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# USSR Report

ECONOMIC AFFAIRS

(FOUO 11/79)

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USSR REPORT  
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DEVELOPMENT OF USSR STATE INSURANCE, (1917-1977)

Moscow RAZVITIYE GOSUDARSTVENNOGO STRAKHOVANIYA V SSSR (1917-1977) in Russian 1978 signed to press 5 May 78 pp 203-220

[Chapter 10 by Gaydar Mukhtarovich Tagiyev from his book of the above title, Izdatel'stvo Finansy, 6,200 copies, 224 pages]

[Text] Chapter 10. State Insurance During the Period in Which Developed Socialism Was Perfected and Communism Was Built (1971-1977).

1. Social and Economic Prerequisites of Developing Insurance Relations.

Mature socialism sets the direct goal of meeting people's needs comprehensively. This found expression in the primary task of the Ninth and 10th five-year plans.

In a report at the 25th Congress of the Communist Party of the Soviet Union, Comrade L. I. Brezhnev, General Secretary of the CPSU Central Committee, said: "In terms of their primary tasks and basic directions of economic activity, the Ninth and 10th five-year plans are a single entity. The reference is to the long-term orientation of party economic policy, in which we see, to use V. I. Lenin's expression, 'the overall plan of our work, our policy, our tactics, our strategy...' <sup>1</sup> The highest goal of party economic strategy 'has been and remains a steady rise in the material and cultural standards of living of the people.' <sup>2</sup>

As a result of successful implementation of the Ninth Five-Year Plan, real per-capita incomes in our country rose by nearly one-fourth, industrial production increased by 43 percent, and the average annual volume of agricultural output was 13 percent higher than in the Eighth Five-Year Plan, in spite of extremely unfavorable weather conditions.

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1. "Materialy XXV s"yezda KPSS" [Materials of the 25th CPSU Congress], p 39

2. Op. cit., pp 39-40

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The 25th CPSU Congress adopted a program of continued increase in worker and employee wages, kolkhoz member incomes and social consumption funds, a program of dynamic and proportional production development and increased production efficiency, and it approved the most important assignments on manufactured and agricultural output growth and the development of other branches of the national economy.

By satisfying a certain range of needs of the Soviet people, state insurance participates directly or indirectly in resolving the tasks of raising workers' standard of living. The objective necessity of insuring kolkhoz and personal property against the negative consequences of natural calamities and accidents will remain throughout the entire period of transition to communism. As the well-being of the people increases, the kolkhoz economy develops and social wealth increases, insurance requirements will grow and the importance of insurance protection will intensify.

Like other economic categories of socialism, state insurance has a historical character. In the highest phase of communism, there will be no objective necessity for finances, for creating a special insurance fund generated from insurance payments. However, until such prerequisites are created, insurance work must be developed and perfected.<sup>1</sup>

The rise in worker real incomes, personal property growth and change in the structure of that property have resulted in substantial change in the terms of nearly all types of insurance for the populace. The introduction of new types of life insurance is a natural pattern. Voluntary citizen insuring of personal property has been further developed.

Democratic centralism has been intensified throughout the USSR state insurance system. It has been a consequence of the perfecting of the socialist state system which has occurred in our country, of the development of socialist democracy and the increasing activeness of public organizations.

The creation, from kolkhoz, cooperative, public organization and individual insurance payments, of a special monetary fund and its use for designated purposes generate relations for redistribution a portion of the national income. Although the role of state insurance in redistributing USSR national income is relatively small, it is steadily increasing year by year. In 1959, only 0.6 percent of the national income was redistributed through state insurance; in 1967 -- 0.8 percent, and in 1970 -- 1.2 percent. Subsequently, growth in insurance payment receipts considerably outstripped the national

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1. Certain economists mistakenly suppose that eliminating all types of state insurance will occur considerably before commodity-monetary relations wither away, approximately at the same time that individual taxes are fully rescinded, and so forth (see "Ekonomicheskiye zakonomernosti pererastaniya sotsializma v kommunizm" [Economic Patterns of the Growth of Socialism Into Communism], Moscow, Izd-vo Nauka, 1967, p 532).

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income growth. Thus, whereas USSR national income in 1970 had increased two-fold as compared with 1960, the total funds mobilized by the state insurance system during that same period had increased nearly four-fold. In the Ninth Five-Year Plan (1971-1975), something over two-fold more insurance payments (contributions) were received than in the Eighth Five-Year Plan, while total national income increased 36 percent.

Voluntary personal insurance developed at the highest rates during the Ninth Five-Year Plan. This trend has continued into the current, 10th Five-Year Plan.

Growth in the public wealth of the kolkhozes and the increased agricultural crop yields have been reflected in an increase in insurance security for all types of kolkhoz property.

## 2. Present Trends in Individual Personal and Property Insurance

Property belonging to citizens by right of personal ownership can be insured under mandatory or voluntary insurance. And voluntary insurance is developing more rapidly at present. This results, first of all, from the fact that it was inadequate in the preceding period and secondly, because of a substantial restructuring of insurance terms for various types of property and because of important organizational measures.

Nonetheless, mandatory insurance also plays an important role. Its terms have remained practically unchanged, having been adjusted only quantitatively -- number of farms and objects insured, amount of coverage, and amount of payments received. At the same time, socioeconomic changes in the lives of the populace, increased urbanization and other factors have had an important impact on the relationship of corresponding indicators of mandatory insurance development.

The development of mandatory worker property insurance is described by the following data. The total number of insureds in the USSR was 36.3 million in 1976, including 23 million rural residents (a four-percent decrease from 1966) and 13.3 million in urban areas (a 13-percent increase from 1966). The amount of coverage under mandatory insurance increased from 24.6 billion rubles in 1966 to 27.6 billion in 1970 and to 33.9 billion in 1976.

Mandatory insurance covers structures and agricultural livestock belonging to citizens. The ratio of insurance on these objects has been changing in favor of an increasing proportion of structures: whereas structures comprised 88.6 percent of the coverage in 1966 and livestock 11.4 percent, in 1976 the figures were 89.4 and 10.6 percent, respectively. Growth in the insurance amount per structure has been very revealing. For rural areas, it was 441 rubles for the USSR as a whole in 1966 and 653 rubles in 1976, that is, an increase of 48 percent. For urban areas, the insurance amount increased from 958 to 1,150 rubles, or by 20 percent, during this same period. As is known, this appraisal does not reflect the full value of structures, but the trend towards growth in the value of structures is obvious.

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The development of voluntary property insurance for the populace has resulted both from overall improvement in the well-being of the workers and change in the structure of private ownership, and in particular from the increased proportion of durables, and from improvement in the insurance itself.

In order to increase the effectiveness of voluntary structure insurance, beginning in 1973, property (structures) has been appraised at state retail prices for building materials, shipping rates, and wage rates for workers employed in construction (previously, the insurance was based on wholesale building material prices).

The development of voluntary property insurance in the USSR, both as a whole and by individual type, is described by the following data: the total amount of insurance coverage increased from 12.5 billion rubles in 1966 to 23.8 billion in 1970 and to 54.6 billion in 1976, that is, a 4.4-fold increase over the entire period, including a four-fold increase for building insurance, a 2.4-fold increase for livestock, and a 4.4-fold increase for household property. Payment receipts from the population during the period from 1966 through 1976 increased 3.6-fold as a whole, including 3.8-fold for building insurance and 3.1-fold for household property. The total number of voluntary property insurance contracts drawn up with citizens was 45.4 million at the start of the 10th Five-Year Plan, as against 31.4 million at the start of the Ninth Five-Year Plan. As of 1 January 1977, the following were voluntarily insured for the USSR as a whole: structures on 32.4 percent of farms, household property of 26.5 percent of families, 54.2 percent of cattle, 25.9 percent of other livestock, and 11 percent of means of transport in private use. The figures presented bear out the fact that, along with certain successes, there are still large reserves for developing voluntary insurance.

During the Eighth and Ninth five-year plans, the ratio of mandatory to voluntary insurance payments changed. Whereas mandatory property insurance accounted for 75 percent of all payments in 1966 and voluntary insurance for 25 percent, the proportions were 53 and 47 percent, respectively, in 1976.

Motor transport insurance is exceptionally promising. As motor vehicle production increases and the material well-being of the Soviet people improves, the number of passenger cars in private use is increasing. Sales of passenger cars to the population reached nearly one million vehicles in 1975 -- seven-fold more than in 1970.<sup>1</sup> The total amount of coverage under voluntary vehicle and other means of transport insurance among the population had increased 11.4-fold in 1976 over 1970, and 70-fold as against 1966. Whereas means of transport accounted for a total of 0.7 percent of all payment receipts from the population for voluntary property insurance in 1966, the figure was 14 percent in 1976.

The intensive development of motor transport has increased the danger to both the means of transport themselves and the people. In this connection,

1. See: "Materialy XXV s"yezda KPSS," p 114.



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a number of economists quite legitimately pose the question of instituting mandatory civil liability insurance for owners of private motor transport. This type of insurance is important for both the injured party and the insurant himself, as it is sometimes beyond the means of the guilty party to make up losses caused third parties while operating means of transport, and he must be helped by shifting such compensation to an insurer. We had such insurance back in the 1920's, but it was cancelled due to a lack of conditions for its development. At present, the extraordinarily high rate of motor transport acquisition [automobilization] by the populace necessitates the introduction (or more accurately the restoration) of civil liability insurance. This is borne out by the experience of socialist and capitalist countries, where this type of insurance is one of the leading types in terms of amount of insurance payments received.

Personal insurance has also developed rapidly in the period under review. That is evident from the following data:

year	number of people insured, millions			growth from 1970, in percent	
	all personal insurance	life insurance	accident insurance	payments on personal insurance as a whole	payouts on personal insurance as a whole
1970	34.5	17.8	16.7	100.0	100.0
1971	40.3	22.3	18.0	134.2	132.2
1972	46.9	27.7	19.2	174.1	157.9
1973	52.9	32.5	20.4	218.0	217.0
1974	58.8	37.3	21.5	262.6	295.5
1975	64.8	41.9	22.9	306.1	385.4
1976	70.7	46.1	24.6	348.1	463.7

In 1976, the total number of people insured under all types of personal insurance had more than doubled as compared with 1970 (the last year of the Eighth Five-Year Plan). By the start of 1977, nearly 61 percent of all workers, employees and kolkhoz members were covered by it. Contributions increased 3.5-fold during that period, and payouts to workers increased 4.6-fold.

The following data testify to the importance of personal insurance. Its proportion of total funds received by the state insurance fund in 1976 reached 62 percent, and its share of insurance payments to the population -- 86 percent. The role of personal insurance in shaping the financial resources of the Soviet state has grown: the life insurance contributions reserve increased 4.3-fold during the 1970-1976 period.

Since 1972, the drawing up of mixed-insurance agreements has been simpler: such agreements are concluded without a physician's certificate for any sum. The accident insurance liability has been broadened. Mixed insurance at double the insured sum for loss of ability to work has been introduced.

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The constant effort by the USSR Main Administration for State Insurance to improve personal insurance and more fully meet the interests of the workers has been reflected in the development of a new type of insurance, wedding insurance, introduced on 1 January 1977. It combines features of mixed life insurance and child insurance.

Further prospects for developing personal insurance seem to us to lie in the introduction of group insurance. Various types of group insurance are being successfully developed in a number of socialist countries (Hungary, Poland, Czechoslovakia, the GDR) and in a number of capitalist countries as well. This experience, as well as our own experience in collective insurance, will evidently be used in the future.

### 3. Insuring Kolkhoz-Cooperative Enterprises and Organizations.

As our new Constitution states, the basis of the USSR economic system is socialist ownership of the means of production in the form of state (national) and kolkhoz-cooperative property. The Soviet state facilitates the development of kolkhoz-cooperative ownership and its rapprochement to state ownership.

Among the measures facilitating the development and strengthening of the kolkhoz, consumer and other cooperative economy, state insurance occupies an important place.

The development of agriculture in the Ninth Five-Year Plan occurred during a most difficult struggle against the calamitous forces of nature. During the five years, only one, 1973, was good for farming, and two, 1972 and 1975, had unprecedentedly severe droughts. Our countryside had not encountered such an unfavorable confluence of circumstances in any other five-year plan.<sup>1</sup>

It was during precisely these years that kolkhozes were given tremendous financial assistance through state insurance, ensuring uninterrupted production in all fields of their activity. During 1971-1976, kolkhozes were paid 10 billion rubles from the state insurance fund to cover losses from the death of (damage to) agricultural crops, livestock, buildings, structures and other property. As a consequence of the certain periodicity of natural calamities, this insurance compensation amount was distributed very unevenly over the years, which is confirmed by the following data.

