Quality, Reliability, and Durability of Items in the Motor Vehicle Industry," "Increase in the Effectiveness of Geophysical Research for Petroleum and Gas," and "The Development and Industrial Introduction of Electric Thermometer Equipment." All of these programs have a complex character; therefore, their implementation involves the participation of many scientific-research and planning-design institutions, VUZ departments, and production organizations of various types -- over 60 participants, in all.

A number of scientific-technical developments for large industrial, construction, and other organizations are fulfilled by VUZ's within the framework of educational-scientific-production associations, of which there are about 30 in the region. They work effectively at the Polytechnical Institute and the Forestry Technology Institute in L'vov, the Institute of Petroleum and Gas in Ivana Franko, and the Ukrainian Institute for Engineers of Water Management in Rovno. This cooperation, on a nongovernmental basis, is also accomplished, as a rule, in the interests of individual enterprises.

Within the region there are enterprises of various ministries that, however, have closely related scientific-technical problems. Therefore, proceeding from the general tasks of scientific-technical progress and by characterizing economic sectors on the basis of related problems of scientific-production and educational-scientific-production associations, interagency scientific-production complexes are being created. Their boards are composed of representatives of scientific institutions and VUZ's, managers (or chief specialists) of industrial enterprises, and representatives of party bodies and society organizations. The board is headed by a member of the bureau of the scientific center, a leading scientist, and his deputy is the head of a party obkom economic section.

The board of the complex develops a strategy for scientific-technical progress in a given economic sector, determines special-purpose programs for individual groups of enterprises, creates associations for their fulfillment, and coordinates their work. Overall coordination of the activities of interagency scientific-production complexes and associations is accomplished by the bureau of the Western Scientific Center of the UkSSR Academy of Sciences; the bureau approves all documents that regulate their work as well as the composition of the management bodies, approves the special-purpose scientific-technical programs, exercises periodic control over their fulfillment, and makes decisions on the creation of new associations and complexes.

Analysis of the work done by us under the 10th Five-Year Plan provides a basis for considering that the above-mentioned organizational forms have proven themselves applicable and rather effective under conditions of the Western Ukraine. Complex plans for the development of scientific research and support of scientific-technical progress within oblasts of the region have been successfully fulfilled. By the end of the five-year plan, the quantity of introduced developments increased by a factor of more than 3. In individual academy institutions, these indicators were even higher. At the Physical-Mechanical Institute of the UkSSR Academy of Sciences, the base institution of the machine-building complex, the quantity of developments introduced into the machine-building sector in the region increased from 6 in 1976 to 23 in 1980, and the economic effect from the introduction of new technology increased by a factor of 6. As it had been supposed, the gainer turned out to be not only the region, but the whole economic sector.

What kind of factors for increasing the effectiveness of scientific research have been activated successfully with the help of the new organizational forms?

First of all, it is the strengthening of the problem content and the concentration of scientific potential on the chief areas of research. The complex approach to scientific-technical problems has shown evidence of efficiency.

One must also speak of the shortening of the cycle from a scientific-technical idea to its introduction into production insofar as, under the conditions of complexes and associations, comprehensive planning of developments, corresponding to the requirements of the special-purpose program approach, has acquired sure ground. This is aided by the presence of interagency laboratories, the possibility for effective solution of problems of project financing, the organization of stage-by-stage testing of research results under production conditions, the creation of a sector of science at the plant and, relative to this, the release of scientists from inappropriate functions in the process of introduction, the precise definition of duties and responsibilities, when production has already become a less passive subject for the introduction of scientific achievements and, as a partner, suggests tasks, participates in development, and takes on functions related to its implementation.

A stability of relations between science and production is being achieved, based on joint programs. Economic agreements are becoming long-term (for two or three years), and agreements for socialist cooperation are being packed with more meaningful contents, and educational-scientific-production associations are also undertaking development of complex programs. The presence of joint management bodies -- boards of complexes that include representatives of party obkoms -- helps to neutralize the negative influence of interagency barriers. The boards of complexes can effectively bring urgent problems to the attention of a group of related enterprises and mobilize efforts for their solution.

And, finally, there is the activization of the efforts of societies. The activities of complexes and associations have received active support from trade-union organizations, which have expanded socialist competition among complexes and within them. The adoption of joint obligations by collectives of scientific-research institutions and industrial enterprises that belong to associations is becoming a good tradition. Komsomol organizations have included questions relating to the implementation of the complex programs of associations within the sphere of activity of coun ils of young scientists and specialists and have organized komsomol-youth collectives for the development of individual topics. Complex creative teams have been connected to the programs through the mechanism of scientific-technical societies. All of this has aided in the creation of the proper psychological atmosphere for uniting science and production.

It is necessary to stress continuous attention to the activities of complexes and associations on the part of party organizations -- from oblast organizations to primary organizations. They aid in setting up relations among scientific, VUZ, and production collectives, increase citizens' activity and people's sense of responsibility, and form cadres of organizers for scientific-technical progress. Primary party organizations undertake the control over fulfillment of complex programs, joint socialist commitments, and the organization of competition. At the meetings

of the secretaries of party organizations of institutions that are a part of an association, recurrent tasks in managing relations between science and production are discussed. These same questions have been the subject of attention of the continuously operating methodological council of the secretaries of party organizations of scientific-research institutes, which was created under the L'vov obkom.

