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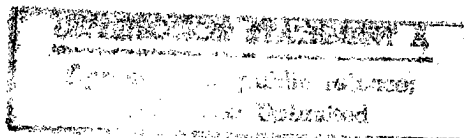
27 May 1982

USSR Report

ECONOMIC AFFAIRS

No. 1012

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27 May 1982

USSR REPORT ECONOMIC AFFAIRS

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RESOURCE UTILIZATION AND SUPPLY

WIDE-RANGING DISCUSSION OF NATURAL RESOURCE USE

Moscow EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA in Russian No 3, Mar 82 pp 147-194

[Transcript by Z. Ibragimova of round table discussion by writers associated with the literary magazine NOVYY MIR and scientists associated with the economics journal EKO held in Novosibirsk: "Economics, Ecology, Ethics"]

[Text] Writers and scientists associated with the two magazines met on the Novosibirsk academy campus for a round table discussion of the topic "Natural Resource Use: Tasks in Shaping a New Awareness." The questions formulated by the editors for discussion specifically included such questions as these:

Is Technical Progress Guilty of Upsetting the Ecological Balance?

Ecological Training and Economic Reality;

The Duty of Science and Literature--Reshaping Social Consciousness....

The following took part in the round table meeting between EKO and NOVYY MIR:

The writers:

D. A. Granin, S. P. Zalygin, V. V. Karpov (at the time deputy editor, but now editor in chief of NOVYY MIR), A. L. Nikitin, G. I. Reznichenko (at that time head of the journalism division, now executive secretary of NOVYY MIR) and V. D. Uspenskiy.

The scientists:

A. G. Aganbegyan: member of the academy, director of the Institute of the Economics and Organization of Industrial Production of SO AN SSSR [Siberian Department of the USSR Academy of Sciences], editor in chief of EKO, Novosibirsk;

N. N. Amshinskiy: doctor of geological and mineralogical sciences, division head of the Siberian Scientific Research Institute for Geology, Geophysics and Mineral Raw Materials, Novosibirsk;

V. V. Bessonenko: candidate of medical sciences, director of the Scientific Research Institute of Interdisciplinary Problems of Hygiene and Occupational Diseases of SO AMN SSSR [Siberian Department of the USSR Academy of Medical Sciences], Novokuznetsk;

O. F. Vasil'yev: corresponding member of the USSR Academy of Sciences, chairman of the Scientific Council of SO AN SSSR for Problems of the Environment, Novosibirsk;

G. I. Galaziy: corresponding member of the USSR Academy of Sciences, director of the Institute of Limnology of SO AN SSSR, Irkutsk;

D. L. Yepiskoposov: doctor of economic sciences, Moscow;

A. S. Isayev: corresponding member of the USSR Academy of Sciences, director of the Institute of Forests and Timber imeni V. N. Sukachev of SO AN SSSR, Krasnoyarsk;

V. P. Kaznacheyev: member of the USSR Academy of Medical Sciences, director of the Institute of Clinical and Experimental Medicine of SO AMN SSSR, Novosibirsk;

R. V. Kovalev: doctor of agricultural sciences, director of the Institute of Soil Science and Agricultural Chemistry of SO AN SSSR, Novosibirsk;

P. G. Oldak: doctor of economic sciences, Novosibirsk State University imeni Leninskiy Komsomol;

V. V. Penenko: doctor of physical and mathematical sciences, deputy director of the Computer Center of SO AN SSSR, Novosibirsk;

A. A. Trofimuk: member of the academy, director of the Institute of Geology and Geophysics of SO AN SSSR, Novosibirsk.

This publication has been prepared from the material of the round-table discussion.

1. The Nature of Our Anxieties

This way of joining the three words of the heading above gives them double meaning. According to V. Dal', nature is first of all "substance, everything that is material, the universe, the entire cosmos, everything perceptible, susceptible to the five senses, but more than that--our world, earth, with everything created on it." And then the heading can be read as "The World, Which Alarms Us." But, again according to Dal', nature is also "character, quality, attribute or essence," and then the phrase can be taken as "The Essence of Our Anxieties."

The discussion here--as was the case around the table--concerns both: both earth, "with everything created on it," whose state is causing us ever more frequent, keen and painful anxiety, and about us ourselves, endowed with the

ability to become alarmed intuitively, to become consciously alarmed, to be anxious on the threshold of a danger which we are able to avert if we are timely enough in understanding exactly what is threatening us and why the threat has come about.

Concern about nature has been elevated in our country to the rank of a most important economic and social problem of the state. In the section entitled "Economic System" the Soviet Constitution states: "In the interest of the present and future generations the necessary measures are taken in the USSR for protection and scientifically sound and optimum use of the earth and its resources, water resources, the plant and animal kingdoms, for protection of clean air and water, to guarantee reproduction of the attributes of nature and to improve the environment." In elaborating this policy the party and government are drafting more and more new pieces of legislation defining the principles of using the resources under the earth, timber resources, land resources and water resources. Laws have been adopted on protection of the air, on protection and use of the animal world, decrees on measures to protect the Baltic, Black, Caspian and Azov Seas, the Volga, Don and Ural Rivers, and Lake Baykal. A specific state committee of the USSR Council of Ministers has also been created for hydrometeorology and monitoring the natural environment. "Improving state management and intensifying monitoring in the domain of natural resource use and protection of the environment. Broader involvement of the public in natural conservation," are goals stated in the "Basic Directions for the Economic and Social Development of the USSR Over the Period of 1981-1985 and Up to the Year 1990," a statement of policy issued by the 26th CPSU Congress in which "Natural Conservation" is given a separate section.

It is difficult at this point to realize that back at the beginning of the fifties there was a serious discussion of the question "Should natural conservation be regarded as a separate field of science?" The attention to ecology, performance of the measures drafted by the party and government, and implementation of many decisions concerning optimum use of natural resources and environmental protection have brought about notable constructive shifts in the shaping of new approaches to the problems of the relationship "biosphere--human activity." Yet, of course, as noted in the decree of the CPSU Central Committee and USSR Council of Ministers dated 1 December 1978 and entitled "On Additional Measures To Strengthen Nature Conservation and To Improve the Use of Natural Resources," local party and Soviet agencies have still not guaranteed in all cases performance of effective measures for soil conservation, for protection against air and water pollution, for optimum use and reproduction of natural resources. Certain USSR ministries and departments are not paying due attention to developing and introducing low-waste technological processes nor to closed-cycle water use systems.

And "anxiety" is perhaps the most "effective" word to describe the state we experience so often when we encounter the most severe problem of our time--the ecological problem.

The facts alarm us. Forests are drying up or burning to the ground, high-quality wood is rotting, and extremely valuable sawdust is going to waste. Certain bodies of water are being poisoned with industrial effluents. Plowland

is being flooded or used for quarries to mine raw materials for production of energy or building materials. We are alarmed by the dry valleys, the shoaling up of rivers, smog, salinization of the soil, acid rain, inconveniences. The life of the birds, wild animals and trees--and finally our own life, which is by no means improved by the deterioration of the life of the omul, the reindeer, the muskrat or the taiga hazelnut.

The analysis of these facts alarms us. The forest is drying up because of harmful emissions into the atmosphere from some sort of economically necessary production operation. The forest is burning because of the criminal carelessness of one person or many. Wood is rotting in a no-man's-land, since certain people are responsible for cutting the timber and altogether different people for skidding it. Bodies of water are often becoming polluted because the general standards of maximum permissible concentrations do not always take into account the limits allowed by the specific ecological system. Plowland is being flooded for the sake of energy, and it is increasingly difficult to obtain energy because the rivers carrying the energy are silting up, and the rivers are silting up because not only plowland, but also the forests, the cradle of those rivers, are going to the bottom of the artificial reservoirs.... We are alarmed by an analysis of the facts in which we see as in a mirror our own activity, which is by no means easy to explain.

We are alarmed by the state of our morality, of our consciousness. How often we are unable to rise above a momentary gain, a momentary interest, in taking important economic decisions which soon take revenge on our shortsightedness with a chain reaction of irrecoverable losses! The needs of society for natural resources are growing very rapidly, but awareness is at best dejectedly noting the costs of a natural resource use that is not always sensible, seeking a way out ... through what? By renouncing progress? By curtailing needs? By rethinking certain slogans which for long years were the basis of relations between man the taker and the environment which was the giver?

But we will not get ahead of ourselves. First we will try to understand the nature of our anxieties.

D. GRANIN: Our meeting, a joint effort by writers and scientists, is an important event in my opinion. We are discussing a topic on which we can find a common language. On many other questions we go different ways--and it is proper that we should separate, that we should diverge, but on this topic we can come together and act jointly. I think that by our common effort we should work out constructive ideas. Even in our enlightened time they possess a considerable force. Society cannot live without updating its ideas. Indeed, the consumer's attitude toward nature has become too deep-rooted in us. The process of reshaping consciousness is a complicated one, but in my opinion nothing short of a new human awareness will be able to solve the innumerable problems of preserving everything that is alive around us, the problems which we enter upon every day like a blind alley. Optimum economic decisions, which, incidentally, are also difficult to find, have usually been aimed at how to obtain a benefit, how to extract more raw materials and live with greater comfort. But what right do we have to suppose that all nature was created for man? The right based on might? Perhaps it is time to speak about

the duty of man, of society, to sacrifice something for the well-being of nature? Perhaps we should look upon civilization as a guarantee of the well-being of nature, of which Man himself is a part? Hasn't the time come for Man to pay nature those debts whereby he himself became Man?

A. AGANBEGYAN: We often encounter a lack of confidence about the usefulness of meetings and conversations like ours: we talk and we talk, and Tom, Dick and Harry listen, yes, that's right.... No changes take place at all. It seems to me that that is not so. Over the last 10 or 15 years very great changes have actually taken place in the attitude of industry and other sectors of the economy toward the problems of natural conservation. And the discussion concerning construction of the Baykal Pulp Combine had decisive importance in that process. At first the fight was waged against that enterprise's being built at all, later so that the effluent would not be discharged into Lake Baykal; that fight was lost though many scientists and writers took part in it. It is no accident that in a 1969 decree the USSR Council of Ministers commissioned the USSR People's Control Committee to call to strict account those to blame for destruction of the regime established for protection, use and reproduction of the natural complexes of the Baykal Lake basin and for inflicting damage on the national economy. It should be said that the enterprise itself--the pulp combine--is extremely unprofitable in economic terms: worse with respect to many indicators than it might have been somewhere else. And it could have been built anywhere you like, because it did not need the very clean water of Lake Baykal. Moreover, it is difficult to deliver the wood to it. But ... victory went to the ambition of certain top officials defending departmental interests. Nevertheless, in spite of the manifest failure of the scientific and literary community, this fight did have consequences of many different kinds. Before that not a single pulp mill had any treatment facilities at all. The largest among them, the one at Bratsk, was put into operation with practically no treatment facilities, and all its effluents were discharged into the Vikhorevka Creek, and this never bothered anyone particularly, no one raised his voice about it. A host of other enterprises--chemical, petrochemical--had no waste treatment at all or the bare minimum. After the Baykal affair not a single pulp mill was built without waste treatment facilities, nor was this confined to pulp mills.

What are up-to-date waste treatment facilities? Their minimum cost is 60-80 million rubles. The complex cannot be covered on foot; to examine it one must go by car. The Tobol'sk Petrochemical Combine has not yet gone on stream, it is not yielding output, but the waste treatment systems are by and large ready. They will cost 200 million rubles. Is this not after all a change of course? Indeed, quite a bit was nevertheless done at Lake Baykal itself. The stream driving of timber was halted on rivers that flow into Baykal. That meant building 3,000 km of roads, halting timbering along Baykal and its rivers, and setting up 200 waste treatment installations. But still the essential issue of the combine has not been resolved; the fight must be continued against narrow departmentalism.

Nevertheless, I emphasize, a certain change of direction has been accomplished. I see this in many facts. For example, scientific institutions have been complaining of GlavBAMstroy [Main Administration for Construction of the

Baykal-Amur Main Rail Line]: it is prohibiting them from conducting dusting experiments along the route to control gnats because, in its opinion, the chemical substances might also destroy the birds, and it could have a bad effect on humans. Nothing of the kind occurred earlier. Or take this example. The city of Udokan was planned on a beautiful level area where its construction was both easier and cheaper. The project plan was approved, but after research demonstrated that this area did not have air circulation, a ban was instituted against building the town at that site, it was moved higher, slightly to one side, and it will now be located on hills, and the construction will be tens of millions of rubles more expensive--and only because of a purely ecological circumstance.

In short, there have been shifts. But these shifts are insufficient in view of the scale of utilization of the substance of nature.

A. NIKITIN: I ask you, can one cease to be amazed that ecological issues--not only with us, but in other countries as well--are being resolved in a cross section of the present day? Yet after all what surrounds us, what we are taking advantage of, is not only the result of human activity, but is above all the result of the biosphere's activity over several billion years. But I do not see at our table either archeologists, or paleobotanists, or paleogeographers--specialists whose knowledge, it seems to me, is indispensable in solving ecological problems. These specialists are not even present at our meeting--so how can we speak of their participation in ecological practice?

N. AMSHINSKIY: The root of many of our troubles is the shortage of knowledge and lack of sophistication. We are unable to examine the entire chain of ecological factors, but otherwise it is impossible to take a far-sighted decision. Just take the issue of strip mining. Why has its time come? Above all, of course, out of considerations of economic efficiency. But at the same time because work in underground mines is heavy and uneconomical. Let us get out from underground, they say, and it will be a completely new type of work. And what happened? I have seen a huge pit, altogether without air circulation, which is filled with smog and sultry heat in the summer and smog and freezing cold in the winter, and it is not a whit easier for man than under the ground. One wonders: Why did we come above ground? Underground workings are in any case not badly ventilated. Do we always make a truly comprehensive comparison of the efficiency of strip mining and underground mining? Do we always reflect on the consequences of "coming above ground" for human health, for the state of the environment?

A. AGANBEGYAN: But perhaps it is the very scale of our society's economic activity that is the principal cause of the growing unrest? In order to offer a vivid idea of that scale, I will quote figures for Siberia, which in the 10th Five-Year Plan occupied leading positions in supplying many types of resources to the country. But first the general picture, the essence of which is the extremely uneven location of the productive forces and natural resources. In the European part of the country and in the Urals, where more than 70 percent of the population of the Union lives, 80 percent of the industrial output is produced, 75 percent of the fuel and 70 percent of all other resources are consumed, though it accounts for only a tenth of the USSR's fuel resources,

approximately one-fourth of the timber resources, only one-fifth of the water resources and about 15-20 percent of the principal minerals. That is why another region--Siberia and the Far East--with 10 percent of the population accounts for almost nine-tenths of all the fuel, about three-fourths of the timber, three-fourths of all the fresh water (not counting Lake Baykal), between two-thirds and three-fourths of reserves of various minerals, and is increasingly becoming the country's center of raw materials bases for the other regions. In the 10th Five-Year Plan the country's European portion and the Urals began for the first time to cut back on the extraction of fuel--though industry and energy needs were growing. The fuel shortage had to be made up by moving extraction eastward. The same applies to timber and a number of mineral resources.

As a result the growth rates of the extractive branches, the growing utilization of the substance of nature, have begun to rise uninterruptedly. And now every year the bowels of Siberia yield up (figures for 1980) 312 million tons of petroleum, 155 billion cubic meters of gas, about 250 million tons of coal; but in order to mine 250 million tons of coal, considerably larger amounts of gangue have to be moved. All of Siberia is under construction, and that means a huge amount of gravel, sand, clay and so on. I would make a rough guess that more than 2 billion cubic meters of land are dug up in Siberia every year. The scale of earthmoving operations is growing rapidly. And the economic problems of the future, which we are formulating even today, are related to transformations difficult to imagine. For example, someone has hypothesized that even by the end of the century 350 million tons of coal will have to be mined per year in the Kansk-Achinsk Basin alone. That amount of coal will require turning over every year practically 1 billion cubic meters of earth. In short, man's interference with nature, whereby he obtains heat, energy and comfort, is taking on planetary proportions.

G. GALAZIY: Yes, the scale of man's impact on nature is in many cases comparable to the scale of natural phenomena themselves, and sometimes even surpasses them. In the future 3-4 billion cubic meters of earth will have to be moved to obtain 1 billion tons of Kansk-Achinsk coal. Make the comparison: All the rivers of our country carry off into the ocean every year about 400 million cubic meters of sediment. That means that our activity just in the KATEK [Kansk-Achinsk Fuel and Energy Complex] alone will result in a movement of solid material on an order greater than accomplished by the country's entire hydrosphere. But the most alarming thing, in my opinion, is that in our actions we continually forget a simple and important truth: Everything in nature is interconnected! Not a single disorder of the ecosystem, not even a slight one, which we might cause, is free of consequences. We must measure our needs against nature's possibilities. Whatever we might invent, we will not be able to take more from nature than it can give.

A. ISAYEV: But we need to know just exactly how much it can give. We live in a truly rich country--we reckon the tons and cubic meters of the most valuable resources in the hundreds of millions and billions, and sometimes it seems to us that we can exploit our natural resources without end. But notions of the unlimited nature of reserves of raw materials are more and more taking on the character of myths which have to be dispelled. The case of the forests offers

a good confirmation. The world's most timber-rich country, our own, suddenly, toward the end of the 10th Five-Year Plan, was compelled to reassess certain stereotyped conceptions. Substantial overestimations of timber reserves and an analysis of trends in forest use made it clear that if reforestation is not intensified, we will realistically be short of timber resources in about 50 years. We are talking here about resources of the greatest value. Where does that lighthearted feeling of prosperity come from? It is based on the customary method of computation in which reserves are estimated on the basis of the so-called upper level--on the basis of forest growth over the entire area of a region. When this approach is taken, everything turns out fine: Considerably more timber is growing than is being cut. But one needs only to examine two essential circumstances for the illusion of well-being to vanish. First, say, they cannot be efficiently exploited because this is forest on frozen soil, it is low in productivity, but it has a tremendous ecological influence and importance. Or mountain forests, which give life to many Siberian rivers and whose condition is crucial to the well-being of large ecosystems. Second, we are today carrying out reforestation only on a third of the area we are cutting. And at present the gap between timber consumption and reforestation is widening.

A. TROFIMUK: The state of reserves is the question of questions in our time, especially with respect to fuel and energy resources. I am no judge of forests, but as I see it our country is well supplied with organic fuel. I might mention that Siberia exceeds in area the United States of America, including Alaska. According to recent data, it is also richer than America in natural resources.

