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TRANSLATIONS ON USSR ECONOMIC AFFAIRS  
(FOUO 3/79)



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THEORETICAL PROBLEMS OF SOCIALIST REPRODUCTION DISCUSSED

Moscow VOPROSY EKONOMIKI in Russian No 1, Jan 79 pp 25-36

[Article by Corresponding Member of the USSR Academy of Sciences  
G. Sorokin: "Problems in the Theory of Socialist Reproduction"]

[Text] Reproduction during the period of mature socialism is characterized, first, by an increasingly complete manifestation of the features which are characteristic of reproduction during the first phase of the communist formation, and, secondly, by a broad workfront for the construction of the material and technical base of communism and the evolution of socialist reproduction as a whole into communist reproduction. Both of these processes occur at the same time and are determined by one another; the latter are based on the successes of the former, and the development of the communist features of reproduction promote a fuller manifestation of the advantages of socialism. The tempos of communist transformations gradually accelerate.

At the stage of mature socialism reproduction is increasingly oriented toward the solution of major social problems. Increasing resources make it possible, in addition to an expansion of the material and technical base and a thorough strengthening and development of socialist production relations, to carry out ever wider transformations of all socialist relations. During the course of this transformation the essential differences between town and country and intellectual and physical labor are overcome, the social homogeneity of labor becomes stronger, the well-being of the workers increases at rapid rates, the comprehensive development of every individual is ensured, and relationships of comradely cooperation become stronger in the world socialist system. Socialist reproduction becomes richer in content, its results become directly connected with a rise in the material and cultural levels of the population, and a new way of life is formed.

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At one time there was wide recognition for the point of view in accordance with which "expanded socialist reproduction means above all an increase in the gross social product; then...an increase in the existing means of production (the implements of labor and the subjects of labor); then...the growth of the working class and of its wage fund; and, finally, it means the allotment of a certain part of the social product (profits) for the needs of socialist accumulation and capital construction."<sup>1</sup> An analysis of reproduction in developed socialist society and the growing role of social problems require that there be included in this formula the reproduction of labor power in the economy as a whole (and not only in industry), and also the reproduction of public wealth, the environment, and the world socialist economy.

Under developed socialism the expanded reproduction of the first productive force of society--labor power--and the harmonious development of the individual become a very important socio-economic task. In addition to an increase in current consumption, society is in need of an accumulation of wealth, in particular those of its component parts like basic non-production capital and the property of the population, and of a renewal of the normal natural conditions for labor and life. Reproduction in any given socialist country is closely interwoven with reproduction in other socialist countries, and an isolated consideration of it proves to be invalid.

During the process of the gradual transition to communism and as a single communist ownership is formed reproduction becomes socially completely homogeneous. Class differences are eliminated in the production and consumption of the social product, national income, public wealth, and so forth. Gradually, the mechanism of reproduction is also transformed: state control over the measure of labor and production and state planning are replaced by public control and planning; wages, prices, profits, and other value forms and levers die away and cost accounting also changes its forms. Labor becomes a prime vital need and moral stimuli and an endeavor to create increasingly become the chief means of motivation to highly productive labor. All this presupposes an improvement of the socialist economic mechanism and a fuller use of its possibilities.

The social thrust of socialist reproduction is very vividly illustrated by V. I. Lenin's schemes which were published in the Lenin Collection, 38. These schemes contain a great deal in common with the schemes in "Capital" and with the schemes in V. I. Lenin's work, "About the So-Called Markets Question." However, in the schemes being considered here the emphasis is put on discovering the results of socialist reproduction, while in the previous schemes the abstract theory of realization was chiefly illustrated. Before analyzing the new scheme,<sup>2</sup> it has to be noted that a terminology is used in it which is common for capitalism and socialism ("constant capital," "variable capital," and so forth). This, of course, is a conventional use of identical terms: each of them has a fundamentally different content under socialism and capitalism. The scheme singles out the workers'

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consumption whose magnitude, as follows from the calculations which are cited, embraces the consumption of all of the workers of socialist society. Finally, the inclusion in the scheme of the column "100 years of socialism" presupposes, in our opinion, an examination of socialism not at its initial, but at its mature stage when it is transformed into communism, and the disclosure of the typical features of socialist (largely communist) reproduction in general, and not of its initial period.

V. I. Lenin's schemes are based on the following chief laws of socialist reproduction: higher economic development rates than under capitalism; the subordination of production to the tasks of raising public well being and of the expanded reproduction of labor power; the development of the technical organization of production; the preferential development of subdivision I compared to subdivision II with the gradual equalization of their growth rates; and an increase in production efficiency which, even with a lowered accumulations norm, ensures an increase in economic growth rates.

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(1) Схема воспроизводства при социализме

	(2) «Постоянный капитал» с	(3) «Переменный капитал» v	(4) «Овещ. стоимость» m	(5) «Весь обществ. продукт» c + v + m	(6) «Накопленная часть» m	(7) Потребительские цены	с d	Доля раб- от в с + v + m (в % от стоимости)	9 Личные потреб- ности на 1 человека в год	(10) Все общее личное потребле- ние
(11) I. Принципиальная схема, составленная В. И. Лениным (см. Ленинский сборник, т. XXVIII, стр. 90-91)										
(12) 2000 лет рабства и крепостин- чества	2A	+ 2A	+ 2A = 6A		1/2A	2A	1:1	50%	1 1/2A	3A
(13) 200 лет капитализма	100A	+ 10A	+ 20A = 130A		10A	10A	10:1	33%	10A	21[A]
(14) 100 лет социализма	10 000A	+ 500A + 700A из m = 1200A	+ 1 000A = 11 500A		300A	1 200A	20:1	67%	—	1 200A 1 025[1.5]
(15) Рост при социализме по срав- нению с капитализмом	1:100	1:50	1:50	1:88	1:30	1:120				1:60
		1:120	1:50	1:88	1:30	1:120				1:60
		всего								
		(16) потребности рабочих								

(17) II. Фактические данные о воспроизводстве в СССР за 1959-1975 гг. (в фактических ценах, млрд. руб.)

1959 г.	140,6	72,3	62,3	270,8	38,3	97,2	1,9:1	100%	—	97,2
1966 г.	245,0	108,0	98,0	451,0	54,2	150,0	2,3:1	100%	—	150,0
1972 г.	403,8	158,1	155,5	717,4	85,3	225,4	2,6:1	100%	—	225,4
1975 г.	499,4	183,7	179,5	862,6	96,6	266,4	2,72:1	100%	—	266,4

[Key on following page]

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[Continuation of key]

## Key:

- |   |  |
|---|--|
| 1. Scheme of reproduction under socialism                         | Vol. 38, pp. 90-91)  |
| 2. "Constant Capital"   | 12. 2000 years of slavery and serfdom  |
| 3. "Variable Capital"   | 13. 200 years of capitalism  |
| 4. "Super-value"  | 14. 100 years of socialism   |
| 5. Total social product   | 15. Growth under socialism compared to capitalism  |
| 6. Accumulated part   | 16. Total consumption of workers   |
| 7. Consumption of workers   | 17. Actual data in reproduction in USSR: 1959-1975 (in actual prices, billions of rubles). |
| 8. Proportion of workers in $v+m$ (in new value)                  |  |
| 9. Consumption of the exploiters                                  |  |
| 10. All personal consumption                                      |  |
| 11. Fundamental scheme composed by V. I. Lenin (Lenin Collection, |  |

As can be seen from the above scheme, socialist reproduction is characterized by a fundamental change in the composition and distribution of the social product and of national income. V. I. Lenin supposed that compared to capitalism, under socialism within the social product the proportion of transfer value would be 13 percent higher, of "variable capital"--almost two times lower, and of "super-value"--44 percent lower. The proportion of consumption in national income is 19 percent higher, while that of accumulations is 40 percent lower. The consumption of the exploiting classes is eliminated, and all of national income belongs to the workers. In the changing composition of national income there is a tendency toward an increased proportion of consumer goods. In the production of the social product there is an increase in the proportion of the means of production as a result of the growth of the technical (organic) structure of production. Compared with capitalism, it doubles.

In comparing the conventional magnitudes which are contained in Lenin's scheme with the concrete reproduction magnitudes it is only possible, of course, to compare tendencies. In addition, it must not be forgotten that our society reached the stage of mature socialism less than two decades ago. The assumption concerning the elimination of the property and consumption of the exploiters has been fully validated. Within the social product the proportion of the means of production is increasing; in national income the proportion of consumption is increasing, and so forth. The positive tendencies in socialist reproduction will show up in full force later, when the technical level of production and the level of labor productivity reach their highest. As of now this has not been achieved, and the technical structure of our production is lower than what was supposed by V. I. Lenin. The value of Lenin's conception of reproduction under complete socialism is in that it points out the ways

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of future development and the strategic goal of socialist reproduction during the period of its development into communist reproduction.

In using the dynamic indicators of the development of the economy of the USSR it has to be kept in mind that the years 1972 and 1975 were unfavorable for agriculture. For this reason, the amounts of production, consumption, and accumulations are somewhat lower than the usual ones. Nevertheless, during a period of 16 years the gross product increased by 3.1 times in actual prices, and national income increased by 2.7 times. Until recent years the surplus product norm increased, but then it fluctuated somewhat in both directions. The technical (organic) structure of production rose, and the proportion of subdivision I output increased.

How were the general conditions of realization observed during these 16 years? Usually, the following three conditions of the realization of the social product under expanded reproduction are considered. The newly created value of subdivision I is greater than the replacement fund in subdivision II [ $I(v + m) > IIc$ ]. The output of subdivision I is greater than the replacement fund in both subdivisions [ $I(c + v + m) > (IIc + IIc)$ ]. All of newly created value is greater than the output of subdivision II [ $I(v + m) + II(v + m) > II(c + v + m)$ ].

In analyzing the social problems of reproduction it would be useful, in our view, to distinguish one other condition: the output of subdivision II exceeds the consumption of the workers of the sphere of material production [ $II(c + v + m) > (v_1 + v_2)$ ]. This excess ensures the attraction of new workers into the sphere of material production, an increase in their consumption, and the maintenance of the workers of the non-material sphere. An excess in the production of the means of production over their replacement fund, of newly created value over the output of subdivision II, and of the production of consumer goods over current consumption which is expressed in the creation of additional consumer goods for new workers and for increasing the consumption of existing workers comprises the potential of expanded reproduction.

In 1959 the newly created output of subdivision I exceeded the replacement fund of subdivision II by 22.7 billion rubles, in 1966--by 25 billion, in 1972--by 50.7 billion, and in 1975--by 51.8 billion rubles. Such is the preponderance of the total output of subdivision I over the overall replacement fund, and also of national income over the output of subdivision II. The output of subdivision two exceeded total personal consumption in the sphere of production by 41.2 billion rubles in 1959, 73 billion in 1966, 104.8 billion in 1972, and 127.7 billion rubles in 1975.

In examining the data on expanded reproduction in the USSR during the years 1959-1975 it is necessary to pay attention to the following. The output of subdivision I exceeds the replacement fund and also the output of

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subdivision II to a smaller degree than it exceeds accumulations. The is explained by the fact that the replacement fund is computed not as of the beginning of the reproduction period (year), but as of its end (that is, including the expansion of production which has already occurred). The amount of the excess is the remnant which goes over to the expanded reproduction fund of the following year. What has been said also applies to the preponderance of the output of subdivision II over consumption in the sphere of material production. This contribution to the expansion of production during the following period plays an important role and comprises around one-half of total accumulations. If the carry-over remnant proves to be insufficient, then in order not to lower the reproduction rates it has to be compensated for on the basis of the output of the future period, which, however, is not always possible; for example, in the production of complex equipment.

The figures show that the average annual "contributions" to the future expansion of the production of consumer goods have been systematically increasing. This is the effect of the orientation of socialist reproduction toward improving the well-being of the population. On the other hand, relatively speaking, the "contributions" to the future expansion of the production of the means of production have been decreasing somewhat. This decrease is most noticeable with respect to the amount of capital, which testifies to shortcomings in its use.

The above-cited analysis of the most general conditions of realization has to be supplemented by an analysis of the realization of the means of production, including the means of labor, the implements of labor, and the subjects of labor, of the distribution of consumer goods for the expanded reproduction of labor power and for the maintenance of the non-production sphere, of the distribution of the product between industry and agriculture, and so forth. For expanded socialist reproduction it is important that the surplus of the means of production over the replacement fund makes it possible to increase production in both subdivisions I and II and to ensure during necessary periods the gradual equalization of their development rates. It is also important that the means of livelihood fund exceed the costs of the expanded reproduction of labor power in the sphere of material production, and that the resources for the development of the non-production sphere increase.

Within the total amount of the industrial means of production the proportion of the means of labor during the years 1960-1972 came to an average of 22-23 percent, declining somewhat toward the end of this period. Around 72 percent of the means of production were produced for subdivision I, and around 28 percent for subdivision II. In 1959 an expansion of production had assigned to it 75.4 percent of the value of the surplus product (of a subdivision), while in 1972 the figure was 60.9 percent (for the non-production sphere--24.6 and 39.1 percent, respectively). A certain shortage of equipment for the mechanization of labor and for reequipping the light

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and food industry is being felt. Of great importance for an analysis of reproduction is a study of the distribution of labor resources and of labor power and other more concrete proportions: for example, a relative analysis of the turnover of the product and of monetary turnover, and of the monetary income of the population and retail trade turnover and fee services. This requires an improvement of the corresponding statistical reporting.

The increased role of social factors and the expansion of the range of production problems makes it necessary to deepen research on economic development rates and socio-economic proportions which are different in the degree to which they can be studied and controlled. At the stage of the development of socialism into communism the relationships between the productive forces and the environment, the productive forces and production relations, and material productive forces and labor power become very important.

The movement to develop socialist and, especially, communist production, a rapid development of the non-production sphere, the drawing into circulation of new sources of energy and raw materials along with the old ones, a rise in soil fertility, the productivity of agricultural livestock, and the useful biological properties of plants, an improvement of the environment, and so forth require enormous accumulations. Of great importance here is the development of new sources of capital, the replacement of extensive sources of growth with intensive ones, a sharp increase in the effectiveness of the use of national income (of accumulation and consumption), and the redistribution of national income between industry and agriculture. Social reproduction is entirely subordinate to the law of an economy of time and an economy of live and past labor. An improvement of efficiency and quality has to become the chief economic criterion of rational reproduction. Already at the stage of socialism the resources which are formed as a result of increased efficiency have to exceed the resources which are obtained with an extensive expansion of production. The more rapidly socialist society moves to the highest phase of the socialist formation, the more important will be the role of the intensive factors of forming accumulations. This requires the development of new methods of increasing efficiency. As was pointed out at the 25th Congress of the CPSU, it is essential to improve the quality of output and the quality of work, to accelerate scientific and technological progress, to achieve a substantial new upsurge in labor productivity, to reduce materials intensiveness, and to increase yield from capital.

In order to determine the growth tendencies of the sources of economic development it is important to correctly evaluate the role of intensive and extensive sources in modern reproduction. However, the evaluations which we have differ from one another by two and more times. At the basis of the differences are different concepts of intensive and extensive factors. Some writers identify intensiveness with a rise in the productivity of live labor, while other identify it with an economy of live and past labor.

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In our view, only a calculation of the total economy of labor (live and past) correctly reflects an intensification of reproduction.

\* \* \*

The problem of rates is one of the most important ones in the theory of socialist reproduction whose central task is the study of the conditions which ensure high economic growth rates. This problem can be solved in two ways: by means either of retaining present growth rates, or of increasing them. Some economists are putting forth the problem of "substantiating the necessity for maintaining high economic growth rates."<sup>3</sup> In our opinion, it is necessary to study the possibilities of accelerating the present development rates of the Soviet economy.

Historically, the growth rates of the socialist economy have been set by the competition with capitalism. Socialism and communism are victorious over capitalism on the basis of more developed productive forces. Therefore, the socialist economy has to grow more rapidly than the capitalist economy. The necessity for competing with the capitalist world will continue throughout the entire period of communist construction. And for this reason the necessity for higher economic growth rates than in the capitalist countries will also continue. Lenin's schemes of socialist reproduction set higher growth rates under socialism than under capitalism, namely: over a period of 200 years capitalism increases the social product by 21.7 times, while socialism increases it by more than 80 times in 100 years.

Growth rates depend upon many circumstances and express diverse phenomena. The growth rates of production and accumulations are one thing, and the growth rates of consumption and of the people's cultural level are another. The problems of the growth rates of industry and agriculture are also solved in various ways; within industry--heavy and light; within accumulations--production and non-production. At the same time, the growth rates are interconnected in the process of the functioning of the economic complex and comprise a single system whose elements depend upon one another.

The development rates of the economy of the USSR have been different during different periods. During the pre-war years the development of industry, especially heavy industry, was accomplished. During the second half of the 1940's and in the 1950's the economy was rapidly restored and there was a preferential development for the branches of industry upon which the scientific and technical base of socialism was based. The 1960's and 1970's have been years of large structural changes in the economy. The construction of the material and technical base of communism is taking place, the rise in public well-being is intensifying, and more and more resources are being switched to the industrialization of agriculture. The population's income is growing at stable high rates, the development rates of agricultural production are increasing, while the growth rates of industry are decreasing somewhat compared with the previous period.

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The structural changes which have occurred, the increase in the dimensions of production and its reequipping, the intensification of the economy, major work to create a stable and highly productive agriculture, and a rise in the cultural and technical level of the workers make it possible, in our view, to pose the question of increasing economic growth rates in the 1980's.

Multi-branch heavy industry is the basis for high development rates in the Soviet economy during the forthcoming decade. During the years 1961-1977 the output of group "A" increased by 3.9 percent and came to three-fourths of total industrial output. In order to characterize the progressive movement of heavy industry let us examine the growth of the metallurgical, machine building, and fuel and energy complexes. In 1960 the USSR smelted 65 million tons of steel and in 1977--147 million tons. In 1960 steel smelting in the USSR came to 71 percent of the level which had been reached in the United States. In 1977 the USSR exceeded the United States in this respect by 26 percent. During the years 1961-1977 machine building output increased by 6.4 times. The Soviet Union occupies first place in the world for the number of metal-cutting machine tools. The Soviet machine tool pool is younger than that of the United States of America. The international specialization and cooperation in production of the socialist countries is promoting the development of machine building. However, the world's largest complex of leading heavy industry branches possesses even greater unutilized reserves, above all, through a better operation of production capacities and a rise in the technical level of production.