Naturally, success in the work of associations is determined also by the interest in them on t .e part of the ministries.

To further raise the level of activity of interagency complexes and associations, in our view, the following is necessary:

To improve the mechanism for forming oblast complex plans for the development of scientific research and support of scientific-technical progress. To develop a single methodology for drafting scientific-technical programs and also methods for controlling and analyzing the results obtained. To expand the function of complexes and associations, particularly, to enlist them in the formulation of scientific-technical plans for the development of the appropriate sectors of the region's economy. To improve the supply-and-equipment, financial, and personnel support in the implementation of complex special-purpose scientific-technical programs, to more actively direct the means of economic sectors toward the creation of joint laboratories and the construction of working space for them on a shared basis, and to strengthen plant science sections by creating branches of VUZ departments at enterprises and at scientific-research institutions. To develop socialist competition among associations and complexes for high end results.

The region has developed complex plans for the development of scientific research and support of scientific-technical progress for the 11th Five-Year Plan and scientific-tec .nical programs for interagency associations, which already number 18. A number of urgent problems of various economic sectors have found expression in the "Complex Plan for Scientific-Technical and Social-Economic Projects of the UkSSR Academy of Sciences with Enterprises and Organizations of the Western Oblasts of the Ukrainian SSR for 1981 to 1985," which permits more active utilization of the scientific potential of republic academy institutes in the interests of the region.

Taksir on Regional Efforts

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 8, Aug 81 pp 50-54

[Report by K. I. Taksir, deputy chairman of the Scientific Council on the Economic Problems of Scientific-Technical Progress of the USSR Academy of Sciences: "The Effectiveness of Regional Forms of Relationships Between Science and Production"]

[Text] The acceleration of scientific-technical progress, as practice has shown, is possible only under conditions of optimum combination and coordinated solutions of problems between economic sectors, within economic sectors, and within regions. In this complicated system, the strongest and most persistent is the system for managing scientific-technical progress within an economic sector. The functions of USSR Gosplan and the USSR State Committee for Science and Technology are primarily

oriented toward this system. But experience shows that ministries and agencies often ignore problems that arise between economic sectors. They also do not pay enough attention to regional problems of scientific-technical progress. Meanwhile, the necessity for improving regional management of scientific-technical progress is dictated by many factors. One of them is the need to utilize local labor and natural resources. It is a matter of taking into consideration regional peculiarities in the development of productive forces, in solving problems in the complex development of cities and villages, and of reducing the fluctuation of personnel and disorganized movement of work forces. The ever increasing scarcities of natural resources and the flow of natural resources in individual regions requires rational planning and utilization of local reserves of raw materials and other materials commensurate with what is necessary for the advantages received.

In recent years, entirely new organizational forms for integrating science and production and for organizing and managing them have appeared in many regions of the country. Let us name, for example, the Dnepropetrovsk complex system for product quality control and effective use of resources, the Krasnodar system for increasing the effectiveness of production, the experience of the Zaporozh'ye and Khar'kov areas in the development of complex systems for increasing the effectiveness of machine building, and the Ural Scientific Center, with its continuously operating oblast scientific-practical conferences.

One of the organizational forms of relations between fundamental science and practice that deserves attention is the creation, on the initiative of the Siberian Department of the USSR Academy of Sciences, of the so-called "innovation belt" for the implementation of applied scientific and technical developments. The idea in creating it was to provide for a process of bringing into being the capacities of scientific research, design bureaus, and experimental bases for conceptually new scientific-technical developments. Now, the innovation belt, which has spread directly around the Novosibirsk Akademgorodok, includes 11 such organizations. Their scientific management is fulfilled by academy institutions, and the administrative-economic management is accomplished by economic ministries. This initiative undoubtedly has played a positive role. However, as time goes by, the administrative and economic pressure by the economic ministries on their subordinate scientific-research institutes and design bureaus that enter into the innovation belt has intensified. Attempts have been made gradually to isolate the Siberian Department from some of them. As a result, the problem of creating a permanently operating base with dual subordination for systematic work in utilizing the latest achievements of fundamental science has still not been solved completely.

On the initiative of the Krasnoyarsk party kraykom and the Donetsk and Voroshilovgrad party obkoms, regional complex plans and plans for scientific-technical progress have been developed. These plans serve as instruments for qualified and effective management of scientific-technical progress in the hands of oblast and kray organizations. This process is not peculiar to our country. There have been rather interesting experiences in developing regional programs for scientific-technical development in Burgas and Lovich (Bulgaria), and also in Hungary.

By what means is the effectiveness of integrating science and production achieved, particularly in interagency special-purpose scientific-production associations? First of all, by utilizing all factors for intensifying civil production. The

factors that operate are those that support the growth of labor productivity and funding pay-off, lower resource-content of products, and increase their quality, and improve other technical economic indicators of enterprises and organizations that participate in program implementation, and also the enterprises and organizations that use the products. Organizational factors are beginning to "work," which affect the volume of production, the degree of its concentration and specialization, the strengthening of relations among scientific, design, and project-planning organizations and enterprises, the structure of management, its methods, principles, and functions, and so forth. The joint operation of all these factors leads to acceleration in the utilization of the latest scientific results and the introduction of the latest scientific results and the introduction of new technology, the conduct of all stages of the cycle, and the reduction of its length by matching stages and phases in time.