	1971	1972	1973	1974	1975	1976
insurance compensation payments to kolkhozes, in millions of rubles	1,186	2,282	1,070	1,481	2,243	1,699
in percent of the total amount for the six years	11.9	22.9	10.7	14.9	22.5	17.1

1. See: "Materialy XXV s'yezda KPSS," p 37.

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The two least-favorable years, 1972 and 1975, accounted for nearly half the six-year total amount paid in insurance compensation. It is precisely here that the economic essence of insurance is displayed especially clearly. K. Marx wrote that insurance is necessary "to eliminate the consequences of the extraordinary destruction caused by chance and the forces of nature."<sup>1</sup>

The period under review is also characterized by the fact that a new system of kolkhoz production insurance was given a final check. This system passed the test for soundness primarily on the basis of its financial stability. In fact, this was the first time anywhere in the world that fields were insured against crop failure. There was a definite risk of revenues failing to correspond to expenditures. In practice (beginning in 1968), the methodology adopted to calculate insurance rates, which was developed by the USSR Main Administration for State Insurance, jointly with the Finance Scientific Research Institute, was shown to be correct.

For the 1968-1976 period as a whole, payments to kolkhozes from the state insurance fund were 102.9 percent of the payout amount anticipated to cover losses. The equivalency of interrelations between kolkhozes and the Main Administration for State Insurance anticipated by the legislation was essentially secured in practice. Nonetheless, it is necessary to continue perfecting the rates, first of all by differentiating them territorially and by type of property insured.

Insurance coverage for all types of kolkhoz property reached 110.8 billion rubles in 1976, an 81.6 percent increase over 1970 and a 2.2-fold increase over 1968. Kolkhoz insurance payments in 1976 had increased 30.7 percent as against 1970 and 46.3 percent compared to 1968. The average payment per farm increased 66.8 percent during the 1968-1976 period, reflecting growth in the value of kolkhoz property.

At the same time, mandatory insurance of kolkhoz property during the Ninth and 10th five-year plans has demonstrated the possibility and necessity of further perfecting it.

Voluntary insurance of cooperative and public enterprise and organization property was also widely developed. In 1976, some 31,700 insurance agreements were drawn up, including 23,900 with consumers' cooperatives and 6,300 with housing-construction, cabin [dacha] construction and other cooperatives. Insurance coverage on cooperative and public organization property in 1976 was 29.5 billion rubles, a 34.2 percent increase over 1970.

In 1975, the Main Administration for State Insurance expanded liability for voluntary insurance on the property of these organizations by including in it losses from mud, ground sagging, subsoil water effects, and also liability for moving property, regardless of to whom the means of transport belong.

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1. K. Marx and F. Engels, "Soch." [Works], Vol 24, p 199.

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In spite of the considerable development of voluntary cooperative and public organization property insurance, the reserves available here have been used inadequately. This applies, in particular, to insuring housing-construction cooperatives. As of early 1975, only 20 percent of the cooperatives were covered by insurance.<sup>1</sup> At the same time, in conformity with crediting procedures, housing-construction cooperatives are obligated to insure houses for that portion of any bank loan not repaid.

One of the primary directions in which insurance is developing and improving is comprehensive consideration of the features of cooperative and public organization activity and the reflection of these specifics in the terms of such voluntary insurance.

The extensive development of agricultural production specialization and concentration on a base of interfarm cooperation and agroindustrial integration is leading to the creation of kolkhoz-sovkhoz, state-kolkhoz and other associations. In this connection, creation of a single system of insurance protection for all agricultural enterprises, both cooperative and state, is a pressing problem.

#### 4. Intensifying Democratic Centralism in the State Insurance System

The Communist Party of the Soviet Union has always attached great importance to perfecting the organizational structure of national economic management, to combining centralized planning and leadership with local initiative, further development of socialist democracy and increasing the activeness of public organizations. This party line is also manifest in full measure in the way the state insurance system is run. The organizational principles and work methods are determined wholly by the economic tasks facing the insurance system.

In accordance with the USSR Supreme Soviet Presidium Ukase and USSR Council of Ministers Decree of 28 August 1967, fundamentally new conditions for insuring the property of kolkhozes were determined and centralized leadership of insurance work was strengthened -- the USSR Main Administration for State Insurance was restored. Changes were subsequently made in the Standard Statute on State Insurance Organs.

Currently, all the country's insurance organs are united into a single centralized union-republic cost-accounting system headed by the USSR Main Administration for State Insurance, which is called upon to ensure a unified financial policy and the general principles and provisions for running the state insurance system. The unity of the system is combined with simultaneous expansion of the rights of the union republics and local organs to solve practical state insurance problems. The cost accounting is done by each union republic for all State Insurance organs as a whole. The USSR Main

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1 See: FINANSY SSSR No 3, 1976, p 57.

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Administration for State Insurance is also on cost accounting. It runs operations covering mandatory insurance for rail transport passengers and insurance for workers through enterprises of union subordination.

Councils on questions of kolkhoz property insurance have been created on a public basis under the USSR Main Administration for State Insurance and the union republic (main) administrations for state insurance, with the participation of representatives of the ministries and departments concerned (Ministry of Agriculture, Ministry of Internal Affairs, and others), as well as kolkhoz representatives, which reflects the genuinely democratic nature of insurance management. It is the task of this advisory organ to examine and discuss the annual results of kolkhoz property state insurance operations and proposals on improving the terms of this type of insurance in order to further improve its economic effectiveness for kolkhoz production. The bond between the state insurance system and agricultural organs which are being enlisted directly in developing and resolving many insurance questions has been considerably strengthened.

During the course of building communism, given simultaneous strengthening of centralized plan leadership, the rights of the regional link of the insurance system have been broadened and an increasing number of questions under the competence of the administrations have gradually been transferred to the insurance inspectorates for solution. During the Eighth and Ninth five-year plans, a number of important steps were taken to improve the system of moral and material incentives for insurance workers. In 1968, a system of bonuses for state insurance inspectorate workers, as well as workers of the state insurance administrations in oblasts, krays, ASSR's, okrugs and cities, was instituted.

In evaluating the status of insurance work, first place was previously given to quantitative indicators. Now, plan fulfillment is not the sole criterion for evaluating the activity of the collective and its leader, consideration now being given as well to at what price this is achieved and to how reserves are being used. Socialist competition, which has been unfolding in all insurance organs, plays a large role in production plan fulfillment. The positive experience of the leading collectives and shock workers of communist labor and the forms and methods which have proven their viability and effectiveness are generalized and studied during the competition.

In connection with the transition to the system of cashless transactions with insurants and the necessity of stimulating the concluding of new agreements and meeting the plan for each type of insurance, changes have been made in the wages of insurance agents not on permanent staff. The work forms of insurance agents have also been improved. The brigade method, which has received broad dissemination, is very promising. On the basis of a generalization of the experience of leading inspectorates of the USSR Ministry of Finance and the central committee of the trade union of workers at state institutions, a Regulation on the Brigade Work Method for Insurance Agents Not on Permanent Staff was approved on 6 January 1975.

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During the period under review significant successes have been achieved in actualizing the very important Leninist principle of significantly lowering the cost of insurance and making it universally accessible. In order to popularize voluntary types of insurance, advertising film shorts are shown in movie theaters, tape recordings are broadcast over the radio, and local television studios are also used. All these mass media and propaganda are combined with lectures, reports and conversations.

The assistance of trade union and other public organizations is of enormous importance to developing voluntary insurance among the populace. Life has produced various forms of community participation in insurance work, the most widespread of which is the creation of councils to assist the Main Administration for State Insurance, in whose work trade union and Komsomol organizations, leading production workers and others participate extensively. As of early 1977, there were 90,000 such assistance councils, uniting 450,000 workers, employees and kolkhoz members.

As insurance operations have grown, the volume of accounting and reporting and the flow of incoming information have increased considerably. The extensive introduction of modern computer equipment has permitted making the numerous compilations and groupings of accounting data quickly and accurately. With prompt and reliable accounting information available to them, Main Administration for State Insurance organs are in a position to actively influence the development of operations, to guide them purposefully, and exercise better control over the protection of state funds. At the same time, the mechanization of accounting frees accountants from unnecessary technical work, increases the efficiency of their labor, and frees their time for economic analysis and monitoring. The introduction of electronic computers, initiated by insurance organs of the Belorussian SSR, has taken on increasingly broad scope. Nonetheless, a number of complex organizational and technical tasks must yet be resolved for modern calculating and computer equipment to be used everywhere.

The steady growth in the economic importance of state insurance under present conditions and the necessity of perfecting the methods of running it have resulted in the adoption of a Decree "On Steps to Further Develop State Insurance" by the USSR Council of Ministers on 8 February 1977. With this decree, the government obligated the USSR Ministry of Finance to ensure the continued development of insurance work in the country, expansion of types of personal and property insurance meeting the needs of the population and of kolkhoz production, improvement in services to the workers, and also strengthening cost accounting in the Main Administration for State Insurance system.

It has been suggested that the union and autonomous republic councils of ministers and the kray, oblast, city and rayon Soviet of People's Deputies ispolkoms pay more attention to state insurance questions and render insurance organs assistance in carrying out their activity.

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According to this particular decree, funds for developing state insurance and designated for building facilities, introducing means of mechanizing accounting and computation, acquiring equipment, office supplies, means of transport and carrying out other measures associated with running insurance operations are created in the state insurance system. Housing construction and worker material incentives funds are also formed. Under the Main Administration for State Insurance, corresponding centralized funds are generated to supplement the funds of union republic insurance organs.

The USSR Council of Ministers decree is undoubtedly a measure of exceptional importance to subsequent development and perfection of state insurance in our country.

Significant changes have occurred in the foreign (outside) insurance system. In 1973, the USSR Foreign Insurance Administration was reorganized into the USSR Insurance Joint-Stock Company (Ingosstrakh). Along with the USSR Ministry of Finance, its shareholders are foreign trade associations of the Ministry of Foreign Trade, the USSR Council of Ministers' State Committee for Foreign Economic Ties, and other organizations. The necessity of reorganizing resulted from a considerable expansion in recent years of USSR trade and foreign policy ties with foreign states, from cultural ties and foreign tourism. The joint-stock enterprise corresponds best to the tasks facing foreign insurance. The prospects for developing foreign insurance are determined in considerable measure by the resolution of both specific and general problems of insurance work under conditions in socialist society.

##### 5. Scientific Research Problems of State Insurance.

Economic development would be inconceivable without the extensive development of scientific research and the introduction of its results into practice. The CPSU Central Committee has repeatedly pointed to the necessity of a turn-around towards working out problems of present and future immediacy as the primary task of the social sciences. This party demand applies in full to financial science, an integral part of which is research on state insurance problems.

Up to a certain time, state insurance problems remained the theoretically least developed. Extensive research on various aspects of the development of property and personal insurance began in the 1960's. It has not been entirely fruitful in all directions, but a considerable advance is quite evident. The interlinking and interdeterminancy of science and practice are indisputable. Science illuminates the way for practice and shows optimum ways and methods of solving problems which arise. The tasks of science and the demands made on it are determined by the requirements of practical activity. Successes in developing and perfecting state insurance during the Eighth and Ninth five-year plans have been connected with a scientific approach to solving the largest problems. They have served as an additional stimulus to broadening and deepening scientific research.

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In speaking of a scientific approach to solving the most important practical problems, we have in mind both leadership of all insurance organ work on a scientific basis on the part of the USSR Main Administration for State Insurance and the development by it of new types of insurance and perfecting existing types, as well as independent scientific research being done in the scientific institutes and VUZ's.

The following monographs and textbooks on state insurance have been published during the post-war period:

Raykher, V. K. "Obshchestvenno-istoricheskiye tipy strakhovaniya" [Socio-Historical Types of Insurance], Moscow, Izd-vo AN SSSR, 1947;

Kon'shin, F. V. "Gosudarstvennoye strakhovaniye v SSSR" [State Insurance in the USSR], Moscow, Izd-vo Gosfinizdat, 1947-1968 (five editions as a tekhnikum text and two as a VUZ text);

Tagiyev, G. M. "Gosudarstvennoye strakhovaniye v SSSR" [State Insurance in the USSR], Moscow, Izd-vo Gosfinizdat, 1953;

Shermenev, M. K. "Sel'skokhozyaystvennoye strakhovaniye v SSSR" [Agricultural Insurance in the USSR], Moscow, Izd-vo Gosfinizdat, 1956;

Rybnikov, S. A. "Osnovy tarifnykh raschetov po strakhovaniyu zhizni" [Principles of Life Insurance Rate Calculations], Moscow, Izd-vo Gosfinizdat, 1959;

Grave, K. A. and Lunts, L. A. "Strakhovaniye" [Insurance], Moscow, Izd-vo Gosyurizdat, 1960;

Drozdov, I. P. and Batorin, V. G. "Lichnoye strakhovaniye v sotsialisticheskikh stranakh" [Personal Insurance in Socialist Countries], Moscow, Izd-vo Finansy, 1963;

"Voprosy gosudarstvennogo strakhovaniya" [Problems of State Insurance] (collection of articles), Moscow, Izd-vo Finansy, 1964;

Reytman, L. I. "Lichnoye strakhovaniye v SSSR" [Personal Insurance in the USSR], Moscow, Izd-vo Finansy, 1969;

Kagalovskaya, E. T. and Popova, A. A. "Finansovyye osnovy strakhovaniya zhizni v SSSR" [Financial Principles of Life Insurance in the USSR], Moscow, Izd-vo Finansy, 1971;

Yakovlev, V. N. "Gosudarstvennoye strakhovaniye imushchestva kolkhozov" [State Kolkhoz Property Insurance], Kishinev, Izd-vo Kartya Moldovenyaske, 1971;

"Gosudarstvennoye strakhovaniye v SSSR" [State Insurance in the USSR] (textbook), Moscow, Izd-vo Finansy, 1971;

Motylev, L. A. "Gosudarstvennoye strakhovaniye v SSSR i problemy ego razvitiya" [State Insurance in the USSR and Problems of Its Development], Moscow, Izd-vo Finansy, 1972;

Kolomin, Ye. V. "Gosudarstvennoye strakhovaniye i khozraschetnaya deyatel'nost' kolkhozov" [State Insurance and Kolkhoz Cost-Accounting Activity], Moscow, Izd-vo Ekonomika, 1972;

Kolomin, Ye. V. "Strakhovaniye obshchestvennogo imushchestva pri sotsializme" [Public Property Insurance Under Socialism], Moscow, Izd-vo Finansy, 1975;

Kulikov, V. S. "Voprosy teorii i praktiki gosudarstvennogo strakhovaniya v SSSR" [Problems of State Insurance Theory and Practice], Moscow, Izd-vo Finansy, 1975.