Many people are disturbed by the fate of petroleum and natural gas more than anything else. The idea is being advanced more and more frequently of cutting back on the extraction of hydrocarbons because of the possibility of rapid depletion of reserves. What is it I intend to say about this? At present we are approaching completion of an assessment of the region of West Siberia. Annual petroleum extraction in this region is supposed to reach nearly 400 million tons (385) by the end of the 5-year period, and gas 330-370 billion cubic meters, or perhaps even that same 400 if transport allows. By the end of the century extraction of both petroleum and gas in this region will increase, but it seems to me that even at the beginning of the new century we will be following an ascending curve on the basis of West Siberia alone. The rates are, of course, very high, but they are backed up with resources. Today about 90 percent of all the hydrocarbons extracted are used for energy both in our country and in the United States. By the end of the century, thanks to nuclear power, this share will drop to 70 percent at best and more likely to 80 percent. And if the country wants to bring up its fuel and power industry to the necessary level over the rest of the century, it cannot renounce the use of petroleum and gas, nor cheap coal either. Japan, West Germany and France are countries which have neither gas of their own, nor their own petroleum, and they are augmenting their consumption. They presumably consider it possible to buy these raw materials at the prices which will be constantly rising and to increase their energy potential with them. But in petroleum production we long ago (in 1975) moved into first place in the world, but in its consumption in the economy we lag behind the United States,

Japan, West Germany and France, and this circumstance ought to be taken into account by those who are militating against reduction--or even in favor of stabilization--of the extraction of hydrocarbon in the interest of our descendants.

Is the development of the petroleum and gas industry presenting a serious problem for environmental protection? It seems to me that present-day technology and the system of protective measures can minimize the effect of this industry on the biosphere. Even now we do not see a single drop of petroleum in a good field....

A. ISAYEV: Today we are using timber which began to grow when serfdom still existed. But the most baneful thing in this affair with timber, though, is that we are utilizing 60 and at the most 70 percent of the biomass of the timber we are skidding. Moreover, we are timbering in the best and most productive stands of the country, in Siberia to be specific. Many virgin tracts have been exhausted. The move to less productive stands involves higher costs. Just imagine: we are using 60 percent of the best timber for the national economy, the rest we at best simply burn in dumps. And there is nothing surprising about this. Take the timbering operation itself. Its task is to do as much as possible with small effort. And this approach--from the standpoint of production it is understandable and legitimate--has the result that the very best is selected for cutting, often without taking into account the ecological load on timberland, without attempts to utilize the reserves more fully and optimally. The timbering operation is driven by the plan, it needs to cut, skid and float the timber as fast as it can. More than one article has been written in the central newspapers about how they are floating, for example, the world's best Angara pine from the upper reaches of the Angara to Igarka, and there half of it goes into logs and half is burned on the tundra. Examples like that are evidence that the attitude toward natural resources needs to be structured on new principles. Production plans should be drafted on the basis of forecasts--social, economic and ecological. These forecasts are very important--and not only in forest use, but also in every major economic effort that involves consumption of natural resources.

A. NIKITIN: But the economy does not exist in and of itself, without society. In my opinion, is society being well served by the economy it has created? If not, then let us think about how to restructure it.

S. ZALYGIN: Right. After all, we pose an economic task and sometimes say: "At any price." And what kind of a price is "any price"? It is the most primitive price. It does not require scientific computations, it lies on the surface: We are taking credit, we are going into debt--to whom? To nature.

REPLY: With no intention of repaying that debt....

S. ZALYGIN: Right. With no intention of repaying.... Nor do I set myself apart from those people who are cutting timber indiscriminately. I might leave the timber institute and become director of a timbering operation, and then I, too, would cut timber. Now it may be that I would feel just a bit more pain in my heart, but as a practical matter that would not change

anything. Very curious phrases have entered our thoughts: "man and nature," "man's single-handed combat against nature."... What kind of single-handed combat against nature? Man is a part of nature, why are we always fighting against ourselves? When in ancient times man turned to some object of nature--to the forest or to a herd of animals--he felt not only his own attitude toward it, but in equal degree also the relationship of that forest or herd to him. He included himself as part of that world, he was authentically a part of nature. Later this unity was lost and nothing replaced it. Now we only know what we need from nature: cutting timber, flooding, plowing up, extracting, and at the very best--exploring. But we do not reflect at all about the relationship of the world of nature to us at this juncture. That psychological bond has been lost. We laugh at the pagans--people who did not distinguish between animate and inanimate objects. But perhaps our laughter is not so clever at all?

P. OLDAK: It would seem that in our development we have come up to the line beyond which we need a new way of thinking and a new way of life. In the seventies of our century humanity came up against global problems--energy, ecology, raw materials, food and demography.... They are all arrayed in a single metaproblem, which we might refer to provisionally as upsetting the balance between social development and earth's natural systems. Humanity has the ability to arrive at balanced use of natural resources. This requires, I repeat, a change in ways of thinking and the way of life.

So, we are looking into the mirror of our relations with nature--and we see our face, which by no means shows the greatest intelligence or the greatest goodness. We began to "tame nature" with the best intentions, and the result is something we don't want to look at.

Why then is it happening? Perhaps an analysis of certain concrete situations will make it possible to find more precise answers to the question that is disturbing many people?

2. Hydropower and Timber

A. ISAYEV: Now that we are speaking about the approach from the standpoint of the future, I will add the example of hydroplants. In my opinion, this is also an example of our shortsightedness. The efficiency of a GES is as a rule assessed according to the amount of the cheap power which will be obtained from putting the new station on line. Now, if we reckon this in terms of the iron and concrete which go into that GES, this is actually so. But if we reckon up all the ecological consequences of building any hydroplant, we get a quite different accounting. The Bratsk Reservoir flooded millions of cubic meters of Angara pine, the best in the world. I do not intend to speak at this point about the Bratsk Reservoir itself, about what kind of water it will later become--that is another question, but we have irrecoverably lost the timber that is at the bottom of that reservoir. The Ust'-Ilinskaya GES: losses somewhat less, but still millions of cubic meters. Has this taught us anything? I was recently at the construction site of the Sayano-Shushenskaya GES--I made an airplane flight specifically to see what is happening there. There is not such a great deal of commercial timber there in any case, but it

was thought uneconomical to skid it out. The pine which can be taken in a simple way is being cut and burned; it is all on the shore. But it is being destroyed, while at the same time a complex needing timber is being built 100 km away. We have taken certain measures--supposedly so that this timber might yet be put to economic use. But ... but--the Boguchanskaya GES is being built, and there it is the same story: They still have not really begun to cut and skid the timber. The Sredne-Yeniseyskaya GES is being designed--and again little thought is being given to timber.

What is going on? The trouble is in the planning, in the approach. The timber needs to be cut approximately 6 years before construction begins. But at that point there is still no relevant decree, and nothing is done. The plant itself is built considerably faster than the effort to put the bed of the reservoir in order. In general the problem of GES is taking on more and more nuances in our time. The reservoir of the Novosibirskaya GES has flooded the most fertile land in the Ob' Valley. When they built the Krasnoyarskaya GES, no one even supposed that it would bring about any changes in the ecological situation. It was assumed that the water would keep from freezing only at a distance of some 20 km from the GES. But it is not freezing over a distance of 150 km, its temperature has changed--the water has become colder, people have stopped swimming in Krasnoyarsk in the summertime. There has been a substantial increase in the percentage of catarrhal illnesses. There are now fogs. The corrosion rate of metal has increased. And so on--a whole series of unforeseen consequences. And now thought is already being given to creating systems which would somehow heat up this water and would improve the hydrological and temperature regimes. Because the Yenisey is being polluted more than before: the change in the temperature regime is making it more difficult to treat the water because the heat the Yenisey carried off to the Arctic has dropped substantially, because.... The Angara has been altered because of the system of GES--it is an absolutely different river....

V. PENENKO: The quantitative approach to assessing possible consequences of a particular decision can be furnished by mathematics. Mathematics can provide precise criteria for evaluating the state of the environment in solving the problem of so-called monitoring. (Monitoring--I should mention--is the term used for keeping track of the state of the biosphere.) But we cannot solve the problem of a forecast merely with measurements "in the field": On the basis of monitoring data we cannot say anything about how the "environment" will behave even in the near future. We need more refined mathematical models, and we are indeed working to build them. At present we already have models for studying the hydrometeorological regime and pollution of the air of cities and industrial areas.

It is well known that atmospheric processes possess the property of globality. We know, for example, that the rate of movement of air masses--the so-called global movement--is approximately 10 meters per second. And this needs to be taken into account when major project plans are being drawn up in the national economy. Let us examine from this standpoint the project for diverting the flow of Siberian rivers into Central Asia. By diverting a part of the flow of the Ob' to the south, we thereby increase the area of irrigation and evaporation. On the other hand taking away flow from the Ob' will alter the salinity

of the northern Arctic Ocean. All of this will have an influence on the processes of heat exchange in the "atmosphere--earth" system. But in what direction or on what scale is still not clear.

Our task is to equip the people in industry with models that would furnish them the possibility of seeing exactly what is happening, what will happen, what they must expect in a particular hydrodynamic, meteorological situation, and so on. We will strive to build a set of mathematical models which would make it possible at least on a project under construction to play out in advance several different scenarios of the ecological development of the economic situation.

S. ZALYGIN: For the present this is not available, but we have been building GES in greater numbers than any country in the world.

One form of energy can be replaced by another. But what is to replace the soil? In this case we do not have any sort of basis for supposing: well, we will make up the deficiencies.... And I know how Gidroproyekt [All-Union Planning, Surveying and Scientific Research Institute imeni S. Ya. Zhuk] operates. At the end of every one of their project plans there is a specific section entitled "Restoration of Land." And this is done this way: 5,000 peasant families, let us suppose, have been moved out of some zone that was flooded, and they are allocated land somewhere on a mountain peak, in a dry gully, at the top of a watershed, they are moved there at state expense, and this is called "restoration of the land." But what is being restored? The people have been moved to far worse conditions, they do not take root there. They scatter away, so that the money was just wasted in setting them up there, in digging them wells, and land which had maximum productivity was lost. The losses of flooding are not taken into account. There is no such method. Now that is the way Gidroproyekt operates, and I have a grudge against it to this day, as it does against me--still greater, as I have become aware from certain meetings and handshakes....

Somewhere in the dawn of a dim youth I was given the job of drawing up a syllabus on the economics of water management for university departments of reclamation. And it turned out that the only writings in the world on the economics of water management pertained to two bodies of water: the Rhone and the Seine. There were no others. Nor could there be. And the syllabus could not be written. Why not? Because we do not have a land register. We flood land, and it costs nothing. We do not even take into account how much yield that land might have given in the future. And any hydraulic engineering project in our country unfailingly turns out to be advantageous. Sooner or later the machinery will generate the number of kilowatt-hours which will justify the construction cost. Unfailingly! Not in 10 years, nor even in 15 years, but it will do it. And the fact that it has chopped off a source of agricultural income--and not just for those 10 or 15 years, but indeed for all of 100 years--no one takes this into account.

A. NIKITIN: In my contacts with soil scientists, paleobotanists and paleogeographers I have become convinced that we still know little about how soil is created. For example, how were the chernozems formed? It is easier and

cheaper, of course, to destroy than to build, but precisely how is that most cultivable layer created without which we cannot imagine modern farming even today?

R. KOVALEV: Our soils are the product of millennia. Their destruction--this is a destruction resulting from processes over many centuries. According to United Nations calculations, humanity is now using 1.5 billion hectares of land for agricultural purposes. But in historical time it has lost exactly that same amount. The soil cover is a national resource, the most important component of the biogeocenosis. What situation do we have in our country? Take the reference book "Narodnoye khozyaystvo ..." [The National Economy ...] and make the calculation. Not so long ago, 15-20 years ago, the USSR had 1.06 hectares of plowland per capita. It now has 0.86 hectare. And in Kemerovskaya Oblast, for example, it is 0.44-0.46 hectare. Where is the land vanishing to? It is being alienated, it is being spoiled, it is being made unusable.

During the development of virgin land in the Baraba Steppe alone a sizable amount of solonets soils was lost: before they gave something, now they yield nothing. And they will not yield anything for a long time yet, because it will take many decades to rehabilitate them. These decades are already passing, but the soils are still in a bad condition.

G. GALAZIY: And the issue of protecting Lake Baykal? Much has been done, but the problem itself has been an urgent one for practically 20 years. Take that same Baykal Pulp Combine. Everything in it would have been fine except for one shortcoming. We still believe for some reason that it is enough to remove organic substances from industrial effluents to solve the problem of purification. And we do not remove mineral substances at all, and their discharge is causing major disruptions in the natural functional system. And this is the basis--the orientation toward removal of organic substances--that has been implanted in the water conservation rules. The most perfect waste treatment installations remove 90-95 percent of harmful admixtures at the present time. But only the organic ones. As a result the fauna of many water basins are continuing to experience a certain adverse pressure. For example, the biological potential of the Baykal omul has been retained, its numbers are growing, but the biomass is not increasing. Why? Because of poor enforcement of the government decree dated 16 June 1971, which states: "Clean up the spawning grounds of the Itantsy, Angara, Barguzina Rivers and their tributaries, the estuaries of rivers flowing into Barguzina Bay, as well as the Selenga shoals, which are the most important for the omul's reproduction."* So, the position of the state is clear, the government decrees are in effect, but they are being poorly and incompletely carried out by the departments of the government.

At this point we need to be straightforward: Given the methods which are used by those who cut timber and those who run pulp mills, and given the methods that now exist for the protection of Lake Baykal, this unique body of water will be polluted even further in spite of explicit government decisions.

* "Resheniya partii i pravitel'stva po khozyaystvennykh voprosam" [Decisions of the Party and Government on Economic Questions], Vol 8, Moscow, 1968, p 481.

After all, this pulp and paper combine is not the only one on Lake Baykal. There is also the Selenga Cardboard Combine. There are the enterprises in Ulan-Ude. There is the Dzhida combine. The Oshurkovskiy Mining and Ore Dressing Combine is going under construction on the shore of the Selenga. And every one makes its contribution. The Selenga, which on the average discharges 900 cubic meters of water per second, is unable to purify the industrial effluents even by dilution ... and again we are compelled to say that the interests of the individual departments and ministries are winning out here over the interests of the state, which are expressed in very straightforward and clear decisions of the Soviet Government on protection of Lake Baykal and the entire zone adjoining it. The rules for protection of state waters now call for observance of maximum permissible concentrations of harmful substances which might accumulate in bodies of water. These maximum permissible concentrations pertain to the body of water as a whole. The state of the body of water is considered good if these same maximum permissible concentrations are lower than those stated in the allowances. What does this signify in practice? Referring to these rules, certain unscrupulous managers of production operations unlawfully discharge into bodies of water huge amounts of harmful substances. What is wrong here? What is wrong is that these maximum permissible concentrations pertain to the entire body of water, whereas they should long ago have been applied to the industrial effluents.

O. VASIL'YEV: If we take a separate production operation, an individual technology, then waste-free production cannot be imagined. There will always be some waste. The problem is how we handle that waste. Usually when we speak of a waste-free production operation, we mean one that is not discharging anything into the environment. That is, everything is organized so that nature is not harmed at all. But this costs quite a bit of money, and questions of economic efficiency arise here....

V. BESSONENKO: And everyone interprets the term "economic efficiency" in his own way. Why is it that production people look upon health and safety people more and more frequently as their adversaries? I think it is precisely because they take differing views of "economic efficiency." Recently we discussed with specialists the question of the economic efficiency of protecting a water basin. And they put an interesting question to me: Why is it that town planners and project planners never ask whether it is necessary to build a water line, is it economical? It is clear to everyone: There has to be a water line, a sewer system as well. And no one calculates this "economic efficiency." But when the water, the forest, the air or the soil has to be protected, the immediately people begin to calculate the "economic efficiency" at every step. But what sort of calculations can there be, when we put no value on water, land, and ultimately human life?

O. VASIL'YEV: The contradiction between the economic efficiency of social production and environmental protection is a contradiction that objectively exists, you can never escape it. I would like to stress that an individual waste-free production operation is almost impossible to imagine. The question arises of complexes which might be waste-free. At what level should be examine these complexes? Perhaps it is some kind of industrial park of the urban type? Or a regional industrial complex? One which would bring together an

entire system of industrial centers, cities, and then specific transportation connections would arise within it--so that the waste from certain production operations would be delivered to others utilizing that waste as a raw material. And perhaps we should think about a complex of waste-free production operations on the scale of the entire country, with maximally efficient development of transportation connections?

Under Siberia's conditions, in which we are building entire industrial regions from scratch, we have a particular duty to be concerned about building connected industrial systems whose impact on the environment will be minimized. But we have to be aware of the difficulties which arise here. Let us turn to the mining industry, which has already been mentioned. As a rule mining operations involve a huge impact on the soil cover, especially open-pit operations, which are the least costly. Open pits operating, say, in the region of the Kursk Magnetic Anomaly are gigantic depressions of large area. Pits of the same kind are being created and developed in the area of Ekibastuz, the Kuzbass, and strip-mining methods are also being planned for the mining of Kansk-Achinsk coal. And these methods involve destruction of layers of soil over large areas and the piling up of large amounts of earth, so-called inert rock, which has to be piled up for a long time. These methods have a strong impact on subsoil water and groundwater as well: the deeper the pit, the larger the area of this impact. By draining the pit, pumping out the water, we are causing a drop in the groundwater levels, which adversely affects the water supply in the neighborhood (wells dry up in nearby villages), on the use of subsurface water, which from the public health viewpoint is of very high quality. And finally, the drying up of the land has an unfavorable effect on the farming in the vicinity. And it is precisely toward the open-pit method of mining that we are oriented in Siberia because it is one of the most profitable and promising.

Let us go further in the chain of events. Suppose that coal has been mined and hauled some distance, leaving its dust along the way (or some other method of transport has to be used, involving polymer film or large amounts of water, which later has to be removed from the coal), and is supplied to thermal power stations, to stations, say, with the capacity being designed at the KATEK (6.4 million kw). When the coal is burned, the ash has to be removed. The lower the quality of the coal, the more ash there is. We have to be concerned about depositing large amounts of ash. But the problem does not come down only to the ash. The operation of thermal power plants has an impact on the environment along at least three lines. Rather large areas are required for dumping the ash. They inevitably have an effect on our streams, our natural bodies of water, and the harmful substances in the ash get into the natural water. And beyond that: in burning coal we so far have not learned to effectively remove not only the ash, but also the sulfurous gas and certain other gases. They go into the atmosphere. Their removal is expensive, but the trouble is that with the rising costs, especially of gas purification, the degree of purification does not increase proportionally by any means, and when we come close to the ideal version, the cost of the installations is inaccessiblely high. The problem arises of acid rain around large thermal power complexes. The soil, the water and the air--these problems are arising in real terms, not to mention the more general impact of power stations on the climate as a result of the accumulation of carbon dioxide, aerosols and so on.