The effectiveness of this cycle from the economic point of view can be usefully looked at as the overall effectiveness of the entire process, including development, creation, and utilization of technical innovations. In this connection, the effect from conducting research and development can be received only in production and in the course of utilizing new items. How, then, can an evaluation be made of the effectiveness of research and development within the framework of interagency special-purpose scientific-production associations [MTsNPO's]?

As a result of accelerated development, the means mobilized for solution of some specific technical problems are being returned in the form of completed technical solutions, new instruments, and so forth, sooner than was foreseen. The scientific-production collective has the opportunity to conduct a larger number of developments, and this leads to an increase in labor productivity. By accelerating the turnover, an economic effect is achieved. On the average, as the experience of operating associations shows, the reduction achieved in the length of time for development and assimilation is from one and a half to two years, including from six to eight months' reduction for development. Obviously, these time-lengths also can have an effect on acceleration; this is a very, very large hidden reserve that can, to a significant degree, help intensify our economy. With such consideration of effectiveness, we assume that the acceleration in assimilation of the output of new items is equivalent to a corresponding application of capital investment at other times that may have led to a comparable type.

At the present time, there is great urgency in the question of transforming applied research into technical development and accelerating the process of transforming fundamental research into applied investigations. The creation, in regions, of various scientific-production complexes headed by academy institutes has opened up the possibilities for planning the scientific build-up of fundamental research that has direct entry into material production. Very much is being done in this connection. However, unfortunately, there is still an absence of legal and economic regulation of the relationships between institutions of the USSR Academy of Sciences and the union-republic academies of sciences, on the one hand, and ministerial scientific-research institutes, design bureaus, and industrial enterprises, on the other hand. In a number of instances, the ministerial scientific-research institutes and design bureaus acquire authorship rights to the research results and include the results of contractual work in their own reports without any reference to the academy institutions. Often there is no objectivity in evaluating the role of

fundamental research. We still have not attained the position where plans for introducing fundamental research results become a basis for the subject plans of ministerial scientific-research organizations.

The experience of Moldavia, Belorussia, and the Ukraine is well known with respect to their creation at academy institutions of various laboratories that specifically help transform fundamental research into applied. Evidently, at head ministerial scientific-research institutes, where there is no possibility for creating such special laboratories, it makes sense to create groups of scientists who could permanently follow the achievements in fundamental research, detect signs of areas with growing prospects, and be informed of all new results achieved in closely related branches of fundamental science. In the selection of subject matter for fundamental research, the most important criterion should be its significance for overlapping sciences and its potential value to the economy.

There is a need for improving instructions for the transfer by scientific organizations of the USSR Academy of Sciences and union-republic academies of sciences to economic ministries and agencies of materials on inventions created in these organizations. Essentially, economic ministries and agencies do not bear any responsibility for examining these materials or utilizing them.

Meanwhile, in a number of union-republic academies of sciences, the number of inventions that are not introduced, including many large and highly effective ones, is increasing. The necessity has arisen to establish a procedure that would increase the responsibility on both sides -- not only academy and applied science, but also ministries and agencies. In our opinion, it would be advisable to create an interagency commission, under USSR Gosplan, to examine and solve problems in the timely implementation of the larger inventions and discoveries of academy institutions that have important economic significance; it would include high-level representatives from the USSR Academy of Sciences, the State Committee for Science and Technology, the State Committee for Inventions and Discoveries, the Ministry of Finance, the State Committee for Labor and Social Questions, and USSR Gosplan. It would be advisable to develop and consolidate the procedures for selection, examination, accounting, planning, and control relating to the introduction of the most important research results.

It must be said that in recent years we have had a tendency to reduce the proportion of fundamental science in some union-republic academies, in the Ministry of Higher and Secondary Specialized Education as a whole, and in certain ministries. Under any circumstances, including during the examination of regional aspects of the problem, it should not be forgotten that fundamental science is our future and that it is creating now what in 15 to 20 years can be realized and provide colossal economic effect. It is essential that this aspect be considered in the planning of scientific-technical progress on a country-wide scale and by individual regions.

The effectiveness of science-production relations cannot but be affected by deficiencies in the system for financing contractual projects being fulfilled by academy institutes. Academy institutes do not have the opportunity to use the means received from contracts to enlist additional staff personnel for the fulfillment of contract work. At VUZ's, this has been solved: it is possible, for example, to send associates on trips relative to contractual subject matter, to provide material

incentives to performers who make substantial contribution to the fulfillment of contracts, and to acquire new equipment needed by the institute, out of contract funds; 25 percent of contract funds going into the fulfillment of scientific research can go into wages to pay professorial-teaching staff at half rate for dual-position holding. This procedure is not available to academy institutes.

Serious difficulties arise in organizing the work of joint laboratories and sections. These units, as a rule, are financed out of production and fulfill special-purpose tasks of ministries. However, up to the present time, the system for allotting and submitting appropriate work limits has not been simplified. The existing procedure is very complicated. It is tied to various types of agreements and decisions by numerous bodies. Much time is spent on this, sometimes a year and a half. Even within a union republic it is not possible to solve the problem of submitting work limits without agreement by an all-union or union-republic ministry. For revision, a large number of documents and normative statements are needed in this field.