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A significant range of state insurance problems has been examined in these monographs:

- Sheremeneva, M. K. "Finansovyye rezervy v raschirennom vosproizvodstve" [Financial Reserves in Expanded Reproduction], Izd-vo Finansy, 1973;  
 Polovinkina, P. D. "Rezervnyye fondy i vosproizvodstvo v kolkhozakh" [Reserve Funds and Reproduction on Kolkhozes], Izd-vo Ekonomika, 1970;  
 Allakhverdyana, D. A. "Finansy i sotsialisticheskoye vosproizvodstvo" [Finances and Socialist Reproduction], Izd-vo Finansy, 1971;  
 Karpova, K. D. "Finansovo-kreditnyye otnosheniya s kolkhozami" [Financial-Credit Relations With Kolkhozes], Izd-vo Kolos, 1971;  
 Semenova, V. N. "Rol' finansov i kredita v razvitii sel'skogo khozyaystva" [The Role of Finances and Credit in Developing Agriculture], Izd-vo Finansy, 1973, and others.

The list of published monographs above testifies to the substantial growth in publications on state insurance questions and the diversity of their subject matter. To them we might add the valuable practical references published in the 1970's by V. S. Averin, N. I. Gladkov, F. S. Gulyayev, M. Ya. Katsov, A. P. Pleshkov, I. P. Shcheglov and others. One natural consequence of the growth in these publications was the allocation in FINANSY SSSR of a special section for "State Insurance Questions." Articles on state insurance are published in VOPROSY EKONOMIKI, EKONOMIKA SEL'SKOGO KHOZYAYSTVA, EKONOMICHESKAYA GAZETA, SOVETSKAYA YUSTITSIYA and other periodicals.

We should note the exceptionally important role personnel training at the Moscow Finance Institute plays in developing scientific research on state insurance problems. All the doctoral dissertations and a majority of the candidate dissertations on various questions of insurance theory and practice have been defended at that institute. In recent years, the number of state insurance researchers has increased and the geography of the research being done has broadened: candidate dissertations have been prepared, for example, at the All-Union Correspondence Finance-Economics Institute, at the Rostov-on-Don, Azerbaijan and Kiev institutes of the national economy, and at Tadzhiik and Yerevan state universities.

Since 1965, pressing problems of state insurance have received broader, systematic, scientific examination at the USSR Ministry of Finances' Finance Scientific Research Institute. They cover problems of kolkhoz and sovkhos production insurance, motor transport and personal insurance, use of the experience of insurance institutions of socialist and capitalist countries, and so forth.<sup>1</sup>

The work of the Finance Scientific Research Institute on all the indicated and other problems is coordinated with the work of the USSR Main Administration for State Insurance. The striving to ensure complete unity of theory and practice is clearly displayed here. At the same time, the necessity of further broadening scientific research on state insurance questions is obvious.

1. FINANSY SSSR, No 3, 1973, p 89; No 8, 1975, p 87; No 8, 1976, p 88.

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Having reviewed the history of state insurance development in the USSR, the conclusion can be drawn that the very important principles, developed by V. I. Lenin, on whose basis the Soviet insurance system has evolved have endured the test of time over many years and have been enriched by new theoretical theses and forms of practical application which take into account the profound socioeconomic changes in the country. Leninist concepts have retained their importance throughout the entire period of building communism, and in them lies the key to solving contemporary tasks of developing and perfecting insurance work.

By relying on Leninist principles of organizing insurance and by creatively developing them as applicable to changing historical conditions, the party and government have been tirelessly concerned about the development of state insurance and about strengthening insurance organs and subordinating all their activity to the tasks of building communism at all stages of economic development, and they continue to be so concerned.

Comrade L. I. Brezhnev, General Secretary of the CPSU Central Committee and Chairman of the USSR Supreme Soviet Presidium, in describing the path taken by our country over the 1917-1977 period, said: "Six decades of building socialism is the brightest possible demonstration of what people of labor are capable of once they take in their hands the political leadership of society and take on the responsibility for the destiny of the country. These decades proved that there have been and are no other paths to socialism without the power of the workers, without the socialist state system."<sup>1</sup>

Soviet state insurance, having received a qualitatively new content, has come a long way and has played an important role in resolving the tasks facing the country at various stages of building socialism in the area of developing the national economy and improving the material well-being of the workers. It has demonstrated its tremendous advantages over capitalist insurance and real possibilities for further improvement. The social orientation of insurance has predetermined the rapid development of all types of insurance during the years of Soviet power.

An important stage in the continued advance of our country along the path towards communism, in building its material-technical base and in raising the well-being of the people was the Ninth Five-Year Plan (1971-1975). It was also most productive in the history of the development of Soviet state insurance. During 1971-1975, payments totalling 26.4 billion rubles were received for all types of insurance, which is more than two-fold more than in the preceding five-year period. In this regard, payments for voluntary types of property and personal insurance were 15.4 billion rubles, or more than three-fold more than in the Eighth Five-Year Plan. Insurance has also been developing rapidly in the 10th Five-Year Plan now underway.

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1. L. I. Brezhnev, "Great October and Human Progress. Report at the Festive Meeting of the CPSU Central Committee, USSR Supreme Soviet and RSFSR Supreme Soviet," in PRAVDA, 3 November 1977.

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In the 10th Five-Year Plan, payments of approximately 40 billion rubles must be received for all types of insurance, including 28 billion rubles for voluntary insurance. By the end of 1980, we anticipate having concluded about 140 million agreements with the populace. We plan to have increased personal insurance coverage to 70 percent of the workers, employees and kolkhoz members able to work. On the basis of the experience of all the preceding historical development of insurance work in the country, it can be confidently assumed that the new assignments will also be carried out.

One outstanding event in the life of the Soviet people has been the adoption by an extraordinary session of the USSR Supreme Soviet held on 4-7 October 1977 of a new USSR Constitution.

The Constitution secures a new historical frontier in our movement towards communism. Each line of the Constitution is permeated with concern for comprehensively developing the historical creativity of the popular masses. It ensures conformity of the tasks, structure, functions and procedures for state organ activity to the stage our development has achieved, the stage of mature socialism.

The new Constitution is unquestionably an important stage as well in the continued development of insurance work, one of the more complex branches of Soviet state financial activity.

While performing important socioeconomic functions, insurance changes and sometimes fundamentally restructures the forms and methods of its own work, as the times and concrete new circumstances demand. The search continues for ways of further improving insurance practice, deepening and perfecting the system of cost accounting, rates, insurance coverage norms, forms of planning and economic incentives, and the most effective methods of organizational activity. Many problems which could not have been anticipated ahead of time and in all the diversity of their specific manifestations have been solved for the first time in our country. The Main Administration for State Insurance is now the largest insurance organization: no other insurance organization in the world can compare with it in terms of work volume or number of facilities.

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'ROUND TABLE' DISCUSSION ON ECONOMIZING RESOURCES REVIEWED

Moscow VOPROSY EKONOMIKI in Russian No 7, Jul 79 pp 35-65

[Article: "Reserves for Economizing Material Resources"]

[Text] In February, 1979, a "Round Table" conference which had been organized by the editors of this periodical was held. The important problems of decreasing materials intensiveness as a crucial direction in the intensification and increased efficiency of social production were posed for discussion.

Representatives of scientific institutions and of a number of ministries and departments took part in the discussion. Some of the "Round Table" participants presented their reports in written form. The materials of the discussion are being published in abridged form.

Academician P. S. Khachaturov (Chief Editor of the periodical VOPROSY EKONOMIKI). This is not the first time that the editors are holding a "Round Table" meeting to discuss important economic problems which have been insufficiently worked out and require treatment on the pages of the periodical.

Today we wish to discuss an extremely important problem--the ways of economizing material resources. It is necessary to determine what kind of situation has developed in this field now and what has to be done to improve it. The efficiency of our entire economy depends to an enormous extent upon increasing the efficiency of the use of material resources. As is known, 85 percent of the output costs of industry is made up of material expenditures. An analysis of the data shows that there are enormous reserves for economizing here. An efficient use of material resources would ensure a substantial increase in our economic growth rates.

It would be desirable to give the discussion a completely concrete character. We shall be talking about an economy of fuel, electric energy, and metal and about the use of raw materials in light industry and agricultural output. At the same time, definite proposals are needed--how to eliminate existing shortcomings in the use of materials.

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We know that there is an overexpenditure of fuel in our country. A considerable amount of coal and petroleum fails to be taken out of the earth, and a great deal of gas is wasted. Although definite progress has been made in the use of electric energy, it is overexpended. There are small inefficient power stations. In machine building metal waste comes to 19 million tons, and use is not being made of the possibilities of rationalizing production processes which would make it possible to use metal much more economically.

Around 300 million cubic meters of commercial timber is taken out of our forests, but much of it remains at procurement sites. As early as the 1930's there were discussions of the fact that our method of floating timber was inefficient, but, nevertheless the practice continues to this day.

Losses of agricultural output are quite palpable. The development of agriculture at the current stage is especially important and enormous resources are being assigned to increase the production of agricultural output. At the same time, a great effect can be achieved by dealing more carefully with the collected harvest. There are not enough elevators and grain storage units in the country and a considerable amount of grain has to be "stored" in trenches. The situation is even worse with the storage of potatoes, vegetables, and fruits. There are great losses of agricultural output when it is transported.

The task of the conference is not only to establish the facts. It is necessary to define the ways and methods of work which will make it possible to improve the situation.

L. L. Zusman (Doctor of Economic Sciences, professor). The problems of economizing ferrous metals are not being considered here for the first time. Although there have been a number of achievements in this work, technological progress has been creating many more possibilities for economizing material resources. The use of ferrous metals (including castings) has to be looked at along the entire cycle of metal's movement in the economy; that is, in its production, structural, and functional elements. An analysis of the problem has to embrace all three cycles simultaneously; otherwise, an economy of metal in one of them could give rise to an overexpenditure in another.

The potential reserve for economizing metal in the economy can be characterized by the following data for 1977. In the production use of metal metal waste came to 60.7 million tons (31.7 million tons in metallurgy, 8.8 million tons in casting, and 20.2 million tons in metal working and machine building), while with the inclusion of irretrievable losses it came to around 63 million tons; in structural use, excepting the fact (according to the published data of a number of writers) that domestic machinery and equipment exceeds the proportion of progressive models by approximately 25 percent, around 15 million tons of metal was expended as a result of the



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excess weight of equipment; and around 20 million tons of metal was expended to maintain machinery and equipment in working order during the process of capital and current repairs. Thus, with 146.7 million tons of steel and 16.8 million tons of iron castings produced in 1977 the potential reserve for economizing metal comes to 98 million tons.

The achievement of a waste free production and consumption of metal and of machinery and equipment elements of equal strength is in the future. However, there exists at the present time substantial reserves for decreasing the metal intensiveness of social production.

The following data testifies to the economic damage which is caused to our economy as a result of metal losses. In ferrous metallurgy from one ton which goes into metal waste--25 rubles; in metal working 100 rubles from one ton which goes into piece waste and 600 rubles from one ton which goes into shavings; 1,000 to 1,200 rubles from one ton of surplus weight in stationary machinery and equipment, and more than 2,000 rubles in mobile structures; and more than 1,500 rubles from one ton of machinery and equipment elements which require replacement with spare parts, and 2,500 to 3,000 rubles including the expenditures for repairs.

The structure of economic damage is the opposite of the structure of the natural losses of metal. Thus, production losses of metal come to 7.2 billion rubles (11-12 percent), structural--15 billion rubles (22-25 percent), and operational--20 billion rubles (63-67 percent).

A decrease in losses has to be achieved by means of decreasing metal intensiveness along the entire cycle of the production, use, and functioning of metal. In addition, the production and structural cycles have to be subordinated to the task of decreasing the metal intensiveness of the operational cycle.