If we take power generated at thermal power plants (even using magnetohydrodynamic generators), the efficiency of these power installations is roughly 32-36 percent, that is, one-third. This means that if in some power complex we are generating 4 million kw of electric power, we are sending about 8 million kw into the environment. Power engineers are concerned about this: Where should it be sent? Either directly into the atmosphere or into a body of water? There is no other way. Moreover, thermodynamics states that the ideal efficiency, which at present is not technically feasible, will not exceed approximately 0.4--that is, this is a situation we will be facing so long as we use conventional methods of obtaining energy, including nuclear power.

The point I wanted to make in giving these examples concerning mining and power is that the problems in protecting the environment and of simultaneously making optimum use of natural resources rest to a large degree on problems of the economic efficiency of production.

S. ZALYGIN: Right at the moment I am working in the Novosibirsk archives--I am studying the first plans for Siberia's development, plans which pertain to the beginning of the twenties. I need this for a novel. But here is something curious. At that time the question of protecting the environment did not occur to anyone. It simply was not posed, and perhaps that was the mistake: Things tend to continue as they began, though at that time they were dealing with figures that were incomparably smaller than at present. But there was one virtue in the way the problems were posed in those years. At the first scientific research congress on the problems of Siberia's development the proceedings were conducted in three main sections. They were named: "Underground," "Surface" and "Man." But in our discussions today about the future this third section often seems to be absent altogether. That is, we do not picture that man of future decades on whose behalf all this is actually being done--all these industrial measures, all the steps of scientific-technical progress. What sort of man will he be? What will he need--the same thing as we today, or something else?

3. Lake Baykal in a Glass of Water: Facts, Myths and Awareness

V. BESSONENKO: In our attempt to understand what is happening we should not divorce man from nature or nature from man, if only because man is himself a creation of nature and--we should add--one of its best creations. All nature, including man, is now experiencing a tremendous pressure from factors which are primarily social and technogenic. I do not want to abuse figures, but I will cite two: 34 percent of all the country's industrial emissions occur in Siberia, which has about 10 percent of the country's population, and these technogenic emissions are distributed very unevenly over the area of Siberia. Unfortunately, we do not forecast at all the ways in which relations develop between nature and the socioeconomic potential in a particular area.

V. KAZNACHEYEV: And we vainly suppose that we will not have to pay for taking unrestricted credit from nature. We are paying for our own carelessness, for our consumer's heedless mentality, for our inability to foresee the consequences of our decisions--we are paying a high price: We are paying with our own health, and not only the health of living generations, but to some extent

with that of future generations as well. As one concerned with the eastern regions and who often visits the North, I can describe the situation coming about in the zones of pioneer development this way: The gigantic army of people who have left their warm nests are rushing there at the call of social interests to storm certain heights of their own, and each is concerned about one thing: taking new places by storm, and there.... And later--some sort of prosperous situation will be achieved, conditions will work out somewhere, though where it is not very clear, but obviously not here, but somewhere in places that are more friendly, more inhabitable. And this psychology of living for the moment has such an influence on the entire way of life in those regions that to a certain extent it has an influence on the fate not only of children who have been born, but even on those not yet born. On the basis of the material available to us, according to the results of our research, we can speak of tendencies toward postponement of the birth of the first child, a drop in the birth rate, and a rise in the divorce rate. There is an increasing rate of complications with the birth of the first child, and we are thus passing on bad health in the future--which is precisely the bill that nature is presenting us for our way of thinking and our mode of conducting economic activity.

It seems to me that the conception of Soviet health care set down in the first years of Soviet power needs further development. We need to prevent disease, we need to learn how to create conditions for extending man's working life, and to do that we have to know at the very least what health is. We need to know the physiology, biology and regional norms of behavior of the healthy man, not the sick man. But the huge pyramid of our knowledge of disease is incomparable with the shreds of knowledge about man's physical and mental health. A consequence of this discrepancy is the overload on medical institutions. We have analyzed the functional dependence of the morbidity rate on the number of physicians and beds in many eastern regions where staff members of the Siberian Department of the Academy of Medical Sciences are working. What can be said? Of course, where the situation is quite bad with physicians and hospitals, there is a certain dependence, but mainly the conclusion is this: The development of medicine in and of itself does not reduce the morbidity rate and work losses. Nor is that all. There are regions where the number of physicians and beds is growing very rapidly, where by all standards we can speak about the world's highest coefficient of saturation with medical service, but where the morbidity rate is also--alas!--very high, where the mortality rate is rising, where pathology tends to become chronic, and so on. What is the trouble? The answer comes forward spontaneously: The model of health care that has taken shape is not always working. And this is especially notable in the eastern areas over which a colossal migrational flow is moving, where huge economic projects are being carried out without having gone through an ecological examination by experts, where the impacts of economic practice on the state of ecosystems are so vivid.

V. BESSONENKO: Not uncommonly we bethink ourselves after the train has left. I lived in the Kuzbass for 25 years, and this feeling that "the train has left" is quite well known to me. It is strange for us medical men to hear economists say that a ton of coal mined in the Kuzbass and delivered from Siberia to the Moscow area is cheaper than the same ton mined in the Donbass and used locally. Perhaps it is even so....

A. AGANBEGYAN: It is so.

V. BESSONENKO: If it is so, at what cost? At the cost that we in the Kuzbass have developed our social infrastructure only to the minimum, thereby eliminating additional overhead costs for every ton of coal, metal, and so on. I remember a time when the Kuznetsk Metallurgical Combine was proud of the most productive mill, but now? For many years the combine has not undergone reconstruction, it is worn out to the maximum. The huge work force that has taken shape has begun to disintegrate: people are not content with the working conditions. In Novokuznetsk itself the human situation is not good, yet Novokuznetsk is exerting a technogenic impact on six neighboring cities, on rural areas--in all there are 1.5 million people living in a zone affected by the influence of this industrial center, which is far from the best. Yet we have quite a few cities like Novokuznetsk in Siberia and the Urals as well. War is, of course, a calamity for the entire nation, but after the war the Donbass and the Ukraine rebuilt their industry, the technology operating there is mainly from the fifties and sixties, but Siberia? Alongside the most recent enterprises here, the prewar and wartime production operations built under conditions of rigid restrictions have been preserved; they are still in operation. And can medicine bear responsibility for the health of the worker under those conditions? Can the forester take responsibility for the condition of the forest which is being cut by the timbering operation?

When the health and safety people speak out against construction of a new enterprise, the production people treat them as though they were conservatives holding back technical progress. But what is actually the result? A new coke chemistry combine has been built in Kemerevo, a new production operation with the firm intention of demolishing the old one. How long have they been in demolishing the old one? A long time. And the environment has been poisoned by their joint efforts--both the new and the old simultaneously. The same thing is happening now: They have started up a new electric steel smelting operation, intending to close down the old one. Both are in operation. It turns out that certain ministries are not able to make ends meet today. They are planning and building, yet they still have a shortage, and they are not able to close down the existing operation. A vicious cycle is formed, especially in areas of intensive industrial development. The Kuzbass, the south of Krasnoyarskiy Kray, the Noril'sk industrial region.... What can you expect medicine to do?

V. KAZNACHEYEV: We deem it indispensable to reassess certain important conceptions. If the basic concerns of the national economy are not focused around man, if man is not put at the center of economic activity, man in all the many-sidedness of his interests and needs--nothing will change. Suppose that we regarded this same Kuzbass, which Viktor Vasil'yevich Bessonenko has spoken about today with such anxiety and pain, as a gigantic combine for production ... of health. What then is it producing? Rejects. Irrecoverable scrap. It is causing an exodus of people. It is promoting an accumulation of genetic defects. At the same time the Kuzbass from the standpoint of the economists is the most important supplier of coal, metal and chemicals, and everything is conducted under the motto "Give, Give!" We need to compare the sociomedical efficiency coefficient and the efficiency coefficient of the

region's industrial contribution to the country's potential. And not to allow a situation in which the higher the latter indicator, the lower the former, the better the production performance, the worse it is for health. Man must be at the center of planning.

We have been to the tire plant in Omsk. A good plant. But we asked them to give us not the gross curve of production and product quality--everyone remembers and knows these figures, but the indicators of the state of health of the plant's workers--and no one was able to say anything on that topic!

D. GRANIN: In this round table discussion I have heard material that is new to me about how the tortures of nature are affecting human health. I must admit that today's statements are also having an adverse effect on health.... And perhaps it is true that there are many bitter things yet to be said--about fish, animals, about trees, indeed about everything alive around us. You listen--and your heart overflows, as they used to say. But I would still like to turn again to the moral side of the problem under discussion. It seems to me that one of the main troubles of our time is precisely that we have ceased to look upon nature as a wonder, as a mystery. As the master, as the "tamer" of nature, man is acting in all his self-conceit. This has gotten into even the program of our round table discussion--in the form of the phrase "Nature--the Foundation of Our Well-Being." Why? On what basis? Probably wolves figure in the same way that reindeer are the basis of their well-being. And there is an element of truth here, but not all the truth. Of course, reshaping the consciousness of man and of human society in that direction--of deep respect for nature, of not only sympathy for it, but also the feeling of being in some unrepayable debt to it--this is a very complicated process because the consumer attitude toward nature has become too deep-rooted in us, but...

S. ZALYGIN: But nature can hide from us only in our own consciousness. The only refuge.... I am going back to history. At one time in Russia there was a famous reclamation expert, Lt Gen Zhilinskiy. The name is rather well known. In three expeditions he carried out important reclamation projects--the draining of the Polesiye, irrigation of the lower Volga and the draining of the Baraba. The staff he had in draining the Baraba, which extended over 350,000 dessyatinas (the Russian word for reclamation, "amelioration," is a foreign word meaning improvement, and we will refer to it as "improvement"), was so small that one can remember it by heart: the chief of the expedition, Lt Gen Zhilinskiy himself, two senior engineers, two engineers and two trainees--gentleman students.... With the help of the peasants they carried out that project over 350,000 dessyatinas. Later we had in Novosibirsk the Barabyuro, headed by engineer T. I happened to meet him. He had a staff of 300. Following his effort the productivity of the Baraba Steppe dropped sharply. Salinization occurred, a phenomenon that in general never occurs in drainage--there have been only two cases, ours and one in Canada. With irrigation as often as you like, with drainage--very rarely. What is the difference between Zhilinskiy and engineer T.? Zhilinskiy knew what he was doing, and the latter did not. Zhilinskiy saw: the creek is running, it is turning into a marsh, it is getting choked with weeds--it needs to be cleaned out. That is, Zhilinskiy was traveling that path which nature itself suggests. Wherever there was a ravine--he cleaned it out, increased the flow. And in that way he treated

350,000 dessyatinas, not with a systematic drainage network. This was not intensive drainage, but it was an achievement. We come along with our equipment in our own time and we say: You did what? All that is trifling nonsense, just let us cut drainage ditches every 300 meters. Machines make it possible! They cut the ditches--and they caused salinization. And they wasted immense funds. And along the way, he it said, they threw away the Siberian breed of cattle, which we scorned and considered altogether unsuitable, semiwild. When their absence was missed, it turned out that it had been giving us the cheapest milk and butter in the world. Because it did not require any care whatsoever. In the wintertime these animals trudged through the snow and foraged on their own.... When the attempt was made to reestablish this breed--and we didn't even consider it a breed--the Siberian Institute of Animal Husbandry searched for 3 or 4 years to find two individuals--without success! There weren't any.... I can remember these small cows quite well. They were slightly larger than goats, there might be 30 or 40 of them on a farm, the farmer did not even know exactly how many. But they came regularly to be milked, you know?

A. AGANBEGYAN: Yes, 900 kg per year, but it was 6-percent milk!

S. ZALYGIN: True, the milk fat content of the milk was 5.8 percent. But the content cost nothing. Even if the wolves took a third of the herd during the winter, that was no particular misfortune, because in and of themselves they cost little. I have digressed, but the two are connected. We have made an anathema of manual labor, but there is one detail it would be worthwhile to remember. Manual labor was not wasteful. And perhaps there would be good reason to look in the experience of the past for some sort of new criteria we might use in evaluating the costs of obtaining products today? In Vietnam, say, there is land which has been used for 2,000-2,500 years, and it is still giving 2-2.5 yields per year. Nor has its fertility declined. Not only do we forget such experience, we altogether overlook it. Let us go back to that irrigation, which is such an urgent problem for Central Asia. People say: the efficiency coefficient of the irrigation system is 50-60 percent. But what are they taking here as the coefficient of useful benefit? Does it include the wasteful overexpenditure of water? For me manual labor is ideal from this standpoint: A man walks along and gives every cotton plant and every head of cabbage exactly as much water as the plant needs. There is no sense whatsoever in giving 2-3-fold more water--it is also disadvantageous to give too little water: There will be no crop. I am not convinced that this particular efficiency coefficient is taken into account with respect to an irrigation system. I rather think that if we evaluate the operation of the system from precisely this point of view--how much water is taken from the source and how much is needed by the cultivated plants and how much they actually obtain, then this coefficient of the most useful benefit will be--well, 5 percent. Somewhere in that neighborhood. Perhaps it would be worthwhile to introduce today a coefficient of wastefulness in evaluating the costs of obtaining a particular product, with the minimum wastefulness of manual labor as the point of departure?

V. USPENSKIY: In our enormous multinational country everyone does not always have enough of a unified national self-consciousness. When kids from

Rostovskaya Oblast are cutting timber somewhere on the Angara, they think only about how they will fulfill the plan, they will have money in their pocket, and they will go home sooner. And that is their entire task. Or another example. The man who becomes the head of the Port of Vostochnyy, which is under construction, is by birth a Ukrainian or a Moldavian. He knows that he will be living here for 4-5 years. And.... The beautiful Sestra Hill graced the city of Nakhodka. All the hills around are made up of the same material, but Sestra is on the road, it is the closest. And it was blown up by people who did not think twice about it. Instead of a beautiful hill there is now a horrible crater. He was told 100 times, they wrote about it in the newspapers and magazines, and finally the destructive operations were halted, but the hill had already been disfigured. And he went away to head a scientific research institute in Odessa. This is the attitude of the temporary worker, it simply is "not mine"!

Recently I visited Mongolia and I was amazed at the thrifty attitude toward nature which I observed there at every step: Not a single Mongol, neither old nor young, plucks even a blade of grass, breaks a twig or throws a jar. Yet it seems an enormous area with a population of only 1.6 million, what reason do they have to be thrifty? I tried to figure out how they came to have that attitude, and I think I know where it came from. It is not a strong country, its population is small. Someone has always been threatening it--now Japan, now China. And national self-consciousness is very highly developed in the country. "I live here, my descendants will live here, I must preserve my land." It is precisely this kind of awareness that some of our people lack.

R. KOVALEV: I liked very much the statements of Daniil Aleksandrovich Granin on man's relations with nature, with the environment, but I must say that an attitude of that kind is a passive attitude. Yet scientific-technical progress is going at full speed, and it cannot be halted. We may find ourselves in a position where it will be too late to speak about having to protect nature.... The efforts of writers, journalists, and newspapermen, forming a united front with scientists--well, they can, of course, contribute a great deal, but not soon, it seems to me. If only the statements of writers had not done any harm--and quite a bit of it! But they have, and even to this very day there are literary presses that are successful which have furnished nothing but evil. A bulldozer operator running a machine with 150-200 horsepower has been proclaimed a hero because he has been furnished that machine, though with it he breaks down who knows how many trees and turns up how much earth to no purpose. We need ecological education, and it should begin as early as possible.

G. REZNICHENKO: It is indisputable that our task is to orient and reeducate man, instilling in him a more thrifty attitude toward nature, that is, toward his own self. If a man becomes ill, he goes to the doctor. If some sort of morbid phenomena make their appearance in society, we should turn to the public. Through NOVYY MIR, through EKO, through other publications we should turn to the public, inform it about those ailments which have to be cured. I want to recall to you the words of Albert Schweitzer: "Ethics is unlimited responsibility for everything that lives." It seems to me that an entire program of man's attitude toward nature, the credo for training the contemporary man, has been set down in those words.

We all remember the well-known slogan--"We cannot wait for charity from nature, it is our task to take it from her." We have instilled this approach, it might be said, with mother's milk, but how much harm has come from its having been understood crudely and primitively. It seems to me that it would be worthwhile to make a request to Goskomizdat [State Committee for Publishing Houses, Printing Plants and the Book Trade] that it not publish or reprint literary works which glorify this consumer attitude toward nature, the principle of taking, taming and conquering.... Let these works remain for history, but let them not exert an influence on the new generations. And more.... You recall Gerasimov's film "At the Lake"? My own personal impression after it was this: Everything is as it should be at Lake Baykal! Everything is glorious there: Baykal is perhaps cleaner than it was. And all of this because the hero in the film drinks a glass of purified water....

REPY: That was a minor character who drank the water.

G. REZNICHENKO: I do not remember who it was exactly. But I remember quite well that he did drink and how he drank: an image! It seems to me that this example is very illustrative. Certainly it says something about the strength of the impact which art has on the consciousness, forcing us once again to reflect on the responsibility of artists for everything they do. It is evident that we have to inculcate an ecological passivism, if it can be so termed, that is, stand in the way of the militant offensive against nature. I do not know whether it is suitable or legitimate to combine those words--ecological passivism, but it does convey the sense of what I have been talking about....

V. BESSONENKO: In studying the reasons why people leave the Kuzbass, we have tried in particular to clarify this question: What is their source of information about the problems of man's relations with the biosphere? Only 12 percent of the respondents gave their supervisors a good grade in this respect--those who are concerned about this problem, who are involved with it, who are teaching their subordinates. These figures indicate the low ecological sophistication of many production supervisors. It is evident that they were not given the necessary knowledge either in the system of education or, still less--in the system of production. And after all, in the final analysis it is not the medical men, not the biologists, nor the geographers who shape, if it can be so put, the health of the environment: It is, I repeat, a consequence of the technogenic impact, and technical progress relies on production supervisors. That is why we are here today discussing at this round table the problem as though with two unequal forces. On the one hand are the precise forecasts on development of mineral resources and a rather accurate idea of the economic prospects, and on the other what sort of approximateness, what sort of general wishes and general arguments when we are discussing nature, when it comes to man! Mathematics, economics and geology are on the one side, and on the other are a group of people who would very much like to preserve nature....

P. OLDAK: It is a surprising thing, science, in spite of its tremendous achievements and high level, contemporary science overlooked the ecological crisis, the energy crisis, the raw materials crisis.... Scientists began to speak about these crises in world forums when they broke out. And that is no

accident. This is not because science is not on the level it should be, but because within science there are few or no subdivisions which integrate partial observations and separate fields of knowledge into a general and global idea concerning our planet, its biosphere and the place of man in it with his constructive and destructive activity.