Interesting experience in economic incentives has now been disseminated in the Siberian Department of the USSR Academy of Sciences. In 1972, three of its institutes -- mining, semiconductor physics, and hydrodynamics -- were given the right to create funds for economic incentives out of consumers' contract funds. The amounts of these revenues were established independently of the size of the economic effect received from the introduction of the institute's developments. True, huge difficulties immediately appeared. First, ministries and enterprises were interested in hiding the economic effect that could be received in a number of instances. Secondly, the position and character of the work of the academy institutions in the technological chain of new-technology introduction were not defined with sufficient clarity. And thirdly, complications arose in connection with the status of matters in the introduction of new technology by the consumer. The introduction of many new developments was delayed for several years and the economic incentives for workers also suffered from this.

The policy on forming and using economic incentive funds that operates in the Siberian Department of the USSR Academy of Sciences now substantially approaches that which exists in industrial ministries. Fund formation is based not on the effect from introducing new technology, but on the guaranteed economic effect, which is charged to and included in the estimated cost of contractual work. For academy institutions, this sum serves not as a supplementary, but a basic source of incentive. Contract funds go to an academy institute in accord with the guaranteed effect regardless of whether a development is introduced into production. This is an additional economic factor in managing the development of research and utilizing its results in production. The Siberian Department still uses this method as an experiment, but in the near future a typical statement will be prepared which can be used by all academy institutions. Recently, an experiment in creating a system of material incentives dependent on the guaranteed economic effect received by the consumer was introduced at the scientific institutions of the UkSSR Academy of Sciences.

In connection with the implementation of measures for strengthening the integration of science and production, appropriate documents should be prepared for standards and methodologies. These should include a Methodology for Technical-Economic Substantiation for Creating MTsNPO's, Policy on MTsNPO's, Methodology for Planning the

Whole Cycle from Research to Production Within an MTsNPO, the Methodology for Determining the Social and Economic Effect from MTsNPO's, and also the Policy on Socialist Competition among MTsNPO's and Complexes. It would be advisable to create, under the L'vov department of the Institute of Economics of the UkSSR Academy of Sciences, a scientific-methodological center to provide aid to scientific and practical workers in this matter. It would be advisable, once every two years, to conduct seminars on specific topics -- planning for the whole research-production cycle, financing experiences, development of special-purpose programs in MTsNPO's, methodological questions for determining the social-economic effect and incentives, and so forth.

A few years ago, a section for the regional problems of scientific-technical progress was created in the USSR Academy of Sciences' Scientific Council on the Economic Problems of Scientific-Technical Progress. This section has now issued the "Methodology for Regional Planning of Scientific-Technical Progress" and has held a series of conferences in Donetsk, Krasnoyarsk, and Moscow. It is apparent that we need to unite efforts and to utilize existing experience to more advantage in organizational-economic and scientific-methodological support to all participants in the integration of science and production.

Summaries of Participants' Speeches

Moscow VESTNIK AKADEMII NAUK SSSR in Russian No 8, Aug 81 pp 54-62

[Report: "Forms for Integrating Science and Production"]

[Text] V. V. PANASYUK, director of the Physical-Mechanical Institute imeni G. V. Karpenko of the UkSSR Academy of Sciences and an academician of the UkSSR Academy of Sciences, talked about the organizational work of the board of the L'vov Interagency Scientific-Production Complex. He reported that the complex included four scientific-production associations: "Avtoprom," "Khimmash," "Nedra," and "Sera." In the interests of developing machine building in the western oblasts of the Ukraine, special-purpose programs have been formulated for each of these associations for improving technology, equipment, and product quality, and also for increasing labor productivity. Programs for the activities of each association are being developed by the scientific-technical councils of the associations. The board of the complex determines the strategy for the development of a given economic sector of the region, designates the chief tasks for individual groups of scientific-research organizations and enterprises, creates new associations, coordinates their work, and controls the fulfillment of special-purpose programs. It is accountable to the bureau of the Scientific Center.

All organizational and practical activities of the complex and associations are directed toward providing assistance to industrial enterprises for the most rapid utilization of scientific and technical achievements. V. V. Panasyuk stressed this thesis with specific examples, particularly that of the improvement in the design and technology of busses at the L'vov Bus Plant and that of the manufacture of a highly effective rock-crushing tool at the Drogobych Bit Plant. The economic effect from introducing scientific-technical developments in the complex as a whole during the 10th Five-Year Plan exceeded 60 million rubles; relations between science and

production became stable; and capable scientific-production collectives were formed, which now have been included in the fulfillment of the tasks of the new five-year plan.

M. I. DOLISHNIY, head of the L'vov section of the Institute of Economics of the UkSSR Academy of Sciences, in his speech, discussed the organizational and economic factors in the creation and functioning of interagency scientific-production complexes and associations.

It is perfectly clear, he said, that scientific-technical potential of the region depends not only on the number of scientific-research institutions and scientific workers found within it, but also on the presence of flexible organizational forms that help mobilize creative thought for the solution of the tasks facing production and on a whole complex of economic, social, and other factors. The creation of such a potential is helped by transforming the structure of mutual relationships among scientific organizations, by intensifying scientific research, and by the most rapid possible movement of scientific ideas into the economy. It is not accidental, and this is shown by the facts, that the participation of enterprises in interagency special-purpose scientific-production associations promotes the constant renewal of products being manufactured, the technical re-equipping of production, and the growth in numbers of qualified workers.