The most substantial losses arise as a result of the short service life and insufficient reliability of machinery and equipment and of the necessity to stop them and make repairs. Decreasing waste is frequently spoken about, but very little is said about the strength of machinery. At the present time every fifth ton of metal is expended to repair fixed capital, chiefly machinery, equipment, and transportation equipment. Capital and current repairs cost the economy around 40 billion rubles a year. Therefore, an increase in the strength of the machinery and equipment parts and units which wear out most rapidly is a very important source for economizing expenditures through a decrease in metal intensiveness.

In order to decrease losses of metal and resources connected with the repairing of fixed capital it is necessary first of all to speed up the replacement of obsolete machinery and equipment. At the present time decommissioned obsolete equipment in industry is almost 4 times smaller than newly commissioned equipment (in 1977 this data was 2.4 and 8.9 percent, respectively). An increase in depreciation allotment norms has had

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practically no effect upon renewal periods. The point is that the economic balances for the planned products list cannot provide for the allocation of substantial resources for the replacement of obsolete equipment. Two-thirds of the metal-cutting machine tool pool is employed in the production of spare parts. Therefore, it is necessary to make serious changes in the machinery and equipment balance, increasing the proportion of resources which are assigned for the replacement of obsolete machinery and equipment.

The question of repair services is of especial importance. Machine building plants establish a guaranteed period for their output which at best is equal to 10 to 15 percent of service life. They do not have any repair service obligations. In our opinion, machine building enterprises should be made responsible for servicing the machinery and equipment they supply with capital and current repairs throughout the entire service life of this machinery and equipment and for the production of spare parts. It is necessary to provide economic stimulation for them by establishing wholesale prices for spare parts which are close to their cost at non-machine building enterprises. Finally, the All-Union State Standards should provide for the strict regulation of the service life and reliability of machinery and equipment until their current and capital repair periods.

A. M. Polyak (Doctor of Economic Sciences, Professor, Moscow Institute of Steel and Alloys). Different authors and specialists put different contents into the concept of "materials intensiveness" and "level of materials intensiveness." The data of the USSR Central Statistical Administration on the structure of expenditures for the production of output, particularly industrial output, is frequently used in order to characterize these concepts. However, this data makes it possible to judge only about the share of material expenditures in the overall costs of output production in the individual branches and about the relationships between the individual expenditure elements. The lowest proportion of material expenditures exists in the fuel branches. It is in this sense that the terms "materials intensive" and "non-materials intensive" branches should be understood--if the indicator of the share of material expenditures in overall production costs is taken as the level of materials intensiveness. In order to determine the level of the real materials intensiveness of the production of homogeneous output it is advisable to use the measurement of the specific expenditures of material resources in physical terms (kilograms, tons, liters, cubic meters, and so forth) as the basic method.

In order to compare the levels of materials intensiveness of heterogeneous products a cost evaluation of the specific expenditure of the relevant material resources for their production is used. At the present time this method is the simplest and most accessible. However, the defect of the existing forms of price measurement are automatically transferred to the results of the comparison of the materials intensiveness of output. The method of evaluating the levels of the materials intensiveness of heterogeneous products by labor expenditures is the most acceptable from the theoretical point of view. Note should be taken of the promising nature

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of this method and of the availability of the necessary basic information. However, this method has not yet received employment. Its introduction as a supplementary and, in a number of cases, as the basic method for measuring the levels of the materials intensiveness of heterogeneous products is an important and top-priority task for economists who are studying the problem of determining the efficiency of the use of material resources.

With regard to what has been said, it is also necessary to bring some clarity into the question regarding the tendencies in the movements of materials intensiveness in the USSR economy during the period 1961-1978. With the existing methods of planning and accounting the amount of material expenditures which are included in the gross output of branches or of the entire economy is determined by the influence not only of the so-called technical factors. The amount of material expenditures in cost terms is influenced by interbranch and intrabranh structural changes, the price factor, and also by "double counting" whose amount may increase either as a result of an expansion of cooperation, or as a result of the accounting and planning methodology being used in the branches.

The share of material expenditures in the social product in the USSR economy has increased somewhat recently, which is confirmed by the data on the dynamics of the gross product and of national income in comparable prices. In 1961-1965 the gross social product increased by 37 percent and national income also increased by 37 percent. In 1966-1970 the gross product increased by 43 percent and national income by 45 percent; in 1971-1977 the gross product increased by 36 percent and national income by 32 percent; and in 1971-1977 the figures were 49 and 46 percent, respectively. Approximately the same figures are received from calculating the gross product and national income in actual prices for the same years (as is proposed by certain economists in order to determine the tendencies of materials intensiveness). When calculated in actual prices the share of production material expenditures (excluding depreciation) in the gross product came to approximately 49 percent in 1960 and 1965, around 50 percent in 1970, 52 percent in 1975, and 51 percent in 1977; that is, again it increased somewhat. At the same time, the specific expenditures of material resources to produce the basic types of output in the economy decreased consistently. This kind of relationship between the tendencies for the movement of the physical indicators of materials intensiveness and the share of material expenditures reflects the objective fact that independently of the direction of changes in the share of material expenditures in the cost of the social product a steady decrease in the specific expenditures of materials in concrete productions, shops, sectors, and jobs is a law (which permits only individual exceptions) that is organically inherent in a developed socialist economy.

In this connection, one has to agree with the point of view of a number of economists who propose that the movement of materials intensiveness in the economy be judged only by changes in the indicator of the share of material expenditures in the cost of the social product (or material expenditures

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per unit of gross product, national income). Of course, the relationship between production material expenditures and national income is one of the central proportions of social production, and the indicator of material expenditures per unit of gross product, or national income is one of the important indicators of production efficiency. However, a change solely in this indicator, taken in isolation and outside of the overall system of indicators of the use of the material resources, does not characterize the full totality of the processes involved in the formation of materials intensiveness in the economy.

The development of a system of the most important indicators of materials intensiveness which has to be constructed with regard to the use of the economy's basic material resources is of great importance for analyzing the tendencies towards changes in material expenditures. Along with the materials intensiveness of national income, this should include: the relationship between the growth rates of the processing and extracting industry; the electricity intensiveness of national income, industrial output, agriculture, construction, and transportation; the use coefficients of finished metal output in the economy, machine building, and construction; the specific expenditures of rolled ferrous metals in machine building and construction; the specific expenditure of fuel for the production of a unit of national income, the expenditure of conventional fuel for a kilowatt-hour of electric energy, and the specific expenditure of coke for one ton of steel making pig iron; the specific expenditure of chemical products per unit of national income; the production of the basic types of finished output per 1,000 cubic meters of procured timber; the specific expenditures of the most important physical materials for the performance of construction and installation work and per unit of housing space; and the expenditure of basic raw materials in the production of the basic products of the light and food industry, and others.

The role of non-capital intensive methods of reducing materials intensiveness which do not require substantial capital investments is now becoming especially important. They include, first of all, measures on economizing material resources which also provide for an improvement of the system of accounting and planning their production and consumption. In this connection, it has to be noted that the indicator of net output as a whole has to orient enterprises toward decreasing the materials intensiveness of the output they produce. This influence has to be exercised by the introduction of indicators for inventorying the production of equipment in units and sets, instead of in physical tonnage and by the replacement of the indicator of physical tonnage in a number of spheres of its application in metallurgy with indicators of adduced tonnage (in accordance with labor intensiveness), theoretical weight, meterage, and others. It has to be noted that the use of a different indicator for inventorying the production of output changes the very results of evaluating the work of a production collective and the psychological climate at an enterprise. Thus, during the years 1971-1975 assortment was expanded and the quality of large-diameter pipes was improved at the Volgograd Pipe Plant. Never-

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theless, in measuring the annual amount of commodity output in physical tons or in a cost evaluation the enterprise's return on capital indicator decreased. And, on the contrary, when the amount of commodity output was expressed in meters the return on capital indicator increased which, in our opinion, more objectively reflects the real results of the enterprise's work.

N. K. Kayumov (candidate in economic sciences, deputy director of the Institute of Economics of the Academy of Sciences Tadzhik SSR). I would like to touch upon a number of questions which are specific and are of importance not only for Tadzhikistan. First of all, there is the question of the quality of cotton and of reducing losses in its harvesting, transportation, and storage. In recent years our selection specialists have been performing serious work to raise high-yield and high-quality varieties of cotton. However, low-quality cotton goes for industrial processing. For example, during the last 15 years the proportion of first grade raw cotton in the total amount of cotton has decreased by more than 18 points, while the decrease in machine harvested cotton has been even greater. As for the select grade, it has completely disappeared from the assortment. Thus, the efforts of selection specialists and practical workers aimed at improving the quality of cotton are being reduced to naught.

One of the chief reasons for the situation which has developed is a rise in the level of the mechanization of the process of harvesting raw cotton. It does not, of course, follow from this that we should give up machine harvesting. On the contrary, the mass use of equipment shortens the harvesting period, makes it easier, and ensures a large economy of live labor. But due to imperfections in the design of cotton-harvesting machines a great deal of cotton is lost and its moisture and contamination levels are increasing. The moisture and contamination levels of machine-harvested cotton is 1.3 and 2.3 times greater than that of hand-harvested cotton. This has led to a decrease in the production of fiber and to a deterioration of its quality. The production of fiber as a whole in the republic has decreased by 1.7 points and is now at the level of the 1940's. For this reason, output losses come to approximately 28 to 30 million rubles. At the same time, the losses of cotton plants due to grade changes are also increasing. Every year in the Uzbek and Tadzhik union republics alone the losses resulting from moving from the first grade to the second come to more than 40-42 million rubles. The use of raw cotton in the cotton textile industry has also worsened. In order to counteract the process of quality deterioration our machine builders have to not only improve the design of existing machines, but to create fundamentally new and highly efficient cotton-harvesting combines.

The price formation system for cotton fiber is also in need of serious improvement. The price mechanism for stimulating an improvement in the quality of raw cotton provides for differentiated prices in relation to the use value of the raw materials. But the prices for cotton fiber are

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established without regard to this demand. For example, a plant receives profits of 138-140 rubles from the production of 1 ton of first grade cotton fiber, and 228-230 rubles for fourth grade fiber. Such prices do not stimulate cotton plants to improve the quality of their raw materials.

It is necessary to consider one more question which is directly related to the quality of textile goods--an increase in the production of fine-fiber grades of cotton which have the best spinning properties and are in great demand among the country's textile workers. There have been substantial successes in this field, but nevertheless the country's needs for this type of raw material are being met by only 50-60 percent. In recent years in a number of the cotton sowing republics the gross harvest of fine-fiber cotton has even decreased, and this despite the fact that the level of profitability is twice as high as that of medium-fiber grades. The lack of efficient cotton-harvesting combines is, in our opinion, the basic reason. As a result, harvesting periods are being stretched out and the labor intensiveness of production is increasing. In addition, the farms which grow fine-fiber grades will fulfill their plans much later than other farms and this is unprofitable. In this connection, we should raise the question not only of the creation of efficient equipment, but also of a different way of evaluating the work of a farm.

Scientific studies which are being carried out in the Institute of Economics of the Academy of Sciences of the Tadzhik SSR show that a definite quantity of cotton is lost as a result of the insufficient development of the production infrastructure, particularly due to imperfections in the road network. In the republic there are 1.4 hectares of sown land with a lower yield of three to four times for every kilometer of dirt road. Even at a minimum estimate this decreases the gross harvest by five to six percent. The insufficient development of the road network is probably explained by the fact that only transportation expenditures are considered in determining effectiveness. It is obvious that account also has to be taken of the effect which is obtained by agricultural enterprises as a result of an improvement of the road network.

In addition to cotton, a great deal of fruit, vegetables, grapes, cocoons, and other cropping and animal husbandry products is lost. Our agriculture produces much more products than are actually consumed. This raises the task of a serious improvement of warehouse and refrigeration work.

The general conclusion amounts to the following: first, it is necessary to move from the development of small-scale and scattered measures to the realization of large overall special-purpose programs which ensure a substantial economy of material resources; secondly, it is necessary to utilize the large reserves for economizing resources which exist at the junction of individual branches which are organically a part of large economic complexes. For this reason, in order to have a clear idea about the use of raw materials from the moment of their production to the receipt of

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final results it is useful to consider the problem of reducing materials intensiveness within the framework of individual complexes.

W. S. Khachaturov. How is the quality of cotton to be improved?

N. K. Kayumov. Our selection specialists are doing a lot of work, although their efforts are aimed basically at increasing the yield of cotton. Yet, it is essential first of all to develop measures to counteract the process of the deterioration of the quality of raw cotton.

V. M. Ivanchenko (doctor of economic sciences, Deputy Division Chief at Gosplan USSR). There are also methodological aspects to the problem being discussed. I am speaking about the creation of a system for economizing resources and of a programmed solution for many problems. I think that nowadays the content of a plan and its conception has to be looked upon first of all from the position of an improvement in the structure of production, scientific and technological progress, and the realization of an effective economy regimen and a system of stimulation. These are the four directions which have to make up a complex and ensure a systems approach to the solution of the problem.