During the 1960's and 1970's a great increase occurred in the productive capital and output of the fuel and energy complex of the USSR. During these 17 years petroleum extraction increased from 148 to 546 billion tons, coal extraction--from 510 million to 722 million tons; and the production of electric energy increased from 292 billion to 1 trillion 150 billion kilowatt-hours. Total fuel and energy resources (in terms of conventional fuel) increased from 836.5 million tons in 1960 to 1,989,300,000 tons in 1977 and come to 7.7 tons per capita. The USSR extracts more coal and petroleum than the United States. As is known, the Soviet fuel industry has uninterruptedly supplied the economy, including during those years when the capitalist countries were seized by an energy crisis.

The above examples show what heights have been attained under socialism by the production of the means of production. Soviet heavy industry and the natural resources of the USSR are capable of satisfying all of the basic needs of a rapidly developing economy.

The transformation of agricultural production into a variety of industrial production should lead to an increase in the growth rates of the economy, especially of the light and food industries. During the years 1961-1976

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investments in agricultural production came to more than 220 billion rubles, which is almost 12 times more than the appropriations for the industrialization of the country during the entire post-war period. And, as follows from the decisions of the July (1978) Plenum of the CC CPSU, during the Eleventh Five-Year Plan capital investments in agriculture will remain on a high level. All of this will ensure an increase in agricultural development rates. In 1981-1985 it is planned to bring the average annual grain harvest to 238-243 million tons, and in 1990--to 1 ton per person.

When the main line of connection between agriculture and industrial production (group "B") is examined it is usually rightly pointed out that an increase of agricultural raw materials entails an increase in the production of consumer goods. But agriculture's influence on economic growth rates is wider. In particular, its dynamics has an important influence on the dynamics of economic accumulation, which is witnessed by the data cited below (in billions of rubles):

	(1) Снижение валовой продукции сельского хозяйства по сравнению с предыдущим годом	(2) Снижение (повышение) накопления в народном хозяйстве по сравнению с предыдущим годом
1963 г. . . . .	6,1	-2,7
1972 г. . . . .	4,4	-1,8
1974 г. . . . .	2,9	+0,5
1975 г. . . . .	6,3	-1,5

## Key:

1. Decrease in gross agricultural output compared to previous year
2. Decrease (increase) in accumulations in the economy compared to previous year

A decrease in agricultural output almost simultaneously leads to a decrease in economic accumulations. A rise in the standard of living occurs under socialism even during unfavorable harvest years. During these years only accumulations are affected, while the increase in the consumption part of national income remains unchanged. A stable and high level of agricultural production ensures stability in the dynamics of accumulations.

Scientific and technical potential is of great importance for increasing economic growth rates. As is known, during the 1960's and 1970's there was a rapid growth in the USSR of the number of scientific workers, engineers, and of appropriations for science. Our economy is supplied with many more scientific and technical cadres than in the capitalist countries. A new system of polytechnical training for skilled workers has been introduced--through the vocational and technical schools on the basis of ten-year



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education. The efficient use of our gigantic scientific and technical cadres in order to accelerate scientific and technical progress is a state task of paramount importance. Its accomplishment presupposes an intensification of the use of these cadres. An increase in the return from scientific and engineering work will promote both an improvement of equipment--the basic reserve for accelerating rates--and an improvement of the organization of production, construction, planning, and so forth.

An improvement of the management of the economy and increased participation by the masses in deciding on production issues play an important role in accelerating economic development rates. At the current stage there are much greater possibilities for materially stimulating a rise in labor productivity. During the 1960's and 1970's major measures were carried out in our country to raise the standard of living of the broad strata of the population. These measures were carried out in accordance with the party's Program to improve public well-being and they have helped to equalize the living standards of the population.

During the 1980's not only a further increase in our resources, but also an improvement of distribution policy will probably make it possible to strengthen material stimulation for highly productive skilled work. While bringing living standards and income from labor closer together, socialism also presupposes their differentiation in relation to labor contribution. Initiative, skill, and discipline in work have to be rewarded. Material stimulation cannot be reduced to monetary income. The conditions for the realization of this income have to be improved. Growing income and needs and the latter's diversity have to find diverse and high quality goods and services. With a rise in the standard of living there is a greater role for services which have to be used widely for material stimulation. However, some economists underestimate the role of the sphere of services, believing that "the housing fund and the network of institutions in the service sphere are an insufficiently flexible instrument with the help of which to accomplish tasks in the field of stimulation...In all cases their development has to be oriented not toward the creation of advantages for certain groups of the population, but toward an equalization of the level at which these needs are satisfied in all groups of the population."<sup>4</sup> In our opinion, an acceleration of economic development rates and of the growth of labor productivity and scientific and technical progress will depend upon a preferential and not a leveling distribution of the housing fund, of tickets to sanitoriums and rest homes, tourist services, and so forth.

Social reproduction presupposes the unity of the continuous process of production in time and space and the unity of rates and proportions. The problems of rates and proportions have an independent significance, but, at the same time, they are interconnected and, in addition, each of them has primacy during one or another period. The interaction of high rates

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and optimal proportions is an important factor in achieving high rates of movement from socialism to communism. As a rule, such rates ensure the most rapid balancing of the economy, although excessive strain may be the reason for disproportions. During the Tenth and Eleventh Five-Year Plans, primarily on the basis of high growth rates for agriculture and labor productivity, it will be possible to substantially improve the balance of the economy, which, in its turn, will make it possible to accelerate the development of many branches of the economy.

Thus, in their aggregate, the decisive factors of economic growth may, in our opinion, ensure increased development rates for our socialist economy during the 1980's. However, this will require that considerable difficulties be overcome, that an effective introduction of new equipment be ensured, that there be a more rational organization of production, an increase in the effectiveness of scientific development work and its use in the economy, and so forth.

\* \* \*

Throughout the entire period of the development of socialism into communism the law of the growth of the technical and organic structure of production and of the preferential development of the production of the means of production is in operation. Expressing the relationship between labor forces and the mass of material productive forces which are put into movement by them during the course of historical progress, technical structure grows; or, to put it differently, every unit of labor power uses increasingly greater masses of the means of production. This is one of the important indicators of labor productivity which connects a relative decrease in labor power with its capital-labor ratio. Marx believed that the law of a more rapid increase in the constant part of capital compared to its variable part is confirmed at every step regardless of whether different economic epochs for the same nation are compared, or different nations during the same epoch are compared.<sup>5</sup> At the same time, along with technical structure, the organic structure of production is examined in "Capital." Organic structure is based on technical structure, but for a number of reasons they cannot coincide. The necessity for a special examination of the organic structure of capital arises, in our opinion, from the fact that the practical solution of the problems of the composition of production is based on existing prices; value structure also makes it possible to perceive the influence of the surplus value norm on organic composition. By increasing the surplus value norm, a capitalist is able to increase the organic and technical compositions of production, and make production more profitable and the working population surplus.

Since commodity-money relationships are used in a socialist economy, in addition to technical structure, it is probably right to examine the organic

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structure of production. Technical structure can be expressed in value indicators, but as a result of the lack of correspondence between values and prices and the physical amounts of the means of production and the various surplus product norms, technical and organic structure may differ substantially. Of course, under socialism the surplus product norm cannot be increased by means of decreasing the standard of living of the workers, or by means of creating a reserve army of labor; but with the satisfaction of the growing needs of the workers and with full employment an increasing surplus product norm makes it possible in necessary cases not to force the growth of the technical and organic structure. Despite the obvious role of the category of the organic structure of production under socialism, certain writers ignore it in their studies.

With the growth of the technical and organic structure of production the cost structure of the product changes: the share of the means of production increases and the share of wages decreases. With respect to the economy as a whole this is a manifestation of the law of the preferential developed growth of subdivision number I; that is, the law in accordance with which, as Marx noted, constant capital has a tendency to grow at more rapid rates than variable capital. Lenin wrote that "the proposition concerning the most rapid growth of the means of production is a simple rephrasing of this law in application to all social production."<sup>6</sup>

Various opinions have been expressed in the intensive discussion of the relationship between the subdivisions of social production. In recent years the opinion has again appeared which, in our view, is invalid and which denies the law of the preferential growth of subdivision I. Thus, E. Gorbunov<sup>7</sup> asserts that the most characteristic tendency of our present economy is an acceleration of the development of subdivision II, its stabilization, and even an increase in its share of the gross social product. He denies the growth of the organic (technical) structure of socialist production, believing that under the influence of a decrease in capital and materials intensiveness the share of "c" decreases relatively, while the share of "v" increases. As a result of this, in his opinion, under present conditions the organic structure of production does not have a tendency to increase.

Let us first turn to the facts. Let us examine how the relationship between the two subdivisions has developed over the entire history of the development of the Soviet economy.

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(1) Удельный вес I и II подразделений в валовой продукции народного хозяйства и групп «А» и «Б» в промышленности СССР (в %)

	(2) Народное хозяйство		(3) Промышленность	
	I подразделение (4)	II подразделение (5)	группа «А» (6)	группа «Б» (7)
1913 г. . . . .	47	53	35,1	64,9
1927/1928 г. . . . .	49	51	39,5	60,5
1932 г. . . . .	54	46	53,4	46,6
1953 г. . . . .	57	43	69,2	30,8
1959 г. . . . .	59	41	72,0	28,0
1972 г. . . . .	63	37	73,6	26,4
1975 г. . . . .	64	36	73,7	26,3

## Key:

- |  |                   |
|--|-------------------|
| 1. Share of subdivisions I and II in gross output of the economy and of groups "A" and "B" in USSR industry (in percent) | 3. Industry       |
| 2. Economy   | 4. Subdivision I  |
|  | 5. Subdivision II |
|  | 6. Group "A"      |
|  | 7. Group "B"      |

The actual data which has been published by the Central Statistical Administration USSR does not permit the assertion that the share of subdivision II has been increasing. The growth rates of the two subdivisions are getting closer to one another, but there is no outstripping development of subdivision II. In order to evaluate the dynamics of the shares of the subdivisions it would be necessary to take account of price changes. But there are not published calculations of this kind. The dynamics of the physical volume of the output of groups "A" and "B" of industry could serve as a certain orientation point. During the years 1961-1975 the output of the former increased by 3.5 times, while that of the latter increased by 2.8 times. In order to substantiate his conclusions E. Gorbunov calculates the output of the subdivisions in the following way: he includes non-production accumulations in subdivision II, excluding it from the output of subdivision I. However, by virtue of their composition the elements of non-production accumulations (construction materials and structures, piping for water lines, sewage, gas) become primarily consumer goods only after the completion of construction and are taken account of through depreciation in the consumption fund. Nor does the previously cited data confirm the writer's speculative conclusion concerning the absence under socialism of a growth in the organic and technical structure of production. On the contrary, the technical structure of production and the capital-labor ratio under socialism are in continuous growth, which, as we have seen, is taken account of in V. I. Lenin's schemes.

A denial of the preferential development of subdivision I and of the growth

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of the technical structure of production is also theoretically invalid. Technological progress, a rise in the capital-labor ratio, a rise in labor productivity, a decrease in the overall expenditures of live and past labor per unit of output with an increase in the proportion of expenditures of past labor, and the preferential growth of subdivision I--these are very important prerequisites for the economic progress of society, for its movement to communism.

But perhaps the above-named chain of dependencies between the phenomena of economic progress is not entirely mandatory? Perhaps another procedure of joining the elements is possible? Some economists assert that for present conditions it is wrong to connect the law of the outstripping development of subdivision I with a growth in the technical and organic structure of production. The relationships in the development of subdivisions I and II are tied together with the expenditure of the means of production per unit of consumer goods. And the following arguments are cited here. If the amount of the means of production in physical terms for the production of a unit of output in subdivision II increases, then subdivision I rose more rapidly; if it decreases, the growth slows down.<sup>8</sup>

As is known, technological progress reduces the expenditures of the means of production per unit of consumer goods, and hence, it would be easy to draw a formally logical conclusion to the effect that the preferential development of subdivision I is not mandatory during the epoch of the scientific and technological revolution. But it has to be considered that the decrease in the means of production per unit of consumer goods occurs with an even greater decrease in expenditures of live labor. In the decreasing aggregate expenditures the share of past labor increases, and this means nothing other than the preferential development of the production of the means of production which is caused by the changing relationship between the expenditures of live and past labor; that is, precisely by a growth in the organic and technical structure of production.

Is it possible to have cases when a growth in the technical structure of production does not entail the preferential development of subdivision I? Hypothetically, it can be assumed that with a very substantial increase in the surplus product norm the growth of the organic structure will not influence a more rapid development of subdivision I. Thus, with a growth of reproduction when the surplus product norm increases by three times the output of subdivisions I and II will remain unchanged. But this example is far from life. A tripling of the surplus product norm during any planning period is impossible under modern conditions. Actually, during the years 1959-1975 the output of subdivision I increased by 227 percent, while that of subdivision II increased by 174 percent. The surplus product norm increased by 11 percent, while the technical structure of production increased by 3.2 times. In order to have equal development rates for both subdivisions with the same technical structure it would be necessary to

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increase the surplus product by two times, which, of course, is unrealistic.

FOOTNOTES

1. N. A. Voznesenskiy, "The Military Economy of the USSR during the Period of the Fatherland War," OTIZ, 1947, p. 45.
2. See the following diagram. Actual data on reproduction in the USSR during 1959-1975 is also cited.
3. V. D. Kamayev, "Developed Socialism: Rates and Quality of Economic Growth," Izdatel'stvo "Mysl'", 1977, p. 4.
4. V. Mayer, "Standard of Living of the Population of the USSR," Izdatel'stvo "Mysl'," 1977, p. 237.
5. K. Marx and F. Engels, "Works," Vol. 23, p. 636.
6. V. I. Lenin, "Complete Works," Vol. 1, p. 80.
7. E. P. Gorbunov, "The Structure and Efficiency of Social Production," Izdatel'stvo "Mysl'," 1974, pp. 132, 145, and others.
8. V. A. Medvedev, "Socialist Reproduction and Structural Changes in the Economy," Izdatel'stvo "Ekonomika," 1973, p. 79.

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CAPITAL INVESTMENT EFFICIENCY IN NONPRODUCTION SECTOR DISCUSSED

Moscow VOPROSY EKONOMIKI in Russian No 1, Jan 79 pp 47-58

[Article by Academician T. Khachapurov: "The Effectiveness of Capital Investments in the Non-production Sector"]

[Text] During the last two decades a theory of the economic efficiency of capital investments in the economy as a component part of the theory of socialist reproduction has been basically worked out and has received a wide practical application. The theoretical propositions which have been published and the practical recommendations which follow from them are applicable to evaluating the efficiency of capital investments in the branches of material production. As for the non-production sphere, in certain methodological documents it is recommended that the efficiency of capital investments be determined on the basis of the same principles as in the production sphere. However, this applies only to those elements of the non-production sphere which operate on the basis of cost accounting (urban transport, municipal services, and others). But for most of the branches of the non-production sphere methodological instructions on determining capital investment efficiency have not even been worked out. This is a serious gap in economic theory and practice. It is not only that 20 and more percent of our total capital investments (excluding investments in the construction of municipal enterprises) are assigned to the non-production sphere, but also that its importance has been increasing at the stage of developed socialism.

The growth of production is the condition for an increase in consumption in a sense for the sake of which the non-production sphere and also all of material production as a whole exists. It is stated in the Constitution of the USSR: "The supreme goal of social production under socialism is the fuller satisfaction of the growing material and spiritual needs of the people" (Article 15). A rise in the material and cultural levels of the people is the chief task of the 10th Five-Year Plan. This is discussed in the "Basic Directions for the Development of the Economy of the USSR for 1976-1978" which were adopted by the

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25th Congress of the CPSU. The basis for this rise is the dynamic and proportional development of production which creates the possibility for satisfying the needs of Soviet people and itself gives rise to ever new needs. On the one hand, increased needs stimulate the development of production. The decisive element in the interactions between production and consumption is production -- the condition for the vital functioning of socialist society and the source of its development. On the other hand, an increase in needs and their satisfaction is of great importance not only as stimuli for the development of production, but also as factors in raising the level of social development and in improving socialist production relations.

Until recently economists and practical workers devoted little attention to the study of needs, consumption, and supply and demand. In economic planning the resource approach was primarily used in making up plans. The problems of consumption -- not only final and personal consumption, but also production consumption -- were not studied sufficiently. All of this can hardly be regarded as justified. In an analysis it is essential to show the diverse character of needs which influences the measurement of the expenditures connected with their satisfaction and of the effect which is obtained. This does not concern only the desirability of an evaluation of the economic efficiency of such expenditures with methods which are usually used in determining it in the branches of material production. It is also useful to attempt to determine the amount of social effectiveness which does not lend itself to measurement by cost indicators.

Works directly devoted to the problems of the efficiency of capital investments in the non-production sphere have already been published in our literature, including in our periodical.<sup>1</sup> In some of them the methodological problems of determining the efficiency of the non-production sphere are treated from correct positions. One must, for example, agree with B. Vaynshteyn that it is not possible to reduce the entire effect of the non-production sphere to an economic effect expressed in rubles. In a number of cases calculations of this kind produce extremely unconvincing results.

As analysis shows, it is possible with sufficient accuracy to determine expenditures for the satisfaction of individual types of needs -- both capital and current needs. However, both the total amount of the expenditures and their distribution for capital and current needs are very diverse. For the satisfaction of certain kinds of needs of decisive importance is not so much the amount of expenditures as the creative abilities of those who are the creators of the consumed effect -- a scholar, a teacher, an artist, a painter. In evaluating the efficiency of these expenditures one has to take account not only of



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the quantitative magnitude of what has been created and designated for consumption, but also of the quality which is obtained in the process of the consumption of the results.

Determining an effect which can be measured against expenditures is much more difficult than determining expenditures. This effect can only partially be expressed in cost indicators. For this reason, in the calculations use has to be made of physical indicators, consumption norms which are attained with given expenditures, a decrease in time expenditures by the consumer, and so forth.

These indicators of social effect have to be taken into consideration when the final result of a measure is determined. However, attempts to give a cost evaluation of a social effect in order to total it up with the cost indicators of the effect frequently have an artificial character. In this connection, in certain cases it is useful to determine the indirect damage which is prevented when a given measure is carried out. For example, the effect of the fight against water pollution consists not only in providing enterprises and the population with the clean water they need, but also in preventing the destruction of fish which can be expressed by the cost indicators of fishing output.