Now that the new form of science-production integration has achieved recognition, it is necessary to focus attention on its organizational, economic, and legal reinforcement and on deepening its principles. It is a matter of careful and comprehensive diagnostic analysis of the activities of associations and complexes, first of all on the level of correlating the scientific, technical, economic, and social interests of the region that are reflected in the association's activities with overall public interests which, unquestionably, must be given preference. Further improvements are required in the organizational structure of new formations. Optimum correlation must be found in the rights and obligations of all management workers of associations and complexes, so as to reduce to a minimum the time spent on all kinds of agreements and on the exercise of control over the fulfillment of accepted obligations. Bringing complex special-purpose scientific-technical programs into being requires the development of a united system of economic regulation of MTsNPO activities that should cover the planning and financing of programs, material incentives for scientists and producers, the safeguarding of the cost-accounting interests of all participants, the protection of nature from harmful consequences of scientific-technical progress, and so forth.

Speaking of the necessity for improving the new forms of science-production relations, M. I. Dolishniy singled out such questions as creating a methodology for selecting urgent scientific-technical tasks within the framework of work on the Complex Program for Scientific-Technical Progress, the substantiation of optimum alternatives for the program, using a broad standard-information base, and others. For the solution of the above-mentioned problems in the L'vov section of the Institute of Economics of the UkSSR Academy of Sciences, a special scientific unit has been created -- the section for regional problems of science-production integration. Together with the Institute of Economics, the Central Mathematical Economics Institute, and the Institute of State and Law of the USSR Academy of Sciences, and the Institute of Industrial Economics of the UkSSR Academy of Sciences, the section has

started to develop the topic, "Research on the Social-Economic Problems and Development of Methodological Bases for Managing Interagency Scientific-Production Complexes and Associations." It was planned for 1981 to develop methodological documents for the economic, organizational, and legal regulation for the formation and functioning of regional interagency scientific-production associations and complexes.

N. G. MAKSIMOVICH, chairman of the council of rectors of the L'vov VUZ center and the rector of L'vov University, devoted his speech to the complex system for quality control in training specialists for the economy and for activities of educational-scientific-production associations (UNPO's). He said that UNPO's conduct work together with scientific institutions, design institutes, and industry. Their aim is to improve the educational process by improving students' practical training, basing course and diploma projects on tasks of enterprises, enlistment at VUZ's of associates from scientific institutions and leading specialists from the economy, the utilization of the unique equipment of scientific institutes and production laboratories for educational purposes, and the improvement of the quality and effectiveness of scientific developments carried out at VUZ's. The successful experience of inculcating in students the habits of creative scientific-research work is confirmed by the award of the Lenin Komsomol Prize to the student planning-design bureau of L'vov Polytechnical Institute.

V. A. ANDRUNAKIYEVICH, vice-president of the Moldavian Academy of Sciences and an academician of the MSSR Academy of Sciences, speaking at the seminar, said that his republic created a Council for the Coordination of Scientific-Technical Problems Between Economic Sectors and, under the republic academy of sciences, its working group. Problem scientific councils have been formed in the academy. Now, they are working on the implementation of 15 republic interagency complex scientific-technical programs. These programs cover questions relating to the rational utilization and conservation of natural resources, the development of biological foundations for adaptive agricultural systems, the creation of new materials and instruments, and so forth. This implementation involves participation by 17 scientific institutions of the MSSR Academy of Sciences, 8 VUZ's, 23 ministerial scientific-research institutes, and 27 scientific-production associations. The head scientific-research institutes are supported by 303 base enterprises.

To concentrate the scientific potential of the republic for the implementation of complex programs, on the initiative of the academy and the Republic Council, 11 inter-sector sections, laboratories, and groups have been organized; in particular, these units have implemented the development and introduction of new technological processes for increasing the reliability and durability of machines and the rationalization of systems for irrigation of agricultural lands under the conditions of complicated local topography. Together with the republic Council of Kolkhozes, interagency laboratories have been created for the development of the physiological bases for mineral supplements for fruit trees and fruit crops. The problems of increasing the juice yield in processing the products of plant cultivation and of decreasing the loss of agricultural products during transportation and storage are now being solved on an interagency basis.

A form of relations between science and production that has entered into practice is the conclusion of contracts by the academy for scientific-technical cooperation with individual regions, enterprises, and organizations.

The coordination of scientific research with ministries and agencies, ministerial institutes, scientific-production associations, and VUZ's, in the interests of the republic economy, has brought about new scientific areas of investigation and has required improvement in the structure of scientific units and the strengthening of their supply-and-equipment base. In the academy, a center was created, on a cost-accounting basis, for the automation of scientific research and metrology, and a specialized design-technological bureau for solid state electronics; the construction of an experimental factory is being completed. A decision has been made to create at the center for automation, a republic system for collective utilization of expensive and unique scientific equipment.

To improve financial support for projects in inter-sector programs and to improve existing procedures for concluding contracts for conducting scientific-research, experimental-design, and technological projects in special-purpose programs, an appropriate position has been developed and approved.