Structural policy. A change in the proportion of progressive branches helps to accomplish definite tasks in scientific and technological progress, but the capital and metal intensiveness of production is not reduced here. The essence of the problem consists in the fact that too little attention is devoted to the qualitative proportions of production. A qualitative characterization of the structure of production is what to produce, how to produce it, and with what technical and economic parameters and characteristics with an orientation toward final consumption, having in mind that the consumer should receive what he needs and, in addition, a national economic effect should be achieved. The problem of structure in its global understanding is very important for us because it determines a reorientation of capital investments toward accomplishing the task of raising the technical level of production and output. Without a radical turn toward a qualitative production structure it will be impossible to solve the problem of material intensiveness, capital intensiveness, and an increase in economic growth rates.

Scientific and technological progress is connected basically with a rise in labor productivity, with only live labor meant. This is understandable, especially since the increase in labor resources in the 1980's will be lowered by 2 to 3 times. To economize resources means to economize labor power, labor, time, and capital investments. A rise in the technical level of production has to be the equivalent of an increase in production potential.

In our opinion, the basic directions of scientific and technological progress are: an improvement of technology, an improvement of designs, and an increase in the reliability and service life of equipment; the wide use

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of substitutes; and a rise in the technical level of production which ensures the production of high-quality output with a decrease in labor intensiveness.

A regimen of economy has to become state policy. A regimen of economy, of course, not at the cost of narrowing assortment and worsening quality. Above all, it means a decrease in the specific expenditures of resources for a unit of useful effect in output. This policy has to become the basic one from the point of view of a regimen of economy. As long as we speak about a regimen of economy and simply reduce expenditures at each individual enterprise or sector, we will economize in one place, while we will get additional expenditures in another. A national economic approach is essential here. We have to achieve the kind of decrease in expenditures in which the total expenditures for the final product are minimal with regard to the use properties and characteristics of each product.

In this connection, attention has to be called to the problems of stimulation. Stimulation has to be achieved not merely through a system of material incentives, but through plans and its indicators. However, a question arises here: what indicators should be used for evaluating the work of enterprises and for forming incentives funds and bonuses? In a number of branches the net output indicator should occupy the leading place. For example, for construction organizations conventional net output would be best. Nevertheless, construction workers speak a great deal about the negative aspects of gross amounts of construction output and are in no hurry to introduce a conventional net output indicator which excludes an interest in material intensive work. A stimulation system has to provide for increased attention to the fulfillment of contract commitments in mutual production relations whose violation leads to large material losses. At the same time, it would be useful to make wider use of direct forms of allotments to the incentives funds of a part of the economy (40-50 percent) of material resources. A decrease in the specific expenditures of materials has to become a very important criterion in the work of associations and enterprises.

It has now become necessary to move from the solution of individual aspects of a problem to its overall solution in which the plan, the tasks of scientific and technological progress, the state policy of a regimen of economy, and stimulation have to comprise a single system which is aimed at economizing current and lump-sum expenditures which define national economic effect and make it possible to manage the concrete factors in economizing resources while planning and achieving high cost accounting indicators at every enterprises. And this national economic effect has to be determined for any measure and be transformed, and be taken account of in norms, standards, and cost accounting indicators.

T.S. Khachaturov. I would like to know to what extent the service life of our machines will be increased if better quality metal is used, and if there is an interest in our country in decreasing, or, on the contrary, increasing the weight of machines on the part of those who produce them?

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I. G. Pashko (candidate in economic sciences, Chief Specialist at Gosplan USSR, Honored Metallurgist of the RSFSR). USSR group "A" industry is marked by a very high level of materials intensiveness. There are enormous reserves here. Thus, in ferrous metallurgy the smelting of 8 million tons of casting iron is connected with a 26 percent decrease in the productivity of blast furnaces and a 30 percent increase in the expenditure of coke (in the United States only 1.5 million tons of blast furnace iron is smelted, that is, five times less). The production proportion of rolled sheet goods is relatively low in our country (41 percent in the USSR compared to 68 percent in the United States and 64 percent in Japan); in machine building 3 to 4 times more steel and iron castings is used than in the developed capitalist countries; and metal cutting methods predominate over the progressive processes of working metal by pressing, stamping, and extrusion. For this reason, in 1977 waste in machine building came to 19 million tons, with around 9 million tons in shavings. According to the data of the USSR Central Statistical Administration for 1967 and 1977, the use coefficient of metal had stabilized at the level of .72 (in the United States --.84).

As is known, the growth rate of national income came to 3.3 percent in 1977 and 4 percent in 1978. In our opinion, such rates are clearly insufficient for accomplishing major socio-economic tasks. It appears that without decreasing the level of metal intensiveness it will be impossible to plan high economic development rates and a high increase in national income. A decrease in materials intensiveness, for example, of one billion rubles ensures an economy of capital investments of 6 billion rubles.

In order to achieve higher growth rates for national income it is necessary to have material resources and, above all, metal: rolled goods, piping, hardware, and products for subsequent conversion. In 1978 more than 151.4 million tons of steel was smelted in our country. No other country in the world smelts as much steel and produces as much rolled goods as the USSR, but, nevertheless, there is not enough metal.

In the past, the country's economic potential was defined on the basis of the level of steel smelting. At the present time the use of this method is inadvisable. A great deal of steel is produced, but there is not enough final output from it--metal products.

The reason for this is the unsatisfactory use of steel. The relationship of our total smelted steel to finished rolled goods (151.4 million tons of steel to 105.3 million tons of finished rolled goods) is 1.44 (in Japan --1.16, in Western Europe--from 1.18 to 1.24). If our steel smelting were to be recalculated by the relationship which has been achieved in Japan, the surplus of steel would come to around 30 million tons of which it would be possible to produce approximately 23 million tons of finished rolled goods, or not to expend around 200 million tons of iron ore raw materials (the West European relationship of 1.24 would give a surplus of steel of 20 million tons of which it would be possible to produce more than 15

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million tons of rolled goods).

In our opinion, it is entirely realistic to bring the relationship between steel and finished rolled goods to 1.34.

What measures will have to be carried out in the 11th Five-Year Plan in order to achieve this?

First, in the USSR in 1977 around 13 million tons, or 8.8 percent, of our steel was smelted on continuous steel smelting installations, while in Japan which bought the license for these installations for us the figure was 42 million tons, or 41.6 percent, which is 3 times more in tonnage and 4.7 more in proportion. In order to achieve the relationship of 1.34 smelting has to be increased on the continuous installations to 40-42 million tons.

Secondly, the industrially developed countries produce more rolled goods (20-22 percent) from semi-killed steel than from killed steel. The production of rolled goods from semi-killed steel has to be brought to 20 percent. Ten years ago we produced very little semi-killed steel and there are achievements, but they are still insufficient.

Thirdly, a large amount of steel castings are used in machine building. In 1978 the USSR produced 6 million tons of steel castings and expended 10 million tons of steel on them (the United States--2.2 million tons of steel, Japan--740,000 tons). In making machines the United States and Japan used much more rolled goods, which is cheaper and requires less capital investments for the creation of casting capacities. In addition, labor productivity in rolling shops and ferrous metallurgy is twelve times higher than in the casting shops of machine building. The use of unjustifiably large amounts of castings reduces the effectiveness of the use of steel and increases the metal intensiveness of machines. In recent years there has been an increase in the production of economical types of rolled goods, thermally strengthened rolled goods, low-alloy and cold-rolled steel, and bent sections, the quality of the metal has improved and there has been an expansion of assortment, but none of this has had an essential influence on decreasing the weight of machines and decreasing waste in producing them. This is explained by defects in the development of the billeting production in machine building and, above all, by the obsolete structure of metal-working equipment (the predominance of cutting to the detriment of pressing equipment, the negligible use of sheet rolled goods in machine building).

In the 9th Five-Year Plan the Ministry of Machine Building Industry overfulfilled its plan for metal-cutting machine tools by 105 percent while its plan for forging and pressing equipment was fulfilled only at the level of 69 percent. The structure of the forging and pressing equipment tools is insufficiently progressive: hammers predominate, while there are too few progressive machines--crank hot presses, radial presses, and

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others which make it possible to produce parts with minimum waste or without waste.

In our opinion, it is necessary to make amendments to the overall program which has been made up by the USSR Academy of Sciences and to the Basic Directions for the socio-economic development of the country for the years 1981-1985. In order to increase the influence on production efficiency when annual and five-year plans are worked out it would be useful for ministries, departments, and republics to establish material intensiveness reduction assignments, that is, to begin to plan material intensiveness.

D. M. Palterovich (Doctor of Economic Sciences, Senior Scientific Associate at the Institute of Economics of the USSR Academy of Sciences). A decrease in material intensiveness is determined to a large extent by how much the development of the implements of labor ensures a saving of raw materials, materials, fuel, and energy. This dependency shows up in all of the stages of production. Thus, in the extracting industry the extent to which raw materials and fuel are extracted from the earth and their delivery to the consumer depends upon the designs of mining machines, the quality of rigging, the use of deep pumps, and the availability of special railroad cars, trucks, and other transportation equipment, which exclude losses during shipment. For example, the introduction of modern electric loading pumps ensures an average increase in the yield of petroleum wells of five times compared to ordinary pumps, that is, almost the average level of gushing wells. The use of special railroad cars for loose types of raw materials and materials almost completely prevents losses during shipment which sometimes reach 10 percent of the total amount of the freight shipped.

In the processing industry the development of machinery ensures: a deeper and more overall processing of raw materials with the extraction of all useful components from them; a decrease in the specific expenditures of raw materials and materials by means of the introduction of more economical technological processes; and fuel and electric energy savings on the basis of the use of more economic engines, electric generators, light sources, gas burners, and apparatus and instruments which optimize the expenditure of fuel, recovery boilers, and so forth.

One can point as an example to the creation of equipment for new and less energy intensive processes of obtaining a number of products (aluminum, magnesium, cellulose, and others). Another example is the possibility of utilizing the resources of waste heat. The Sterlitamak "Soda" Production Association has created equipment and installations for the use of waste heat which make it possible to obtain in the chemical, petrochemical, and microbiology industries an annual economic effect of more than 20 million rubles. However, due to an insufficiency of equipment and the lack of specialized plans for the production of recovery and heat using apparatus the industry still has large losses of heat in order to obtain which hundreds of thousands of tons of fuel has to be expended.

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Substantial reserves for decreasing metal and fuel intensiveness and, consequently, materials intensiveness could be realized in the production of the implements of labor. What are the ways of realizing these reserves? First, an optimization of the needs for implements of labor and an improvement of their structure and design and, secondly, an improvement of the technology of metal working.

In an economic analysis of the reserves of materials intensiveness attention is usually called to the possibility for economizing metal by means of strengthening it or replacing it with other materials, and also of a wider use in machine building of the methods of the precision stamping of parts from rolled sheet goods, precision casting, powder metallurgy, knurling and welding methods, and so forth.

A large amount of published data shows, however, that the use coefficient of the basic types of rolled goods and castings in machine building fluctuates on the average within the range of .7-.8 (excluding forgings made of ingots for which the use coefficient of metal usually does not exceed .3), while the introduction of progressive technology makes it possible to increase it by 10 to 15 percent with a corresponding decrease in the expenditure of metal. In effect, the overall growth in the use coefficient of metal in machine building does not come to one percent in a five-year plan.

In the production of individual products the use of various types of improved quality metal (heat-resistant, polymer or aluminum coated, low-alloy steel, shaped and bent sections, and so forth) ensures an economy of from 5 to 25 percent of the metal, while in certain cases it is even larger. However, in the foreseeable future as a result of the introduction of progressive technology it will only be possible to economize several percentage points of the metal consumed. As for the use of plastics, it is now replacing around one percent of the ferrous metal in machine building and even according to the forecasting data this economy will not exceed four to five percent during the next two to three five-year plans.

The importance of the above-enumerated directions of economizing is very great; however, they still cannot be compared with the possibilities for economizing metal as a result of an improvement of the designs and type-size structure of the machinery and equipment being produced. In other words, in evaluating the problems of "what to produce?", "from what to produce it?" and "how to produce it?" it has to be emphasized that the decisive importance for decreasing metals intensiveness is the question of "what to produce?"

In our opinion, it has become necessary to make more radical changes in the character of the designs and in the type-size structure of the equipment we produce in such a way as to make it possible to obtain a greater economy not only of metal, but also of fuel, electric energy, and of other operational expenditures.

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Substantial reserves for economizing metal are connected with doing away with the excess and practically unutilized reserves of strength in structures, with miniaturization and microminiaturization, and with the use of fundamentally new, economical, structural-technological solutions.