In analyzing the efficiency of capital investments in the non-production sphere we shall not consider the satisfaction of material needs for various consumer goods in their physical form (for example, for foods, clothing, furniture, and so forth). The satisfaction of these needs depends directly upon the amounts of production and the delivery to consumers of the corresponding products, and also upon their quality and price. All of these questions belong to an analysis of the material production sphere; the specific nature of services does not manifest itself here, and, for this reason, these questions can not be the object of this study.

Let us begin our examination of the efficiency of capital investments in the non-production sphere with housing. Housing construction demands very substantial investments. During the six post-war five-year plans and the three years of the 10th Five-Year Plan almost 300 billion rubles have been invested in housing construction and this comprises 17 percent of the total capital investments during those years. As a result, 2,693,400,000 square meters of total (useful) living space has been commissioned: This represents 56,200,000 apartments in which 235 million people, that is, 90 percent of the country's population has been housed.<sup>2</sup> Sixty-three percent of the living space has been commissioned in cities, and 37 percent in rural areas. As a result of construction, the urban housing fund has increased compared to 1945 by approximately five times and in 1977 came to 2,001,000,000 square meters.

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A large part of the housing fund, especially in the cities, has been built with state resources and provided to citizens free of charge. Around eight percent of commissioned housing space is accounted for by housing construction cooperatives; moreover, the state allocates the cooperatives substantial credit. The construction of houses on the basis of personal resources of workers and employees and with the participation of state credit also occurs and is performed primarily in the cities.

What is the economic effectiveness of the housing construction which is performed by the state? First of all, it can not be determined solely on the basis of the value of housing construction output. Using this method, the problem could be solved not for the effectiveness of construction itself, but for the effectiveness of new equipment which is used in construction, or the effectiveness of new construction methods. For example, capital investments in new materials, in the mechanization of construction, and so forth, make it possible to economize expenditures or to increase the amount of construction. This effect in relation to the investments which gave rise to it determines effectiveness. In addition, it is necessary to know if there is a change in the quality of housing as a result of the use of new equipment.

An analysis of the data for recent years shows that housing is improving. As a consequence of this, first, the value of one square meter of housing space has been increasing from year to year, and, secondly, the average amount of useful apartment space has been increasing. This is witnessed by the following figures:

Periods and Years	Average Cost of One Square Meter of Space (Rubles)	Average Useful Space per Apartment (sq. meters)
Fifth Five-Year Plan	74	39.7
Sixth Five-Year Plan	83	42.0
Seventh Five-Year Plan	92	42.5
Eighth Five-Year Plan	115	45.8
Ninth Five-Year Plan	136	48.5
1975	148	49.3
1976	155	50.3
1977	156	51.1

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As we see, the average value of one square meter of space during the time being considered doubled, while the average useful apartment space increased by 28.7 percent. This means that the quality of housing has improved, but the state has not obtained any "commercial" advantage from this. Nevertheless, it regards it as a highly important economic task to continue to improve the quality of residential houses and to provide more and more conveniences to the people who move into them. Industry which supplies construction materials, piping, and housing construction equipment has a considerable role in the accomplishment of this task.

In improving the quality of housing and the housing conditions of the population, we increase the social effectiveness of housing construction, those standards by which clients and contractors and the suppliers of materials and equipment have to guide themselves. Housing is one of the most important consumption articles. Its value, like that of other types of output, is determined by the socially necessary labor expenditures. The distinctive feature of this type of output is in the fact that it is not sold, but distributed in accordance with the right to housing written into our Constitution. The effect of capital investments in housing construction consists in raising the standard of living of Soviet people and improving their material and cultural wellbeing. There is also an economic effect, but an indirect one which consists in the fact that an improvement in housing conditions, as, in general, an improvement of the material wellbeing of the workers, inevitably influences a rise in labor productivity and, this means, the volume of output. The extent to which a rise in labor productivity is determined by an improvement of housing conditions can only be judged approximately, on the basis of the data in questionnaires. It appears that this influence is diverse depending upon the degree to which the needs for housing are satisfied. For example, moving from a room in an old house without conveniences into a modern well-equipped apartment will have a greater influence on increasing labor productivity than if this same worker were to move from one apartment with all conveniences into another, similar one, but with more space. These diverse influences of housing can be disclosed by questionnaires.

Such is the situation with capital investments. As for reducing current expenditures for housing repairs and maintenance, capital investments cannot reimburse themselves on this basis. Only in the capitalist countries do house owners obtain profits from rents. In our country rent is very low and its level has been stable for a number of decades. There can be no question of profits: Rent for housing and municipal services covers no more than one-third of the expenditures for the operation and repair of current housing.<sup>3</sup> There are even greater

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expenditures for capital repairs: They comprise around 40 percent of the annual capital investments in state and cooperative construction in the cities and workers' settlements. An increase in these expenditures can be limited through organizational and technical measures. They include the steps already being taken to create a system of large specialized organizations for the technical servicing and current repairing of residential houses and their equipment (elevators, heating systems, the mechanization and automation of operations processes) and others.

The task now is to further develop housing construction in order to provide the population with even more housing space. During the years of the post-war five-year plans we were able to satisfy the urgent needs of the population for housing, to bring per-person housing space close to the hygienic norm, and to free people from the inconveniences of communal apartments. The issue today is to provide a separate room for every family member, to further increase useful space per person, and to bring it to 18-20 square meters in the cities (instead of the 12.2 square meters at the present time). This social effect which is measured in physical indicators will also increase the economic effect which is created by providing housing. At the same time, there are important tasks in reducing the cost of construction, but not through lowering its quality, but through a better organization of the labor of construction workers, through its mechanization, and through a thrifty attitude towards materials. The absolute effect of the construction of residential buildings is the amount of housing space of a given normal quality which has been commissioned on schedule, and the relative effect -- the difference in the cost of construction per unit of space at a given quality level.

Needs for domestic services are another type of needs by the population which are satisfied through the non-production sphere. This includes needs for footwear and clothing repairs, their individual manufacture, repairs of various household machines and instruments, furniture repairs and production, dry cleaning and dyeing, laundering, apartment repairs, public bath services, barber-shops, and photography. The domestic services branch is developing rapidly. Their volume in 1977 was 1.9 times greater than 1970 and comprise 6.3 billion rubles, including 2.2 billion rubles -- clothing and footwear repairs and manufacture, 1.7 billion rubles -- repairs of domestic machinery and instruments, and .6 billion rubles -- hair cutting.

Domestic services for the population belong to the sphere of material services and in their character are in many respects similar to the production of consumer goods. In order to provide services to the population it is necessary to have capital investments for premises,

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equipment, and inventory, and in certain cases circulating capital (for materials) is needed and also an increase in the wage fund. The construction of special buildings for domestic services is needed chiefly in building Houses of Domestic Services, Domestic Services Combines, Dry Cleaning and Dyeing Factories, and others. The equipment of domestic services enterprises is frequently comprised of obsolete equipment which has been passed on from industrial enterprises. Domestic services enterprises receive little modern, new equipment of high productivity.

All of this leads to the effect that capital investments domestic services enterprises are small compared to the branches of industry which produce consumer goods. The total volume of capital investments in domestic services in 1977 was 3.6 times smaller than the investments in light industry, and the capital-output ratio came to around .4 rubles per one ruble of domestic services. The construction periods for domestic services enterprises are also small: they come to around one year. On the whole, the service sphere is economically effective; its profits in certain years come to 9-10 percent.

But the effect of the sphere of services cannot be characterized solely by the profits indicator. Its social effect consists in the fact that the work of this sphere frees time for the population, frees it from household work, and raises its standard of living. Domestic services are not always profitable: in small cities and villages they produce losses, but for considerations of social effectiveness the network of domestic services enterprises in the village and in small cities is continuing to develop.

The quality of services -- the lack of lines, efficient work by reception points, the filling of orders on time -- is of great importance for increasing social effectiveness. All of this places serious tasks before the workers of domestic enterprises. Their total number in 1975 was 2.5 million people. The success of services depends to a large extent upon the qualifications of the employees which for a number of jobs has to be rather high and upon the system of material stimulation. In determining the effectiveness of domestic services with regard not only to the economic but also to the social effect it would be useful to develop and introduce coefficients for the evaluation of the quality of services on the basis of the time savings which are obtained by a consumer of these services. For the calculations one could conventionally equate the value of every man-hour of this savings to .5 of the value of a man-hour of work time. The average monthly wages of a worker and employee in the economy, including payments and benefits from the social consumption fund, came to 212 rubles in 1977, or 1.3 rubles an hour; if one calculates wages to

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include the surplus product with a ratio of 1:1, then it was 310 rubles, or 1.9 rubles per hour. This indirect effect should not be totaled up with the direct effect -- it should be calculated "outside the balance."

To a large extent the quality of domestic services depends not only upon the work of domestic services enterprises themselves and of their personnel, but also upon the punctual delivery by industry of the spare parts, materials, and equipment they need. Unfortunately, sometimes the performance of these deliveries is regarded as a secondary task of industries. The quality of services suffers from this, orders are not filled in time, and refusals to perform necessary repairs and other types of services are possible. The social effect of the service sphere is thereby lowered, and this lowering has to be seen as being the fault of industry.

Material needs include the services of passenger transportation. We are not concerning ourselves here with the controversial question of whether general use passenger transportation belongs to the sphere of material services, or directly to the sphere of material production. Quite a few different opinions have been expressed on this point in the literature. The Central Statistical Administration USSR, for example, classifies neither passenger transportation nor general use communications in material production, which, in our opinion, is incorrect. However, everybody agrees that the effect of transportation -- moving, a change in location -- is an entirely material effect which requires specific expenditures of live and past labor. Hence, the possibility of calculating the economic efficiency of capital investments in passenger transportation. This efficiency can be calculated as it is for other enterprises by comparing capital investments with the output which is obtained (absolute efficiency), or by comparing the difference in capital investments for variants with the difference in cost of output (relative efficiency). Cost here is formed, as at other production enterprises, from wages, fuel, energy, and materials expenditures, and depreciation. All of these calculations are more simple to perform for enterprises which are engaged solely in passenger hauls. At railroads and other types of general use transportation the methods of applying both current expenditures and capital investments to freight and passenger hauls have been used successfully for a long time already.

The traditional calculations of efficiency -- based on comparing capital investments and current expenditures -- will far from always yield a complete picture concerning the expediency of carrying out various transportation development measures. Let us take as an example the subway. The Moscow subway carries 2.1 billion passengers a year (1977 data). With a fee of five kopecks per ride the gross receipts now come to approximately 100 million rubles a year. Meanwhile, at current prices the capital investments in the Moscow subway

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system are expressed in many billions of rubles (a kilometer of shallow line is 3.5 times more expensive than a surface line and half the cost of a deep line), and if the decision on building the subway had been based on the capital investment reimbursement period through net profits, it would not have been built at all.

But the effectiveness of developing the subway is determined not so much by how much can be obtained from it in net profits, but by its social effect -- an improvement of the living conditions of people. It is also this which determines the remarkable appearance of the stations which is characteristic for the Soviet subway not only in Moscow, but in other cities also. The subway also yields a substantial indirect economic effect in that it saves people time. If the time economy is taken to be only 30 minutes per trip (in fact, the economy is much greater if one considers what transportation difficulties there might be in a city of 8 million without a subway) and the cost of a man-hour is taken as one ruble, the indirect economic effect of the subway would be expressed in a figure that is ten times greater than its gross receipts.

Proceeding from the above-cited considerations, the efficiency of increasing the speeds of passenger hauls can also be calculated. This increase demands an increase in direct expenditures for the hauls, since with higher speeds more fuel, energy, and materials are expended and the wear and tear on the rolling stock and lines is increased. Correspondingly there has to be an increase not only in the cost of the hauls, but also in their price, and this means in the total income of transportation enterprises also, which may justify the required capital investments. But, in addition, account has to be taken of the indirect effect which is to a large extent a social one -- an economy of trip time which makes it possible to increase production time and free time. Based on the cost of a man-hour of work and free time, the cost equivalent of the economized amount of man-hours has to be taken account of in a special manner and compared with the direct effect from the speeding up of the hauls. This kind of calculation can be performed both for an acceleration of hauls on a given type of transportation and for a shift from one type of transportation to another. In all of these cases one must refrain from totaling up the direct effect with the computed conventional indirect effect. But it is essential to know the magnitude of the indirect effect and to consider it in evaluating a variant for speeding up hauls.

One also has to take account here of another effect from the speeding up of passenger hauls and from improving their quality -- a decrease in so-called transportation weariness as a consequence of shortening the time spent enroute, or increasing conveniences. As surveys have shown, transportation weariness which occurs during a trip in an overcrowded car has an effect on labor productivity. If the degree of the

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decrease in this weariness is known, this means that it is possible to calculate its negative influence on economic indicators and to define the advantages which are achieved as a result of the complete or partial elimination of this harmful influence. Damage from transportation weariness sometimes occurs as a result of poor operations by transportation, lagging in repairing transportation equipment, the failure of buses to come out onto the line, and so forth. The damage resulting from it in these cases has to be attributed to transportation enterprises and reflected in their work indicators.

Special note has to be taken of the effect of ensuring the safety of passengers. A person's life cannot be evaluated in cost indicators. The maximum safety of passengers is an indispensable condition of the effectiveness of transportation, and it has to be ensured at practically any cost. The methods of estimating the required level of safety which exist in capitalist countries and are based on the amounts of insurance payments for injury or death from transportation accidents are unacceptable for the socialist system.

Let us now examine the problem of evaluating the efficiency of the expenditures for education. Here, perhaps to a greater extent than in any other sphere it is important to determine the social effect. Universal education, the mastery of knowledge by the great masses, and the creation of all of the necessary conditions for the advancement of talent -- this is an enormous advantage of socialism. The right of citizens of USSR to free education of all kinds is recorded in the Constitution of the USSR. This right is made wide use of by the people. An end has been put to illiteracy -- the lot of the majority of the people before the revolution. Universal mandatory secondary education has been effected, and vocational-technical, secondary specialized, and higher education have been widely developed. Training is carried out at production. All of these features are magnificent gains of socialism. The high social effectiveness which is characteristic of socialist society manifests itself in the education of the people, the comprehensive development of the individual, and in satisfying the thirst for knowledge.

But it is not only a matter of social and cultural progress: the comprehensive training of cadres is also of great economic importance. The educational system creates the most valuable element of the productive forces -- qualified cadres who are capable of running modern enterprises with their increasingly complex implements of production, of creating these implements and of organizing relations between people which correspond to developed socialism.

The expenditures for education as a whole and for its individual types of cadre training can be determined quite accurately. In 1940 they

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came to 2 billion rubles, in 1965 they had increased to 14 billion rubles, and in 1977 to 28.3 billion rubles. In 1977 capital investments from the state budget for science and education reached 1.9 billion rubles.<sup>4</sup> During individual periods construction for educational purposes was even greater. In Moscow alone before and after the war hundreds of school buildings and the buildings of Moscow University and a number of institutes and educational institutions were built. In the country as a whole, from 1918 through 1977, 114,000 schools for 41 million students were put into operation. During the years 1971-1975, 6.2 million square meters of space were put into operation in higher and secondary specialized educational institutions.

Not only the total amount of expenditures is known, but also the expenditures for training cadres in individual specialties and with individual qualifications. According to the data of state statistics, the state's expenditures per student comes to 180 rubles a year in general educational schools, 650 rubles a year in secondary specialized institutions, and more than 1,000 rubles a year in higher educational institutions.<sup>5</sup> This means that training in the average 10-year school costs 1800 rubles, in the tekhnikum (three years) -- 2,000 rubles, and in a higher educational institution -- from 4,000 to 6,000 rubles. There are smaller expenditures in the humanitarian VUZes and greater ones in the technical and medical VUZes.

Thus, educational expenditures can be calculated more or less accurately. It is much more difficult to determine the effect. The social effect of education consists in the following. Society has planned to provide a definite educational level for the popular masses and a definite level of training as a whole and of training in concrete specialties. Time and expenditures are required to achieve these goals. These expenditures can be greater or lesser depending upon the physical plant and personnel provided for the needs of education, but with high quality absolutely ensured. It is necessary to verify how all of this has been done.

It is also important here to evaluate the economic effect. It is obvious that it should have an effect upon a rise in labor productivity, an increase in the amount of output and an improvement of its quality, and a rise in the technical level of production. All of these results are not achieved immediately, but with the passage of sufficient time to obtain a secondary or higher education and also to accumulate work experience and advanced training.

It has already been suggested in published articles that the influence of a worker's skills on the level of labor productivity be defined. It was assumed here that the difficulty of the work performed depends upon the education which has been obtained (number of years of study).

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However, the coefficients which are at the base of such a calculation (length of studies) can hardly be acknowledged as providing a correct characterization of the level of qualifications.

Calculations of the proportional wages of each category of workers, keeping in mind that in the establishment of wage levels the qualifications of the workers are the basis, correspond more closely to the adopted economic methods. Given an equal intensity, the result of complex and skilled labor should be output of higher quality and of greater quantities. It is already possible on this basis to draw conclusions about the efficiency of skilled labor and, thereby, about the effectiveness of education. This means that if, for example, the wages of a skilled worker is 1.5 times greater than the wages of an unskilled worker, and the wages of an engineer is 1.5 times greater than those of the skilled worker, then the effect which is obtained from their training can be taken in each case to be 1.5 times greater; that is, proportional to their labor expenditures which are expressed in wages. Expenditures of live labor in output costs are also determined in accordance with this. The differences in the effects of the labor of workers with dissimilar qualifications can be taken as a conventional "education rent," as the differentiated effect which is obtained from their labor. The total effect of the education of each worker can be determined by means of dividing this "rent" by an effectiveness norm:

$$\mathcal{E} = \frac{P}{E_M}$$

This effect, of course, is different from the cost of training which is computed on the basis of expenditures, and such principles of the calculation of effectiveness should be regarded as only one of the possible proposals for evaluating it.

An increase in the social effectiveness of education is also promoted by such characteristics of the organization of labor which affect its productivity as the creative character of labor and the elimination of monotony, satisfaction with one's work, an improvement of working conditions and greater safety, the elimination of industrial injuries, help in the selection of occupations and types of work, and so forth. We do not have the possibility of examining these characteristics of work in more detail here, but we would like to note that in most cases, in addition to the social effect, account should also be taken of their economic effect through a rise in labor productivity.