The transition to the special-purpose program method for planning scientific research is now expanding and deepening in all parts of the MSSR Academy of Sciences. This process is spreading to ministerial and VUZ science, and this is perfectly natural, since it determines the increase of effectiveness in research on a wide front of science.

In playing its role as the coordinator of fundamental sciences in the republic, the BSSR Academy of Sciences, under the 10th Five-Year Plan, headed work in the fulfillment of 20 of the most important complex programs in the natural, engineering, and social sciences, according to L. I. KISELEVSKIY, the chief scientist-secretary of the presidium of the BSSR Academy of Scienoes and an academician of the BSSR Academy of Sciences. Fifty coperformer organizations from various ministries and agencies and 21 VUZ's participated in this work.

In the last five years, scientists of the academy headed research on programs directed at the creation of new methods for increasing the effectiveness of civil production through its intensification, at the development of practical measures for protecting nature in the republic, for new means of forecasting reliability of machines, for new polymer materials and structures, and so forth. Significant practical results have been achieved in the work. Over 1000 developments, with a yearly economic effect of about 350 million rubles, were introduced into the economy by the academy as a whole and, already in 1980, this effect is 135 million rubles, which exceeds the volume of contractual financing by a factor of 4.3 The accelerated introduction of the results of scientific research into practice has been aided by the development in Belorussia of new forms for integrating science and production which are close to those developing in the Ukraine. An important place among them is occupied by long-term direct program agreements concluded by the academy presidium, on the one hand, and economic ministries and large production associations, on the other hand. So-called units with dual subordination have also appeared in Belorussia. Representatives of ministerial and VUZ sciences work on common problems in these units, and practical utilization of the results of the work are planned from the very beginning.

A certain amount of assistance to academy institutions in introducing their developments into production is given by base enterprises, which are attached to individual institutes and make available part of their production capacity for the final development stages of technical innovations proposed by scientists. Much has been done

within the academy itself to create the supply-and-equipment base to pave the way for carrying scientific developments forward to the stage where they already can be applied at enterprises. The Belorussian Academy of Sciences has the Central Design Bureau (TsKB) with an experimental plant, which has as one of its tasks the creation of experimental models of instruments and equipment. Several sections of the TsKB operate directly at academy institutes.

All of this has allowed a significant rise in the level of scientific and technical developments and a rise in the significance of the Belorussian Academy of Sciences in the matter of intensifying production and in improving people's lives.

For the 11th Five-Year Plan, said L. I. Kiselevskiy, 36 republic special-purpose complex programs have been confirmed in fundamental research, in the conduct of which there will be participation by all scientific institutions of the BSSR Academy of Sciences, 32 VUZ's, 19 ministerial scientific-research institutes, three large production associations, and other organizations. In addition, academy efforts are concentrated on the fulfillment of 21 all-union and 37 republic programs for the solution of the most important scientific-technical and economic problems, and nine institutions of the BSSR Academy of Sciences have been designated head institutions for these problems.

A. V. BUGATSKIY, chairman of the Southern Scientific Center of the UkSSR Academy of Sciences and an academician of the UkSSR Academy of Sciences, discussed the concentration of VUZ and academy potential. After raising the question of increasing the contribution made by VUZ workers to the accomplishment of urgent tasks in integrating science and production, he said, the bureau of the center assumes that the determining factor in the achievement of this aim is the concentration of scientific efforts on large complex problems. For this purpose, the center has created two academy VUZ scientific complexes: in physical and chemical foundations and problems of organic and bioorganic chemistry, in astronomy, and in astrophysical instrument making, that is, in those areas in which scientists of academy organizations and VUZ's already have had or can have definite success.

Another promising form of science-production integration that allows VUZ's to accomplish their specific tasks more effectively while simultaneously increasing their real contributions to scientific-technical progress, is the widespread cooperation that has been achieved in the region between VUZ's and enterprises within the framework of educational-scientific-production associations. There are now 15 such associations operating in the region on a nongovernmental basis.

Having studied the experience of the Western Ukrainian Scientific Center, the Southern Scientific Center of the UkSSR Academy of Sciences and the Council of VUZ Rectors of the Odessa Zone started to organize interagency scientific-production complexes. Five of them were created: food, chemical and medical, machine building, machine-tool building, and poultry farming. In all, these complexes are working on 130 topics and a number of special purpose programs directed toward the development of the economy of the Southern Ukrainian Economic Region. The expected economic effect should be 25 million rubles. From the work done, it is possible to conclude that, with careful planning, all of the forms discussed for organizing scientific work can be a real factor in the mechanism for managing scientific-technical progress.

The Southern Scientific Center of the UkSSR Academy of Sciences has developed a complex plan for cooperation between the UkSSR Academy of Sciences and oblasts of the Southern Economic Region for 1981 to 1985. In formulating the plan, special attention was given to research directed toward the solution of problems in the chemistry of high-purity substances, the development of sea transportation and related types of transportation, the economic substantiation of the Danube-Dnepr canal project, the fight against loss of metal from corrosion, and so forth. In the fulfillment of the projects in the plan, there is participation by 56 institutions of the UkSSR Academy of Sciences, 18 VUZ's, and 195 enterprises and economic organizations.