4. We Must Learn To Reckon, To Think and To Foresee. We Must Learn! (Attempts To Answer Certain Questions)

What a spellbinding effect has been exerted on more than one generation of Russian people by Yevgeniy Bazarov's vigorous statement, which was new at the time: "Nature is not a temple, but a workshop, and man is the worker in it"! And with what bitterness we now, more than 100 years later, constantly reproach ourselves, constantly remark to one another: "But a brook is after all a miracle, and a forest a gift, and after all nature is not just a workshop, but a temple capable of purifying man of momentary vanity, of helping him to think in the proper scale and in terms of the whole!"

But how, how to combine the strip mine and plowland, a chemical plant and a pine forest, an oil pipeline and rivers with sturgeon? Learn, they say, to reckon. Learn, they say, to think. Learn, they say, to manage. Learn, they say, to foresee. They say: LEARN....

S. ZALYGIN: I have undertaken certain attempts in my position. I will say it frankly--with the feelings of a man grasping at a straw. But a straw may prove to be a part of a bundle. What have I been able to do? I reached an agreement with our scholars in the field of philology, and they included in the curriculum of all university schools of philology a course entitled "Literature and Ecology." Which means that the teacher will know something about the central problem of our times. And here is something I failed at. It was my idea that discussion of a thrifty attitude toward nature should be included in school curricula, that a core sample should be under glass in every school--the soil in cross section so that a person would know from childhood what kind of earth his school stood on, what kind of earth he walked on, what kind of earth supported him and fed him. We must begin to do something in that spirit. But so far I have not had any success with the Ministry of Education....

G. REZNICHENKO: It is with the school children that we must begin the effort, and that as soon as possible. Only in that case will society experience a beneficial change of direction toward natural resource conservation in another 20 years. It seems to me it would not be a bad idea if along with "My Native Language" there were also a textbook entitled "Our Own Nature"--a textbook which would fix in the child's outlook the ABC's of an ethical attitude toward nature. And the attraction for nature among schoolchildren has increased greatly over the last decade.

REPLY: Well, some kind of consumer attraction.

G. REZNICHENKO: I don't think it is confined to that. I want to cite a fact. In 1966 the journal YUNYY NATURALIST [YOUNG NATURALIST] had a readership of

150,000, and now it is 2.5 million. And it certainly would be 5 million, if the restrictions on circulation were withdrawn. And the Komsomol Central Committee has about 15 publications, and how else is one to exert an influence on young people, the most mobile, the most susceptible and the most promising part of society, if not through newspapers and magazines?

V. KAZNACHEYEV: It is not only schoolchildren and philology students who need courses in ecology. They need to be introduced in all technical VUZ's and universities in the country, and management people at various levels should be sent to them. Medical people in Siberia--scientists and practitioners--have been drafting what is referred to as a conception of a system of life support which--to state it briefly--covers all the aspects of people's life in a particular area and the end product of the operation of that system--people's health.

V. BESSONENKO: And in that system we regard the health care agencies as a subsystem called upon to provide the higher management levels information on the correspondence between the interests of production and the interests of a medical and social welfare nature, about the functioning of the units of the national economy from the standpoint of the preservation, enhancement or squandering of human health.

V. KAZNACHEYEV: Health summaries, according to our ideas, ought to be laid every morning on the desk of the obkom secretary--together with summaries on the performance of enterprises and economic entities, law enforcement agencies and so on. An analysis of those health summaries would result in recommendations like this: Comrade managers of such-and-such a plant, association, complex, immediately change the diet of the work collective, change the pace of production, change the recess itineraries--you are overloading the efficiency coefficient of manpower, and tomorrow this will result in a collapse of economic indicators and a failure to meet plan targets. I think that at enterprises with farsighted managers something of the kind is already taking place, but that kind of practice ought to be the rule and not the exception.

V. BESSONENKO: Though ecological training necessitates a great many economic clarifications.

A. ISAYEV: And concern about natural resources also necessitates capital investments. It is assumed that a forest grows by itself, without particular material costs. But that is not the case. Even in our own Siberia there are large areas which can be described as forest-deficient--just like those in the Ukraine, in Belorussia, in other regions of the European part of the country. And capital investments for reforestation in the eastern regions must be substantially augmented. Indeed in general, if one is to judge, say, by the state of forestry, educational work alone would not be quite enough--certain organizational efforts are also necessary. Why, say, is timbering assigned to forestry? After all, this sector is responsible for forestry proper, mainly for reforestation, for protection of timber resources and for monitoring their condition, and yet it is being forced to engage in timbering, it is assigned a plan, and a large plan at that, yet it is not given equipment, and they are beginning to resort to all kinds of tricks. Forestry means foresters, whose

duty is to care for the forest, not to fell it, but as soon as they are compelled to do this, they get out of it the best way they can: They cut the best tracts, they enter into all sorts of deals with the timber and lumber industry, allotting the most productive stands, and so on, and so on. Another result of assigning a plan to the forestry sector is that cutting as a part of forest care becomes cutting for income: Self-interest becomes the guiding principle. But certainly it would be possible to resolve the issue on the scale of the entire country: Forestry would be concerned only with its own job, which incidentally is rather important, and it would not be weighed down with the duties of others.

And now, finally, here is something else that seems to us obvious in resolving forestry problems: Multiple use of timber resources needs to be developed. Optimum use of what we skid out would make it possible to reduce cutting to one-half. What is needed, then, is a production complex that would guarantee us, as is the case in Finland, Sweden, the GDR and certain other countries, at least 90 percent utilization of the wood skidded. This is the first and mandatory condition for putting affairs in order in the forestry sector. Otherwise we will continually be expanding timber cutting, expanding tree removal on a growing scale, because, I repeat, we are moving into stands which are less and less productive. And then the second thing--I say it once more--is that the time has come to realize that after all the forest does not grow for free.

P. OLDAK: I am an economist, and I am not very good at talking about this, but it needs to be said: Accounts with nature--alas!--are not settled in terms of money. It is suitable at this point to recall the story about the priest and his worker Balda. Earth's foolish people are represented by the self-interested priest, and its nature by Balda. And the account is settled in fillips that make you leap to the ceiling, that drive you out of your mind, that leave you speechless. Why is it that science is still only taking note of disturbing processes? I emphasize: Because there are no integral scientific subdivisions in the field of science. Not a single major problem of economic ecology can today be turned over to one institute. It has to be broken up, indeed like science itself, "by university schools," and it is that which results in the shortsighted solutions. Yet nothing else will cost us so little and will yield us so much as creating integral scientific subdivisions. Consider: On what points do the positions of the scientists and the writers agree? First--improving the scientific soundness of management of social development, rising to the integral level of solving problems. Second--taking the natural factor into account in selecting economic solutions. And third--the search for organizational forms for carrying out the preferable solutions which have been substantiated by science. What is the principal difficulty of the first task? Today we are encountering ever more frequently problems of an altogether different kind--at the interdisciplinary level, but we do not have scientific subdivisions for solving them. Who is working on the project plan for diverting a portion of the flow of Siberian rivers to Central Asia? Dozens of institutes. But there is not a single head organization of an interdisciplinary kind. It is not possible for us to assign a single major problem to one institute, one center. Solutions to our integral problems are worked on for dozens of years by dozens of different staffs, which is why the

solutions do not become integral in nature at all. Until this situation changes, science will be engaged in discussions at the integral level, in spite of the very large advance made at the middle and lower levels.

A. AGANBEGYAN: Yes, as a matter of fact we do not have comprehensive scientific institutions in which specialists of many scientific fields would be represented, institutions which could take on the role of coordinating centers. Take a simple problem: We need to evaluate, say, the effect of a power station on the environment. Who can do this? The emissions into the atmosphere are reckoned up by one organization, pollution of bodies of water by another, the influence on the forest by a third, and that is fine, if they calculate....

P. OLDAK: The difficulty of performing the second task--taking the natural factor into account in economic decisions--is related, in my view, to a very simple thing: Our knowledge of ecology is not staying ahead of the problems. It is our technical knowledge that is advancing at a faster rate, and we are making technical decisions without examining them from the ecological viewpoint. That is what happened at Lake Baykal.

A. TROFIMUK: That is also what is happening at the KATEK. The Kansk-Achinsk Basin is a pearl second only to the natural gas of the northern portion of Tyumenskaya Oblast. We know of no other such places where such an inestimable amount of resources might be concentrated in such a small patch of land and can be virtually shoveled right out of the ground. But the traditional method of processing brown coal is creating a serious situation from the ecological standpoint. If, say, we build 10 thermal power plants in an area, each of them rated at 6 million kw, it will no longer be possible for people to live there. In our opinion, it is not possible to build more than three or four stations there: Nature does not allow it. People throughout the world are now concerned with the problem of converting coal to liquid hydrocarbons. We have also conceived a production like that, and this problem, in my view, is as important as mastering nuclear power. But the scientists have been given only 10 years to develop a complex running into many millions. The necessity of setting up an Institute for the Overall Problems of Processing Kansk-Achinsk Coal has been proclaimed. Whose hands did it fall into? Into the hands of the Ministry of Coal Industry. The leaders of the coal industry made statements in Krasnoyarsk--listening to them, one got the impression that now they have altogether ceased to be concerned with coal and are devoting themselves exclusively to producing kerosene, gasoline, and everything necessary from coal. But these are words, and the reality is such that in 3 years this ministry has not even managed to issue a plan assignment for this scientific institute. And if the ministry does issue such an assignment, it is likely to be a narrowly departmental organization oriented exclusively toward the problems of mining coal.

P. OLDAK: That is how it has been and still will be for many other aspects and projects. Perhaps even with respect to diverting a part of the flow of Siberian rivers. There will be economic calculations, precise technical instructions: "do not dig here, but here," "dig so much and so much," and so on, but what will happen, for example, to the marshes of Western Siberia--will

they begin to burn or not, what will happen to all the elements of the huge ecosystem--answers to those questions will be furnished by time, perhaps by decades, when the canal is already in existence, and there will be nothing else to do but fill it in. At this point it is possible to make an error without a particular risk, to foresee that reality will give only negative answers to such questions, since the level of our knowledge about ecological systems is extremely low. We are constantly behaving like barbarians, and yet our ambition is fantastic!

However, if ecological knowledge is to be built up in advance of the problems, we need to redistribute resources allocated to science. Today the physicists, the chemists and the applied people are riding in the head car of the science train. And ecology is traveling in the last car. And no one--I will speak straightforwardly--is struggling for them to change places. The fateful example of Sevan has not taught anyone anything. Nor has the Baykal experience. And that is the way it will be until we realize in practical terms that if we really want to preserve nature, we must put ecological knowledge in first place. And how many ecologists are we training? People simply do not want to talk about it....

At the same time even those few specialists whom we are training today--no one needs them, because the structure itself has not been revamped. Finally, about the organizational forms of management. They do not conform to the problems we have come upon. These forms were shaped in the previous era, the era of industrialization, to which they were in fact adapted, but they are not adapted at all to the era of equilibrium natural resource exploitation.

A. TROFIMUK: The way out, as I see it, is for the State Committee for Science and Technology to be equipped with precisely those institutes which are concerned with interdepartmental problems of nationwide importance. That is how I see the Institute for the Overall Problems of Processing Kansk-Achinsk Coal. The State Committee for Science and Technology should itself direct that institute, it should gather in it the best specialists that we have in the country, and it should create all the conditions they need for fruitful work. Only then can we hope that the 10 years granted to science will yield results.

P. OLDAK: I think that there ought to be a department for environmental protection which would rise above the other departments. It is not important what it is called--a ministry or a state committee, but it must be directly subordinate to the Supreme Soviet. It must be higher than any of the departments, because the departments are called upon to concern themselves above all with the problems of today, while this organization would be concerned with the interests of our grandchildren and great-grandchildren.

A. AGANBEGYAN: Yes, we do lack an entity which would manage this entire problem area. There is the committee for hydrometeorology and environmental control. There is the public health inspectorate, there is the separate forest inspectorate, and so on. Everything in nature is interconnected, yet everything is disjointed in the management structure. It is not very clear to me what the Ministry of Agriculture can do with some ferroalloy plant which is ejecting into the atmosphere substances that are causing damage to the soil.

It cannot do anything. No one at all bears responsibility for such things in our context, and there is no one who can be made liable for the damage, for the loss. Incidentally, here is an example that has been mentioned in the round table discussion. The Irtysh--Karaganda Canal was built, the Bukhtarminskoye Reservoir was created. As a result the enormous floodlands of the Irtysh near Omsk ceased to be flooded, and the level of subsoil water dropped. Omskaya Oblast has suffered losses running into the many millions in 10 years. And now what? Who is to be sued for those millions of rubles? The organizations of Kazakhstan have resolved their local problems, they are not even aware of what is happening with the floodlands in Omskaya Oblast--that is not their territory.

So we need some sort of plenipotentiary state committee--I am in agreement with that proposal--for the problems of environmental protection, a committee with full powers, with field offices, with broad powers to monitor enforcement of laws, to impose penalties, and so on. At the same time the powers of local authorities ought to be expanded; they should be granted the possibility of tightening up certain all-union laws in accordance with regional peculiarities.

N. AMSHINSKIY: Of course, who isn't concerned with the protection of nature at this point! There is water conservation, and fishery inspection, and state mining equipment inspection and the forestry service and so on: that is, nature has been "covered" by so many nannies that you can't count them, but it has received little benefit from these nannies. As a matter of fact, we need a State Committee for Natural Conservation which would incorporate all such services as protection of mineral resources, protection of the air, protection of the animal kingdom and the plant world, and in such a way that each administration would have its own enforcement agencies. As in Czechoslovakia. When you go into the forest there, you are met by a forester. In a uniform, with a weapon. Like the border guard standing watch over the homeland. With convictions alone, I believe, we will not solve the problem of natural conservation.

D. GRANIN: Why speak in terms of "guarding"? It seems to me that the very term indicates an extremely passive attitude to the problem. Guarding presupposes use and exploitation. Why not "protection of nature"?

D. YEPISKOPOSOV: An international conference on protecting the beauties of nature was held back at the outset of the century. Since that time many organizations and thousands of scientists and figures in culture, the arts and literature have displayed concern about this problem and have carried on a vigorous activity, but the results have nevertheless been small. I would mention an article by Kapitsa, a member of the academy, published in PRAVDA in 1973, entitled "Planet Earth--Our Home." The article stated that humanity had less than 100 years left to prevent an ecological crisis. Here another 8 years have passed, and little has been done. On the contrary, the situation has worsened. Why is it happening this way? Evidently international organizations concerned with this problem, the scientists working in them, do not have all the decisive instruments that would have an effect on social processes. Perhaps a general document needs to be drafted as a beginning--a

Program of Man's Relations With the Environment on a Global Scale, with sub-programs for solving the problem at the regional, national level.... At present the poisoning of nature is everywhere outstripping the process of restoring its balance, of rehabilitating it. It seems to me that there is much here for which the social sciences, economic science in particular, can be reproached.

A. AGANBEGYAN: Probably economists do actually bear the greatest responsibility--even for the fact, to be specific, that our economic mechanism, both the one now in effect, and to a certain extent the one being designed--does not provide financial incentives to encourage the endeavor to achieve clean air and water, better utilization of resources, multiple processing of wood, for example, and so on. Much has been said here about the lack of an ecological assessment and of a charge for land, for water. Though the decree dated 12 July 1979 proposes in one of its points that a charge be introduced for water management consumption--for industrial enterprises. But no charge is being introduced for the use of water for irrigation and other agricultural measures. Nor do we have a charge for multiple use of mineral resources. I think that a charge should be introduced for the use of natural resources, a special charge for discharging effluents, for emissions into the atmosphere--for everything that causes harm to the state of the environment. Then business executives would have an incentive to concern themselves more seriously and more thoroughly with the problems of reducing harmful emissions, to put institutes to work on this problem, to create new subdivisions oriented toward solving the problems of weight-free technology, treatment of effluents, and so on.

But I must note that favorable economic prerequisites do exist at present for solving ecological problems. In the years of the Eighth and Ninth Five-Year Plans the extractive industry grew very substantially, sharply augmenting its size--by 25 percent in each 5-year period. A new stage has now begun. In the 10th Five-Year Plan the volume of extraction increased only 10 percent. And the volume of timber skidded also dropped. We are making the transition to a diminishing growth of extraction of natural raw materials, and then we evidently will move on to stabilization--for many types of raw materials in any case. The conditions themselves, then, are objectively stimulating us to make better use of every unit of natural raw material. In addition, the extraction of natural resources is becoming so expensive, that investment of funds in their economical consumption is 2-3-fold more efficient than expanding extraction. And this stage of intensive development toward which we have been oriented by the 26th party congress, must become the stage of the spread of low-waste technologies which ensure multiple use of raw materials and more thorough processing. In addition, funds going for new construction have for all practical purposes been frozen--it is being reduced more and more, and the entire growth of capital investments is oriented mainly toward reequipping existing production operations, which is, of course, having a favorable effect on the solving of many medical, social welfare and ecological problems. Now, I would also like to mention that a specific section in the documents of the congress has been devoted for the first time to the problems of environmental protection. It is terse, but still it is a separate section, which indicates that greater attention is being paid to this matter.

R. KOVALEV: There have been many notable decrees of the party and government regulating use of natural resources, both biological and mineral, but the trouble is that most of these decrees, and a great pity it is, are not fully enforced--because of departmental disunity, because of a lack of sophistication at the local level. I think that until we have strict legislative regulations we will not accomplish anything realistic in solving the problem that disturbs us.

A. NIKITIN: The same situation as with agriculture is taking shape with the protection of nature. When I am asked what in my opinion should be given to our agriculture for it to give the country in turn what it should give, I reply: nothing but precise enforcement of the proper decrees of the party and government.

N. AMSHINSKIY: I get the impression that at this point there is no longer a need to study the problem--we need to draft harsh laws and set up the corresponding monitoring services.