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In its essence, the effectiveness of science is close to the effectiveness of education, although the methods of calculating it are very different. Karl Marx's statement about the transformation of science into a direct productive force is well known. This applies in full measure to the applied branch sciences which directly service production. Therefore, the effectiveness of applied scientific research should be calculated on the basis of the same methods as the effectiveness of planning and other production operations. The methods of determining the effectiveness of applied scientific research were developed in "The Basic Methodological Propositions on Determining the Economic Effectiveness of Scientific Research Work." In accordance with these propositions, we establish the field of its application (applied research), a basis for comparison (new and replaced equipment), economic potential (with full introduction), and the division of expenditures and effect into types of work throughout the entire "science-planning-experimenting-production" chain. Capital investments and costs were distinguished within total expenditures, and then the relationship of the obtained effect to expenditures was calculated.

The situation is different in determining the effectiveness of basic research. First, it is by no means always possible to judge its future practical result, not to mention at least an approximate calculation of the relationship of effect to expenditures. Sometimes even the creators of very important scientific discoveries do not have a clear idea of the possibilities for their direct application in practice. Secondly, the effect of the achievements of the fundamental sciences -- that is, of scientific discoveries -- is not limited to an economic effect and is supplemented, as a rule, by a social effect, opening up for human society ever new prospects for mastering the secrets of nature and helping to perfect man himself.

However, it should be noted that the social effect of the development of science may not only be a positive one (a rise in the standard of living, an improvement of medical services, an improvement of working conditions -- factors which also have an economic significance). Along with this social effect of the development of science there may also be a negative effect consisting in air or water pollution, or in a deterioration of recreation conditions. If one were to speak about the development of science in modern capitalist society which is rent by contradictions, the development of the means of mass destruction are a great threat for mankind.

As for the methods of calculating the effectiveness of science as a whole, this kind of calculation is possible through a computation of labor productivity. Effectiveness is obtained from the expression

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$$\beta = \frac{\Delta D \cdot m \cdot n}{C + E_n K}$$

where  $\Delta D$  is the annual increase in the annual income;  $t$  -- is the numerical value of the proportion of this increase which depends upon a rise in labor productivity;  $n$  -- is the numerical value of the proportion of the rise in labor productivity which depends upon scientific achievements;  $C$  -- is the annual expenditures for science;  $K$  -- are the capital investments in the development of science;  $E_n$  -- is the normed coefficient of effectiveness. On the basis of this, the reimbursement period of the expenditures for science comes to four to five years.<sup>6</sup>

The above-examined partial indicators of the effectiveness of scientific research work are indicators of absolute effectiveness. Along with this, it is entirely possible to make use of relative effectiveness calculations. This is required in cases when from several possible variants of scientific research work it is necessary to select the most effective one which ensures the best correlations between expenditures and results. The calculations for a relative effectiveness variant may be performed in accordance with the recommendations of the Standard Methodology for determining the effectiveness of capital investments and new equipment in the USSR economy in accordance with the method of adduced expenditures.

It is very unlikely that the effectiveness of a rise in the level of culture or art lends itself to any kind of accurate measurement. However, the development of all types of art is of enormous social importance in that it influences the education of the man of communist society and his perfection. Expenditures for the development of culture and art increase as the level of the development of production and the level of national income rise. These expenditures are justified by their social effect.

Health care is a component part of the non-production sphere. The social effect here manifests itself in the fact that it is directed toward improving the health of people, decreasing the amount of time lost from active life due to illness, improving overall health conditions and, as a result of this, prolonging people's lives. All of this requires definite expenditures.

In 1977 expenditures for health care (including physical culture) came to 16 billion rubles in our country; they had increased by two times compared to 1965. Within the 1977 expenditures 12.5 billion rubles had been allocated from the state budget, including 703 million rubles

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in capital investments: The corresponding figures in 1970 were 9.3 billion rubles and 499 million rubles. As a result of these expenditures great successes have been achieved in creating a health care base and decreasing illness.

In 1977 there were 900,000 doctors of all specializations in the USSR, or 35 per 10,000 inhabitants. Many first class hospitals equipped with the latest equipment have been built. The number of sanatoriums and rest homes increased by 3.5 percent compared with 1939 and by 35 percent compared with 1970. The USSR is in first place in the world for the number of its doctors, and occupies one of the leading places for the number of its hospital beds. As a result of the successes of health care there has been a sharp decrease in infectious diseases. Mortality from diseases of the circulatory organs, malignant growths, diseases of the digestive organs, and others is lower in the USSR than in the United States, England, and the Federal Republic of Germany.

The above data testifies to the great social effect of the development of health care. A decrease in sickness makes it possible for the workers to make fuller use of the physical and intellectual goods of life and ensures them a prolonged active life and a prolonged life in general. The social effect from new medicines, means of treatment, and medical equipment is exceptionally great. Thanks to the discoveries of E. Jenner, L. Pasteur, I. Mechnikov, W. Roentgen, A. Fleming, and J. Salk a countless number of people have had their lives saved or prolonged. It is possible to estimate the social effectiveness, but it is impossible to express it in cost indicators. The social effect resulting from the improved quality of medical services and also from treatment and rest in sanatoriums and rest homes can be determined through special studies. It has to be considered that the improved health of people and the prolonging of their lives is influenced not only by an improvement of health care, but also by the way of life and a rise in the material and cultural levels of people. To discover the measure of this influence requires special study.

Along with the social achievements in the field of health care, the economic effect of its development also has to be determined. There is a decrease in failures to appear for work due to illness, the amount of time worked increases and along with it the production of output and labor productivity increase. All of this can be accurately calculated with the data of the existing statistics.

However, the organization of health care has to be further improved. The level of comfort in hospitals has to be elevated, more space per bed has to be provided, meals have to be improved, and better care has to be ensured. These measures have to be carried out in the very

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system of health care. At the same time, it is essential that the medical and pharmaceutical industries increase the production and improve the quality of the medical equipment and medicines, above all the scarcest items, which they provide to health care agencies. The accomplishment of these tasks requires a further increase in expenditures both in the health care system and in the industry which produces the output it needs.

As in the health care system, there is a substantial social effect from physical culture and sports and also from tourism. Methodologies for determining the effectiveness of expenditures in these branches of the non-production sphere have been developed on the basis of the fundamental propositions of the theory of efficiency and they have received a practical application.

The distribution sphere in which trade and public catering can be included merit especial consideration. In a number of published works on this problem one can encounter assertions that the effect of capital investments is discovered by comparing them with the turnover of a trade enterprise: The greater the turnover per ruble of investments, the greater the effectiveness. It is hardly possible to agree with this way of framing the matter. The final result of trade is not turnover by itself, and especially, not the profits of a trade enterprise, but the delivery of goods to the consumer with the greatest convenience for him. It is not only necessary for a good to be sold to a consumer, but also for the consumer not to lose time in searching for a necessary good and in standing on lines. Thus, in evaluating the effectiveness of trade it is important to know its social effect which consists in satisfying the needs of the people and in shortening the time required for a purchase and in making more free time available to the consumer. The economy of time in these cases can be calculated physically on the basis of the number of man-hours, and, if necessary, evaluated in rubles by using the above-cited calculations of the cost of a man-hour of free time.

The problems of determining the effectiveness of capital investments in municipal services which belong to the sphere of services but have the features of material production have remained outside of our analysis. The calculation of the effectiveness of capital investments here does not differ from the analogous calculation in the production sphere. Nor have we touched upon the methods of calculating the effectiveness of capital investments in the field of ecology which require an independent study.

The above-cited considerations show that it is time to move to a determination of the social effectiveness of capital investments. The

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development of the methodology of this kind of calculation has to be completed and handed over to planning in economic agencies: This will make it possible to evaluate the social and economic results of the development of the non-production sphere on a single scientific basis.

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FOOTNOTES

1. Ye. Voronina, "The Effectiveness of Social Expenditures on Education," VOPROSY EKONOMIKI, No. 11, 1973; B. Vaynshteyn, "On Evaluating the Social Results of Scientific and Technological Progress," VOPROSY EKONOMIKI, No. 2, 1974; E. Gorbunov, "The Effectiveness of the Sphere of Domestic Services," VOPROSY EKONOMIKI, No. 7, 1974; V. Komarov, "The Sphere of Services and the Effectiveness of Social Production," VOPROSY EKONOMIKI, No. 2, 1975; A. Vitin, "The Effectiveness of Non-Production Capital Investments," VOPROSY EKONOMIKI, No. 7, 1978.
2. "USSR Economy in 1977," Izdatel'stvo "Statistika," 1978; pp. 352-353, 415, 412, 413; "USSR Economy in 1970," Izdatel'stvo "Statistika," 1971, p. 546.
3. "USSR Economy in 1977," Izdatel'stvo "Statistika," 1978, p. 415.
4. Ibid, p. 562.
5. Ibid, p. 408, note.
6. "Soviet-American Symposium of Economists," Izdatel'stvo "Progress," 1978, p. 18.

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INTERSECTOR CAPITAL INVESTMENT COMPLEX EXAMINED

Moscow VOPROSY EKONOMIKI in Russian No 1, Jan 79 pp 59-69

[Article by V. Krasovskiy: "The Investment Complex: Planning and Unused Potential"]

[Text] The economic system of advanced socialist society is characterized by the existence of a powerful group of sectors and industries in Department I producing the means of labor for shaping the country's fixed capital and figuring as the basis of socialist expanded reproduction. The intersector capital investment complex, that is, the complex of sectors and industries creating products that will become fixed capital, is the most dynamic part of Department I of the economy, whose special role was emphasized by V. I. Lenin when he was analyzing expanded reproduction as a whole. An advanced intersector capital investment complex makes it possible to ensure stable economic growth rates, to adopt technical progress, and to carry out large-scale socioeconomic programs.

But sufficient use is not being made of the broad opportunities of the intersector capital investment complex. At the November (1978) Plenum of the CC CPSU L. I. Brezhnev stressed that the state of affairs in capital construction is slow to improve. It was also noted that a certain lag of machinebuilding behind the needs of the economy has begun to take shape.

Under present-day conditions there are new approaches to the planning of the intersector capital investment complex, to the mobilization of its unused potential and to more intensified use of its potential.

The Intersector Capital Investment Complex, Its Makeup, Indicators and Orientation Toward End Product

There are both broad and narrow approaches in defining the makeup of the intersector capital investment complex. The more restricted makeup of the complex is limited to the construction and building materials industries, but machinebuilding is excluded. Yet the manufacture of the end product of sectors and industries producing fixed capital in the form of finished projects requires not only the passive part of fixed capital in the form of

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buildings and installations, but also the most active part--manufacturing, transport and other equipment, and that is the product of machinebuilding enterprises. The expanded treatment of the complex sees unity in the intersector capital investment complex on the basis of resources and includes the production of materials used in construction, including nonferrous and ferrous metallurgy, as well as a number of groupings in the chemical industry (for example, production of synthetic resins, plastics and products made from them). The industries and sectors in the investment complex included in the expanded view supposedly accomplishes more enclosed and internal turnover of physical resources. But this kind of "vertical" structure of the investment complex would seem to violate the nomenclature for complexes which has already developed and in which distinction is now made for the fuel and power complex, the complex of natural and chemical raw materials, etc. We should also take into account that the principal tasks of the investment complex include the production on schedule of a high-quality end product of construction in the form of technically advanced fixed capital, which puts the emphasis rather on the goal than on the orientation toward resources. Moreover, in the broad treatment considerable double counting of the output of the raw materials industries is inevitable because they participate simultaneously in many complexes. In shaping the makeup of the large intersector complex we must do everything to avoid double counting, such as when the raw materials industries in the fuel and power complex include in their makeup construction organizations for building mines, quarries, and so on, while on the other hand the investment complex embraces the mining of ore and the production of coke. For complexes shaped by their goal elimination of double counting is an important methodological and planning problem.

According to available calculations, the investment complex has a share of more than one-fourth of the entire output of the branches of physical production, about 18 percent of fixed productive capital and capital investments, and 25 percent of production personnel. We should expect a certain growth of these indicators in the future. The productive capital of the investment complex stood at 138 billion rubles even in 1975, and production personnel ran to 20.6 million persons.

Until recently no indicators were singled out in reporting and planning for the investment complex as a separate group of sectors and industries accountable for expansion and renewal of the country's fixed capital, which made it difficult to establish a balance-sheet linkage for the means of labor and also to achieve the necessary cooperation between capital construction and machinebuilding. Yet in the drafting of medium-term and long-term plans, in which major social, economic and investment programs are distinguished, it is becoming indispensable to have this kind of record on the complex. The investment complex has already been given a special section in the drafting of the Comprehensive Program for Scientific-Technical Progress in the USSR Academy of Sciences and the USSR State Committee for Science and Technology.

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The progressive practice of issuing planning assignments concerning startup of operating complexes and enterprises as called for by designs to sectors and industries producing fixed assets should be expanded in order to radically improve the planning of capital construction and of the entire investment complex, as well as to improve the economic machinery in the sphere of capital investments. It is evident that we should abolish the practice of planning and accepting work by intermediate stages in construction and installation operations as the end product of the investment complex. We accordingly must have a schedule for gradual transition of the relevant ministries and departments to the system of delivering the capital investment product ready for operation or, as it is put figuratively, "pod klyuch," for the 1979-1980 period. These measures follow from the requirements advanced by the 25th CPSU Congress.

It was pointed out at the November (1978) Plenum of the CC CPSU that the orientation toward the end results of production and the search for the most efficient and economical ways of achieving them should be put at the center of all the work on the new 5-year plan. There must be interrelated planning of all the capital-building sectors and industries, including contract construction organizations, enterprises in the building materials and fabrications industry, the portion of machinebuilding producing capital goods, organizations engaged in construction by the direct labor method, and also organizations that carry out operations for major repairs and which assemble equipment and construction fabrications for construction projects. Yet at present the investment plan regulates primarily the activity of organizations operating as contractors in capital construction.

Planning assignments for the startup of productive capacities and facilities envisaged by 5-year plans of capital investments should be stable in the size of investments, the amount of financing, deliveries of manufacturing and electrical equipment, etc. The investment plan could be adjusted during fulfillment only for the startup of capacities because of the new problems that have arisen.

We should place restrictions on the practice of defining capital construction's need for materials, fabrications, wire and cable, etc., on the basis of standard amounts per 1 million rubles of the estimated value of the construction and installation work to be done, which is justified only for approximate forecasts. This is a consolidated indicator based on averages that is called the "millionnik." It is obtained from summary data on the resources needed by capital construction as a whole per 1 million rubles of construction and installation work. This indicator is useful in aggregate computations, but altogether unsuitable in determining the need for materials of construction sites and projects, since it does not take into account either the specific nature of sectors and industries or the phase of completion. In the very near future there will be a need to organize the transition of participants in the investment complex to material supply in accordance with the needs stated in project plans and cost estimates and synchronized with the construction schedule and deadlines for startup of facilities.

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At the same time project planning organizations should furnish in project planning documents order specifications for building materials and equipment to be used by supply components of USSR Gossnab. In addition all participants in the investment complex should take measures to disseminate more widely and develop further the effective forms of package delivery of production equipment to capital construction projects.

The problems of improving planning and mobilizing unused potential should be dealt with in the various stages of the investment process--project planning, construction, attainment of rated capacity and retooling of existing enterprises.

#### New Tasks of Project Planning and Improvement of Its Effectiveness

On the whole project planning organizations are still fulfilling their important role in the capital investment field unsatisfactorily, often out of touch with those new requirements which capital construction must now meet. For instance, they are doing little to facilitate adoption of the new indicators of the output of the investment complex. Customers and construction organizations at the local level are not able to competently distinguish within the overall design the individual lines and units that optimally make up independent production complexes. Only experienced production planning organizations are capable of this. Yet until recently project plans were not ordinarily developed in elaborate form, the individual lines and complexes were not distinguished, and this, of course, made it more difficult to produce the product in units of productive capacity that could be put into operation, as required in the decisions issued as directives.

The volume of project surveying is steadily increasing in proportion to the rising estimated cost of construction, since it is established as a certain percentage of capital investments. This allows project planning organizations to be rather free in disposing of growing financial resources and in doing designs for projects not included in the construction plan. As a result uncompleted project planning is increasing by almost 700 million rubles every year, and in 1977 amounted to approximately 8 billion rubles. Profit of project planning organizations has reached 24 percent, and has risen far above the standard. The number of project plans developed exceeds by more than fourfold the need for new construction starts.

Yet year after year the economy is feeling a shortage of project planning documentation to cover the planned volume of capital investments, and many leading construction projects receive blueprints and cost estimates literally on the run. At the same time, customers are building up on their books an increasing amount of unused project plans and cost estimates which do not match the list of projects scheduled for construction. The volume of project planning and cost estimate documents continues to be excessively large. Even for plants in the petroleum refining and rubber industry of the same type all the cost estimates are compiled from scratch, though in large part they duplicate one another, whereas relatively small changes would have to

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be made if a standard version were used. Interesting in this connection is the progressive experience in construction of the Volga Motor Vehicle Plant, where the project planning was done concurrently with construction work. This made it possible for the project plan to take into account the most recent developments in architectural layout and design, it made the design more "resistant to obsolescence," and it also meant that the first phase of the plant went into operation 2.5 years earlier than envisaged.\*

It would seem that the rights and duties of project planning organizations need to be expanded substantially and that they should be incorporated into the largest production associations. There they might perform many functions related to capital construction, including orders to furnish the required machines, apparatus, instruments, and so on to meet the design specifications, supervising progress in construction and attainment of rated capacity, and control of construction cost and other technical-and-economic indicators. Project planning and design organizations developing engineering plans and blueprints of equipment are even now part of the relevant major associations in many industries (for example, VNIIMETMASH [All-Union Scientific Research and Project Planning and Design Institute of Metallurgical Machinebuilding] in the association headed by the Ural Machinebuilding Plant, etc.). Project planning organizations in the construction field could become components of construction ministries or their associations. Bringing construction organizations and project planning organizations together will create conditions for reducing the amount of construction project planning documentation, since the consumers and producers of blueprints and other project planning documents will be administratively united and can therefore enlist technically sophisticated specialists among line personnel, especially for preparing blueprints. Even now experience has been good with incorporating project planning organizations into construction associations in the petroleum and gas industry, in the electric power industry, in the reclamation field, etc.