Under management by the Southern Scientific Center of the UkSSR Academy of Sciences, 10 complex special-purpose interagency programs are being formulated at the present time for the 11th Five-Year Plan. In all of the oblasts of the region, complex plans are being drafted for the development of scientific research and the acceleration of scientific-technical progress; these plans should reflect the decisions of the 26th CPSU Congress and the 26th Ukrainian Communist Party Congress on questions relating to the development of science and expansion of its relationships with production.

For the successful development of large regions of the country, existing local scientific resources must be utilized to the maximum extent but, also, the scientific potential of central institutes should be more widely enlisted in the solution of regional problems. This thesis was heard in a speech by V. G. BAR'YAKHTAR, chairman of the Donetsk Scientific Center of the UkSSR Academy of Sciences and an academician of the UkSSR Academy of Sciences. In 1979, an agreement was signed for scientific-technical cooperation between the UkSSR Academy of Sciences and enterprises and organizations of Donetskaya and Voroshilovgradskaya Oblasts. In accord with this agreement, a complex plan has been prepared for scientific-technical and social-economic research by the UkSSR Academy of Sciences directed toward increasing the effectiveness of production and work quality in industry and agriculture of the Donbass for 1981 to 1985. The formulation of the plan was preceded by a large amount of work done by the bureau of the Donetsk Scientific Center together with oblast party bodies and including the preparation of special standards and reference materials. As a result, agreements were concluded for the conduct of 255 scientific-research projects for 141 enterprises and organizations by 30 scientific institutions of the academy. This is research in the creation of new technologies, equipment, the organization of production, labor, and management in the coal industry, ferrous metallurgy, machine building, chemical industry, food, construction, and agriculture.

The Donetsk Scientific Center together with the Ukrainian Communist Party obkom formulated four regional programs within the framework of the complex plan. In particular, one of these provides for work on environmental protection and reducing the pollution of air and water basins by harmful wastes, and the revitalization of ecological conditions. This includes the development of measures for maximum utilization of mineral wastes and by-products in industry and construction. Independent programs have been allotted to metallurgy, to metal conservation and its better utilization, and to coal mining and the improvement of coal-mining technology.

Nevertheless, despite the urgency for the region's economy of these types of plans and programs, said V. G. Bar'yakhtar, they often do not have clear focus and needed

success rates. The main difficulty in introducing program methods is caused by the predominence of planning and management by economic sectors. The majority of the programs developed lack organizational unity based on the utilization of centralized funds for special purposes. Most often, the coperformers finance individual sections of a program, and this practice leads to its own specific problems. The forms of production management that predominate in large economic regions, oblasts, and industrial cities do not help the implementation of regional programs for scientific-technical and social-economic purposes.

The experience in the work of the Donetsk Scientific Center of the UkSSR Academy of Sciences shows that the needed form for coordinating and directing the efforts of scientists and specialists for the solution of basic regional problems can be successful with the creation in oblasts of a single system of nongovernmental bodies for management of scientific-technical progress. Under the conditions that have evolved, all coordination activity and control over the fulfillment of scientific research plans are accomplished by local party bodies. The Donetsk obkom of the Ukrainian Communist Party has made a decision to create a system for regional management of scientific-technical progress. One of the elements of the system is the development of complex plans for scientific-technical progress by regional cross-section. A Complex Program for Scientific-Technical Progress in Donbass Industry to the Year 2000 has been developed on the initiative of the Donetsk Scientific Center. It will be updated every five years and will serve as a good orientation for creating five-year plans for all scientific-research institutes, VUZ's, enterprises, and associations.

The implementation of regional plans and programs should help the underlying organizational reinforcement of this program. Toward this aim, the party obkom of Donetskaya Oblast and also gorkoms and raykoms of the Ukrainian Communist Party have created councils for increasing the effectiveness of production and work quality, and the oblast, city, and rayon ispolkoms of the Councils of People's Deputies have created commissions for scientific-technical progress.

In accord with the USSR Constitution, it is advisable to expand more widely the authority of local organs of Soviet power so that they can manifest their own organizational foundation for managing scientific-technical progress.

The chief scientist-secretary of the presidium of the Ural Scientific Center of the USSR Academy of Sciences, G. N. KOZHEVNIKOV, characterized the work of his center in part as the arrangement of close, creative relationships with production. Socialist-cooperation agreements and economic agreements are being concluded. Training of highly qualified specialists for industry is being conducted. Plant exhibits of scientists' works are being organized. Long-term contracts have been concluded with the large "Uralmash" and "Uralkhimmash" associations. These leaders in their respective economic sectors have become a kind of proving ground for developments by Ural scientists. From there, these developments are disseminated not only to the enterprises of one economic sector but also to enterprises of other sectors. The creation of laboratories with dual subordination has also turned out to be an extremely fruitful form of cooperation. As a result, during the 10th Five-Year Plan, about 100 scientific developments were introduced into the economy, with a total economic effect of over 200 million rubles.

Scientists and producers have started to implement the regional complex programs, "Mineral Wealth of the Urals," "Ferrous Metallurgy of the Urals," "New Materials," "Waters of the Urals," "The North of the Urals," and others. Common to these programs is the uniting of the efforts and resources of VUZ's, ministerial scientific-research institutes, and enterprises of the region under the management and with the participation of the Ural Scientific Center of the USSR Academy of Sciences. Just to fulfill the "Mineral Wealth of the Urals" program, 65 organizations have been enlisted.