A. AGANBEGYAN: I do not agree. The problems of protecting the environment are being studied very little in our country, and we have fallen further behind foreign countries in science than in the practical field. In the United States there is a specific environmental protection agency that enjoys the powers of a privileged department, and this agency also has a specialized scientific center. Whereas we are now taking the first steps toward using mathematical models to solve ecological problems, hundreds of models are already in use there. A huge army of people equipped with complicated apparatus are engaged in monitoring--tracking the state of the environment. Our chemists are perfecting a technology for treating something, the biologists are concerned with the problem of recultivation of soil, the hydrologists with the problems of the quality of water treatment, but we do not have--I repeat--interdisciplinary institutions. Not a single one. Just as in the field of health care there is no interdisciplinary institute that would concern itself with man as such, not from the standpoint of his lungs, heart or kidneys, but with Man as a whole, including the problems of the influence of technogenic factors on the human organism. Nor do I agree with those who feel that our laws are good in all respects, that they have foreseen everything, and it is just a matter of thoroughly enforcing them. Our economic legislation is underdeveloped. The basis of economic legislation does exist, adopted by the Supreme Soviet, but that is the basis. Now the specific normative acts have to be drafted. Here is a specific example: Everywhere in our rivers and seas, except for the section of river between Moscow and Dubna, any vessel can discharge sanitary sewage without any sort of treatment. At the same time all Soviet vessels which call at foreign ports are equipped with imported devices for burning or recovery of all waste. Because in any foreign port a huge fine has to be paid even for a small discharge of waste. There is nothing close to this rule in our legislation. Many other laws are also lacking. How do they combat vehicle exhaust gases in America? The government sets standards which have to be met, say, in 1985. And all the companies know that they have 5 years to conduct the cycle of research and to set up the new production. The future standards serve as a reference for other sectors of the economy as well. We have no setting of future standards at all, and certain of the standards in effect, as we have heard today, operate to the detriment of ecological systems.

O. VASIL'YEV: I would like to give an example of what a proper ecological policy can accomplish with respect to natural resource use. This is the Swedish example. It must be said that Sweden is one of the most highly civilized countries in its standards--and specifically for its standards concerning environmental pollution. As far as I know, they have introduced there the most progressive air pollution standards; they incorporate not only absolute concentrations, but also probability characteristics. At the outset of the seventies the Swedish Government passed a law on regulations governing the discharge of polluted water into natural bodies of water. The law is extremely harsh--in effect it prohibits the discharge of untreated industrial effluents. A grace period is given--1 or 2 years--to prepare for enforcement of the law. Under the conditions of Sweden, where jurisprudence operates in a harsh way, without any sort of allowances, this has resulted in the following. In every industrially advanced country water use is growing faster and faster. In Sweden during the first year or two that the new legislation took effect water consumption fell by approximately one-half. This was because Sweden's industry had been compelled to reorganize and adapt to the new legislation. Subsequently, of course, this curve began to rise, but no longer at the same rate and at a level much below the previous water consumption.

Of course, the legal powers of the appropriate agencies need to be developed so that even those goods laws which we do have are unswervingly implemented.

V. USPENSKIY: I would like to mention that there are cases in our country of good results of joint intervention by writers and scientists in solving acute problems of economic ecology. They have after all been able to preserve Lake Baykal by and large. I would mention the Taymyr Preserve, the Caucasus Preserve. Collaboration between writers and scientists has helped to save nature in those regions. But these are all tasks in the tactical plan, while our main job is a strategic task: breaking up outlooks, reshaping man, reeducating him.

A. AGANBEGYAN: I must say that nothing can be compared with literature as an educative force. And it is very gratifying that the writers have responded feelingly to the problems under discussion. That alone is enough to make the effort of our round table discussion productive. Allow me to thank all those who have participated in the discussion.

... The search for a way out of the situations which more and more often seem to us critical is leading to the conclusion that a set of interrelated measures--legislative, organizational and educative--needs to be carried out.

The first expressions of the need to protect nature appeared in the Russian press back in the time of Peter I. The Russian economist and journalist Ivan Tikhonovich Pososhkov wrote for Peter I the "Paper on Scarcity and Wealth," in which he advocated full-fledged development of the country's productive forces by expanding production of domestic goods, developing trade and increasing commerce with other countries, proposed that many state reforms be carried out, spoke about the need for measures to be adopted to protect the forests and fisheries. "Many people are now complaining about fish, saying "the

fishing has gotten bad," Pososhkov wrote in 1724. "Yet they do not understand why it has become bad nor that ... they are taking the young fish, so that they do not become big fish." It would seem that complaints of such a venerable age might compel us to look more optimistically on the problems whose acuteness began to be felt long before the scientific-technical revolution. But in the time of Peter I (who incidentally made provision in his ukases for protection of forests, game, fowl and fish, water resources, minerals and even measures to provide greenery in the cities) the problems of protecting the soil and the air did not yet exist. The newness of our problems is obvious, their acuteness is bringing us to our senses and is driving us to search for better methods of conducting economic activity than those we are capable of today.

And probably the opinion of participants in the round table discussion was unanimous on one point: A key condition for solving the problems that have become painful in the field of "economics and ecology" is the state of our awareness. It is apt to recall the words of L. I. Brezhnev which he uttered in a speech commemorating the 50th anniversary of the Great October Revolution:

"But nature has not lost for us its tremendous value both as a prime source of material benefits and also as an inexhaustible source of every man's health, joy, love for life and spiritual wealth. My point in mentioning all this is to emphasize how important it is to protect nature, to preserve and augment its riches. A stewardly and zealous use of natural resources, concern about the land, about the forests, about the rivers and clean air, about the plant world and the animal kingdom--all of this is our vital communist concern. We must preserve and embellish our land for present and future generations of Soviet people."

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REGIONAL DEVELOPMENT

SOVIET UKRAINE'S NEW PERSPECTIVES FOR ECONOMIC, SOCIAL DEVELOPMENT

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 1, Jan 82 pp 3-12

[Article by V. Masol, deputy chairman of the UkrSSR Council of Ministers; chairman of UkrSSR Gosplan]

[Text] Our country entered the 11th Five-Year Plan in the full flowering of its strength and might. The broad perspectives for the further economic and social development of the USSR and of all union republics were outlined in the decisions of the 26th Congress of the Communist Party of the Soviet Union, the November (1981) Plenum of the CPSU Central Committee and the Sixth Session of the USSR Supreme Soviet.

The working people of the Ukrainian SSR, firmly united around the Communist Party, its Central Committee and Politburo headed by L. I. Brezhnev, faithful Leninist, distinguished leader of the party and the Soviet state, and tireless fighter for the peace and security of peoples, received the decisions of the November Plenum of the CPSU Central Committee as a concrete program of implementation of the tasks posed by the 26th Party Congress.

In keeping with the 11th Five-Year Plan, the Soviet Ukraine as part of the national economic complex will scale new heights in the development of the economy, culture and science and in the betterment of the people's well-being.

In his report at the November (1981) Plenum of the Ukrainian CP Central Committee, V. V. Shcherbitskiy emphasized that the 11th Five-Year Plan is the concrete embodiment of the policy developed by the 26th CPSU Congress regarding the realization of the tasks of communist construction. Indicators of the Five-Year Plan for the Development of the Economy of the Ukrainian SSR fully correspond to the Basic Directions of Economic and Social Development of the USSR in 1981-1985 and the Period up to 1990. This is a vivid manifestation of the Leninist nationalities policy of the CPSU which is aimed at the all-round development of all union republics.

The 11th Five-Year Plan--a Concrete Program for Implementing the Economic Strategy of the CPSU

The Five-Year Plan for the Development of the Ukrainian SSR in 1981-1985 provides for realization of the main task of the 11th Five-Year Plan, which consists in securing the further improvement of the well-being of the Soviet people on the basis of the stable, progressive development of the economy, the acceleration of scientific and technical progress, the conversion of the economy to intensive development, the more rational use of the production potential, and the all-round conservation of all types of resources and the improvement of the quality of the work.

Accordingly the current five-year plan emphasizes the social orientation of the entire national economy, enhances the role of intensive factors and the effectiveness of social production in forming stable growth rates and improving the structure of the economy and should produce higher end results compared with inputs.

The accelerated rate of intensification and the increased effectiveness of production are key particulars of the present five-year plan. In line with the party's directives, the conversion of the national economy to primarily intensive development is to be completed between 1981 and 1985.

The demand of the 26th CPSU Congress that the economy be economical was reflected in planned indicators of production effectiveness which as a rule are significantly higher than those attained in the last quinquennium.

The productivity of social labor--the decisive indicator of production effectiveness--is to be raised by 19 percent during the 11th Five-Year Plan. This factor must account for 96 percent of the increase in national income (compared with 90 percent under the 10th Five-Year Plan), while the conditional saving of labor will be approximately 3.7 million man-years.

This is an important task and it must be resolved through the acceleration of scientific and technical progress, the reduction of the number of manual laborers, the improvement of the organization of labor and production, the elimination of losses of working time, and the raising of the level of utilization of available labor resources. The need to solve this problem is also occasioned by the demographic situation in the Ukraine in the 1980's.

In years to come, the success of our future progress will depend more and more on the able and effective use of all available resources. The lowering of the materials-output ratio and the strengthening of the economy regime acquire exceptional national economic importance in this regard. In accordance with the decisions of the 26th Party Congress, in 1981 the CPSU Central Committee and the USSR Council of Ministers issued a decree "On Strengthening the Effort to Make Economical and Rational Use of Raw Material, Fuel-Energy and Other Material Resources." Under the 11th Five-Year Plan, our republic will do a great deal of work in this direction. The targets for making economical and effective use of material resources are calculated for

a broad range of indicators, apply to all ministries and departments and for many types of these resources are 1.5-2 or more times higher than the level attained under the 10th Five-Year Plan. Thus, the saving of fuel and energy resources should be 27 million tons of ideal fuel (compared with 15.3 million tons) and the saving of ferrous metals must be 4 million tons (compared with 1.5 million tons).

Provision is also made for the more complete use of secondary resources. The utilization of the most important types of secondary products in production is slated to increase 1.4-1.5 fold. According to the plan, more than 3 billion rubles' worth of products will be produced using secondary resources in 1985.

The conservation of material resources reduces the materials-output ratio (by 1.7 percent). The result is that national income grows faster than the gross social product. The lowering of the enterprise cost of production and the expansion of the volume of production will increase profits in UkrSSR industry during the current five-year period by 36 percent (compared with 18 percent in the past).

The plan devotes a great deal of attention to securing the more complete and rational use of production capacities and fixed capital. Measures indicated in this direction--in addition to the one-time significant increase in the effectiveness of capital construction and the improvement of its structure--made it possible for the 11th Five-Year Plan to increase national income by 19.6% while capital investment rose by only two percent.

The present five-year plan attaches special significance to the acceleration of scientific and technical progress--the principal lever of intensification of production and of increasing its effectiveness. Ukrainian research and design organizations will work on the development of new, progressive production processes, machinery and equipment and of more effective and economical materials. The five-year plan includes targets for six special republic programs ("Energy Complex," "Metal," "Material-Intensiveness," "Agrocomplex," "Sugar," and "Labor") and targets for 35 republic programs that are addressed to the most important scientific and technical problems. The Ukrainian SSR also participates in the fulfillment of targets of approximately 160 all-union scientific and technical programs.

The scale of automation and mechanization of production is being expanded. 8400 facilities will be totally mechanized and automated and 11,000 mechanized flow and automatic lines will be put into operation. More than one million persons in the republic economy will be transferred from manual to mechanized labor. During the current five-year period, industrial enterprises must master the serial production of over 4600 new types of products. Over 2000 obsolete machines, models of equipment and instruments are scheduled to be taken out of production for the first time.

In 1981-1985, 420 automated control systems are scheduled to be introduced and 560 computer and control complexes using microprocessors and minicomputers are slated to be put into operation. The activation of general-purpose computer capacities will more than double.

The expansion of the scale of application of progressive technologies and new equipment and the raising of the technical level of production will enable republic industry (for the quinquennium as a whole) to realize a saving of more than three billion rubles from the lowering of the enterprise cost of production.

The improvement of product quality is an important direction of scientific and technical progress. The production of products bearing the state Quality Emblem during the five-year period will increase by almost 65 percent and their share in overall production will reach 20.4 percent in 1985.

The consistent improvement of the economic mechanism is a significant factor in increasing the effectiveness of social production. The 11th Five-Year Plan was developed with due regard to the demands of the decree of the CPSU Central Committee and the USSR Council of Ministers "Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing the Effectiveness of Production and Improving Work Quality" (1979).

In particular, special attention is devoted to the elaboration of special integrated programs, the number of material, labor and financial balances has been expanded, and a system of scientifically substantiated progressive technical and economic norms (presently under development) that will be instituted at approximately 5000 Ukrainian enterprises. The plan includes a number of new sections and indicators.

However, as L. I. Brezhnev noted in a speech at the November Plenum of the CPSU Central Committee, the measures of the given decree are being implemented slowly and halfheartedly. This criticism also applies to our republic in full measure. All levels of management must step up the effort to secure the full realization of measures specified in the decree of the Communist Party and Soviet government to improve planning and the economic mechanism and to secure the transition to new working conditions.

The increased effectiveness of social production and the projected transition to predominantly intensive development made it possible to specify in the five-year plan higher growth rates and absolute growth than those attained in the 10th Five-Year Plan. Thus UkrSSR national income increased by 19.6 percent between 1981 and 1985. The volume of industrial output rose by 23 percent.

Key Questions in the Development of the Republic's Branches of Material Production Under the 11th Five-Year Plan

The top-priority development of industry as the leading branch of the Soviet economy plays a significant part in the realization of the economic strategy of the Communist Party and in the fulfillment of the tasks of the 11th Five-Year Plan. Much attention in the five-year plan is accordingly devoted to the development of the basic branches of industry.

The accelerated development of atomic energy is an important aspect of the development of the UkrSSR fuel-energy complex under the 11th Five-Year Plan. The entire increase in the production of electric power will be realized from the activation of capacities at atomic power stations. The use of nuclear fuel for the needs of the national economy will free more than 60 million tons of organic fuel during the five-year period.

The implementation of an energy-saving policy acquires special urgency. This will require the development and broad introduction of new, less energy-intensive technologies in all branches of industry (and especially in the coal industry, ferrous metallurgy and construction materials industry).

Coal production is slated to grow. New and rebuilt coal mines will be put into operation and technico-economic indicators of the performance of coal enterprises will be instituted.

Considering the lag of this branch, we should reduce the time required to prepare new adits and longwalls and create a reliable front of working faces. The activation and improvement of the use of the existing capacities, the higher level of mechanization of labor-intensive processes and the acceleration of the reconstruction and modernization of coking coal mines must play a substantial role.

The Ukrainian gas industry will build and put into operation the Urengoy-Uzhgorod gas pipeline--one of the central construction projects of the current five-year plan.

Ferrous metallurgy must solve important problems. First of all, this branch must increase metal production significantly. Primary attention in the given instance should be devoted to improving quality and expanding the production of economical types of metal products, to the development of progressive processes and technologies, to the improvement of the work of the mining and coal-tar chemical industry, to securing the rhythmic operation of enterprises, and to the economic utilization of fuel and raw-material resources.

The plan calls for increasing the production of rolled metal from low-alloyed steels (1.8 fold) and heat-hardened metal (2.1 fold), for the production of 70 new hot-rolled and 25-cold-bent rolled sections, new economical and special types of steel pipe and metalware. The higher quality of metal products will enable the national economy to save two million tons of metal during the five-year period. The increase in the production of metal products is slated to result from the improved use of existing capacities and from the construction and reconstruction of a number of facilities at metallurgical and mining enterprises.

This branch must secure the smooth interaction of allied enterprises, shops and sectors, must take steps to eliminate bottlenecks and intrabranh discrepancies and to strengthen production and technological discipline.

The 11th Five-Year Plan calls for the relatively more rapid development of the chemical and petrochemical industry. The basic efforts of the work force in these branches must be concentrated on the further raising of the technical level of production, on the total utilization of raw materials, and on the consolidation of the raw materials base. During the quinquennium, the production of mineral fertilizers will be expanded more than 1.3 fold. Primary emphasis will be placed on the production of complex and concentrated fertilizers.

The volume of production will be significantly higher (by more than 1.3 fold) in machine building and metalworking (compared with 1980). The creation and development of the production of technological aggregates of great unit capacity, their greater economy, and the production of systems and complexes of machines and equipment for the mechanization and automation of production processes are the basic directions in the development of this branch which determines technical progress in the national economy. The productivity of new types of machines and equipment will be increased 1.3-1.5 fold while their reliability and service life will be increased by 25-35 percent.

Power and atomic machine building, the machine tool and tool building industry, machine building for animal husbandry and fodder production, agricultural machine building, the production of instruments, automation equipment and computers will develop at a relatively more rapid development.

The timber, wood processing and pulp-paper industry must use timber resources more fully and without detriment to the environment, must secure the total processing of the given raw material, and must develop the production of progressive types of branch products. Thus, during the current five-year period, 32.8 million m³ of scrap and low-grade lumber were used to produce wooden blocks, pulp and other types of products (this was 26 percent more than during the preceding five-year period).

According to the plan, the development of the construction materials industry will be directed toward improving the supply of construction with effective materials and components, with construction and local binding materials, and toward improving the quality of branch output.

The principal task of the 11th Five-Year Plan underscores the orientation of industrial production toward the solution of problems associated with the improvement of the people's well-being. The five-year plan envisages the relatively more rapid growth of Group 'B' products over Group 'A' products. Between 1981 and 1985, 185 billion rubles' worth of consumer goods will be produced (or 32 billion rubles more than in 1976-1980). This will permit the more complete satisfaction of the population's requirement for food, manufactured goods and consumer durables.

Light industry output will increase by 17.4 percent, including a 24.2 percent increase in textiles and a 27.3 and 19.3 percent increase in knitted and sewn products. There will be an increase in the production of products for children and for products in mass demand; the product mix will be expanded and product quality will be improved.

The plan calls for the construction, reconstruction and expansion of a number of light industry enterprises, including cotton spinning mills, linen mills, knitted under- and outer-garment mills, nonwoven fabric mills, etc.

The dynamics of production of consumer durables is characterized by accelerated rates and significant growth (1.4 fold). The plan calls for the production of new models of radios and electronic apparatus, improved, sophisticated electrical household machines and appliances; for the activation of capacities for the production of color television sets, tape recorders, furniture, gardening and household equipment; for the reconstruction of individual enterprises for the production of high-quality utensils, artistic glassware and crystalware, etc.

There will be further development in the volume of output of local industry (by more than 1.3 fold). The production of products from local raw materials and production scrap and craft output will increase 1.4 fold. Much attention will be devoted to expanding the production and mix of the simplest commodities and especially of those for which the demand is still not entirely satisfied.

The republic is taking measures to see to it that a significant quantity of consumer goods will be produced in excess of the current five-year plan. In particular, 400 million rubles' worth of such goods are to be produced in excess of the plan in 1982.

The development of the agro-industrial complex, the improvement of the supply of food to the population and the improved supply of agricultural raw materials to industry are of decisive importance for the realization of the tasks posed by the Communist Party regarding the further improvement of the people's well-being. A comprehensive food program integrally associated with all sections of the five-year plan for the development of the republic's economy is being elaborated with the aim of resolving this problem in the Ukrainian SSR.

In accordance with the indicated volume of agricultural and livestock production, gross agricultural output for the Ukrainian SSR as a whole is determined in the sum of 32 billion rubles (on an annual average basis) for the 11th Five-Year Plan (a 12 percent increase compared with the 10th Five-Year Plan).