The relative share of construction done according to standard designs has grown considerably in recent years and stands at about 80 percent for the national economy, including 68 percent for industrial construction, 88 percent for transport construction, 95 percent for construction of agricultural facilities (except for water-management installations), 96 percent for housing construction, and finally, higher than 85 percent in construction of cultural and consumer-service facilities. Given this high share for the use of standard designs, it is not altogether clear why there must be a growth in the number of project planners and project planning organizations, especially when we take into account that construction is not receiving all the project planning and cost estimates it needs. At the same time, work has so far been held up on the development of standard cost estimates and also price lists for finished capacities and facilities, even though they might easily be compiled on the basis of the standard designs. It would seem that

\* METODY I PRAKTIKA OPREDELENIYA EFFEKTIVNOSTI KAPITAL'NYKH VLOZHENIY I NOVOY TEKHNIKI, No 25, 1975, p 29.

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the growth of standard project planning should show results in a faster pace for the process of project planning as a whole. Many departments are loading up their project planning organizations with all kinds of studies, reports, analyses of the current state of ongoing enterprises and other materials, frequently to the detriment of their principal work of project planning and cost estimation.

It is also important to turn attention to the production engineering part of project planning. The production engineering part of designs, which is the heart of them, is now in a worse state than the construction part, since here there are far more materials providing information, instructions, methods and other guidance from USSR Gosstroy. There have been well-known achievements in standardization of the construction of buildings and installations and in the compilation of standard albums, catalogs and other similar materials for organizing up-to-date project planning. But the production engineering part of project plans is not so well supplied with the necessary information, is not receiving the materials on standards and methods it needs, and would seem to be in a neglected state.

What are called "production modules," whereby the overall manufacturing layout of new enterprises would be broken down as it were into individual units and blocs which can be successively put into operation and are capable of producing finished products on their own, are widely known in the foreign practice of capital construction. This kind of system makes it possible to obtain output in the second year after construction begins and to obtain profit from the first phases to help in financing subsequent construction work. In the USSR this kind of procedure in project planning is used in the electronics industry, it was used in building the Volga Motor Vehicle Plant, etc. In ferrous metallurgy the "modular method" would mean the erection of a series of vertical production chains--from smelteries to the respective set of rolling mills; in nonferrous metallurgy it would mean vertical lines--from the enrichment mills and smelteries to the refineries. But it has not been given official recognition in project planning practice, in the reference materials on production engineering in project planning or in normative publications. Construction time indicators ought to be based on synchronization in the startup of the various production modules.

#### Certain Problems in Improving the Planning of Capital Construction

The principal task in drafting plans of capital investments is the retooling of industries, associations and enterprises with recent equipment and advanced production technology. Physical and financial resources are first committed to performance of these projects at existing enterprises. The order of priority in the conduct of these measures, their expected efficiency, completion dates, the necessary material support and complete synchronization with production plans are determined on the basis of intersector and sectorwide plans for retooling. Capital investments must be appropriated not in general terms, for projects, but for the output obtained from the retooling. In the same way the allocation of funds for new construction

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should be allowed only if the required volume of output cannot be obtained at existing enterprises even after reconstruction or retooling.

Not only construction organizations but also machinebuilding enterprises should become extensively involved in carrying out projects for the retooling and reconstruction of existing enterprises, and in a number of cases this also applies to major repair subdivisions of the operating industries. Machinebuilding ministries and associations must unfailingly take into account the peculiarities of enterprise retooling and reconstruction. Along with large-scale and powerful machines, they should also organize the manufacture of small-size and light-duty machines and transport equipment capable of being "fitted in" to the buildings and wings of existing enterprises.

The continuing squandering of capital investments is causing great concern. At the November (1978) Plenum of the CC CPSU L. I. Brezhnev said: "So far we have been unable to halt the process of the squandering of capital investments over numerous construction projects. Unfinished construction is growing. Uninstalled equipment worth several billions of rubles is lying idle in warehouses." In the capital investment field we find that sizable funds are being allocated to new construction projects instead of concentrating capital investments on construction projects which are closest to completion so that they could be completed more quickly. For instance, construction projects in a high stage of completion carried over from the previous year are allocated altogether inadequate funds--approximately 11-12 percent of the entire estimated cost, which makes it inevitable that they remain part of unfinished construction for a long time. The problem is not just that this creates above-allowance unfinished construction, but that this unfinished construction consists of a large number of construction sites and projects with a low level of technical completion.

In order to correct the situation that has come about with the degree of completion of unfinished construction, in our opinion, over the next year or two the transition should be made to approval of volumes of capital investments not only for construction projects as a whole, but also for projects that promise output. A realistic concentration of investments will result.

In plans for development of the Soviet economy capital investments should be given for the major capital investment programs which are being devised in accordance with the decisions on important national-economic problems issued as directives. They are given on a separate line to indicate the volume of investments and the date when they will go into operation under each program. The technical-and-economic justification of the program can be set forth in special documents--TED's (technical-and-economic reports), which would also contain the volume of work planned, the schedule of stage-by-stage completion, arrangements for intersector relations and deliveries, an exhaustive list of who is responsible for what, a calculation of the total benefit of the program, and also a plan showing the gradual repayment of funds as the various units in the program are completed.

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A progress schedule and interrelated itemized list should be worked out for each program. The transition must be made from approval of itemized lists diversified by departments to the planning and approval of the lists as a body, so that they are economically and technologically consistent with one another.

Inclusion of new enterprises and also of projects for reconstruction and expansion of existing facilities in the plan for project planning and construction should be based on TEO's [feasibility studies], reflecting advanced technical designs and economic solutions and stating the maximum cost of construction. In determination of the estimated cost of industrial and technical projects it is indispensable to make provision for outlays for the construction of housing and facilities for social welfare and cultural services for the work force of the enterprises being built.

But the overriding task is to reassess the list of unfinished construction projects and determine the sequence in which they are to be completed on the basis of speed in starting up production capacities and facilities that are in a high degree of completion. At the same time construction projects in a low state of completion or being done according to outdated designs should be temporarily halted.

It would be helpful to have full cost ceilings of new projects for the branches of physical production or ceiling levels of specific capital investments at which the efficiency of newly built enterprises is preserved, and to organize the use of such standards in the expert evaluation of project plans and cost estimates and also in bank supervision of the effectiveness of credits extended.

A question also arises of the requisite legal enforcement of government decisions concerning reduction of the estimated cost of construction and compilation of timely and good-quality cost estimate documentation. Probably the USSR Ministry of Justice should draft recommendations concerning legal enforcement of decisions concerning the estimated cost of construction in view of the fact that cost overruns inflict great damage on the country's economy and stand in the way of rapid adoption of the achievements of technical progress. The State Price Committee of the USSR Council of Ministers should scrutinize the relationship between the cost and capacity of machines and also between the weight of machines and their effective output, preventing a hidden rise in the cost of machines disguised as modernization or modification.

At the same time, until the estimated cost of capital construction becomes altogether stabilized, temporary indices should be used for converting the value of capital investments to comparable prices, and they should be used in planning capital investments and in the selection of projects to be included in the plan so that reserve funds are left in case of a cost increase that cannot be controlled.

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In order to sharply reduce the length of the investment process and also to prevent the obsolescence of enterprises with long construction times, it is recommended that full records be kept on the time factor in capital construction. This would include adoption of the method of concurrent performance of the various stages of capital construction--surveying, project planning, construction and attainment of rated capacity, using the progressive experience of the Volga Motor Vehicle Plant, where construction work was concurrent with project planning and also with the efforts to attain rated capacity.

There should evidently be a change in the procedure for compiling standard project planning and construction times so as to eliminate the present practice of allotting additional time in the standard construction time for the startup of each new shop, complex, and so on. The construction time of projects should be limited to, say, 2 or 3 years, regardless of the size of the project; then it would not be the construction time set that could vary, but the number of simultaneous flows and the support of construction projects.

In our opinion we should organize gradual reduction of the standard time for attainment of rated capacity at new enterprises as uniform rules are adopted for delivery of projects ready for operation so that in the 11th Five-Year Plan standards for attainment of rated capacity could be abolished at projects converted to this system of delivery. That time would make provision for only brief startup and prestartup periods lasting a maximum of 6 months, and provision would also be made for organizing a network of teams and crews for startup and adjustment.

There is also a question of the gradual transition of capital construction to work in two and three shifts without increasing the total number of construction workers, using the experience of Leningrad machinebuilding plants. It is important to correctly determine the capacity of construction organizations and to plan their optimum use. Finally, one might recommend adoption in the practice of planning capital investments of the indicator of the degree to which capital investments are determined by investment decisions made in the past and project plans and cost estimates already compiled; it is these which predetermine the future allocation of investments for projects already begun. This coefficient would be subject to a limit of 3-3.5 years.

Speeding up the process of bringing new enterprises and new production capacities up to rated output is an important means of reducing the length of the production cycle as a whole. In the USSR the standard time for attainment of rated output ranges from 1 year to 3 years. According to foreign data, the startup period and attainment of rated capacity do not exceed half a year. At the present time the actual time for attainment of rated output exceeds the norm. A number of scientific developments call for a still longer period for attainment of rated output, including so-called "economic assimilation," which would mean 6-7 years. In our opinion we must on the contrary make a thorough examination of all violations of standard periods



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for attainment of rated output and gradually tighten up the present standards. Very important and useful work has been done in this respect by the scientists in Bashkirskaya ASSR in an affiliate of the Scientific Council for the Efficiency of Capital Investments. The research was done at enterprises of the petroleum refining and petrochemical industry in Bashkirskaya ASSR, where in the 1966-1970 period 60 major production projects with more than 800 million rubles were put into operation. But at only 11 projects, which means 18.3 percent, were the rated output indicators achieved within the standard time. The length and period required to attain rated output meant a loss of more than 180 million rubles of gross output.

Researchers of the Bashkir affiliate of the USSR Academy of Sciences Yu. Malyshev, V. Kiseleva, D. Bronshteyn and V. Ivalyuk correctly noted the similarity of many operations carried out in attaining rated capacity and in the performance of major repairs. More and more frequently now, when major repairs are undertaken work is done on reconstruction of particular units, to modernize equipment and partially replace it with new equipment when this is economically advisable. The principal stages in the preparation of equipment for operation and bringing it up to operating parameters are practically identical following the full range of tests and major repairs. The only difference is in the level of the qualifications of personnel. However, when we compare the standard time set for attaining the productivity of standard units following major repairs and following completion of construction (and the full range of testing), we find that a different time is planned for the same work. For example, following major repairs on a unit for hydrorefining of diesel fuel 120 hours, or 5 days, are given to achieve full rated output, while attainment of rated output on the same installation by a construction and installation organization is allowed 2,160 hours, or 90 days, which is 18-fold more. Relations like this are typical of almost all types of capacities being brought up to rated output (hydrorefining of diesel fuel, catalytic reforming, atmospheric-vacuum pipe, etc.).

The Bashkir economists provide a table in which standard times for attainment of rated output following construction and installation on the one hand and major repairs on the other can be compared. More economical times are achieved for almost all types of capacities by organizations doing major repairs; in practice the time required to reach rated capacity is reduced to 1/18, 1/45, 1/60, 1/90 or even 1/120!

The time for reaching rated capacity in facilities furnished with new equipment occurs as a rule because there are "difficult" assemblies. Though in value terms their share is no more than 5-8 percent, much time is, nevertheless, spent on their "adjustments." For instance, full assimilation and refinement of certain assemblies of an installation for the hydrocracking of vacuum gas oil took 23 months, whereas attainment of full average daily output took only 15 days. For that reason principal attention should be paid to timely attainment of rated capacity on those assemblies which are new and on preparing special recommendations for bringing them to rated capacity, testing them and making refinements in them. There is also interesting

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experience in the use of funds allocated for major repair treated in the writings of the Kuybyshev economist (I. Rimer, for example). On the whole we should note that in the stage of attainment of rated output at new production capacities there is a large unused potential for shortening the time required for this important stage in the investment cycle.

## New Technical Directions in Capital Construction and the Tasks of the Plan

In the USSR a mighty material and technical base has been built in past years for capital construction. But we now note serious shortcomings in it. Definite mistakes have been committed in developing the production of certain building materials and fabrications. Preference has been given to such materials as reinforced concrete, cement and metal. At the same time the production of finishing materials has been insufficiently developed, and this has had an adverse effect on the rise of labor productivity in capital construction. The importance of preassembly in construction has been exaggerated beyond all measure. Most installations have reached 80-90 percent in the degree of preassembly, but labor expenditures on them are in a number of cases higher or the same as for brick construction. Many skeleton-panel apartment houses or skeleton-type administrative buildings would require less labor and would be cheaper if built from brick.

Accordingly the CC CPSU and USSR Council of Ministers adopted the course of extensive use of light and lightweight fabrications back in 1972. In the years that have passed since that decree was issued, considerable work has been done in building and putting into operation plants for making lightweight fabrications, for producing special highly efficient floors, aluminum fabrications, asbestos-cement construction products, lightweight fillers and thermal insulating materials, etc. Unfortunately, many project planning and construction organizations are reluctant to use these lightweight building materials. They seem to have become devoted to the heavy and expensive materials and fabrications. It is significant that the construction and reconstruction of plants for reinforced-concrete products, which number nearly 260, are being carried on more rapidly and vigorously than construction of enterprises for lightweight products and fabrications, where the level of planned fulfillment for construction and installation work is sometimes not even as high as 20 percent. The example of construction of enterprises for glued wooden fabrications is very instructive. By the end of the Ninth Five-Year Plan capacity was to be built for the production of 465,000 cubic meters of these fabrications, and 31 sets of manufacturing equipment for those enterprises were to be manufactured. In actuality the enterprises built in the years so far have a capacity of only 90,000 cubic meters, and this is done on imported equipment, and instead of the 31 sets of equipment, only 1 prototype has been made.

If the same amount of rolled products of ferrous metals now allocated were used to manufacture 250,000 tons of cellular floor decking instead of 125,000 tons and approximately 300,000 tons of bent profiles instead of 145,000 tons, progressive lightweight fabrications would be largely in use in construction.

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Total outlays to build capacities for the production of flat steel fabrications and rock-wool batts are a fraction of the cost of building capacities for the production of reinforced-concrete slabs and the corresponding amount of enforcing steel, cement, sand, gravel and keramsite, which would not be needed at all if the lightweight steel fabrications were used.\*

One might cite a multitude of such examples and cases. But in this case we are talking about a resolute reassessment of the technical policy in construction along the lines indicated in the decree of the CC CPSU and USSR Council of Ministers (1972) which promises a tremendous gain in time, quality and reduction of labor intensiveness and materials intensiveness of construction, but to a considerable extent this is being held back by the present system of payment for partial completion, so that there is a drive not toward cheap versions, but toward those which are heavy and expensive. The plan of the intersector capital investment complex must be oriented toward the use of progressive materials and fabrications.

#### Some Unused Potential for Reduction of the Estimated Cost of Construction and the Economic Machinery

Within the group of the capital investment sectors and industries (those whose products become fixed capital) we observe the sharpest and most persistent departures from a system of comparable prices that has been adopted in economic practice. The reason is that the so-called fixed (comparable) prices in capital construction are not prices for the finished product of construction (that is, for capacity, an enterprise with a stated output, and so on), but prices for partial completion (per cubic meter of earth moved, per cubic meter of brick laid, per cubic meter of reinforced concrete poured, per cubic meter of plastering, and so on). The emergence of these "comparable" prices for partial completion could substantially increase the cost per unit capacity, which would not be comparable with the cost of projects built earlier.

The increase in the cost of construction and installation work now taking place even in calculations made in fixed prices and costing standards is largely the result of the effort to increase the materials intensiveness of these operations, since the more expensive the building materials and fabrications used, the larger the wage fund and the more profit are planned for construction and installation organizations. At the same time even the volume of project planning work is determined as a function of the scale of construction and installation work embodied in the design, which motivates even project planning organizations to make the projects they design more expensive. On the whole the procedure used in determining economic incentives and in evaluating the performance of builders and project planners does not on the whole orient them toward making projects cheaper, but toward making them more expensive. At the same time this is having an impact on the drop in the output-capital ratio in the economy.

\* See VOPROSY EKONOMIKI, No 3, 1976, pp 22-23.

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Calculations show that optimization of the composition and quality of building materials makes it possible to reduce their mass per work unit approximately 25-30 percent, which has an effect on construction time, on labor intensiveness and also on the cost of construction.

Predominant use of heavy fabrications and materials in construction, heavy reinforced concrete above all, whose share is 35-40 percent of the cost of all the materials used, is mainly the result of organizational factors. Enterprises subordinate to construction ministries are producing 96 percent of all the reinforced concrete. The prices for prefabricated reinforced-concrete products offer comparatively high profitability for construction organizations--approximately 20-25 percent. The cost of the reinforced concrete used is in turn credited to fulfillment of the plan of construction and installation work, so that it encourages predominant use of this heavy material. This is standing in the way of development of the production of poured reinforced concrete, whose use makes it possible to save as much as 25 percent of the metal and concrete and to reduce the construction cost considerably. For instance, prefabricated reinforced-concrete footings for columns are 1.5-2-fold more expensive than poured footings, and their manufacture requires larger expenditures of labor, but the output per construction worker is 2.5-3.5-fold greater than when the footings are poured. This, of course, distorts the indicator of labor productivity, but it predetermines the higher "profitability" of the heavy materials. We should also bear in mind that steam curing of 120 million cubic meters of prefabricated reinforced-concrete products requires a tremendous amount of fuel, since the use of steam is not always required with poured concrete.

Within the group of the capital investment sectors and industries we observe the sharpest and most persistent departures from a system of comparable prices that has been adopted in economic practice. It is thought that the source of the cost shifts is primarily prices of raw materials and fuel and power resources in the group of nonreplaceable resources and subject to the conditions of rent relations. But under present conditions the most disorderly and uncontrolled price changes are taking place in the capital investment industries and sectors.

The political and economic tasks of the present period and also the long-range tasks of scientific-technical progress cannot be performed if the economic machinery for the conduct of the capital investment process is left as it stands. Principal attention in the long run should be paid to intensification of the investment sphere, to stabilization and reduction of estimated cost, to the orientation toward the end product, to a new organization of the investment process, to a decisive improvement in the rate of turnover of capital investments and therefore to creation of new internal potential for expanded reproduction.