Repeated note has been taken in our economic literature of the differences in the size structure of the metal working equipment which is produced by Soviet and American machine tool builders. From 1961 through 1970 1,864,000 metal-cutting machine tools were produced in the United States, including 1,247,000 units, or 60 percent, of small very simple machine tools with a cost of up to 1,000 dollars (excluding machine tools for home workshops and schools). From 1971 through 1977 the production of machine tools was 1,549,000 units, including 1,158,000 small machine tools --the latter's proportion had increased to 75 percent. Basing ourselves on the average weight of a machine tool which is produced in the USSR (more than three tons) and in the United States (1.2 tons) and the average metal use coefficient in machine tool building (USSR--.8, United States-- .85), it can be calculated that in our country 900,000 tons of metal are required for an annual production of around 240,000 machine tools, and in the United States around 340,000 tons are required. The difference is 560,000 tons and, moreover, this is basically a consequence of differences not in the technology of metal working and machine tool building, but in the size structure of the machine tools produced.

Of course, small machine tools can only be used to replace larger ones in limited numbers. But even a small (compared to the United States) increase in the proportion of small equipment can ensure a large economy of metal. There are also considerable reserves for economizing metal in replacing a part of our excavators with lighter loaders, and in the optimization of the size structure of tractors, trucks, drilling installations, and certain other machines.

The processes of the creation of new types of machinery and equipment and the formation of the structure of their production are still insufficiently oriented toward economizing raw materials, materials, fuel, and energy. In our view, it is necessary for designers and production engineers to devote more attention to the creation and improvement of equipment which ensures this kind of economy and to orient the technical and structural policy of the machine building branches toward the formation of an economical type-size structure for machinery and equipment. A special overall interbranch scientific and technical and production program has to be worked out for the purpose of economizing raw materials, materials, fuel, and energy. The gradual exhaustion of rich and convenient mineral deposits, the world market increase in the cost of raw materials of 2 to 2.5 times and of more than 4 times for fuel, and the enormous possibilities for economizing resources through the introduction of progressive equipment make the development of such a program not only important, but also essential.

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V. I. Pavlov (candidate in economic sciences, sector chief at the Scientific Research Institute of Planning and Standards at Gosplan USSR). A re-orientation of our economy in a materials economizing direction would make it possible to decrease the materials intensiveness of the gross social product from 580,000 rubles in 1975 to 570,000 in 1978, with the result that the economy of raw materials, materials, fuel, and thermal and electric energy and other types of material and technical resources in 1978 compared to 1975 would be around 10 billion rubles against the 8 billion rubles planned in the five-year plan for 1980. The achievement of such results would be helped by the introduction of an indicator for materials intensiveness among the calculated indicators. And the planning of the materials intensiveness of output in all of the elements of the economic mechanism would make possible a fuller disclosure and use of production reserves.

Due to the fact that material expenditures comprise the basic share of expenditures for production and their rational use can bring about the greatest national economic effect, it would be advisable to introduce the indicator for materials intensiveness among our directive indicators, providing for its planning even in connection with the planning of output costs.

At the present time more than 20 billion rubles worth of purchased semi-goods and component products is used in machine building. The experience connected with a technological improvement of product design testifies to the fact that the use of different design schemes for the same product and a variation of the products list of purchased component products can reduce their costs by an average of 15 to 20 percent, and, with regard to their consumption, this will make it possible to obtain an economy of several billion rubles.

In order to ensure an interconnection between physical and cost indicators it is necessary to develop and regularly renew (not less than once in two to three years) products list price lists for the types of output which are included in the national economic plan, and for material and technical resources this has to be done with regard to the specific nature of branches, productions, and suppliers.

In our opinion, there should be the most rapid introduction of the proposal by Academician A. Aganbegyan to take account not only of the quantitative but also of the quantitative indicators of our output, that is, to evaluate economic work not by the gross, but by the quality of the gross. This will make it possible to avoid the shortcomings which are characteristic of the gross output indicator.

In connection with the decrease in the materials intensiveness of the social product, the demands are increasing upon the development of overall interconnected economic programs for resource economizing. Programs of this kind which are being used in the CEMA countries are very effective. The

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lack of an interconnected overall plan of measures for economizing various types of resources leads to economies of certain resources and overexpenditures of others. For example, an excessive decrease in the thickness of walls leads to losses of heat as a result of poor insulation. In the country's large cities during the last 15 to 20 years as a result of a deterioration of heat insulation the heat consumption norms for one cubic meter have increased by 1.6 times, and in panel buildings compared to brick buildings specific heat losses have increased by two to three times, while in a number of countries the insulation of buildings has improved by 1.5 to 1.8 times. In this way, an economy of construction materials turns into enormous losses of heat throughout the entire service life of buildings.

The introduction into the economy of scientific research and development achievements which have found a wide application in world practice will make it possible to sharply increase the efficiency of social production and to decrease its materials intensiveness. Thus, better strength calculations for the parts and units of machinery and equipment and an improvement of the billet base of machine building will make it possible to free around 10 to 12 million tons of additional metal while improving the use properties of output. A simple decrease of 4 to 5 million tons in the "production" of excess shavings in machine building will give the economy an annual savings of around 7 billion kilowatt hours of electric energy and of the labor of more than 230,000 machine tool operators. A rise in the level of traffic control in railroad transportation of only one percent will make it possible for the same rolling stock to carry an additional 2 million tons of freight every year.

An analysis of the structure of overall national economic materials intensiveness shows that around one percent of the material expenditures in the economy is accounted for by such resources as thermal energy, steel piping, mineral fertilizers, and commercial timber, approximately 1.5 percent by synthetic resins and plastics and wall materials, almost three percent by boiler and furnace fuel and rolled ferrous metals, 7.5 percent by feed, and around nine percent by all types of fabrics and chemical fiber. It should be noted that a decrease in the materials intensiveness of the output of machine building by one percent produces an economy of more than 400 million rubles, and the same decrease in agricultural output saves around 740 million rubles. In addition, an average annual increase in the production of agricultural output by 1 billion rubles requires capital investments of 12 billion rubles (60 branches of industry work directly on the output of fields and farms, while 90 branches of industry are directly or indirectly involved in processing agricultural output). Every year in machine building the economy of rolled ferrous metals comes to 150 to 200 million rubles, and as a result of imperfections in the technology of painting parts, units, and products the annual losses of primers, lacquers, and paints are estimated at 300 million rubles. Due to the large amounts of fabric wastes the economy of the RSFSR alone loses 3 to 4 billion rubles annually. It is necessary to stimulate an economy

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of all types of material and technical resources in all of the branches of the economy, and for this reason uniform methodological principles for paying bonuses for an economy of resources have to be worked out.

O. D. Gotsiridze (deputy division chief of Gosplan USSR). An enormous industrial production potential has been created in the USSR. With the present scope of production and consumption the problems of a maximally efficient use of the economy of material and technical resources and their economy are of exceptionally great importance.

An economy of material and technical and fuel and energy resources is achieved both by means of carrying out organizational and technical measures, a wide use of progressive design solutions, and an improvement of technological processes and by means of an improvement in the quality and use properties of resources themselves, an increase in the production of efficient and economical types of materials, a decrease in the specific expenditures of materials and raw materials for the production of finished output, and a deeper and more overall processing of raw materials.

However, in the future the maintenance of the development rates of our economy is only possible on the basis of a qualitative and not a quantitative change in the mass of material and technical and energy resources. We are speaking about the necessity for developing and introducing into our economy qualitatively new materials and energy sources which must sharply change the quantitative characteristics of the resources which are consumed. For example, the appearance in the 1950's of film technology and integral circuits instead of electronic bulbs and mounted parts led to qualitative changes in the production of electronic equipment and the output of the radio engineering industry, and to a sharp decrease in the need for ferrous metals, cable output, other materials, and electric energy and current sources. Similar changes are now occurring in the development of power engineering--the construction of atomic electric power stations and thermal stations does not require a substantial increase in the extraction and transportation capacities for organic types of fuel.

Of great importance for providing for the economy's needs for material and technical resources is the use of secondary resources and production and consumption wastes whose utilization will make it possible to obtain additional valuable raw materials, to decrease the expenditure of primary raw materials, materials, and fuel and energy resources, to increase the economic efficiency of social production, and to improve environmental protection.

However, insufficient use is still being made of secondary resources and production and consumption wastes. Some of them are lost, destroyed, dumped, and put into bodies of water, which damages the economy and leads to environmental pollution. Thus, in 1979, 791,000 tons of polyethylene will be produced, including 154,000 tons of polymer film, while the polyethylene balance provides for the repeat use of only 10,000 tons, or only 5.2 percent.

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In pursuit of an order from Gosplan USSR and Gosstat USSR and the USSR Central Statistical Administration, for the first time in 1972 an inventory of the formation and use of 318 types of secondary resources was conducted at the enterprises of 42 ministries. As a result, it was established that more than 65 million tons of ash and slag is formed at thermal electric power stations, while only 6 percent is used. More than 20 million tons of pyrite cinders which contain a substantial quantity of iron, sulphur, zinc, and other ferrous and rare metals had accumulated at the dumping grounds of sulphuric acid productions, but only 20 percent of these resources were utilized. A large number of such examples could be cited. While there has been a substantial overall growth of industrial production in the country, unfortunately, the use of production wastes has increased negligibly.

The shortcomings in the organization of the procurement, processing, and use of secondary resources are to a large extent the result of this work being scattered through various organizations, which leads to the dispersion of monies and the under-utilization of technical possibilities and an insufficient coordination of the scientific research work being done in the branches to rationalize the processes of the use of secondary resources and production and consumption wastes. Little work has been done on studying the problems of economically stimulating and increasing the interest of enterprises and organizations in collecting, processing, and using secondary resources and wastes. All of this confirms the necessity for developing and realizing a state overall program for the efficient use of secondary resources which has to become a component part of the country's economic and development plans.

D. G. Radina (candidate in economic sciences, senior scientific associate at the Scientific Research Institute of Labor of the USSR State Committee for Labor). The organization of material and moral stimulation for the workers of industrial enterprises (associations) and also the development of a system of their responsibility for the inefficient expenditure of resources is an important precondition for decreasing the materials intensiveness of output.

The greatest attention at a number of industrial enterprises (associations) is devoted to the organization of bonuses for an economy of metal. This is a result of the importance of this type of material for all of the branches of the economy and also of the fact that norm setting for it and a calculation of its expenditure is at a higher level than for other types of material resources.

One of the effective and promising methods of increasing the interest of workers in economizing material resources is team cost-accounting (ZIL, the Moscow Electrovacuum Instruments Plant, the Yaroslavl Motor Plant, the Leningrad "Sevkabel" Cable Plant, and many enterprises in ferrous metallurgy). The organization of production and labor by team contract has become widespread in a number of branches. An economy of material resources is a very

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important indicator of increasing the effectiveness of the work results of such collectives. The most effective forms of socialist competition which are aimed at economizing material resources are enterprise counter-plans, personal and team economy accounts, personal, group, and collective creative engineering and technical worker plants, and reviews and competitions for the effectiveness of the use of raw materials, materials, fuel, and electric energy.

On the whole, insufficient attention is devoted to the organization of bonus payments for the workers of industrial enterprises (associations), and this was confirmed by a study which was conducted by the Scientific Research Institute of Labor in 1978. The basic reason is that the ministries and departments do not devote the necessary attention to this problem. There is a universal absence of a progressive norm base and of scientifically substantiated methods for establishing resource expenditure norms; of organized weighing work, warehouses for storing raw materials, and control and measuring instruments; and at many enterprises inventory and control work over the receipt and expenditure of raw materials, materials, and fuel is poorly organized. As a result, at a number of enterprises there is practically no base for the introduction of effective bonus systems for an economy of resources.

A decrease in materials intensiveness or other concrete indicators which are aimed at an efficient use of resources is not calculated as basic indicators in paying bonuses to leading enterprise (association) workers. Bonus payments for economies to the engineering and technical workers of management divisions and services which by virtue of their work are supposed to have an important influence on improving this indicator are not sufficiently widespread.

In 1977, the Scientific Research Institute of Planning and Standards at Gosplan USSR and the Scientific Research Institute of Labor of the USSR State Committee for Labor developed the "Regulation on the Organization of Bonus Payments for the Workers of Enterprises (Associations) for Economizing Material and Technical Resources and Reducing the Materials Intensiveness of Output." The purpose of this regulation is to provide assistance to ministries and departments in their work on organizing bonus payments for these indicators. In addition to organizational and economic factors, serious attention is given in this regulation to the creation of an effective source of bonuses, since the effectiveness of the incentives systems which are introduced depends upon the solution of this problem.

An economy which is achieved at industrial enterprises (associations) compared to the operating material resources expenditure norms ensures a substantial amount of above-plan profit in the material intensive branches of industry. This, in its turn, should have an influence on increasing the amount of monies which are allocated for paying bonuses to workers for decreasing the materials intensiveness of output. As

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a result of calculations which have been performed at a number of enterprises it has been discovered that additional allotments to the material incentives funds from above-plan economies come to 2 percent of the achieved economy of material resources.

In order to create a real source (apart from increasing the amounts of bonuses or economizing through a redistribution of monies among the estimated expenditure items of the material incentives funds) the "Regulation" provides for a direct allotment of monies from the above-plan profits which are obtained on the basis of an economy of resources compared with the approved expenditure norms--in the amount of from 10 to 50 percent of the value of the economized resources. A differentiation of the allotment should be performed by ministries (departments) in accordance with the specific nature of the branches (types of productions).