UkrSSR agriculture is to develop intensively on the basis of more sophisticated farming techniques, chemicalization and land reclamation, the specialization and concentration of production, interfarm cooperation and agro-industrial integration. The growth of agricultural production will for the most part be secured by the higher productivity of farm crops, farm animals and poultry.

As V. V. Shcherbitskiy noted at the November Plenum of the Ukrainian CP Central Committee, adverse weather conditions in republic agriculture is a quite common phenomenon. In the last 20 years, they have recurred every 2-3 years and in some oblasts almost every other year. Therefore we must be able to adapt to the bad climatic conditions and find effective ways of producing stable results.

In agriculture, a leading role is assigned to grain farming. Average annual grain production is to be increased to 51 million tons (compared with 43.2 million tons in the last five-year period). There will be an increase in the production of sugar beets (to 56.6 million tons) and in sunflowers, potatoes, vegetables, fruits, berries and grapes.

Major measures are also indicated for strengthening the fodder base of animal husbandry. At the end of the 11th Five-Year Plan, the annual volume of procurement of fodder on collective and state farms will increase by 22 percent (compared with the annual average for 1976-1980). Its quality will be significantly improved. The plan for the current five-year period devotes a great deal of attention to the development of the concentrated feed industry.

On the basis of the strengthening of animal husbandry's material-technical and fodder base, average annual meat production (slaughter weight) should reach 3.9 million tons; milk production should reach 22.8 million tons. Increased livestock productivity must account for 83 percent of the total increase in meat production and for 84 percent of milk production.

In accordance with the decisions of the Communist Party and the Soviet government, individual and collective gardening as well as subsidiary farms of enterprises and organizations will receive wide development.

The plan envisages measures for the further strengthening of the material-technical base of agricultural production: over 26 billion rubles in capital investments and a large quantity of tractors, combines, trucks and other equipment and mineral fertilizers have been allocated for the branch's current five-year period.

It cannot be forgotten that in a number of instances, the allocated funds are not fully utilized and some farms do not make sufficient use of agricultural equipment and reclaimed land. Therefore it is very important to utilize the existing potential and material, financial labor resources to the fullest.

The 11th Five-Year Plan particularly emphasizes the importance of reducing losses of agricultural products. In this regard, there are plans for increasing capital investments in the creation of storage facilities, for building intrafarm roads and other measures, which will make it possible to reduce losses of agricultural products.

In the solution of the food problem, an important role assigned to the development of the food industry which is slated to produce 23.1 percent more during the current five-year period. Substantial attention is devoted to the processing of raw materials within optimal periods of time, to the reduction of losses of raw materials, to the improvement of the utilization of by-products. The production of semifabricates, culinary products, packaged goods, dietetic and children's foods will also be expanded.

The plan calls for the further development of all types of transport, for the increased effectiveness of their work and for improvements in the quality of service of the national economy and the population. Total freight traffic in all types of transport during the five-year period will increase by 11.5 percent, including a 10.3 percent in rail traffic, a 26.5 percent increase in truck traffic and a 19.9 percent increase in river traffic. In motor transport, there will be further development in the technical production base and qualitative change in the structure of rolling stock. During the five-year period, 7900 kilometers of hardtop motor roads will be built and rebuilt. River transport will play a more prominent part in serving the republic's economy. The share of mixed shipping by "river-sea" vessels will grow. The problem of port development and reconstruction and of raising the level of mechanization of loading and unloading operations retains its urgency.

Important problems confront Ukrainian builders in the 11th Five-Year Plan: the volume of capital investment in this branch in our republic is 95.6 billion rubles.

The plan indicates a number of measures for the regularization of capital construction and for increasing its effectiveness. Thus the projected branch structure of capital investments is directed toward the improvement of national economic proportions and the elimination of difficulties in supplying the national economy with individual types of products.

Capital investments will grow at a rapid rate in a number of branches of heavy industry: by 28.7 percent in the fuel-energy branches and by 38.3 percent in machine building. Limits on capital investments in branches that produce consumer goods remain at the level of the last five-year plan. Over 35 percent of all capital investment is in the development of the agro-industrial complex.

The present five-year plan calls for the commissioning of fixed capital with a combined value of 94 billion rubles, which is 5.3% more than in 1976-1980.

Principal attention in the plan is devoted to increasing the effectiveness of capital investments. Accordingly, they are to be concentrated to a greater extent on the economically and technically substantiated number of construction projects. Throughout the economy subordinate to the UkrSSR Council of Ministers, the number of productive construction projects will be reduced by roughly one-third, while the capital investments in every such construction project will grow by almost 50 percent. Seventy percent of the capital investments in the production sphere is channeled into the startup program. There will be an increase in the share of capital investment planned for the reconstruction and technical retooling of existing enterprises. The level of incomplete construction will decline from 79.7 percent (of the total volume of state capital investments) at the beginning of the five-year plan period to 69.5 percent at the end of 1985, which corresponds to the norm.

The plan envisages a six percent increase in the volume of contractor-performed construction and installation work in the republic in general. At the same time, 1.3 billion rubles in state capital investments are allocated for the development of construction's material-technical base.

The 11th Five-Year Plan also calls for further improvement in the distribution of the productive forces in the Ukrainian SSR. Enterprises will continue to be sited in small and medium-size towns that have the necessary conditions for industrial development and construction of new enterprises and the expansion of existing enterprises in large cities and industrial centers will also be limited.

The Program for Social Development and for Improving the People's Well-Being

In accordance with the economic strategy of the Communist Party and the principal task of the 11th Five-Year Plan, the 26th CPSU Congress outlined a broad social program that provided the basis for the five-year plan's system of measures for securing further improvement in the people's well-being.

In order to implement the measures planned in this direction, there will be substantial changes in one of the most important national economic proportions--in the distribution of national income between consumption and accumulation: during the current five-year plan period, the consumption fund will grow at a relatively more rapid pace thereby ensuring the increase in resources allocated for the satisfaction of the Soviet people's growing needs.

Republic per capita real income during the five-year period will grow by 17 percent. Approximately 2.5 billion rubles (according to the calculations for 1985) will be allocated for centrally financed state measures aimed at raising the Soviet people's living standard. This figure includes 1.2 billion rubles allocated for raising wages. The average monthly wage of workers and employees in the national economy will grow by 11.7 percent during the 11th Five-Year Plan period, while the pay of kolkhoz workers in the social sector will increase by 19.7 percent. Thus, taking incomes from personal household plots into account, the incomes of kolkhoz workers will approximate those of workers and employees.

As the corresponding conditions are created and the necessary resources are amassed, the minimum wage will gradually be raised to 80 rubles a month and the rates and salaries of workers and employees will be increased (first of all, in the productive branches of the national economy). Thus, in the coal industry, this measure will for the most part be carried out in the first quarter of 1982. Some branches will continue to increase the amount of additional pay for night work.

It is also planned to strengthen the stimulating role of wages and to make them highly dependent on end results, on increased effectiveness and the quality of work.

During the five-year period, social consumption funds will grow by 24 percent and will reach 25.9 billion rubles in 1985. These funds will finance centralized measures increasing state aid to families and children and further improving pensions for the population.

The repayment of internal state loans will continue under the 11th Five-Year Plan.

The plan devotes special attention to improving the supply of goods to the Soviet people, to the more complete balancing of their effective demand with commodity resources and paid services.

State and cooperative retail trade in 1985 is projected in the sum of 56.7 billion rubles (an increase by 21 percent during the five-year period). The sale of nonfood commodities is slated to grow at a relatively more rapid rate. Public catering facilities will undergo further development. Work will continue on the technical retooling of trade enterprises, on the introduction of progressive technologies.

The volume of consumer services will reach almost two billion rubles in 1985 and will grow by 40.6 percent during the five-year period. This will include a 45.9 percent increase in rural areas. There will be a 1.5-1.7 fold increase in the volume of services performed by rental points, by household appliance repair centers, by housing repair and construction facilities, and by laundries.

The Communist Party and the Soviet government attach paramount importance to the solution of one of the most important social problems--the housing problem. The major task in the next decade will for the most part be to provide each family with a separate apartment. Under the current five-year plan, 80.7 million m² of housing will be built thereby improving housing conditions for approximately seven million persons. Much attention is devoted to the improvement of the quality of housing construction, of the layout, comfortability and finishing of apartments. By the end of the five-year plan, most dwellings will be built on the basis of new, improved standard designs.

The volume of capital repair of residential buildings will also be expanded. A preventive maintenance system will be instituted. State plans will henceforth incorporate targets for the capital repair of housing and will make provision for the requisite material resources. More than 18 million m² of housing will be repaired during the five-year period.

The current five-year plan allocates 2.3 billion rubles for the construction of public utilities (taking into account the funds provided by ministries and departments). The network of water lines will be expanded. The average daily consumption of water per urban dweller will increase from 266 to 290 liters during the five-year period. The effort to bring a total halt to the practice of discharging raw sewage into the Black Sea and Sea of Azov will continue. New sewage treatment plants will be put into operation.

The installation of gas service in cities and urban type settlements will also continue. Urban transport will undergo further development. More streetcar tracks will be laid and trolleybus lines will be extended. The first phase of trolleybus transport will be activated in Ivano-Frankovsk, Kerch', Snezhnoye, Uglegorsk, Kupyansk, and Lozovaya. The first phase of high-speed streetcar transport will be activated in Krivoy Rog. Subway construction will continue in Kiev and Khar'kov and will commence in Dnepropetrovsk. New hotels to accomodate 5000 guests will be built. It is planned to carry out a considerable amount of work on the organization of public services and amenities in town and country alike.

The plan makes provision for the further development and improvement of public education and the social upbringing of children, for the more complete satisfaction of the economy's requirement for skilled workers and specialists and for the further development of culture and art.

The expansion of the network of children's preschool institutions acquires great socioeconomic significance. At the end of the five-year plan period, 58.4 percent of all preschool age children will be accomodated by kindergartens and day care centers (more than 65 percent of the kindergartens and day care centers are in cities). In a number of Ukrainian industrial centers, the requirement for preschool institutions will be essentially satisfied. There will be permanent kindergartens and day care centers on every kolkhoz and sovkhoz.

In 1985, virtually all eighth grade graduates will continue their education in institutions offering secondary education. Extended-day schools and groups should be able to accomodate approximately 45 percent of the pupils in grades 1-8.

During the five-year plan period, 1.9 million specialists with higher and secondary specialized education will be trained. At the end of 1985, there will be 6.4 million of these specialists at work in the republic (one million more than in 1980).

In 5 years, schools in the vocational-technical education system will train 2.3 million skilled workers (or almost seven percent more than under the 10th Five-Year Plan).

The current five-year plan will expand the material-technical base of educational and cultural institutions. The plan calls for the construction of schools to accomodate 700,000 pupils and preschool institutions with accomodations for 500,000 preschoolers. The problem of providing dormitory space for out-of-town students attending higher education institutions will be essentially solved. The effort to create the necessary conditions for the more complete satisfaction of the population's cultural needs will also be continued.

Concern for human health is a characteristic feature of our Soviet society. The plan makes provision for the further development of all elements of the health care system, physical culture, sport and recreational conditions for republic dwellers.

Forty-seven thousand new hospital beds will be put into operation. The number of hospital beds per 10,000 population will be increased to 131 (compared with 125 in 1980). The network of outpatient clinics, sanatoria, boarding homes, rest homes, Young Pioneer camps, and tourist institutions will also be expanded. There will be an increase in the number of physicians and paramedical personnel and the quality of medical care will be improved.

Environmental protection is a major socioeconomic problem. The five-year plan envisages a complex of measures aimed at the conservation and rational use of water resources, at the protection of air, land and forests; at the development of preserves; at the reproduction of fish reserves; and at the more complete extraction of useful minerals from the earth. Twenty-eight percent more capital will be invested in republic nature conservation measures than under the 9th Five-Year Plan.

On the basis of widely developed socialist competition, in 1981--the first year of the 11th Five-Year Plan--the working people of the Ukrainian SSR promoted the republic's further economic and social development. The volume of industrial production increased by three percent compared with 1980 while labor productivity in industry increased by 2.3 percent. Notwithstanding the difficulties accompanying a drought year, workers in the countryside met the established target and filled the motherland's granaries with 827 million poods of grain, i. e., realized the average annual level of grain procurement under the 10th Five-Year Plan. The plan for sowing winter crops has been fulfilled. The size of the livestock population has been preserved.

More than 160 of the most important production capacities and facilities and a large number of housing projects, schools, preschool institutions, hospitals, and polyclinics have been put into operation. Conditions have been created for raising the people's well-being further.

At the same time, in the development of the Ukrainian economy, there have been difficulties primarily associated with the limited character of agricultural raw material resources. There have also been certain shortcomings. Some of the enterprises, associations, construction projects, kolkhozes and sovkhozes have failed to cope with their assigned targets. The available possibilities and reserves for increasing the intensiveness of production and for raising its effectiveness have not been used sufficiently.

The plan for the social and economic development of the republic during the 11th Five-Year Plan period and the plan for 1982--which have been approved by the November Plenum of the Ukrainian CP Central Committee and ratified by the Fourth Session, Ninth Convocation of the UkrSSR Supreme Soviet--are documents of major political and national economic significance. They articulate concrete measures for the practical implementation of the decisions of the 26th CPSU Congress and the 26th Congress of the Ukrainian Communist Party. The fulfillment of plan targets will require all republic work collectives to mobilize manpower and resources, to bring internal economic production reserves to bear, and to improve the quality of work in all elements of the national economy.

At the same time, much attention must be devoted to the strengthening of state planning discipline, to the unconditional fulfillment of established plan targets, to the strict observance of contractual discipline, and to the inadmissibility of the downward adjustment of plans.

The broad development of the socialist competition of labor collectives, their high socialist pledges, and their counterplans are a guarantee that the republic--under the wise leadership of the Communist Party--will successfully implement the historic decisions of the 26th CPSU Congress and targets of the 11th Five-Year Plan for the further economic and social development of the Ukrainian SSR in the name of the great cause of communist construction in our country.

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REGIONAL DEVELOPMENT

SYSTEMS APPROACH TO FORMING TERRITORIAL PRODUCTION COMPLEXES IN UZBEKISTAN

Tashkent OBSHCHESTVENNIYE NAUKI V UZBEKISTANE in Russian No 1, 1982 pp 27-31

[Article by A. K. Berdintsev]

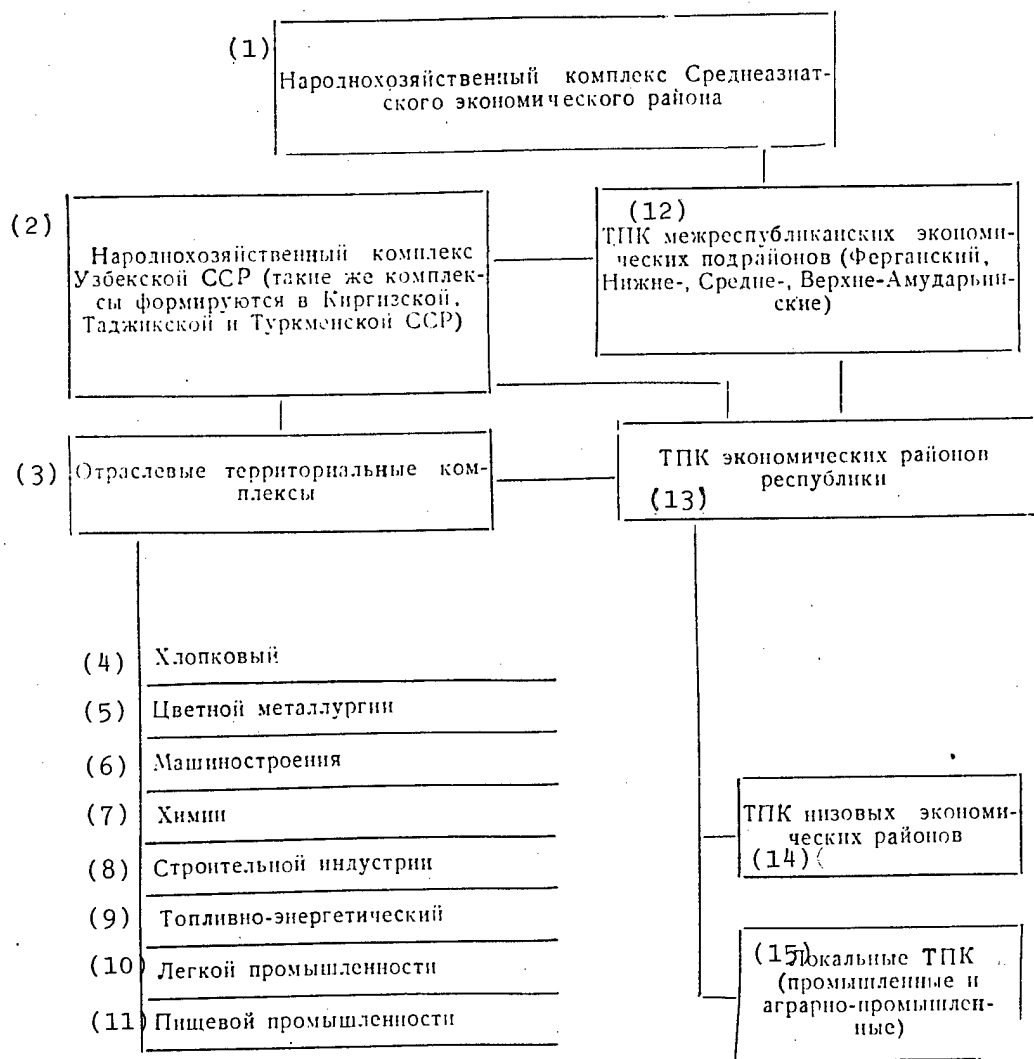
[Text] From its very inception, the Soviet theory of territorial production complexes (TPC's), TPC's have been viewed as an interconditional combination, as a part of the system of such combinations. Nonetheless, to date there is no general theory of the formation and planned (controlled) development of TPC systems based on the in depth analysis of the dialectical essence of the interaction of differentiation and integration of territorial production phenomena.

The systems-structural approach permits us to view the TPC as a system of territorial structural formations with a definite hierarchy. With regard to the TPC, the system is manifested in the interaction of hierarchies: whole higher order complexes are divided into parts--lower order complexes that perform certain functions in the general system.

At the same time, each type of TPC forms a system upon interacting with complexes of its own type. Thus, when integral regional TPC's interact with one another, they form a system of regional complexes (economic regions); industrial and agro-industrial TPC's form their own systems when they interact. Consequently the taxonomy of TPC's requires not merely random fractional parts but only those parts that directly form a given whole when they enter into a certain system of relations (internal economic-production relations).