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BALANCE SHEET METHOD OF PLANNING

Moscow VOPROSY EKONOMIKI in Russian No 1, Jan 79 pp 70-80

Article by P. Krylov. "Improvement of the Balance Sheet Method of Planning"

Text The balance sheet method occupies a leading place in the methodology of planning, which is governed by its role in ensuring the proportionate development of the national economy in conformity with the requirements of the economic laws of socialism. This method makes it possible to draft a unified state plan, in which the physical-material and value proportions of socialist expanded reproduction and the development of all the sectors and regions of the country are integrally coordinated.

The balance sheet method--the most important element of the entire system of scientific methods of planning--is directly connected with the program-goal and standard methods. Its bases were incorporated in the plans of the State Commission for the Electrification of Russia and the First Five-Year Plan. The elaboration of the main group of balances during the drafting of the First Five-Year Plan was a significant stage in the formation of the balance sheet method. Along with the physical balances the most important value balances, as well as the balance of labor resources were drawn up for the first time. With allowance for the social tasks of the First Five-Year Plan the main types of balances were drawn up by social sectors. The further development of the balance sheet method proceeded along the line of both the enlargement of the group of balances being drawn up and the increase of their validity. The various types of balances now being used encompass all the sections and indicators of the plans at all levels of economic management: from the plans of enterprises and associations to the unified state plan.

The enormous scale of the economy and the complication of national economic and intersectorial ties under the conditions of a developed socialist society are making increased demands on the balance sheet method. These demands have been caused first of all by the creation of new sectors and works, the expansion of the list of products being produced, the types of jobs and services, the formation of more and more diverse intersectorial ties. Thus, in the standardized list of sectors and subsectors of industry their number is

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about 400, while the detailed products list by grades and sizes numbers 12 million items. A great dynamicness, which is determined by the acceleration of scientific and technical progress and the change of the pattern of production and personal consumption on the basis of the development of new types of products and technological processes, is typical for intersectorial ties under present conditions.

A significant feature of the process of forming the proportions at present is the intensification of their interconnections, including the connections of the physical-material proportions with the proportions of the distribution of labor and financial resources. The careful coordination of the physical-material resources with the value indicators is especially important for meeting the effective demand of the population for commodity services of the necessary variety. As to the production of the means of production, here the production of various types of products, which meet uniform demands, particularly for interchangeable types of fuel and power, construction materials and so on, is being rapidly expanded. All this has caused the need for the considerable development of all types of balances.

The most important demand on the balance sheet method of planning at present is its use with allowance for the finding of the most effective means of the proportionate development of the economy on the basis of the economical use of resources and their purposeful distribution so as to ensure the meeting of the demands with the least expenditures.

The new demands being made on the balance sheet method of planning are being met in the practical activity of planning organs. The elaboration of balances is being accomplished more completely at all stages of planning, beginning with the preparation of variants of the preliminary balance sheet estimates for the control figures of the annual and long-range plans up to the approval of the main types of balances within the state plans. The substantiation of the calculations of the demands by individual items of the balances by using technical and economic standards has been improved. Modern computer equipment is widely used in the formulation of a number of balances, for example, in the centralized calculations of the demands for rolled ferrous metal products by sectors of machine building, for materials in construction, the aggregate balance of machines and equipment in value terms and others. A number of models of the intersectorial balance of the production and distribution of products in physical and value terms have been developed, which are beginning to be used also in planning estimates.

However, the achieved level of the elaboration of balances does not yet fully meet the increased demands of planning. The development of the balance sheet method in recent times has proceeded primarily in the direction of the increase of the number of balances being used with the retention of the basically formed methods of their compilation. A significant drawback is the fact that the main place in balance sheet work is assigned to the elaboration of annual balances, while for the present long-range (five-year) balances are not being used entirely. The necessary coordination of the

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three main types of balances--physical, labor and financial--has not been assured. The principle of efficiency is not always consistently followed in balance sheet work. The inadequately reliable balancing of the development of individual sectors of the national economy remains one of the unresolved complicated problems.

The planning organs at all levels and especially USSR Gosplan when drafting plans attempt to ensure their balancing, but there are some difficulties in solving this problem. They are the result of a number of causes. Some of them are of an objective nature, others involve shortcomings in the organization and methods of planning. The main objective cause is the fact that in recent years a number of sectors of the extractive industry have been developed by means of a shift to the use of less rich deposits or deposits in remote regions, which has led to an increase of the specific capital investments and the production cost. Thus, during the years of the Ninth Five-Year Plan in the petroleum and gas industry, metallurgy and the timber industry the increase of capital investments outdistanced the increase of the production of products. A tendency toward the increase of the production cost of the products of some sectors of the extractive industry and agricultural products was noted. All this adversely affected the rate of development of the basic sectors of heavy industry and the increase of resources of agricultural raw materials.

A number of difficulties in the formation of financial balances are connected above all with a certain lag of the increase of the production of consumer goods, which enjoy a greater demand, behind the increase of the monetary income of the population, as well as with the decrease of the growth rate of the profit.

Serious tasks on the improvement of the balancing of plans and on the assurance of the proportionate development of the national economy are set in the 10th Five-Year Plan. In a report at the 25th CPSU Congress L. I. Brezhnev especially emphasized that the assurance of the stable balanced growth of heavy industry is the core of the party economy policy for the long-range future. At the congress much attention was also devoted to the development of agriculture and the production of consumer goods on a scale which meets the demands of the population and the national economy. In connection with this during the 10th Five-Year Plan it is planned to increase the absolute increments of the production of petroleum and gas, the smelting of steel, the production of plastics and synthetic resins, chemical fibers. At the same time stepped-up assignments on the economy of the most important types of material resources were established. During the first three years of the five-year plan the recovery of petroleum and gas and the production of a number of basic chemical products and construction materials increased significantly. However, as L. I. Brezhnev noted at the November (1978) CC CPSU Plenum, the overall development of the economy in many respects depends on the further increase of the production of metal and the extraction of fuel.

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Additional measures on the acceleration of the development of agriculture are being implemented in conformity with the decisions of the July (1978) CC CPSU Plenum. Much work on the improvement of the system of planning as a whole, including the improvement of the balance sheet method of planning, is necessary along with the measures being implemented on the increase of production and the economy of material resources.

The development and enhancement of the role of all types of five-year balances are the most important direction of the improvement of the balance sheet method of planning. The five-year plans are the main form of planning of the economic and social development of the country. Within the framework of annual planning it is impossible to improve substantially the proportions of the development of the national economy and its main sectors, since the opportunities to increase production or save resources here are very limited. In connection with this the stricter limiting of some demands, the reduction of reserves, the increase of imports or the reduction of exports and so on are the main way of achieving a balance of development in the annual plans when there is a shortage of resources.

The complex and effective balancing of the development of the national economy and its sectors can be assured only in five-year plans, which create considerably more opportunities for the achievement of the proportionate development of associated sectors and works and the necessary value proportions. The drafting and coordination of the five-year plan with a breakdown by years as the basis of the proper balancing of annual plans are especially important.

In recent years the balance sheet work when drawing up five-year plans has been improved. The number of physical balances being elaborated has increased. Within the 10th Five-Year Plan 232 physical balances with a breakdown by years were approved, of them 154 were approved by the USSR Council of Ministers, while the remainder were approved by USSR Gosplan. The balance of labor resources and the main financial balances were drawn up by years. However, the established practice of elaborating balances when drawing up five-year plans still does not completely meet the current demands of the proportionate development of the national economy.

A significant drawback of balance sheet work when drawing up five-year plans is the fact that USSR Gosplan, as well as ministries and departments, as a rule, do not elaborate the physical balances in accordance with the products list being planned by them. Meanwhile, more than 13,000 balances are approved in the annual plans by USSR Gosplan and its organs. In the five-year plans a considerably smaller number of balances of production capacities are also used than in the annual plans, although the problems of expanded reproduction can be solved successfully only in long-range plans. All this attests to the expedience of enlarging the group of physical balances which are elaborated in the five-year plans, which will make it possible to coordinate quite completely the main intersectorial proportions.

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For the better provision of the five-year plans of production and capital construction with material resources it is necessary to determine the main directions of the distribution and supplies of allocated resources in a breakdown by sectors and the main consumers. The increase of the number of physical balances and the enhancement of their role require the corresponding expansion of the planned products list and production capacities, which are elaborated in the five-year plan. At the same time this products list should be more consolidated than in the annual plans, since in the drafting of five-year plans the specific types of new machines, equipment, instruments and materials cannot yet be entirely specified; substantial changes in the variety of consumer goods and in the dates of the placement of new types of products into production are possible.

A drawback of the system of value balances, which are drawn up in the five-year plan, is the lack of approved five-year financial plans with the necessary estimates by ministries, departments and councils of ministers of the union republics. In connection with this the plans on production and capital construction by sectors are inadequately backed by financial resources, changes in the economic interrelations of the sector and the state are not revealed, the planning of long-term credits is made difficult. The calculations of the main types of revenues and expenditures of the state, which are made in the five-year plan, are consolidated ones and subsequently are adjusted substantially. This especially pertains to the profit. The balance of the monetary income and expenditure of the population in a breakdown by union republics in the five-year plan is elaborated only for the final year of the five-year plan.

The systematic revisions during the five-year plan of wholesale prices, which are made for many sectors and subsectors, adversely affect the stability of the value indicators and the proportions of the five-year plan. Thus, during the years of the Ninth Five-Year Plan the total amount of the changes of wholesale prices was 15 billion rubles. As a result the coordination of the financial indicators of the annual and five-year plans was considerably complicated.

All this causes the need for the elaboration in the five-year plan of financial balances in the full amount mainly according to the group of balance sheet estimates of the annual plans, including the drafting of five-year financial plans for ministries and departments and their delivery to associations and enterprises (according to a consolidated group of indicators). An important condition of the effectiveness of the five-year financial plans and balances is the maintenance of the stability of wholesale prices, so that their revision during the five-year plan would be made only for individual types of products in case of sharp changes in the conditions of production.

In addition to the enlargement of the group of balances elaborated in the five-year plan, it is necessary to increase their validity. This is connected with the fact that when drafting the five-year plans an adequate

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technical and economic substantiation of the applied standards, including the assignments on the reduction of the rate of consumption of material resources, is not ensured. In part this is caused by objective difficulties of taking into account the achievements of scientific and technical progress. The shortcomings in determining the economic efficiency of new equipment are the primary cause. In connection with this the development of a system of progressive technical and economic norms and standards, which is elaborated for a five-year period and is made more precise subsequently by years, is an important direction of the improvement of balance sheet work.

The increase of the level of validity of the balances is the most important prerequisite for their directional nature, approval and delivery to the performers. The expansion of the work on the elaboration of the five-year balance of labor resources, especially with a breakdown by individual rayons, krays and oblasts, the making of balance sheet estimates of the supply with manpower of the main sectors of the national economy, industry and construction, as well as the training of skilled personnel and specialists are also of great importance.

One of the main prerequisites of the improvement of the elaboration of the balances in the five-year plan is the availability in them of the necessary reserves of material and financial resources. During the five-year period additional demands for resources usually arise, which are connected with the use of the latest achievements of science and technology, the development of new mineral deposits, as well as with changes in the conditions of foreign trade. Deviations in the production and purchases of agricultural products, which are caused by weather conditions, substantially influence the development of the national economy. Additional demands also arise with the need for the accelerated development of individual sectors or the solution of territorial problems.

A shortage of the reserves, which are stipulated in the five-year plans, especially for capital investments, under the conditions of substantial changes of material and financial resources and demands during the five-year plan leads to adjustments of the plans of capital construction, as well as the plans of production and economic indicators for a number of sectors of industry and the national economy, to violations of the planned proportions of the five-year plan. Along with the reserves of resources of raw materials, fuel and materials, including for additional capital investments, the reserves of consumer goods with allowance for the possible increase of the effective demand of the population, the reserves of financial assets in the estimates of the balance of income and expenditure of the state and others are also of great importance.

The creation of a system of fixed standards of the reserves of the most important types of material resources, which are stipulated in the balances, especially for scarce materials, is the main means of solving this problem. In this case all the indicated reserves should be coordinated with each other. At the same time it is improper to direct one's attention toward

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the formation in the five-year plans of especially considerable reserves, especially under the conditions of a shortage of a number of the main types of raw materials, material and financial resources. The main way of ensuring the reliable balancing of the five-year plans is the more careful determination of the demands of the national economy and the possible resources. The amounts of the reserves should be established only on the basis of those demands which it is impossible to foresee in the calculations of the five-year balances.

Consolidated balance sheet estimates for the long-range future of the economic, scientific, technical and social development of the country are conducive to the increase of the level of balance sheet work in the five-year plans. They make it possible to characterize the main shifts in the production and consumption of the most important types of material resources with allowance for the trends of scientific and technical progress, as well as the availability of natural resources and manpower by regions of the country.

Useful experience on the formulation of consolidated physical balances, as well as the balance of labor resources for the long-range future has already been gained in USSR Gosplan during the work on the main directions of the economic and social development of the country up to 1990. The data of these balances are also promoting the determination of the changes in the structure of the demands of the national economy and the population during the five-year plans, the establishment of the most effective ways of meeting them with allowance for the forming trends for a long period. All this attests to the need for the development of an intercoordinated system of balances for the long-range future, for the five-year plan and the annual plans.

Of great importance for the successful elaboration and fulfillment of the planning balances is the enlargement of the group of annual report balances which at present are drawn up according to a significantly smaller products list than the planning balances, which complicates the analysis of the actual proportions in the development of the economy. It should be emphasized that the annual report balances are the most important means of monitoring the fulfillment of the planning balances and the observance of the planned proportions. However, in the check of the fulfillment of the plans, especially the annual plans, the violations of the planning balances are being inadequately analyzed. As a result the timely taking of steps to eliminate the arising individual bottlenecks and disproportions is being complicated.

One of the most complicated problems of the elaboration of balances is the assurance of their intercoordination. On the scale of the national economy the physical, labor and financial balances are coordinated on the basis of the comprehensive substantiation of the state plans according to all types of resources. Such work is also performed within the calculations of the main indicators of the balance of the national economy. The formulation of the planning balances of the social product and the national income are

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the primary content of these calculations. The balances for such very important aspects of expanded reproduction as the dynamics and use of fixed capital and labor resources are elaborated separately.

The separation of the groups of balances especially influences the drafting of the plans of development by sectors. This finds expression above all in the inadequate coordination of the balances of material and financial resources. Thus, the plan on the production cost and the profit is directly not coordinated with the allocated material resources, which in most sectors constitute the bulk of the production costs. The plans of capital investments are coordinated with material resources in value terms only for deliveries of equipment on the basis of the elaboration of the aggregate balance of the equipment.

The elaboration of physical balances not only in physical-material terms, but also in monetary terms might be the main means of the direct coordination of material and financial resources. An example of coordination of this type is the above-indicated calculations of the aggregate balance of equipment in value terms, which generalize the data of a large number of balances by its individual types.

It is most complicated in the calculations of physical balances in value terms to determine the average wholesale prices of the material resources which are used according to individual directions. The data of the annual intersectorial report balances of the production and distribution of products, which characterize the consumption of material resources by sectors of the national economy in value terms, might be the underlying basis for the calculations of the physical balances in value terms. However, for the practical use of these data it is necessary to elaborate specially the dynamics of the average prices of the consumption of material resources. The NIIPiN [Scientific Research Institute of Planning and Standards] of USSR Gosplan in the early 1970's made experimental calculations of the balance of ferrous metals in value terms, but, unfortunately, subsequently this work was not continued.

Considerable experience on the elaboration of physical balances in value terms has been gained for consumer goods. Balances of this type are elaborated primarily for the main nonfood consumer items. At the same time for many balances of consumer goods and above all for foodstuffs only the deliveries according to the market funds are elaborated in monetary terms, which complicates the analysis of the structure of the use of goods by individual directions. In our opinion, the elaboration of the balances of the means of production in monetary terms should be revived and the calculations of the balances in value terms for foodstuffs of a complex assortment should be made.

The more extensive use in the system of balances of calculations in value terms is of great importance for the consolidation of the unity of the planning of physical-material and value proportions. This will also make it

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possible to improve the substantiation of the financial balances on the basis of their coordination with the physical balances and will promote the more complete accounting in planning of the effect of the law of value under socialism.

The expansion of the practice of elaborating complex physical balances as the most important condition of intercoordinated material and technical supply is of great importance for the improvement of the balance sheet method. At present the majority of the physical balances are compiled as one-product balances and only some of them are compiled as complex balances, for example, the balance of boiler and furnace fuel, of reinforced concrete structures, the aggregate balance of lumber in terms of round timber and several others. However, the group of interconnected balances can be expanded, for example, by means of the balances of all types of fibers, some interconnected types of machines and equipment, construction materials and so forth. The importance for long-range estimates of even more "extensive" complex balances, such as the balance of construction materials (ferrous metals, aluminum, plastics and wood), systems of machines and machinery, which ensure the complete mechanization of difficult and labor-intensive jobs in the sectors of the national economy, textile raw materials, interchangeable food products, is increasing.

The use of complex physical balances requires the solution of a number of methodological and organizational questions. It is necessary to elaborate methods of the determination of generalizing measures, which could characterize the given set of interchangeable materials with allowance for the consumer qualities of the individual types of products. For example, in the balance of construction materials 1 ton of aluminum replaces in construction 3 tons of ferrous metals, while 1 ton of plastics replaces in machine building 5 tons of ferrous metals. The NIIPiN of USSR Gosplan proposed to develop special coefficients of the interchangeability of material resources, which take into account both the efficiency of the product being produced and the conditions of its use by different consumers.

The method of elaborating complex balances is more complicated than that of one-product balances, since interchangeable types of material resources should be distributed with allowance for the peculiarities of their consumption in individual sectors and the possible replacement of some materials by others. Here it is necessary to calculate the economic feasibility of such a substitution depending on the cost of the individual materials, their quality, degree of scarcity and other factors. Due to the large number of factors of this type when elaborating complex balances it is necessary to use various economic-mathematical models. The use of the calculations of the intersectorial balance of the production and distribution of products plays a noticeable role in ensuring the completeness of the entire system of physical balances. However, this question requires special examination.

An important direction of the improvement of the elaboration of balances is the assurance of the unity of the fundamental scheme of their compilation. The main principle of the existing scheme of physical and financial

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balances is the comparison of the demands with the resources, which makes it possible to establish the presence of individual disproportions and "bottlenecks." The use of this scheme is an essential condition of the assurance of the proportionate development of the national economy. However, for a number of types of balances the demands are not being compared with the resources. This pertains above all to the balances of fixed capital and production capacities, the scheme of which foresees only the movement of capital and capacities: their availability, increment, retirement and increase by the end of the planning period. Such a scheme does not make it possible to establish to what extent the planned increase of the fixed capital and capacities corresponds to the demands of the national economy.