All these relationships between science and production will be improved during the new five-year plan. The scale will be broadened, for example, by strengthening cooperation between academy and medical institutions. Better use of the experimental bases of various agencies in the fulfillment of special-purpose programs is being provided for. This pertains particularly to the food program.

During the years 1981 to 1983, the scientific center, as the head organization, will begin to implement the special-purpose complex program, "The Intensification of Industrial Production in the Urals," on which a majority of the scientific institutions of the region have been working. Of important significance for the development of science-production relationships is the fulfillment of recommendations adopted by the Ural Scientific Center of the USSR Academy of Sciences for scientific-practical conferences, which have been conducted under four five-year plans on the initiative and under the management of the oblast party organization.

Contacts by the Bashkir Affiliate of the USSR Academy of Sciences with VUZ's, ministerial institutes, and enterprises of the autonomous republic were characterized by the deputy chairman of the presidium of the Bashkir Affiliate of the USSR Academy of Sciences, G. A. TOLSTIKOV.

Experience in conducting scientific research jointly with one of Bashkiria's largest VUZ's, the Aviation Institute, showed scientists of the affiliate that maximum effectiveness of scientific relationships with VUZ's cannot be provided by episodic contacts. It is necessary to have unified plans for research, development, introduction into production, and publication, which are possible only with the organization of joint laboratories. To date, there are eight such laboratories, which include researchers from the Physics and Mathematics Section of the Affiliate and also from the Ufa Petroleum Institute and the Aviation Institute. Because of these laboratories, a number of large developments have been introduced into production.

A computer center and a laboratory of ferromagnetism have been created jointly with the Bashkir State University. The Laboratory for the Synthesis of Antiparasitic Preparations for Livestock Breeding has been created jointly with the Agricultural Institute. The volume of research is being increased under agreements for creative cooperation in chemistry, biology, pharmacology, physics, cybernetics, and so forth. Chemists have a leading role in this work. Bashkiria can rightly be called the republic of chemistry. The Institute of Chemistry of the Bashkir Affiliate of the USSR Academy of Sciences is the largest institute in Bashkiria. It applies the classical three-link scheme for introducing the results of scientific research -- academy institute, ministerial institute, and plant -- and the two-link scheme -- academy institute and plant. The first scheme, undoubtedly, is the more justified from the point of view of rational distribution of efforts. It is even more

justified because it permits the utilization of experimental facilities of ministerial institutes otherwise unavailable to academy scientists. The most fruitful relationships have turned out to be those with NIIneftekhim and NIIneft'.

What precisely do the scientists of the affiliate offer to the economy of the republic? There are the results of fundamental research, projects fulfilled on request from enterprises, and proposals for the improvement of technology based on deep study of technological processes. Scientists of the affiliate, particularly chemists, spend a great deal of time on production, and this explains the decision to move certain laboratories of the Institute of Chemistry to the area of the enterprises. However, the process of establishing contacts between Bashkir academy science and VUZ's and industrial organizations does not always go smoothly for both objective and subjective reasons.

The L'vov experience has taught us much, said G. A. Tolstikov, and it will be used to a still greater degree by the Bashkir Affiliate of the USSR Academy of Sciences in future practice.

Data on large-scale cooperation between institutes of the Siberian Department of the USSR Academy of Sciences and enterprises of the economy were introduced in the speech of V. YE. ZUYEV, chairman of the presidium of the Tomsk Affiliate of the Siberian Department of the USSR Academy of Science and a corresponding-member of the USSR Academy of Sciences. This cooperation has permitted the doubling of labor productivity at the "Sibsel'mash" plant without using any additional material resources. The Siberian Department of the USSR Academy of Sciences has a reputation for its complex coordinated plans for introducing the achievements of science and technology into production, drafted and implemented jointly with many all-union ministries. Joint meetings of the boards of the ministries and the presidium of the Department are held periodically, with the discussion of plans for and the results of cooperation, including the introduction into production of very promising and revolutionary fundamental science results.

The Council for the Coordination of Scientific Research has been working for 10 years in Tomsk under the party obkom. Its composition includes managers from all of the scientific-research institutes of the city, the prorectors for science of all VUZ's, the directors of large plants, and the chairman of the oblast Council of Young Scientists and Specialists. The Council has 10 sections, each of which conducts one large complex scientific-technical special-purpose program, providing methodological and operational management of its implementation. As an example, V. Ye. Zuyev referred to the programs, "The Automation of Scientific Research and Technological Processes" and "Powder Metallurgy." The aim of the first of these is -- through fundamental research and applied developments by united efforts -- to create and introduce into both science and industry, mass automated systems based on the KAMAK standard. The second program poses the task of raising the wear resistance of punches, presses, and other machine components by a factor of 5 to 10. The working group for this program is headed by the second secretary of the party obkom.

The CPSU obkom has adopted a decision according to which experimental sections for mass introduction of scientific achievements will be created during 1981 at a number of large industrial and construction organizations.

Having published this material on the integration of science and production under the conditions of developed socialism, the editors propose to continue, on the pages of this journal, a discussion of the questions raised.

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