The ministries, departments, and production associations should probably devote more attention to the problems of ensuring a closer connection between the system of incentives for executive and engineering and technical workers for new equipment and bonus payments for the basic results of economic work; of strengthening control over the direction of organizational and technical measures plans in the materials intensive branches of industry; and of increasing the interest of workers at industrial enterprises (associations) in developing and introducing less materials intensive output. The amount of the allotments for incentives has to be determined with regard to the weight of the economic effect achieved through decreasing materials intensiveness.

I. V. Rakhlin (doctor of economic sciences, senior scientific associate at the Institute of Economics of the USSR Academy of Sciences). Under present conditions, as a result of poor work on a number of fundamental problems, technical policy in general and in the field of material resources in particular has an insufficient grounding. Among these problems are, first, a methodology for evaluating the effectiveness of decisions on the basis of a consideration not only of economic but also of social factors, and, secondly, a further development of the balance methods of planning. A program of social development and of raising the standard of living of our people was adopted at the 25th CPSU Congress. In this connection, the problem arises of determining the economic effectiveness of the use of materials in the form of material goods and services to satisfy the needs of the people. Thus, 45 percent of the chemical output produced in our country is designated for non-production consumption. However, the existing methods of determining the effectiveness of capital investments (1969) and of new equipment (1977) do not contain any recommendations regarding methods of calculating the effectiveness of the use of new equipment in the non-production sphere and in households. This direction is connected with the receipt of an enormous socio-economic effect through the elimination of damage which is caused to the health of people, the quality of foods, the environment, free time, and the population's consumption budget; that is, real social results some of which can and must

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receive an economic evaluation.

For the time being, the results of effectiveness calculations which largely take no account of social factors and results are being used to substantiate a single technical policy. For example, only 20 percent of our plastic resources have been brought into the sphere of economic substantiations since the existing documents for calculations (use in the non-production sphere and in households, an increase in the amounts of use in previously developed fields, the lack of analogues for comparisons, and so forth) do not correspond to those which have been adopted in the methodologies in effect.

An extensive products list of material balances which are necessary for achieving physical-material interbranch and intrabranh proportions in the economic development plans is developed in planning agencies. The system of these balances consists basically of so-called mono-product balances and embraces products which are homogeneous in their physical-material function (for example, rolled steel, piping, cement, linoleum, and others). With this kind of organization of the work a large number of isolated narrow branch balances are made up which are poorly connected with overall physical-material balances. As a consequence of the physical character of these balances there arise discrepancies between certain physical and cost indicators of the plan.

A further development of balance methods has to be based, first, on a shift to material resources consumption balances and, secondly, on a shift from mono-balances to overall balances which embrace interchangeable material resources of various types. The development of a methodology for composing overall material resources consumption balances (for example, balances of structural materials in machine building, of packing and packaging materials, real and artificial leather in the shoe industry, and so forth) will be the basis for substantiating a technical policy of the consumption of material resources. In addition, it is important to provide elements for optimizing these balances with regard to an economic evaluation of the social results which are achieved. This will make it possible to substantiate optimal material resources consumption variants from the point of view of socio-economic effectiveness.

V. A. Spektor (candidate in economic sciences, division chief of the Scientific Research Institute of the Economics of Construction of Gosstroy USSR).

The assignments for economizing construction materials which have been stipulated for 1976-1980 are based above all on an expanded use in construction of new effective materials and products and on the development of new and the improvement of existing structures and methods of calculating them. If the economy of rolled ferrous metals which is being planned for 1980 in the USSR Ministry of Industrial Construction is taken as 100 percent, then 31 percent of this economy has to be achieved through an expanded use

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of effective types of rigging steel and of economical sections of rolled goods with high physical-mechanical characteristics, and 43 percent through the development of new and improvement of existing construction structures and methods of calculating them.

Under the conditions of intensification an improvement of the system of material and technical supply is of great importance for economizing resources. The development of a system of overall production supplies as one of the very important directions in improving supplies also promotes an economy of material resources in construction. The realization of the measures which are being provided for by the long-term program for the introduction of the "Komplekt" overall production supply system in the USSR Ministry of Industrial Construction will make it possible in the ministry as a whole to decrease stoppages at construction and installation jobs by 25 to 30 percent, to decrease labor expenditures at construction sites by 10 to 12 percent, losses of materials and products--from 1.5 to 10 percent and more, and labor expenditures at loading and unloading and warehouse operations by an average of 20 to 25 percent.

During the years 1974-1978 the increase in warehouse capacities in the USSR Ministry of Industrial Construction came to around 60 percent, while the amount of work increased by 10 percent. During this same time the volume of the centralized processing of materials and products and the level of their plant readiness in the production subdivisions of the administration for overall production supplies increased by 1.5 times. However, despite the work which has been accomplished, the ministry's need for warehouse space was met by only 40 percent, while for closed warehouses and production premises the figure was 35 percent.

An analysis of the data of the construction enterprises of general construction ministries shows that the centralized processing of materials at overall production supplies bases makes it possible to decrease waste and losses of petroleum bitumen by 10 percent, rigging and roofing steel--by 3 percent, rolled roofing materials--by 5 percent, construction glass--by 10 percent, linoleum--by 4 percent, fillers--by 15 percent, wall coverings--by 5 percent, paint and dye materials--by 4 percent, chalk pastes--by 11 percent, and sawn materials--by 11 percent.

The proportion of processed materials in the total amount of materials came to the following at the bases of the ministry's (for example, the USSR Ministry of Industrial Construction) administration for overall production supplies (as of 1 January 1978): 58.4 percent for glass cutting, 33 percent for linoleum, 55.8 percent for wall covering, 66.1 percent for the preparation of paints, 90.3 percent for the preparation of fillers and cements, 59.3 percent for the production of products made of roofing and galvanized iron, and 34.4 percent for the production of carpentry products. Work on the centralized processing of materials has been organized unsatisfactorily at the ministries of industrial production of the Armenian and Azerbaydzhanian Union Republics, at the Main Administration

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for Industrial Construction of Stavropol'skiy Kray, the Main Administration for Industrial Construction of Tyumenskaya Oblast, the Main Administration for Industrial Construction of Astrakhanskaya Oblast, and others. For example, at the Ministry of Industrial Construction of the Azerbaydzhanian SSR centralized processing is provided for only 17 percent of the linoleum, 14 percent of the floor boards, 40 percent of the paint and dye output, and 30 percent of construction glass.

The question of the packet and container shipment of freight is of great importance. Unfortunately, such shipments still comprise a small proportion. Meanwhile, the experience which exists in construction organizations shows that container and package shipments make it possible to reduce labor expenditures in loading and unloading and warehouse operations by an average of 20 to 25 percent and losses of small item and loose materials by 10 percent, and to decrease rolling stock idle time during loading operations. In the USSR Ministry of Industrial Construction containerization equipment is used to supply construction projects with 81 percent of their brick, 30 percent of their door and window blocks, 82 percent of their glass and glass blocks, 40 percent of their linoleum, 68 percent of their wall coverings and ferro-concrete products, parquet, floorboards, rolled roofing materials, plaster panels, and others.

The Mosotdlprom Trust of the Main Administration for Construction of Moscow contains the large "Stroydetal'" combine which is equipped with highly productive mechanisms and equipment and which has an annual production of 50,000 fillers, chalk pastes, oil tints, primers, cements, and mastics. The production by the "Stroydetal'" combine of varnish-free fillers and a water-oil emulsion makes it possible to economize 1,000 tons of varnish a year. At this combine around 1.9 million square meters of linoleum is welded into carpets and delivered to projects in a centralized manner in a set with skirting and other accompanying materials, which excludes losses of insulated linoleum that previously had come to 5 percent. The centralized cutting of 8.5 million square meters of wall coverings and their delivery in sets has made it possible to completely eliminate losses which had reached 18 percent with hand work. The introduction by the Trust of centralized supplies for construction sites of finishing materials with increased plant readiness has made it possible to eliminate losses of them and to reduce labor expenditures at finishing jobs by more than 200,000 man-days a year.

The system of supplying construction site orders through the agencies of Gossnab USSR is of great importance for economizing material resources in construction. True, it is not yet possible today to speak of its wide and universal introduction. Only 8 percent of the capital construction is supplied in this way, but the existing experience shows that from the point of view of economizing material resources this system is effective. Thus, supplying the orders of the construction organization of the Main Administration for Construction of Murmanskaya Oblast in accordance with needs defined by plans and estimates helped to decrease the actual expenditure

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of construction materials by 1 million rubles of the estimated cost of construction and installation work. The annual economy of materials compared to the expenditure norms came to 3 to 5 percent for cement, 2 to 3 percent for construction glass, 5 to 8 percent for soft roofing, 4 to 5 percent for slate, and so forth.

The effectiveness of the new supply system which was developed and introduced in the construction of the Kama Motor Vehicle Plant was an expression of the fact that control is carried out over the expenditure of material resources in accordance with the expenditures for materials stipulated in the estimates. This provided for an economy of basic materials of 4 to 9 percent compared with the expenditures in the construction of the Volga Motor Vehicle Plant. One of the effective ways of economizing material resources in construction is an improvement of norm setting. The development of a system of planning material and technical supply for construction requires a constant improvement of its norm base.

I. A. Mikhaylova-Stanyuta (candidate in economic sciences, senior scientific associate at the Institute of Economics of the Academy of Sciences Belorussian SSR). In Belorussia primarily the processing branches have been developed and the proportion of their material expenditures in production expenditures is quite high. Thus, for industry as a whole their proportion is 86 percent (91.5 percent in the light industry, 96.2 percent in the food industry, 76 percent in machine building and metal working). With the present scope of the consumption of materials an economy of only 1 percent is equal to an economy of 180 million rubles compared to 46 million rubles in 1960.

An economy of metal plays a special role for Belorussia since the republic does not have its own metallurgical enterprises. Ninety-eight percent of the need for rolled ferrous metals is met through imports from other areas of the country which come to 2 million tons a year. How is the scarce imported metal used? The use coefficient of rolled ferrous metals in the republic's machine building comes to .736, that is, 26.4 percent goes into waste. True, compared with 1969 (.714), it has increased somewhat. However, such an increase over a ten-year period is clearly insufficient.

The level of the coefficient in the republic's machine building is approximately the same as the average union one, but the formation of its average magnitude has been influenced by the high metal use coefficient in the electrical engineering and instrument making branches which define the specialization of production in the republic. At the enterprises of the Ministry of the Motor Vehicle Industry the coefficient is lower than the average one and comes to .721, while it is .728 at the Ministry of Tractor and Agricultural Machine Building. Yet, the metal use coefficient reflects the progressiveness of technology and technological solutions.

The net weight of a product characterizes the decrease in materials intensiveness. In this area there are definite successes in the republic. For

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example, the specific materials intensiveness of the MTZ-80 tractor compared to the MTZ-50, calculated per unit of power (horsepower), decreased from 70 to 40.2 kilograms, that is, by 41 percent, while its engine decreased from 7 (the D-50 engine) to 5.4 kilograms (D-240) and 4.4 kilograms (D-240T), that is, by 37 percent. The specific materials intensiveness of the MTZ-80 and MTZ-82 tractors is on the level of the best foreign analogues of the Ford, John Deere, and Perkins-Massey-Ferguson companies which, it is true, have a somewhat smaller motor potential, but, then, are more economical in their fuel expenditure. In their specific mass (kilogram/horsepower) and specific fuel expenditure the engines of the Minsk Motor Plant are also lower than the analogous American ones (the Case 336VD and John Deere 4270D). The Minsk Motor Vehicle Plant has the country's lowest expenditure of metal per ton of truck freight capacity, and there has been a constant decrease in the weight of the large-capacity trucks of the Zhodino Motor Vehicle Plant and of the motorcycles and bicycles and also of many other types of machine building output which is produced in the republic.

At the same time, a study of the technical and technological levels of engineering solutions confirms that there are substantial reserves for reducing materials intensiveness. An analysis of individual indicators of the machine tools produced in our republic and of foreign analogues testifies to the fact that with the same and, in certain cases even worse technical parameters our machine tools have a much greater mass.

In order to explain such losses it is necessary to analyze the formation of materials intensiveness beginning at the stage of technological design preparation. Already at this stage there is a lack of control over the level of materials intensiveness. The client is interested basically in the technical parameters of the machine tools and the area occupied by them so as to be able to place a line in the existing area. The price in which material expenditures are taken account of plays a secondary role for the client. On the other hand, a high price is important for the producers. It is advantageous for them to have large material expenditures, since the price for new products will undoubtedly cover them and ensure a profit which is established in percentages of cost. If it is considered that three-fourths of the cost is comprised of material expenditures, it will be clear that the producer sets himself the task not of reducing material expenditures, but rather, on the contrary, of validating an increase in them.