One of the main causes of the shortcomings of the existing scheme of the elaboration of the balances of fixed capital and production capacities is the nonelaboration of standards of the demands for them by sectors and works. Meanwhile, such standards are necessary for the planning of capital investments on the basis of the increase of production, as well as with allowance for the assignments on the increase of production efficiency and above all the rise of labor productivity.

The demands for some items of the physical balances are also not being fully taken into account. This pertains, for example, to material resources being allocated for capital repair and current operating needs, the market funds and reserves of suppliers and consumers of a number of scarce materials. As a result it is impossible to compare the actual amount of the demands with the resources, which leads to the incomplete balancing of the plans according to some items.

All this attests to the need for the consistent use for all types of balances of that scheme of estimates, which would provide for the determination of the total amount of the demands. For this the data on the total amount of the demands should be cited in the used scheme of the elaboration of balances for individual directions of the use of material resources, where the amount of the demands is not being fully satisfied. The comparison of these data as a whole according to the balance will make it possible to establish the degree of satisfaction of the total demands of the national economy and the population. Here by a demand we understand a really existing demand which stems from the established standards, from the amount of the effective demand of the population.

The assurance of the coordination of the physical balances and plans of distribution, which are elaborated by different links of planning and management, is an important question of the improvement of physical balances. Thus, at present USSR Gosplan draws up about 1,700 balances, USSR Gosplan directly--about 2,500 balances, the all-union main administrations of supply and marketing attached to USSR Gosplan--about 11,000 balances, the union and union republic ministries--approximately 40,000 balances. Here the balances and plans of distribution of USSR Gosplan cover more than 70 percent of the value of the products, while for some very important material resources this proportion is 90-95 percent, ferrous metals--99 percent, fuel--100 percent.

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Nevertheless the physical balances and plans of distribution, which are elaborated by USSR Gosplan, cannot ensure the balancing of the demands and production according to a specific products list. This work is done by USSR Gossnab and its organs, as well as by ministries and departments. The balances and plans of distribution, which are elaborated by them, are the concrete expression of the balances elaborated by USSR Gosplan or their supplement primarily by means of the products of the chemical industry, equipment and instruments, which are consumed in relatively small amounts. Under the conditions of the performance of balance sheet work by different organizations cases occur when in satisfying the overall demand for basic materials and equipment discrepancies on the specific list of products being produced arise and the necessary auxiliary materials and components are not allocated. The proper coordination of the deliveries of material resources which meet similar demands is sometimes not ensured. Thus, the balance of linoleum for floors is elaborated by USSR Gosplan, while the balance of parquet is elaborated by USSR Gossnab.

The achievement of the completeness of material and technical supply requires above all the increase of the coordination in the work of various organizations which distribute materials resources, and above all USSR Gosplan and USSR Gossnab. The proper determination of the list of products, the assignments on the production and the balances for which are established in the state plan, is also of great importance. It is necessary to include in this list all the types of products, which play an important role in the establishment of the national economic and intersectorial proportions, the increase of the standard of living of the people, the strengthening of the defensive capability of the country and the development of foreign economic ties, as well as scarce types of products. At the same time it is necessary to have and constantly to update the unified list of balances and plans of the production of products which are liable to centralized distribution on the basis of the All-Union Classifier of Industrial and Agricultural Products with an indication of the individual organs of planning and management, which carry out this distribution. There should also be determined the procedure of coordination by planning organization of the interrelated balances and plans of distribution.

The development of direct ties between supplies and consumers, during which the peculiarities of the pattern of production and consumption for each production association (enterprise) can be taken fully into account, is an essential condition of the proper balancing of production with material resources according to a detailed products list. The organization of long-term direct ties for deliveries of products should basically be completed already during the 10th Five-Year Plan.

Above it was noted that the establishment of the most efficient proportions, in case of which the meeting of the demands is achieved with the least expenditures of material, labor and financial resources, is the most important demand on the balance sheet method. This approach to balance sheet work in recent years has been especially typical of such a balance as the

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balance of fuel and power resources. In connection with the extensive use of gas and petroleum the cost of a conventional ton of consumed fuel resources has decreased substantially, which led to a saving of assets during the years of the last three five-year plans in the amount of approximately 30 billion rubles. The effectiveness of the balance of textile raw materials increased due to the replacement of natural fibers by artificial fibers.

The main direction in increasing the efficiency of the use of resources when elaborating all types of balances is the determination of the demands of the national economy on the basis of progressive standards which provide for the gradual reduction of the expenditures per unit of production. The economy of resources at present is playing a greater and greater role in meeting the demands. Thus, with an overall planned increase of the production of finished rolled ferrous metal products during the 10th Five-Year Plan in the amount of 19 million tons, its economy in 1980 should be more than 9 million tons, or about 50 percent of the increase of the resources, for cement--more than 5 million tons, or more than 20 percent. The economy of fuel and power resources in 1980 is envisaged in the amount of 190 million tons, that is, more than 30 percent of the total increase of the resources of the fuel and power balance. The economy of lumber in capital construction and the production of packaging, the planned amount of which--30 million m<sup>3</sup>--exceeds many times the stipulated increase of the export of timber, is of even greater importance. The established assignments on the economy of materials resources in 1976-1977 on the whole were fulfilled.

The role of the economy of labor inputs during the use of labor resources is especially great. During the years of the 10th Five-Year Plan the increase of the number of workers and employees in the sectors of physical production is envisaged in the amount of 4.5 million, while the economy of manpower by means of the increase of labor productivity in terms of 1980 should be 26 million people. During three years of the five-year plan the economy of manpower was about 11 million people with an increase of the number of those employed in physical production of about 4 million people.

However, given the achieved gains in the area of balance sheet work, in planning practice a unified system of indicators of the evaluation of the efficiency of the economy of materials resources has not yet been created.

Along with the economy due to the decrease of the rate of consumption of resources, as compared with the base period, it is necessary to calculate also the economy due to improvements in the pattern of consumption of materials. Here a shift should be made to the extensive making of calculations of the economy of materials resources in value terms, which will make it possible to take this economy more fully into account in the plans on the production cost and the profit. The making of such calculations is especially urgent under present conditions, when the economy of individual materials in physical terms is at times achieved by means of an increase of the use of other, at times more expensive materials (for example, with an increase of the use of nonferrous metals and plastics instead of ferrous metals).



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The problem of making comprehensive calculations of the economy of all expenditures when elaborating individual types of balances is also becoming urgent. Thus, when elaborating physical balances calculations should be made not only of the economy of materials resources, but also of the expenditures of living labor and capital investments. This is especially important because the economy of material expenditures frequently involves an increase of other types of expenditures, the influence of which at present is not taken into account. The calculations of the economy should be made not only for the producing enterprises, but also for the consuming enterprises. Therefore the amount of the total economy, which is connected with the use of more economical types of material resources, can be obtained on the basis of the data on the national economic impact, which includes the total economy both for the producer and for the consumer of the product with allowance for the economy of material resources, living labor and capital investments. Along with these general indicators for some types of balances it is expedient to use more extensively specific indicators of efficiency. For example, in the balance of rolled ferrous metal products the coefficient of the yield of satisfactory metal from ingots, the coefficient of the use of rolled ferrous metal products in machine building and so on can serve as such an indicator.

The creation of a unified system of norms and standards, which would cover all types of resources--material, labor and financial--is of decisive importance for the economical use of all types of resources. The existing norms and standards characterize at all levels of production mainly the use of material expenditures. The standards of the expenditures of labor resources are used primarily at the level of associations and enterprises. The group of financial standards, which includes only the standards of the provision of enterprises and associations with working capital, the standards of the formation of economic incentive funds, the norms of amortization deductions and several others, is limited.

The plan of the first section of a comprehensive system of standards, which covers the main types of material, labor and financial resources, has presently been prepared. It is envisaged to elaborate this system from the level of enterprises up to USSR Gosplan, which will make it possible to accomplish the necessary coordination of the norms and standards at various levels of planning. It is proposed to use considerably more extensively the standards of the use of equipment and the calculations of the demands for it, to elaborate a number of new economic standards, including the enlargement of the group of standards of capital investments and the standards of the expenditures of wages per unit of volume of production. The development of systems of economic standards will promote the integral coordination of the amount of expenditures of certain resources or others with the achievable results and above all with the output of products. The creation of a unified system of standards presumes not only the enlargement of the group of standards and the assurance of their intercoordination. As practice shows, the isolated approval of different standards, including standards of material and labor expenditures, frequently has the result that the

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planned economy of material expenditures can be covered by an increase of the expenditures of living labor, and vice versa.

It is expedient to exercise control over the achievement of the overall economy of assets when making calculations of the standards of expenditures in monetary terms. However, this requires the performance of much preliminary work and the extensive use of computers.

The most important demand on the system of standards is the assurance of their progressive nature on the basis of the consideration of the achievements of the scientific and technical revolution. This problem is especially pressing, since in planning practice overstated, technically unsound rates of consumption of material resources are still being used, there are instances when the planning standards are established higher than the actual consumption of materials. In solving this problem it must not be forgotten that frequently the norms of consumption of materials are not observed and orientation on the actual consumption would mean the refusal to introduce sound standards. It seems to us that, while maintaining the existing system of determining the standards for the main consolidated types of norms and standards, the comparison of the planning norms not only with the preceding norm, but also with the level of the actual consumption should be made.

It is possible to solve many of the above-examined questions of improving the balance sheet method of planning only in integral connection with the overall increase of the scientific level of all methods of the economic and social planning of the development of the national economy in conformity with the main tasks set by the 25th CPSU Congress and the subsequent decisions of the party and the government.

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FINAL PRODUCT ACCOUNTING WILL IMPROVE AGRICULTURE'S EFFICIENCY

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[Article by VASKHNIL Academician V. Tikhonov, and M. Lezina:  
"Final Product of the Agroindustrial Complex"]

[Text ] One of the most important characteristics of contemporary economic development is the progressively more complex structure of social production, the subdivision and consolidation of production functions, and their attachment to relatively independent sectors. The expansion of intersector linkages leads to the increased role and significance of the planned regulation of intersector exchange proportions in order to orient each sector towards the maximization of final economic results. At the November (1978) L. I. Brezhnev stressed that orientation towards the final results of production should be at the center of all work on the new five-year plan. This "requires more detailed attention both towards intersector and intra-sector proportions.

The process of the division of labor accompanying the creation of new sectors, the rapid development of intersector economic linkages forming the material basis for intersector integration, has, in recent years, been especially intensive in the economy's agrarian sector. During the past decade such specialized large sectors as water resources and land improvement, machinery building for animal husbandry and fodder production, rural construction, the mixed feeds and microbiological industries, the repair of equipment, and material-technical support and supply for agriculture have been, in essence, built from the bottom up. The problem now is to form industrial feed production and the meat animal sector. Tractor and agricultural machinery building, the production of mineral fertilizers, the processing industry specializing in preparing high quality products from agricultural raw materials, the transportation and communications system, a well developed network of wholesale and retail trade in agricultural products, and processed products are all under intensive

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development. In other words, an entire multisector system oriented towards the expanded reproduction of agricultural output, its processing into objects of final consumption, and its delivery to the consumer is being formed.

Although this system has not yet been organizationally formalized it exists and functions in the form of a national economic agroindustrial complex (AIC), being realized through the existing widespread distribution of agroindustrial enterprises and associations. Each of the sectors making up the AIC carries out one specific function within the intersector division of labor, specializing in its own stage of a single process of reproducing a final product produced from agricultural raw materials. At the same time each sector maintains its economic independence and relative economic individuality. In this regard it has its own specific sector goals implemented through a system of intersector commodity relations.

The significance of the intersector commodity circulation as a factor determining to a great extent the economic results of management has increased especially rapidly for agriculture. During 1966-1970 the relative share of kolkhoz and sovkhoz expenses for payments for material deliveries and services from nonagricultural sectors amounted to 48.5 percent of all material expenses, during 1971-1975 it increased to 54.6 percent and in 1976 reached 61.3 percent. At the same time the sector is being increasingly converted to a supplier of raw materials for the processing industry. Thus, in 1959, out of a total mass of agricultural output which entered circulation outside the sector, about 43 percent was consumed by the population and almost 52 percent was used as raw material for industrial processing. During 1972 the share of raw material amounted to 66 percent and the share of consumed final product 31 percent.

Special requirements are made upon the planning and management system. It must, not infringing upon sector economic interests, orient all sectors of the AIC towards the optimization of sector and the maximization of final national economic results. This presupposes the maintenance of stable, regulated intersector economic relations which, as is stressed in the decree of the July (1978) Plenum of the CC, CPSU "should assist in the growth of the community and the unity of interests of the state, kolkhozes and direct producers of products, and serve as an active factor in the growth of labor productivity." It was noted at the plenum that certain negative factors with regard to this problem have not yet been overcome. In recent years the terms of intersector exchange have become unfavorable for agriculture. Prices for material resources and rates for productive services provided to kolkhozes and sovkhozes by nonagricultural sectors

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have increased considerably faster than the magnitude of their useful effects. As a result, despite the increase in procurement prices, the amount of agricultural output exchanged for each unit of supply and services is systematically increasing. This leads to an unjustifiable increase in material outlays, the growth of product prime cost, and reductions in the profitability of kolkhoz and sovkhoz production. In addition, technical resources for labor are still not supplied in an integrated manner. This reduces the efficiency of their utilization and makes necessary the employment of sizable quantities of manual labor and the retention of relative surplus labor in agricultural production.

All this is to a considerable degree explained by the insufficient thoroughness and diligence in the orientation of the sectors making up the AIC towards final economic results, one of the most important forms of which is the final product of the agro-industrial complex. The existing system of statistical accounting is not yet adapted towards determining the magnitude of the AIC final product and the size of the allocations to each sector participating in the production of a given product. This leads to difficulties in AIC planning and in the development of an effective system for economically orienting each sector towards the maximization of final product.

This is why it is necessary to develop methods for calculating the size of AIC final product which would realistically evaluate the share of each sector in its formation. The first attempt at solving this problem was made by M. Eydelman on the basis of the intersector report for 1972. Such a methodological approach was necessary. However, it was very complex and the potential for its use is restricted. It is therefore necessary to reconstruct the entire system of statistical accounting for AIC sector activity in order to obtain information on the role and share in the production of final product. Such a restructuring requires the solution of a number of methodological problems: the essence, boundaries and structure of the AIC, methods for calculating net product and net income created in each sector, and on this basis developing methods for calculating final product which reliably represents the mechanism of AIC formation in the mutually related stages of production.

The AIC is a production and economic system, the goal of which is the expanded reproduction of objects of consumption, reserve and export stocks of products of agricultural origin. Theoretically, as an economic category of developed socialist society, the AIC reflects the totality of economic relations operating within the interlinkage of relatively independent sectors producing agricultural goods and processing them into finished items of demand and delivering them to the consumer. It follows from this that; first, the agroindustrial complex

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includes only those linkages which arise in the process of agricultural production and processing into final consumer goods; second, all those production and economic linkages which are irreplaceable in carrying out the target function (tasks) are of major significance.

In its natural form, the AIC final product is created mainly in agriculture, sectors of the food and light industries, and partially in the public food service system. The initial stage in the reproductive process of the entire complex, the central element of which is agriculture, is the production of the means of production for the sector making up the AIC, and the final stage is retail trade. At all stages of the reproduction process, sectors in the AIC infrastructure carry out service functions. There is widespread reference in the economic literature to the functional structure of the AIC, which reflects the sequential and parallel stages in the process of reproducing its final product: 1 - production of the means of production for AIC sectors; 2 - production of agricultural goods; 3 - the production of produce, footwear, fiber and other goods from agricultural raw materials; 4 - sales of AIC goods to the consumer through the wholesale and retail trade system; 5 - production and technical servicing of all stages in the reproduction cycle. These structural elements also determine the functional boundaries of the agroindustrial complex<sup>1</sup>. In addition, the AIC is also a totality of relatively detached sectors, participants in economic interaction, making up the single target function. The AIC is a complicated multisector subdivision of the national economy. It is (and should be) a relatively independent and unified object of central planning.

If one views the agroindustrial complex from this perspective then a more thorough analysis of its sectoral structure is required. First of all, not all sectors of the national economy supporting the AIC with means of production can be included within it. For example, motor vehicle building, the chemical industry, and the petroleum refining industry, while playing an important role in AIC functioning, are not included within it and their activities are only included to the extent that they participate in the formation of the final product of the entire sector. This means that the sector boundaries of the AIC as a production subdivision of the national economy substantially differ from its functional boundaries.

Second, a number of sectors of the food and light industries processing agricultural goods are simultaneously suppliers of means of production to agriculture. During 1966-1975 the deliveries of such sectors increased more than 6 fold, and, according to our studies, in 1975 amounted to more than 9 billion rubles.

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As can be seen, the sector structure of the AIC is also distinguished from its functional structure. Therefore, in order to study the mechanism of AIC final product value formation and to calculate the share of each sector in the final effect, in addition an analysis by stages of the reproduction process it is also necessary to carry out a differential analysis by elements making up its sector structure.

It is customary to consider the final product of an intersector production complex as the output created during a definite period of time (usually one year) and entering into personal or productive consumption beyond the boundaries of such a complex, i.e. not entering into the current productive use within it. The natural, material-physical form of AIC final product is the entire amount of items for consumption manufactured from raw material of agricultural origin; agricultural production entering into private and social consumption without industrial processing; products entering state export and reserve stocks, and the productive consumption of sectors in the national economy not included within the AIC.

The sum of the value of these groups of products reflects the total magnitude of AIC final product value at the sales stage, i.e. where it is manifested. With regards to the sources of its formation (production), they turn out to be obscured and the extent of AIC sector participation in their creation is distorted. That is why this method for calculating AIC final product can only be used on a restricted scale. In order to estimate the role of each sector in the AIC in creating final product, the production approach is necessary. This would reveal the actual sources of formation. The starting point for this method is the calculation of the magnitude of the net product created in AIC sectors. This is the basis of final product value.