These basic methodological principles were used in analyzing the formation and development of TPC's under the specific regional conditions of Uzbekistan, which prompted the conclusion that a considerable number of TPC's of various scale, type and size have already formed and that their strengthening in the process of their development has led to the formation and functioning of a number of TPC systems. They are systems of integral regional TPC's, lower order integral TPC's, and industrial and agro-industrial TPC's. Their taxonomic sequence is shown in the following chart.

Taxonomic System of Territorial Production Complexes in Uzbekistan



Key:

1. National economic complex of the Central Asian economic region
2. National economic complex of the Uzbek SSR (similar complexes are also being formed in the Kirghiz, Tajik and Turkmen SSR's)
3. Branch territorial complexes
4. Cotton
5. Nonferrous metallurgy
6. Machine building
7. Chemistry
8. Construction industry
9. Fuel-energy
10. Light industry
11. Food industry
12. TPC's of interrepublic economic subregions (Ferganskiy, Nizhne-, Sredne-, Verkhne-Amudar'inskiye)
13. TPC's of republic economic regions
14. TPC's of lower order economic regions
15. Local TPC's (industrial and agro-industrial)

In addition to territorial production complexes, the chart also shows branch (interbranch) territorial complexes. This was done to illustrate the very important principle that the development of branch (interbranch) and territorial production complexes is an interconnected and interdependent process. The planned siting of enterprises of the branch (interbranch) complex must ensure the fulfillment of the program for the development of TPC's. On the other hand, the tasks of development of TPC's must necessarily be taken into account in the planning of the development of branch territorial complexes.

What is the economic content of the aforementioned systems of republic TPC's, their purpose, and the corresponding planning and research task?

The system of integral (multibranch) regional TPC's objectively exists in the form of a network of intrarepublic economic regions, of which there are six in the republic: Tashkentskiy, Ferganskiy, Samarkand-Karshinskiy, Bukhara-Kyzylkumskiy, Nizhneamudar'inskiy and Surkhandar'inskiy.

The economic purpose of the given system of TPC's consists in the determination of their economically expedient integrated development, which can also serve as the analytical basis for the elaboration of the territorial section of the plan for the development of the republic's economy. The following clarifications must be offered in this connection*.

The present administrative division of the republic into oblasts is to a considerable degree subordinate to the interests of improving governability, which in some instances slightly restricts the possibility of creating an integrally developed economy in every administrative oblast. For example, it is not expedient to create such an economy in each individual oblast of the Fergana Valley. Instead, it should be created in the aggregate of economies of these oblasts, i. e., in the Fergana economic region as a regional TPC in general.

Hence it is obviously expedient that the territorial section of the plan for the development of the republic's economy be accompanied by a description of this analytical base in the form of a textual presentation of the principal directions of development of each of the republic's economic regions and the oblasts comprising them, but as functional parts of the "whole." In our view, administrative oblasts in the plan should be presented not in alphabetical order but as a part of the given economic regions.

The given analytical basis should also explain and substantiate further tasks in the equalization of the level of industrial development of economic regions and oblasts, which is very timely for the republic. This is attested to by the summary index of industrial development which according to the data for 1977 (the UzSSR=1.00). The index for the Tashkentskiy economic region was 1.78; Ferganskiy--0.84; Samarkand-Karshinskiy--0.62; Bukhara-Kyzylkumskiy--1.02; Nizhneamudar'inskiy--0.49; and Surkhandar'inskiy--0.47. The fluctuation of the given index for the various oblasts is still more significant. The problem of its equalization can be more successfully resolved when administrative oblasts are examined not in isolation but

*For more detail, see the author's article "Improving Economic Zoning and Territorial Planning in the Republic," EKONOMIKA I ZHIZN', No 4, 1976.

in their interaction with other oblasts belonging to the same economic region. For example, the level of industrial development of Syrdar'inskaya and Dzhizakskaya oblasts can be raised more successfully with due regard to the character of industrial development of Tashkentskaya Oblast (together with which they presently form a single economic region) and with the direct participation of the industrial enterprises of Tashkentskaya Oblast and Tashkent City.

In such an interrelationship, it is also expedient to resolve the tasks of development of the production and social infrastructure, e. g., the network of motor roads, electric power transmission lines, the network of vocational-technical training schools, etc.

Integral regional TPC's in close interrelationship with one another form a system from which the republic's national economic complex develops and functions as a higher link, in the given instance--the Central Asian economic region.

At the same time, each integral regional TPC itself is a highly complex system that forms with the interaction of local complexes--lower order integral, industrial and agro-industrial complexes situated in a given economic region in which they function as component parts of a single "whole."

The system of lower order integral TPC's exists or more precisely should exist in the form of a network of lower order economic regions (which number approximately 60 in the republic) and has the mission of serving as the basis for forming consolidated rural administrative regions. However the frequent change of boundaries of administrative regions coupled with the substantial change in their number makes the planned formation of the economy of lower order economic regions difficult. Rural administrative regions in the republic numbered: 117 in 1940; 148 in 1958; 62 in 1962; 89 in 1965; 128 in 1975; 134 in 1977; and 153 on 1 January 1981.

The increase in the number of rural administrative regions is designed to facilitate and improve their controllability. Nonetheless, at the local level, lower order enterprises are consolidated; interregional feedlot, procurement, supply and transport bases; support-type railroad stations with warehouse facilities and other enterprises serving two and even more rural administrative regions are created. There is obviously an objective integration process, i. e., associations develop into larger economic associations. The task of scientific research is to identify these objectively forming economic regions as lower order integral links in the taxonomic system of TPC's that must necessarily possess potential economic wholeness and must be stable lower order economic organizations.

The system of industrial TPC's forms from objectively existing and developing industrial regions and centers. In this system, two types of complexes can be singled out under the regional conditions of Uzbekistan. The first type of complex consists of new industrial regions and centers that originate on the basis of the development of mineral and raw material resources or electric power sources, e. g., the Angren-Almalyk'skiy and Navoi-Kyzylkum'skiy mining regions, the Chirchik'skiy power industry center, etc. The second

type consists of industrial regions and centers that arise on the basis of the industrial complexes of old cities, e. g., Tashkentskiy and Fergano-Margilanskiy industrial regions, Kokandskiy and Samarkandskiy industrial centers, etc.

To date, eight industrial regions have formed within the system of the republic's TPC's. Thirty industrial centers are developing within these regions. In addition, 13 industrial centers are forming and developing outside of the industrial regions. It is planned to create another six centers in the future.

The task of scientific research is not only to identify objectively forming and developing industrial regions and centers and to indicate the possibility of creating new ones, but is also to determine the directions of development and the optimal branch structure of each of them with due regard to their functional significance in the system of industrial TPC's, integral regional TPC's and the republic economy as a whole.

The economic purpose of the given system is to promote improvements in the territorial organization and territorial planning of industrial production and to the combination of the branch and territorial aspects of its development.

The combination of agriculture and the processing industry gives rise to a specific form of TPC: agro-industrial complexes (AIC's) which in turn are subdivided into species and types. They are lower order, local agro-industrial enterprises, combines and associations as a local form of agro-industrial integration and regional AIC's, i. e., complexes within the limits of an entire region as its highest level. The national economic cotton complex of Central Asia is an example of the latter.

The system of agro-industrial complexes in Uzbekistan received its greatest development in the production and processing of perishables (fruits, vegetables, grapes) in the form of agro-industrial enterprises, combines and associations.

Sovkhoz-plants, that presently number 60, including fruit- and grape-growing, and exclusively grape-growing, vegetable-fruit and vegetable-dairy sovkhoz plants, are the most developed form in this subsystem.

This type of AIC is exemplified by the "Nizhniy Chirchik" fruit- and grape-growing sovkhoz which is a large, thoroughly developed farm that specializes in grape and wine production. The creation of such agro-industrial enterprises holds promise for the republic's piedmont and mountainous region where many similar enterprises could be organized.

Republic sovkhozes with a high level of specialization provided the base for the development of territorial agro-industrial associations (AIA's) specializing in fruit and vegetable canning and in grape- and winemaking, which unite agricultural enterprises (sovkhozes) with enterprises in the canning and winemaking industry not within the framework of individual farms but on the scale of a lower order economic region. Within the present

system of UzSSR AIC's numbers 17 such territorial AIA's, including: 5 in the Tashkentskiy economic region; 5 in the Ferganskiy economic region; 3 in the Samarkand-Karshinskiy economic region; 1 in the Bukhara-Kyzylkumskiy economic region; 2 in the Nizhneamudar'inskiy economic region; and 1 in the Surkhandar'inskiy economic region.

For the further development of this very promising subsystem of republic AIC's, it is advisable (1) to organize at its machine building plants the production (on a cooperative basis) of complete equipment packages for the processing of grapes, fruit and vegetables; and (2) to include in AIC's not only sovkhoses but also kolkhozes with the aim of creating mixed state-kolkhoz AIA's on a regional and eventually the oblast scale. This will promote not only the expansion of the base and potential of the future development of the system of the republic's AIC's but also the acceleration of the industrialization of agriculture, the socialization of kolkhoz property, and the formation of industrial categories of cadres on kolkhozes and sovkhoses.

Agro-industrial integration has not been duly developed in the sphere of cotton farming at the local level. The same is also true of sericulture and animal husbandry in the republic. The elaboration of the scientific principles and avenues of development of AIC's in these branches is an urgent task of scientific research.

The economic purpose of the system of AIC's is to maintain the proper proportionality in the development of agricultural and industrial production, which will also promote proper branch and territorial planning. Experience shows that territorial production complexes form and develop most successfully on the basis of special integrated programs that are incorporated in the national economic plan.

As we know, the decree of the CPSU Central Committee and USSR Council of Ministers of 12 July 1979 "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing the Effectiveness of Production and Improving the Quality of the Work" assigned USSR Gosplan the responsibility of developing special comprehensive programs for the development of individual regions and territorial production complexes as a key part of state long-range plans for economic and social development and of coordinating these programs with the corresponding sections of the plan and with available material and financial resources*.

The establishment of TPC's as an entity of national economic planning will make it possible to escape the narrow framework of branch planning, will permit a radical solution to the problem of combining it with territorial planning, with the solution of regional economic problems, and to make most rational and effective use of resources allocated for the development of various branches and for the development of new territories.

*"On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing the Effectiveness of Production and Improving Work Quality," Postanovleniye TsK KPSS i Soveta Ministrov SSSR ot 12 iyulya 1979 g. [Decree of the CPSU Central Committee and USSR Council of Ministers dated 12 July 1979].

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REGIONAL DEVELOPMENT

ROLE OF PRICE INFORMATION AS AN IMPORTANT ECONOMIC TOOL

Kishinev SOVETSKAYA MOLDAVIYA in Russian 27 Mar 82 p2

[Article by B. Malakhov, deputy chairman of the Moldavian SSR State Committee for Prices, Kishinev: "An Important Tool of the Economy"]

[Text] A price-information service has been created in the republic. It helps economists and other specialists in the national economy to better orient themselves in the solution of problems connected with improvement of the economic mechanism.

In implementation of the economy policy of the party and the government, price information is of major importance. Planning, credit extension, calculations, cost accounting are accomplished through the agency of prices. Prices to a large extent determine the multilateral processes of national-economic development. Both the economic resources of the state and the continued growth of the material well-being and cultural level depend on them in decisive measure.

Prices must increasingly contribute to raising of profitability, elimination of production losses and growth of profit primarily through reduction of production cost and growth of labor productivity, improvement of production quality and accelerated utilization of new high-efficiency equipment. In a word, they play an important role in improving the entire mechanism of management.

The solution of these problems is greatly assisted by information on prices. It makes it possible in a timely way to inform industrial associations and enterprises, kolkhozes, sovkhoses, sovkhoses-plants, interfarm enterprises and associations, enterprises and organizations of the service sphere as well as workers on the existing levels on changes in wholesale, purchase and retail prices as well as rates for services. It makes it possible for specialists of enterprises and organizations in the development of schemes of prices for new products to select an analog, more precisely to determine the size of material and labor outlays, profit, profitability and the level of projected prices. Regulation of the information service on prices will make it possible to provide the resources and funds for search and issue of information on this question and what is most important--to strengthen state price discipline.

Taking all this into account, the Moldavian SSR State Committee for Prices has been systematically holding conferences, seminars, scientific-practical conferences on individual questions of price formation with heads of finance planning services, economists of ministries, departments, enterprises and organizations of cities of republic subordination for many years in a row.

Kishinev, Tiraspol', Bel'tsy and Bendery have price-information bureaus (SIBy). During 1980-1981 a unified republic information-service system was formed. It has for its purpose providing all units administering the national economy of Moldavia with effective and reliable information for each concrete period of time on existing prices and rates at all established levels, methodology of formation, manner of establishment and use for the purpose constant upgrading of the economic validity and effectiveness of prices and their role in the process of management of production and prevention of violation of state price discipline. An indispensable condition for the improvement and development of this system is reduction of outlays for the accumulation, systematization, search and issue of information to users through the introduction of progressive equipment and means of communication, automation and centralized information services.

The system functions under conditions of being able to pay for its way. All maintenance expenditures are through the means of enterprises and organizations that make use of its services. The size of such payment is determined by the volume of commodity production. In 1982, this rate varies from 19 to 35 rubles for one million rubles of sold production.

Relations between price-information bureaus and enterprises or organizations are regulated by special contracts which determine the rights and obligations of the parties. For the current year, 237 such contracts have been concluded, including 99 for five years.

As we know on 1 January 1982 the new wholesale prices for industrial production and rates for electric power and thermal energy were introduced. At this time there went into effect new markups for wholesale prices and price reductions for the benefit of supply, sales and assembly organizations. For the transition to new wholesale prices and rates in national-economic planning and financing, calculations were performed in the second half of last year (this, by the way, is still being done) on changes in the cost of produced and obtained products as well as recalculation of the plan for 1982 and for the five-year period in the new prices.

This major troublesome and responsible work was done with the direct participation and aid of price-information bureaus of the Head Kishinev Price-Information Bureau (chief--M.N. Tarasov) only in November-December of last year, and in the first half of January of this year, 750 specialist planners, economists, accountants and engineers visited them for these questions. They were provided with approximately 14,000 answers to different price inquiries. Moreover, answers were provided not only for requests on new wholesale prices but also on previously operating ones as well as on normative net production.

The work of the price-information bureaus is gaining increasing recognition by specialists of enterprises. Positive testimonials on their work have come in particular from economists of the Kishinev Combine for Artificial Leather and Industrial Leather Products imeni M.I. Kalinin, the Rybnitsa Sugar and Alcohol Combine, the Ungeny Rug Combine, the Kagul Butter Plant and other enterprises.

The republic price-information system has now been provided with price lists approved by the USSR State Committee for Prices, union ministries and departments, union-republic state committees for prices and other price-forming organs. In addition, the necessary normative technical documentation is available (GOST's, OST's, RST's and TU's) as well as statistical, methodological instruction and economic literature.

A considerable amount of work at price-information bureaus is being done on systematization and codification of price lists. Changes that occur are inserted daily in them. Last year more than 298,000 changes were listed. This year the services of price-information bureaus are being used by republic ministries and departments and 1,422 enterprises and organizations.

At the present time, considerable attention is being given to the formulation at enterprises of "Passports of Validated Prices for Used Raw and Other Materials, Semifinished Products, Component Items and Finished Production." The formulation of such "Passports" makes it possible to introduce order in work with prices and normative technical documentation, to ensure their reliability, to make easier analysis of their validity and control over the correctness of use of prices for products put out by these or those enterprises or associations.

Such "Passports" significantly ease the work on the transition to the new wholesale prices and rates in planning and financing of the national economy. Operators of calculating machines are guided by them when making up various bank documents.

On the example of Moldavia, price-information services are now functioning in Uzbekistan; our experience has been studied in detail by specialists from Estonia, Latvia and Kazakhstan. It received a high rating at an all-union conference-seminar conducted by the USSR State Committee for Prices in November 1981.

But not everything is proceeding as we would like it to. Personnel of price-information bureaus still rarely visit enterprises and organizations to provide practical assistance in setting to rights price-list services and are conducting insufficiently group consultations on specific questions of price formation; they are slow in converting enterprises to direct information services.

Price-information services and their branches are activating the functioning of collections of the new wholesale prices; they are providing accuracy in replies to questions not only on prices but also on norms of net production and are striving to have their services used not only by industrial enterprises but also by trade, consumer and municipal-service enterprises, agrarian and scientific production associations, kolkhozes, sovkhoses and various procurement organizations.

The 26th CPSU Congress set major tasks in the field of development and use of retail and wholesale prices. There is no doubt that the price-information service will play an important role in this important work, in increasing the learning of cadres and intensifying state and public control and responsibility of directors over the observance of state price discipline.

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REGIONAL DEVELOPMENT

PRESTIGE OF NORMATIVE SERVICES REVIEWED

Tallinn SOVETSKAYA ESTONIYA in Russian 2 Apr 82 p 2

[Article by V. Panov, chief of Norms and Quotas Department of Gosplan ESSR]

[Text] One of the chief ways of economizing of material resources for associations, enterprises and organizations is through their transfer to the normative method of accounting of outlays for production and calculating production cost of products on the basis of the system of norms and quotas established by Gosplan USSR in 1980.

This system is being introduced in conformity with the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979 "On Improving Planning and Increasing the Influence of the Economic Mechanism on Raising Efficiency of Production and Quality of Work."

The purpose of creating a unified system of norms and quotas was to provide scientific substantiation, to improve proportionality and balance of plans, to reveal and to utilize the deeper reserves of production and thus to increase its efficiency.

In May 1981, Gosplan ESSR ordered ministries and departments of the republic to carry out a number of measures, significantly changing the existing style of normative work: for example, the procedure for development, approval and utilization of norms and quotas, the preparation and ratification of departmental complex plans for improvement of norm setting for the 11th Five-Year Plan, creation of a collection of norms and quotas forming a specialized data base.

On the basis of the accumulated information in this collection, analysis is performed of the dynamics and prediction of norms and quotas, control is exercised over their fulfillment and a comparison is made of actual specific expenditures with planned ones.

What is the state of affairs today?

All republic ministries have developed complex plans for the improvement of norm setting in the period to 1985. The ESSR Ministry of Local Industry, the Ministry of Motor Transport and Highways, the Ministry of Construction Materials Industry, the Ministry of Housing and Municipal Services and the Estonian

Republic Union of Consumer Societies have reinforced cadres of the norm-setting apparatus and created new appropriate units. But at most ESSR ministries and departments, these functions are still spread out among different administrative services or turned over to scientific-research and planning organizations. Even at those ministries where special units have been created, the preparation of departmental recommendations on a procedure of revision, renewal, development and ratification of norms and quotas has still not been completed, although the time set by Gosplan ESSR is over.

In regard to union-republic ministries, half of them as yet have not completed even the first stage of this work (on complex plans). But time is pressing. Today in the second year of the 11th Five-Year Plan, the task is to immediately begin on the formation of a normative planning base. At the 26th CPSU Congress, special attention was devoted to the importance of the indicator of production cost. In this connection, provision has been made in five-year and annual plans, beginning with 1983, for industrial, construction and transport ministries and departments, associations, enterprises and organizations to set up targets on cost of production (work) and for these targets a limit to material expenditures in monetary terms per ruble of production (work).

It is important for specific targets on production cost and maximal levels of material expenditures to be optimal, mobilizing and to be aimed at a radical breakthrough in the use of raw materials, fuel, power and other material resources. The role of a production-cost indicator should be strengthened by improved methodology of calculation and counting of outlays on production. ESSR ministries and departments are under the obligation of completing during the 11th Five-Year Plan the transition of subordinate enterprises and organizations to the normative method of accounting of outlays on production and calculation of production cost.

We know that the realism of plans also largely depends on the quality of norms and quotas used. For 1982 and for subsequent years of the 11th Five-Year Plan major tasks have been set for economy of material resources on the basis of introduction of progressive norms for their expenditure per unit of produced product.

For all ESSR ministries, general economy of boiler and furnace fuel this year compared to 1980 should amount to 34,200 tons of conventional fuel, thermal energy--130,000 gigacalories, electric power--115 million kilowatt-hours, rolled ferrous metals--2,490 tons. The list of material resources and types of production (work) used in the establishment of outlay norms has been significantly expanded. This obliges ministries and departments in a timely way to arrange for a revision of existing norms and within designated periods to present their drafts to Gosplan ESSR. But it is necessary to note that work on the special goal complex program for economy of energy is being conducted unsatisfactorily. While according to the plan, developments on the enterprise level had to be completed by 1 February and on the ministerial and departmental level by 1 March, as of today these materials have come only from each sixth organization.

For the purpose of further improvement of planning of material-technical supply, experimental calculations are being conducted with the help of computers in March-April of production requirements for metal products of the enterprises of two ESSR ministries. If the experiment turns out to be successful, the system of requisitionless [bezzayavochnoye] planning of material-technical supply will be subsequently disseminated to all the ministries and for all types of resources.

In 1981, on the basis of instructions of Gosplan USSR, calculations were conducted at some enterprises of the ESSR MMP [Ministry of Local Industry] on the full labor intensiveness of each unit of basic types of products. This work must be continued in the first half of the current year. The fact is that the use of cost indicators of labor productivity (output of gross and commodity production) does not provide an objective description of the level and dynamics of labor productivity in all parts of production inasmuch as such indicators depend on changes in material intensiveness, profitability, level of cooperation and the like.

The introduction of indicators of full labor intensiveness for a production unit, on the one hand, makes it possible to change over to the normative method of planning the number of industrial-production personnel in close tie-in with final production and expands possibilities and raises the level of centralized planning and, on the other hand, provides precise criteria of efficiency of use of labor outlays at all levels of planning.

To raise the responsibility of enterprises and organizations to ministries and departments, verification should be conducted of the drafts of their production plans, beginning with an examination of the validity of the norms and quotas found in these plans. Even the quite imperfect method of verification of norms through statistical reporting shows to what degree they are inaccurately worked out. If one considers that of all the norms and quotas used in planning of production the republic Gosplan and Gosplan USSR examine and approve only one-tenth of them, it then becomes clear: the main work in this direction should be initiated at ministries, departments and their scientific-research institutes and at associations and enterprises.

Questions of norm setting of labor, expenditure of materials are decided on in production. This largely depends on the work of normsetters and representatives of the technological service. We have many workers who come out with initiatives for the revision of obsolete norms. And engineers of the chief technologist's department frequently hardly participate in norm setting; actually they do not take part in questions of reduction of labor intensiveness. Evidently, it is necessary to speak of raising the skills of specialists in norm setting. Permanently operating production conferences and trade-union organizations of enterprises could pay more attention to improvement of norm setting.

Thus the prestige of the norm must be understood, beginning with production collectives.

At the present time, automated control systems of associations and enterprises (ASUP) and sectorial automated planning and control systems (OASU) are to be found in many sectors. Work is proceeding on the creation of a second section for an automated system of planning calculations (ASPR). The functioning of all these systems is based on normative information. Consequently without a collection of norms and quotas, all these systems will be far from perfect and hardly of any practical benefit. This serves as a reason for the need of urgent establishment of normative services, the transition from work with an infinite number of numerical data to work with a system, strictly regulated on the basis of renewal times, revision and approval of norms and their inter-related use in planning and in accounting of expenditures of labor, materials and financial resources.

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REGIONAL DEVELOPMENT

ARMENIA'S SOCIAL, ECONOMIC POTENTIAL

Yerevan KOMMUNIST in Russian 14 Mar 82 p 2

[Article by Yu. Suvaryan, docent of the Chair of Planning of the Yerevan Institute of National Economy, candidate of economic sciences: "Social-Economic Potential of the Republic"]

[Text] The victory of the Great October Socialist Revolution and the formation of the USSR created the necessary political and social-economic prerequisites for the planned and balanced development of the economy and culture of all the union republics into a single national-economic complex of the country. Even the directives of the 15th party congress on the First Five-Year Plan for Development of the USSR noted that it required special attention being given to the development of the economy and culture of the backward, weakly developed national borderlands and regions. The chief direction of overcoming this social-economic backwardness was the ensuring of high, exceeding average union, rates of growth of the economies of individual union republics and national okrugs. This was directly reflected in the historical destiny and practice of the Soviet Armenia of the present day. In 1980 compared to 1940, the industrial yield of Armenian SSR had grown forty-fivefold versus a growth of the gross production of USSR for this period of twenty-onefold. Agriculture, transport and capital construction developed at a high rate, the volume of retail trade increased and per-capita real income grew.

Because of the dynamic and proportional growth of the economy, the republic has at the present time a strong scientific-production potential, a modern multisectorial industry and a highly developed agriculture. Machine building, instrument making and machine-tool building, chemistry, nonferrous metallurgy and electric-power engineering have become leading sectors of industry. The traditional sectors of industry--light and food--are being expanded and improved. Motor-vehicle construction and microbiology are developing rapidly. Sectors of the nonproduction sphere--education, health care, sciences, municipal and consumer services--have achieved major successes.

Achievements of the republic's workers have been particularly noticeable during the years of the Ninth and Tenth Five-Year Plans. During these years, in addition to extensive expansion of production on the basis of wide-scale employment of the achievements of scientific-technical progress, qualitative changes

occurred in all parts of the economy connected to the transition to a primarily intensive type of economic growth; the distribution of productive forces on the territory of the republic was improved, and definite successes were attained in the field of social development.

For the period 1970-1980, the size of the national income better than doubled; fixed capital of all the sectors of material production grew 2.31-fold; the volume of industrial production increased 112 percent, of agriculture--34 percent, freight turnover for all types of transport--84 percent, capital investment--38 percent.

Introduction of the achievements of scientific-technical progress was speeded up. By the end of the Tenth Five-Year Plan, the number of introduced measures relating to new equipment was 6,501 in the republic's industry; this provided an economic effect of 42.7 million rubles. During the 10th Five-Year Plan, 65 models of new machines, equipment, instruments and automation equipment were created annually; in the course of a year on the average series production was initiated for 203 designations of new types of manufactured products.

The technical equipment of labor is growing; the capital-labor ratio and the power-labor ratio are rising. A slow but stable reduction of the relative share of manual labor is taking place. The share of workers performing work on automatic equipment and with the aid of machines and mechanisms during 1976-1979 grew 3.7 percent.

Indisputable achievement is to be found in the radical changes taking place in the quality of the work force. A steady rise in the educational and vocational-qualifications level of the employed portion of the population in public production is occurring. The number of persons is growing with higher, incomplete higher and secondary specialized education, while the number of persons is being reduced with incomplete secondary and elementary education. At the same time, the educational level of the employed population in Armenian SSR is somewhat higher than for the USSR as a whole. Whereas in 1979, 267 out of every 1,000 employed in the country had higher, incomplete higher or secondary specialized education, the figure for Armenian SSR was 291 persons. This is a stable process.

All this attests to the obvious achievements of the republic in the field of higher and secondary specialized education as well as broad development of the network of scientific-research, planning-and-design, cultural and educational institutions.

Significant successes have been achieved in the field of improved organization of production, deepening of its specialization and concentration and also improvement of the distribution of productive forces on the territory of the republic. Special reference should be made to the organization of affiliates of industrial enterprises in small cities, small and large villages of the republic. They are intended to provide not only the development of specialized sectors of production but also rational utilization of labor and power resources and to ensure a balancing of the level of social-economic development of rayons.

All sectors of the national economy are developing dynamically and proportionally. The share of machine building and metal working is growing in gross industrial production, which at the present time is more than 28 percent.

The economic effectiveness of public production is rising. There should be noted the rather high level of productivity of public labor; 56.3 percent of the growth of the national income was due to its rise in the 10th Five-Year Plan.

In regard to the indicator of growth of labor productivity in industry, our republic occupied 10th place during 1965-1975 and fourth place during 1976-1980 among the union republics. The growth of industrial production because of rising labor productivity, however, has not been large so far. During the 10th Five-Year Plan, growth of industrial production due to this factor amounted to 52.8 percent compared to 75 percent for USSR industry. This is to be explained primarily by the extensive character of expanded reproduction and the high relative share of labor-intensive sectors of precision machine building.

Return on investment and material intensiveness of production are important indicator of production efficiency. The resources of the technical base of production for raising return on investment and labor productivity so far have not been sufficiently utilized. This is to be explained by its low shift coefficient and large relative share of passive elements in the composition of fixed capital, a comparatively slow rate of renewal of equipment as well as introduction and assimilation of new equipment and significant losses of worktime.

During the Ninth and Tenth Five-Year Plans tendencies were observed of reduction of material intensiveness of production; this is achieving increasing importance as a factor of production efficiency.

A rather high rate of increase of production volume and a steady rise of labor efficiency were also characteristic of the starting year of the 11th Five-Year Plan. National income in 1981 compared to 1980 grew 7.2 percent, industrial production--7.5 percent, agricultural production--9.7 percent and start up of fixed capital--19 percent. Labor productivity in industry increased 3.9 percent, in agriculture (public production)--14.6 percent and in construction--4.2 percent.

The quality of production output has improved. The share of products of the highest category of quality in the total volume of industrial production in 1981 amounted to 19.3 percent.

Housing construction, education, medical services for the population, science and culture underwent further development.

For successes attained in economic and social development, Soviet Armenia has been pronounced winner for the sixth time in a row in the All-Union Socialist Competition and awarded the challenge Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the AUCCTU and the Komsomol Central Committee.

Big tasks face the republic's workers in the jubilee year of the formation of the USSR and during the 11th Five-Year Plan as a whole. Important tasks have been designated for the economic and social development of the republic in regard to further improving the efficiency of public production. In forthcoming years, as pointed out in the decree of the CPSU Central Committee "On the 60th Anniversary of the Formation of the Union of Soviet Socialist Republics," the chief attention will have to be concentrated on intensification of the economy, speeding up of scientific-technical progress and the achievement of high end results with lowest outlays of raw materials. The republic's workers will undoubtedly do everything possible to multiply the successes of the socialist community of nations and nationalities during the current five-year plan.

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REGIONAL DEVELOPMENT

DEVELOPMENT OF ECONOMY LIES IN IMPROVEMENT OF MANAGEMENT, COST ACCOUNTING

Kishinev SOVETSKAYA MOLDAVIYA in Russian 17 Apr 82 pp 2-3

[Article by I. Royzman, doctor of economic sciences]

[Text] Management, as we know, can be performed in sundry ways: wastefully or thriftily, with initiative or conventionally. One of the ways of achieving the best results in the development of our economy lies in the improvement of the socialist method of management--cost accounting.

The decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Increasing the Influence of the Economic Mechanism on Raising Efficiency of Production and Quality of Work" recognizes the need of ensuring further development of cost accounting at production associations (enterprises) and at construction and installation organizations on the basis of the targets of the five-year plan and long-term economic norms guaranteeing an increase in resources left at their disposal depending on improvement of the concrete results of economic activity accompanied by the simultaneous growth of fund deductions going into the state budget. As we can see, cost accounting, which had been justified by even V.I. Lenin, has not only not lost its force but even contains big and even insufficiently used possibilities of raising the efficiency of public production.

Let us remember that cost accounting is dialectical in its nature. Its chief principle is the combination of directive centralized planning with the operational and economic independence of production subdivisions and creative initiative of labor collectives. And in this is to be found the strength of the socialist method of management.

Cost accounting today is a most important means of accomplishment of the party's economic policy and the fulfillment of the task formulated by the 26th CPSU Congress of achieving the biggest results in production at the lowest cost. The congress, as we know, made known the requirement of intensifying the orientation of all elements of the economy toward the attainment of the best end national-economic results.

Cost accounting can be entirely compared to a live organism which is complex and is constantly improving. Now at the present state of development, it has

a number of unique traits. In particular, it is presently being realized on the basis of the targets of the five-year plan and long-range economic norms. This was emphasized in the aforesaid decree of the CPSU Central Committee and the USSR Council of Ministers on improving the economic mechanism. This document also specifies a whole series of measures aimed at the improvement of cost accounting, raising the production efficiency of every association (enterprise) and intensification of the country's economy.

What are the basic guidelines for the improvement of cost accounting? The first is ensuring fulfillment of the sales plan while taking into account fulfillment of delivery commitments. At the present time, much more importance is attached to this than formerly. If an enterprise fulfills the plan for a given indicator 100 percent, this means that its incentive funds will be increased by 10 percent. If a plan is botched, the funds are reduced, and the bonuses of managers are reduced. Moreover, while formerly in nonfulfillment of plan for deliveries users (customers) far from always demanded forfeit payments, now they are simply obliged to do this. In the future, not partial but full compensation will have to be made for losses incurred through the fault of suppliers. Thus profit is the generalizing result of cost accounting activity; it should more accurately react to the fulfillment of economic contracts and observance of delivery discipline. And this will help to provide plans more completely with the required material resources.

An important role for the improvement of cost accounting is played by intensification of the regime of economy. Under present-day conditions, when a tremendous production potential has been accumulated in the country, which so far has been used far from completely, when for each new ton of raw materials we are obliged to move further to the north and the east, the zealous, economic use of all material and labor resources is of first importance. It may be stated with confidence that today the reduction of costs in the production of a product unit through curtailment of all forms of losses presents the most advantageous direction for our society in the struggle for growth of production efficiency.

Production cost is the most sensitive "sensor" of expenditure of labor and material resources. In particular, its reduction must become the chief, fundamental factor of growth of profit rather than increased production output and even more so the hiking of wholesale prices for new products, which incidentally is frequently encountered in the practice of individual enterprises. Unfortunately, during the past five-year plan, the share of profit coming from reduction of production cost in Moldavia's industry was significantly below that of the plan. On the whole, the production cost of the products of industry is being reduced but not at a sufficiently high rate. Thus per-ruble costs of commodity production were reduced in 1979 (in comparable prices) 0.2 percent compared to the preceding year. And in 1980, only by 0.07 percent. Moreover, in such sectors as the construction-materials industry and the food industry, costs, on the contrary, have been growing from year to year.

The second way of improving cost-accounting effectiveness is the new guideline of counter plans. They must be aimed first of all at the attainment of higher quality indicators compared to the targets of the five-year plan, that is,

to labor productivity, profit coming from reduction of production cost, share of production of highest category of quality and the like. The solution of this problem is hindered by a certain inertia in thinking. Thus, for example, most heads of industrial enterprises of Moldavia who had not adopted counter plans for 1980 explained this by the fact that they had not been allotted... additional material resources. It is necessary to overcome the tendency of a one-sided quantitative approach, that is, an orientation only in the direction of increasing production volume and not of improving qualitative indicators.

Cost accounting should be developed not only in "depth" but also in "breadth." In other words, it is necessary to improve internal (intraassociation, intra-plant and so on) cost accounting as well as to disseminate cost-accounting methods of work at industrial associations and ministries. Problems of "internal" cost accounting in our republic are being successfully solved at many enterprises. This applies, for example, to the Bel'tsy Butter and Fat Combine, the head plant of the Tiraspol' Cannery Association, the Kishinev Tractor Plant and the Mikroprovod Scientific-Production Association. But here they also have their problems. In converting to the brigade form of organization and pay, it will essentially be necessary to create everywhere brigade cost accounting all over again. The significance of this problem is tremendous. Using in the evaluation of brigade activity such an indicator as level of production cost (computed on the basis of items of expenditures dependent on the brigades), we shift thereby the basic struggle for economy to the work-place level. And in this matter, there is already to be found a certain amount of experience. It was accumulated by the collective of Kishinev's Styauaroshiye Knitwear Association, where an all-union seminar was recently held on a study of problems of introduction of the brigade method.

The decree on improving the economic mechanism emphasizes the need of improving the use of cost-accounting methods and of gradually introducing them in the operation of industrial and construction ministries. In our republic, these methods are being partially used in the operation of the ministries of light, meat and dairy, furniture and woodworking and local industry. Moldavia also has one "typical" industrial association--Moldsakharprom where there also has been accumulated a certain amount of experience in the introduction of new methods of management. Unfortunately, they have so far been used timidly and, what is more important, simplistically, and their influence on the content and style of economic operation of the aforesaid ministries and association is still small. The result is that in this, third, direction of boosting the effectiveness of cost accounting there are still many unutilized possibilities.

There is still a fourth direction of work--shifting of ministries and associations (enterprises) to the normative-share method of profit distribution. Let us recall the gist of it. In case of fulfillment of the profit plan, a certain previously determined share of it remains at the disposal of this or that operational unit for the financing of its needs. Contributions from profit into the budget are guaranteed here in the same amounts as were established by the plan (even where the plan is not fulfilled).

This way makes it possible to share increase the economic responsibility and motivation of ministries and associations for the results of their work.

This method is now being used by us in Moldavia at a whole series of enterprises of union subordination. Moreover, at Bendery City Dairy Plant and at Kishinev Refrigeration Combine, an experiment is being conducted on the introduction of this method. Most of Moldavia's industrial ministries will transfer to the new procedure of profit distribution beginning in 1984.

... The methods of improving cost accounting are varied. The task of their introduction into practice is difficult: they require a boosting of the literacy of economic cadres, the organization of wide-scale propaganda and the introduction of progressive methods and raising of the responsibility and discipline of every worker. At the present time, this precisely is the main direction of struggle to raise the effectiveness of our economy and to fulfill the tasks set by the 26th CPSU Congress.

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