Net product is the totality of all value created within a definite time unit (usually a year). In a multisector system, in which each sector carries out a sequentially implemented stage in the process of reproducing a single product, the magnitude of net product created at the first stage of the cycle can be used as a base. At all subsequent stages the newly created value is "attached to this amount. In the AIC the production of agricultural goods can be considered as this stage since the sectors carrying out subsequent stages -- the production of means of production -- realize the net product created by them through prices reaching back to the beginning of producing and processing agricultural goods. At this stage all newly created value in plant and animal raising is included in the calculation. The existing methods of statistical accounting do not precisely reflect its magnitude. As a result there is an artificial increase in the

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magnitude of net income in the reported component of newly created value in the sector and a corresponding reduction in the magnitude of necessary product. In addition, not all net product produced in agriculture is taken into consideration.

For example, in 1972 the value of agricultural net product statistically reported amounted (in current prices) to 59.6 billion rubles.<sup>2</sup> The fund for the payment of labor expended in the production of agricultural products at state enterprises and kolkhozes was 28 billion rubles and the amount of net product realized by agricultural enterprises was 8 billion rubles. The remaining 23.6 billion rubles (59.6 - 28.0 - 8) is considered the net income of the population engaged in individual operations. The latter cannot be considered proper, since, first of all, private subsidiary operations are organically linked with public production at kolkhozes and state agricultural enterprises and function with the constant participation of their productive resources. Consequently, part of the value of its goods is produced by the labor of workers in the public sector and is only sold in the private sector. Secondly, the payment of labor in the state and kolkhoz sectors is below the socially normal level and private operations are objectively a source of part of the necessary product.

All this means that with regard to its economic nature newly created value in private subsidiary operations is divided into three parts: necessary product created by the labor of workers in social production; necessary product created by the labor of workers engaged in private subsidiary operations; surplus product created by them. If one assumes that the average social magnitude of outlays for the reproduction of labor power is at the level of wages in nonagricultural sectors of the national economy, then the first part amounts to 9.2 billion rubles, the second 8.2 and the third 6.2 billion. Then the structure of newly created value in agriculture will be as follows (in billions of rubles):

Public sector	37.2v	+ 8.0m	=45.2
Private sector	8.2v	+ 6.2m	=14.4
	45.4v	+14.2m	=59.6

A question arises in the analysis of these figures: why does the norm for surplus product in the private sector turn out to be several times higher than in the public sector? Theoretically there should not only be no difference here, but, on the contrary in the public sector, characterized by a higher level of labor productivity the surplus product norm should be higher than in the private sector.



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This is due to inaccuracy in statistical reporting. The USSR TSSU [Central Statistical Administration], summing up data on the size of the net product created in agriculture states that it is reduced since part of the net product of agriculture is accumulated in the centralized net income of the state by a system of turnover taxes and is included in industry, that is,<sup>3</sup> not at the site of its creation, but at the site of its sales.

As is known, the turnover tax not only has a function of accumulating net income in the centralized net income of the state, but also serves as a tool for redistributing primary incomes. In this case we are not interested in the economic nature of its component parts, but in its primary sources, from which part of the centralized net income is received by the state. Agriculture is one of these. Part of the net income created in this, the material basis of which is the surplus net income in the form of differential rent is, in the course of intersector exchange, shifted to the processing industry and realized in the form of industrial product prices. Naturally, the problem arises of justifying the incidence of the turnover tax on production and the industrial processing of agricultural raw materials, and between sectors carrying out these functions.

This task is solved in various ways: the method of determining the magnitude of differential rent on the basis of calculating unit prices, the method of calculating outlays of reduced labor based upon intersector balances, and others. All these produce roughly equivalent results. Since the first method is distinguished by high labor intensity and requires special study of the quality of farm lands, in this case we prefer the method of calculating reduced labor outlays. In 1972, the light and food industries processed 50.3 percent of agricultural gross output. This means that out of the average annual total of 28.7 million agricultural workers, 14.4 million were engaged in the production of such raw materials. About 3.4 million annual workers in the light industry sector were engaged in the industrial processing of agricultural raw material, and in the food industry the figure is 1.7 million.<sup>4</sup>

A coefficient of 1.2 was used in order to reduce labor at industrial sectors.<sup>5</sup> In the study it was established that of the labor outlays for the production and processing of raw material of agricultural origin 70.2 percent were in agriculture, 19.8 percent and 10.0 percent respectively went to the light and food industries. This computed structure was used to delineate the share of agriculture in the part of the turnover tax which is placed upon the light and food industries on the sales of products made from agricultural raw material.

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In 1972 agriculture accounted for about 26 billion rubles of the total turnover tax entering the state's centralized net income from sectors engaged in the processing of agricultural products. The total net product amounted to 85.6 billion rubles (59.6 + 26.0). Kolkhozes and state agricultural enterprises are the suppliers of the overwhelming share of raw material to the processing industries. One can therefore be completely justified in including this part of net income as the public sector of production. The structure of its net product also changes correspondingly. In the public sector it amounts to 71.2 billion rubles (45.2 + 26.0), and in the private sector remains as before -- 14.4 billion rubles.

The second stage in the study is the determination of the value of the "attached" net product created in the food and light industries, in infrastructure sectors and the circulation sphere. The value of the net product of these sectors is calculated on the basis of total wages, profits, and turnover tax.

In order to determine the net income of these sectors accruing to agroindustrial production, coefficients based upon intersector balances and current statistical materials which indicate the relative share of raw materials entering these sectors from agriculture and the percentage of sector workers engaged in its processing and the percentage of services provided to the sectors making up the complex by sectors in the infrastructure and circulation sphere have been developed.

Sectors of the food industry, with the exception of the fisheries industry, work almost completely with agricultural raw materials.<sup>6</sup> Therefore part of the net product of these sectors is included in the AIC. The net product of sectors in the light industry is included in the AIC in proportion to outlays for labor utilized in the processing of agricultural raw material. The size of the net product created in trade, the procurement system, material-technical supply, transport and communications is determined similarly. The size and structure of net product value for 1972 calculated by this method and arranged by groups of sectors making up the AIC is as follows:

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	Net product (bill. rubles)	Including		Norm for surplus product (percent)
		Necessary product (bill. rubles)	Surplus product (bill. rubles)	
Agriculture	85.6	45.4	40.2	88.5
Including				
Public Sector	71.2	37.2	34.0	91.4
Private sector	14.4	8.2	6.2	76.5
Food industry	14.0	3.5	10.5	300.0
Light industry	16.7	4.5	12.2	271.1
Trade and public food service, pro- curement, material- technical supply, and sales	13.1	6.7	6.4	95.5
Transport (freight), and communications in service of production	2.4	1.2	1.2	100.0
For AIC as a whole	131.8	61.3	70.5	115.0

Materials for the calculation of the size and structure of net product and net income of the agroindustrial complex produce extensive and important information for the analysis of the intersector relationship of economic conditions and results of economic activity. The dynamics of these indicators can be used to improve the planned management of intersector linkages in the AIC.

From 1966 to 1975 the size of AIC net product increased from 96.0 to 146.2 billion rubles, or by 52.3 percent. The lowest rates of growth in net income were in agriculture. As a result the relative share of this sector in total AIC net income was reduced from 72.5 percent to 62 percent, while for the remaining sectors it increased. This is a normal process, indicating the intensification of the division of labor, improvements in the socialization of production in the AIC, and the constant tendency

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towards the transformation of agriculture into a specialized "pure" sector engaged directly in plant and animal raising.

Concurrently, attention should be directed towards two conditions: First, the high norm for surplus product in the processing industry sectors. This is due to a number of factors, in particular the higher level of labor productivity here, compared to that in agriculture. To a certain extent the surplus product norm influences price dynamics. There is a large difference between procurement prices for agricultural raw materials and wholesale prices for processed products entering agriculture from these sectors. For example, during 1966-1976 procurement prices for grain did not change, but prices for mixed feeds delivered to agriculture from the food industry doubled. During these years the deliveries of mixed feeds to kolkhozes and sovkhozes increased 2.8 fold, while their monetary cost, in current prices increased 5.7 fold. The second factor is the high growth rates of net product and net income in the sectors of the circulation sphere, in which the systems of procurement material-technical supply and sales occupy a significant share (See table)

	Structure of AIC net product (percent)			Average annual growth rate of AIC net product (percent)
	1966	1972	1975	1966-1975

Agriculture	72.5	64.2	62.0	3.0
Light industry	10.4	12.7	13.8	8.0
Food industry	9.7	10.6	11.6	6.9
Trade, procurement, material-technical supply and sales	5.7	9.9	10.5	12.1
Transport and communications	1.7	1.9	2.1	7.3
AIC as a whole	100.0	100.0	100.0	4.7

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Such a relationship of growth rates can hardly be justified. Characteristically, the growth in net income per 1 percent growth in wages during 1966-1975 in agriculture was 1.3 percent while the number of employees was reduced, in sectors in the circulation sphere it was more than 1.5 percent, in spite of the fact that the average annual growth rate in the wages fund in such sectors was 9.2 percent with an average rate of such growth in the AIC as a whole of 4 percent. Obviously, the difference between sectors in the AIC with regard to surplus product norms and growth rates of net product is to a considerable extent explained by proportions in intrasector exchange which are unfavorable for agriculture.

Examined from a value perspective, the final product of the AIC is the total net product created in AIC sectors, amortization deductions made from fixed productive capital, the value of objects of labor and productive services obtained from sectors producing means of production and conducting production service functions (for example, repair, land improvement construction, and the servicing of water resources systems, etc). The final product of the AIC should include the net product and amortization deductions of specialized sectors in machinery building producing the means of labor for all other sectors of the AIC. With regard to the objects of labor, the AIC final product should include the value of those goods from outside of the the complex. This will take place in due course when the agroindustrial complex is formed as a relatively independent subsystem of the national economy and as an integral object of management. Now, however, when this formation has not yet occurred, the calculation of the value of subjects of labor created in these sectors and used for the production of AIC final product is the sole method for reflecting the growing role of these sectors in the creation of food products and other consumer goods manufactured from agricultural raw materials.

Output directed towards intrasector production are intermediate products, just like the value of agricultural raw materials entering the processing industry within the complex. The final product of these elements is reflected through the size of net product. One should keep in mind that a sizable share of the subjects of labor (all seeds and part of the feed) created in agriculture for intersector consumption are stocks at the beginning of the year. That is, they are intended for consumption in a future period and consequently should be included in AIC final product. To the extent that it is assumed that the value of seeds and feeds consumed in a given period of production are equal to the value of these subjects of labor intended for a future period we include this magnitude in final product.

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However, such values do not coincide, and consequently in calculating AIC final product their differences should be taken into consideration.

The contemporary information base does not permit the direct estimation of the magnitude and structure of AIC final product. It is necessary to carry out complex and laborious calculations using materials from intersector balances, current sector and general state statistics in order, in particular to determine the share of each sector in AIC final product. We made the calculations of amortization deductions of fixed capital similar to the net product calculation with the help of specially developed coefficients.

At the present stage of its formation AIC final product value is broken down into the following elements: magnitude of net product created in agriculture; part of the net product of sectors of the food and light industries, sectors of the service sphere, transport and communications (engaged in production servicing) rendered to the processing, transport and sales of agricultural output and processed products; amortization deductions from the value of fixed productive capital of agriculture, sectors of the processing industry, the circulation sphere, transport and communications utilized for the production, processing, transport, and sales of agricultural products and processed items; the value of subjects of labor entering agriculture, the processing industry, the circulation sphere, and transport and communications from resource producing sectors to the extent that they are utilized for the production, transport, processing and sales of agricultural products and processed good. In the appropriate accounting one can also include here the difference between the value of goods of agricultural origin productively consumed in agriculture in a given year and the value of their reserves at the beginning of the subsequent year.

The agroindustrial complex is characterized by an abundance of intersector linkages. A given sector is a supplier and consumer of the same types of products. An orientation towards the gross turnover between results in the complication of the accounts and double counting, which amounts up to 40 percent of gross output volume, but also promotes increases in unproductive expenditures. This is especially manifest in the operation of the procurement system, where counter flows of the same types of products assume gigantic scales. For example, in 1960, 15.4 percent of the total grain procured was returned to agricultural enterprises in the form of feed and seed, while in 1976 the figure had reached 36.6 percent. This leads to unjustifiable increases in agricultural enterprise production

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costs. In our opinion it is necessary to decisively move towards the planning not of commercial or gross output, but final product, taking into consideration the real scales of intra complex commodity circulation, which should be based primarily on direct intersector linkages formalized by the appropriate contracts.

## Sector Structure and Dynamics of Agroindustrial Complex Final Product

Product	1966		1972		1975		1975 1966
	Bill rub.	% of total	Bill. rub.	% of total	Bill rub.	% of total	
Capital sectors	19.0	16.5	38.4	22.6	56.4	27.8	2,968
Agriculture	69.6	60.5	85.6	50.3	90.7	44.8	1,303
Food industry	9.3	8.1	14.0	8.2	16.9	8.3	1,817
Light industry	10.0	8.7	16.7	9.8	20.2	10.0	2,020
Sectors in the sphere of circulation (public food service, procurement, material-technical supply and sales)	5.5	4.8	13.1	7.7	15.4	7.6	2,800
Transport (freight) and communications	1.6	1.4	2.4	1.4	3.0	1.5	1,875
Entire AIC final product	115.0	100.0	170.2	100.0	202.6	100.0	1,762
Including net product	96.0		131.8		146.2		1,523

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In order to obtain the sector structure of final product in the process of its distribution between AIC sectors, the sum of amortization deductions from fixed productive capital of industrial origin, and the value of subjects of labor are included in the share of resource producing sectors. The share of the remaining sectors in AIC final product is primarily net product.

During the decade from 1966 to 1975 the structural dynamics of final product clearly revealed a tendency towards reducing the share of agriculture and increasing the share of remaining AIC sectors. There was an especially rapid increase in the share of resource producing sectors supplying means of production and productive services. During 1966-1975 the value which these sectors contributed to AIC final product increased almost 3 fold, including 2.3 fold for products of light industry and transport, 2.4 fold for the food industry and circulation sphere, 3.4 fold for agricultural products, with an increase of net product amounting to 30.3 percent. There are theoretical explanations for this process of more rapid growth rates of material expenditures compared to growth rates of net product. However, in each specific case, the size of the more rapid increase is determined by several optimal boundaries. Output material intensity is one of the indicators of these boundaries.

During these years the index of material intensity per unit of agricultural output calculated by the physical volume of the delivery of means of production to agriculture from nonagricultural amounted to 1.79, while the index of material expenditures of the sector for their payment in money terms was 2.38. This means that the total index for the price of delivered means of production was 1.33. According to our studies, during these years the price of a unit of capacity in the tractor fleet and its "train" of agricultural machinery increased by 1.8 fold, the price of mixed feeds by 2 fold, the units of productive area in livestock raising by 2.3 fold, and in swine raising by almost 4 fold. This lead to corresponding increases in amortization deductions. This process, improving the conditions in resource producing sectors leads to reductions in growth rates of agricultural net income.

Compensations for the growth in material outlays through increased procurement prices to some extent promote the normalization of conditions for expanded reproduction in agriculture, but cause corresponding changes in the level of material outlays in the processing sectors, increased rates for services rendered by sectors in the circulation sphere and the infrastructure, and in the final event give rise to a tendency towards hidden increase in retail prices. In other words, in the



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course of intersector exchange a process of redistributing net product created in agriculture takes place. For example, the volume of work for the repair and technical servicing of enterprises in Gosselkhoztekhnika rendered to kolkhozes and sovkhozes increased by 3.9 fold in monetary terms during 1966-1977. The profits from these operations increased by 5.3 fold. The volume of procured agricultural products increased by 50.7 percent. During this period the profit of enterprises and institutions in the procurement system increased from 668 to 1,364 million rubles, i.e. it more than doubled. The magnitude of net income at kolkhozes and sovkhozes during this period has practically no change, while the profitability level constantly declined. Increases in agriculture's material outlays, involving above all the growth in prices for industrial goods and services, and related increases in procurement prices accompanied by stable retail prices have had a number of negative effects hindering progressive changes in AIC production structure, and in the systems of retail trade, transportation services and communications. Therefore the instructions of the July (1978) Plenum of the CC CPSU on the necessity of seriously improving economic relations between sectors of the agroindustrial complex are of special significance.

The final product indicator can play an important role in the implementation of these instructions, since it can be the basis for obtaining a reliable estimate of the results of AIC productive activity in general, and role of each sector within it. This will help solve the problem of orienting all sectors in the complex towards the maximization of national economic results. The suggested methodology for calculating final product can in principle be implemented on the basis of official statistical information from the TSSU and a number of coefficients calculated on the basis of data from national economic intersector balances. This involves quite laborious computations.

With appropriate improvements in statistical reporting this work could be carried out with less labor and with a higher degree of accuracy. Therefore, it seems to us under contemporary conditions it is very necessary to restructure the accounting system for the productive activity of the AIC and its sectors. It is above all essential to bring some order into annual information on the value of means of production entering the AIC from capital producing sectors, on the share of agricultural products in the raw materials of processing industry sectors, the number of workers engaged in processing agricultural raw materials, and to the extent to which trade and transport participate in servicing AIC sectors. The availability of this information will permit the development of a single proven and sufficiently simple algorithm for calculating AIC final product

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which will ensure the practically complete reflection of its formation processes at various stages of reproduction.

FOOTNOTES

1. Some economists distinguish sector infrastructure as an independent sphere of the AIC. In this work we will not take that position, since we see our task as the analysis of only the production functions of the AIC which are reflected in the final product.
2. See. "Narodnoye Khozyaystvo SSSR v 1975 godu" [National Economy of the USSR during 1975], Statistical annual, Izdatel'stvo Statistika, 1976, p 564.
3. op. cit. p 564
4. VOPROSY EKONOMIKI , No 4, 1975, p 59. "Narodnoye Khozyaystvo SSSR v 1975 godu" [National Economy of the USSR during 1975] p 110.
5. M. Eydel'man, "Mezhotraslevoy balans obshchestvennogo produkta" [Intersector Balance of the Social Product] Moscow. p 361.
6. The share of agriculture in the raw material base of the sector (without fisheries) was 96.4 percent in 1972. See "Narodnoye Khozyaystvo SSSR v 1975 godu", pp 101-108.
7. We did not include the value of imported agricultural raw materials entering the AIC into its final product because, in our opinion only real internal resources measure the productive capacity of the AIC.
8. "Narodnoye Khozyaystvo SSSR v 1977" [National Economy of the USSR During 1977] , Izdatel'stvo Statistika, 1978, p 541.

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