Thus, the producer and the consumer have no claims on materials intensiveness. Another question arises: are the production designing services interested in reducing materials intensiveness? After all, weight is specified in a product's documents. In part it is limited, but if all of the other parameters, except materials intensiveness, correspond to the demands made upon them, this will not put a stop to starting output in production. Moreover, a high materials intensiveness is not a barrier even to the awarding of the Token of Quality. The reason is the replacement of grades of metal. Production designing calculations are made for

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high-strength grades of metal of a definite profile, but they are not delivered. This is how replacements of less strong materials of inappropriate profiles appear, which leads to a decrease in the reliability and service life of products and an increase in the expenditure of materials. In addition, designers are not always well-informed about the conditions of the operation and use of mass and series production products in the spheres of their greatest application. For this reason, when they design they allow large guaranteed allowances for parts and units.

Not all of the types of type sizes of our products are subjected to calculations for rigidity, strength, and so forth during planning and designing work. Such calculations are performed only for base products, and subsequently this cumbersome "base" moves from one model to another. In addition, neither designers nor production engineers are properly provided with incentives for the development of less materials intensive types of output.

A decrease in materials intensiveness depends to a large extent upon the planning of technological progress. In practice technical development plans are more concerned with the problems of labor organization and reducing labor intensiveness than materials intensiveness. An analysis which was performed by us has shown that most enterprises which do not fulfill their cost plan do not fulfill their plans for a decrease in material expenditures either. The increased attention to a growth in labor productivity is understandable, since the stimulation funds are formed in relation to the growth rates of labor productivity.

While the problems of reducing the expenditure of materials at enterprises are nevertheless given attention, the problems of reducing stocks of commodity assets are ignored. Enterprises are not interested in the best use of stocks which sometimes greatly exceed the established norms. In individual years above-norm stocks at the Minsk Motor Vehicle Plant have exceeded 70 percent of the norm, at the Minsk Motorcycle and Bicycle Plant--50 percent, while at remaining enterprises they have not been lower than 25 percent. In Belorussia as a whole, above-norm stocks have reached 55 percent. In addition, the increase in stocks has been occurring independently of the dynamics of materials intensiveness.

Practice has shown that the close interconnection between all the factors of production makes it possible in individual cases to deliberately increase materials intensiveness, if other types of expenditures are materially reduced on the basis of this increase. For example, cases are known when a unified part or unit exceeds, albeit negligibly, specialized ones in materials intensiveness. However, the economy does not suffer any damage from this, since the increased expenditures for materials are compensated for by an economy of various expenditures in the production of unified parts and units. The chief thing in evaluating effectiveness is the combination of factors, especially when their dynamics moves in diverse directions. However, in this combination materials intensiveness, like any other factor, can at a certain stage play a compensating role which in

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the final analysis will bring about a positive evaluation of effectiveness.

A study of the problem of materials intensiveness in its regional aspect makes it possible to discover how the special characteristics and place of a republic in the social division of labor effect the actual level of materials intensiveness. Thus, in Belorussia an increase in the materials intensiveness of gross output during the past 15 years (4 percent) was the result of branch structural changes (9 percent), although non-structural factors helped to decrease materials intensiveness (5 percent) but were unable to neutralize its growth which was caused by an increase in the proportion of industry (from 50 to 69 percent). In industry the influence of the above factors moved in a single direction. Moreover, during the last 10 years one-third of the decrease (2.9 percent of 8.3 percent) was a result of structural changes (the share of gross output in the most materials intensive branch--the food industry--decreased by 10 points). Structural changes also had a great influence on the level of the metal use coefficient.

Of course, it is difficult to "manage" materials intensiveness in a region through the structural factor. The favorable influence of structural policy should not be reduced merely to decreasing the materials intensiveness of production. However, we can already observe changes in the branch specialization of the republic's machine building which are directed toward decreasing the share of the metal intensive branches which do not have a corresponding metallurgical base and toward increasing the share of the electrical engineering and instrument making branches which are provided with the necessary labor resources.

Practice testifies to the highly effective influence on materials intensiveness of intra- and interbranch production specialization. Unfortunately, the existing planning system reduces to a minimum the possibilities of a region for solving these problems.

To this day, the republic has no overall program for economizing material resources which is backed up by directed capital investments. The realization of such a program would make it possible to avoid many unwarranted losses.

P. S. Malinovskiy (candidate in economic sciences, division chief at the All-Union Scientific Research, Planning, and Designing Institute for Metallurgical Machinery).

In order to satisfy the economy's needs for pipelines with anti-corrosion plating the All-Union Scientific, Planning, and Designing Institute for Metallurgical Machinery has developed a process and created a unit for the production of thin-walled welded pipes whose use will make it possible not only to fully satisfy the needs of agriculture, but also to provide the economy with an enormous economy of metal.

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In 1972 a shop for the production of thin-walled welded pipes was constructed at the Davydov Agricultural Machinery Plant. The use in irrigation systems of galvanized pipes with a 1.8 millimeter wall makes it possible to replace the ordinary steel pipes with a 6 millimeter wall. The annual economy of metal in the production of thin-walled pipes on the machine tools which are slated to be installed at the Davydov Plant will be around 90,000 tons. The production of this quantity of metal requires the expenditure of around 60 million rubles. The basic equipment which contains many original machines was produced in accordance with blueprints made up by the All-Union Scientific Research, Planning, and Designing Institute for Metallurgical Machinery in Romania at a cost of around 6 million rubles, but it has not yet been installed. Thus, the delay in starting up the complex at the Davydov Plant is causing the economy triple damages: every year 90,000 tons of metal is overexpended, valuable equipment costing 6 million rubles is not used, and agriculture is not supplied with pipes for irrigation cropping.

An expansion of the production of rolled goods and piping with protective coverings is a very important national economic task. Their use makes it possible to avoid corrosion during storage and transportation, and also substantially increases the service life of construction structures and machine building parts. It is not surprising that especial attention is devoted to the production of rolled goods with protective coverings in the United States, Japan, and other developed capitalist countries. For example, in 1977 the production of galvanized sheet in the United States was 5.13 million tons, in Japan--5.21 million tons, and in the USSR--only .61 million tons, that is, 8.5 times less. Despite this lagging, a number of design developments which have been achieved at the All-Union Institute for protective covering machines have not been realized for a long time.

The production of hollow castings at continuous steel casting machines makes it possible to substantially shorten and simplify the technological cycle in the production of seamless piping, to decrease capital expenditures, and to improve the quality of piping and reduce its cost. The All-Union Scientific Research, Planning, and Designing Institute for Metallurgical Machinery and the "Tulachermet" TSNITICHMINPO have developed a technology for the production of hollow castings and have tested the design of the basic technological units of a machine for casting hollow castings. According to the calculations of the Ukgipromez, the introduction of this installation at the Taganrog Metallurgical Plant will make it possible to decrease the metal expenditure coefficient by 8.2 percent, to increase the production of first-grade piping by 1.6 percent, and to obtain an annual economic effect of 2.5 million rubles. However, since 1974 the USSR Ministry of Ferrous Metallurgy has been postponing the schedules for the production of the machine, thereby holding back the introduction of a highly effective method of producing hollow castings.

The All-Union Scientific Research, Planning, and Designing Institute for Metallurgical Machinery and the Institute of Electric Welding imeni

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Paton have developed an original technology for producing economical double-T sections. The process has been brought to perfection on an experimental unit. Tests of the double-T's have shown that they are in no way inferior to rolled beams in their strength properties. The special features of the new technological process which has been developed for the first time in the world make it possible to economize 120,000 tons of metal with an annual mill productivity of 350,000 tons. However, under various pretexts since 1971 the USSR Ministry of Ferrous Metallurgy has been refusing to finance the creation of this mill. A large number of such examples could be cited.

A substantial increase in experimental productions which are a part of head institutes or scientific-production associations is a very important means of accelerating the introduction into production of new and highly efficient units and machines. The effectiveness of the development of experimental productions is confirmed by the following examples. In metallurgical machine building experimental productions account for slightly more than one percent of the capacities of all of the plants. Nevertheless, the experimental plant of the All-Union Scientific Research, Planning, and Designing Institute of Metallurgical Machinery has produced and introduced into industry a number of new machines which are of exceptionally great importance for the country's economy: pilot models of mills which represent a new direction in the production of billets for machine building parts which are close in form to finished products, mills for the production of axles, shafts, wheels, bearings, screws, rings, and so forth. The use of such billets in machine building makes it possible to obtain an average metal economy of 18 percent of the weight of the products. Today 92 detail-rolling mills are being used in industry and around 200,000 tons of metal a year is being economized; the basic mill models are for joint processes of continuous casting and rolling. At the present time a large part of our aluminum and copper rolled goods is being produced on such mills. Thanks to the complete continuity of the processes labor productivity has increased five times, the cost of conversion has decreased by 38 percent, and specific capital expenditures have been reduced by three times; on the basis of a new technology for producing especially thin welded pipes which has been developed at the All-Union Institute for Metallurgical Machinery, small-dimension mills have been designed and manufactured for the Voroshilovgrad Plant imeni Yakubovskiy which have an annual production of 4.5 million meters of thin-walled piping for agriculture and provide an economy of around 200,000 tons of metal a year; the same is true of the first models of systems for the automatic regulation of the thickness of rolled sheets for continuous cold rolling mills. The system has made it possible to sharply decrease uneven thickness in the strip with the result that the actual precision of the finished sheet is 4 to 5 times greater than that regulated by the existing standards. The economy of the metal with a mill productivity of around 1 million tons a year will be 50,000 tons. These systems have been successfully introduced at the Magnitogorsk Metallurgical Combine, the Cherepovets Metallurgical Plant, the Zhdanov Metallurgical Plant imeni Il'ich, in the GDR, and elsewhere.

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A single technical policy has to be carried out of supplying domestic metallurgy with the necessary machinery and equipment to meet the growing needs for steel, ferrous metals, and alloys with regard to the unique experience which has been gained in creating first-class metallurgical units and rolling mills which in a number of cases are superior to their foreign analogues.

Machine builders are frequently reproached for increasing the weight of structures. Yet, the existing system of planning rolled goods compels a designer to orient himself not toward the modern methods of metal working. The expenditure of rolled goods and not the expenditure of metal as a whole is planned, and for this reason the designer is compelled to make greater use of casting structures. The experience of the Electro-Steel Plant for Heavy Machine Building which was permitted to use rolled goods in excess of the norm has shown that the use of welded structures decreases expenditures by 2 to 3 times and reduces the consumption of various materials by 8 to 10 times.

It has been said here that it is necessary to set norms for every product. In our opinion, this will lead to even greater confusion. Norms have to be set in such a way that a designer has the possibility to think about a structure beforehand and to make it more elegant and more efficient.

T. S. Khachaturov. In many cases designers are not interested in increasing the weight of products. However, there exists an interest in using standard creator's parts, which objectively does not stimulate a decrease in materials intensiveness.

V. I. Radin (doctor of technical sciences, chief designer at the Electric Machinery Plant imeni Vladimir Il'ich). I would like to illustrate with several concrete examples the points which have already been spoken about here, and also to raise a number of problems. The USSR produces electric motors with a total capacity of more than 40 million kilowatts every year. Their installed capacity is greater than the capacity of all of our electric power stations. Electric engines both in our country and in the entire world consume 43 percent of the electric energy which is produced, while in certain very important branches of industry this figure is 90 percent. Their production consumes around 500,000 tons of electrical engineering steel a year and around 50,000 tons of coiling copper. More than one million people tend electric motors. Our electric motor pool is constantly growing. The use of electric motors characterizes the use of all installed equipment. In the USSR a large amount of positive experience has been gained in developing uniform theories of electric motors. Thus, during the 9th Five-Year Plan production began on synchronized motors of the fourth all-union series 4A which in their technical and economic indicators correspond to their best foreign models.

The economic effect from this series is characterized by the fact that every new motor is approximately 20 percent lighter than its analogue from

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the previous uniform series, that there is a 20 to 25 percent smaller expenditure of coiling copper, steel, and iron, and that the efficiency coefficient of the electric motors is one percent higher (a one percent increase in the efficiency coefficient will economize approximately 2.5 billion kilowatt-hours of energy a year). The overall economic effect from their use is estimated at 350 million rubles a year.

It was possible to achieve all of this above all on the basis of an overall approach to the development of the series in which 43 designing and scientific research organizations from 8 ministries took part. All of their work was conducted according to a single network schedule involving the use of computers. New materials, electrical engineering steels, wire, and ball-bearings were created.

In addition, at the same time that the motors were developed all of our electric machine building plants were re-equipped with the result that as early as the 10th Five-Year Plan the entire increase in electric motors is being achieved without increasing material expenditures, since the new series is being mastered. On the basis of the fact that the new series is replacing obsolete models, material expenditures for the production of the electric motors are being decreased and, in this way, the increase is being achieved without increasing material expenditures.

However, I would like to consider some unsolved and important problems. If the growth rates of the production of electric motors continue in the future to be the same as in the 9th and 10th Five-Year Plans, by the year 2000 all of our electrical engineering steel and coiling copper will be expended for the production of electric motors and the economy will experience a shortage of labor resources.

We produce many more electric motors than the United States, but their installed capacity is the same in both countries and their power-labor ratio is much higher than ours. A comparison has shown that the average output of our electric motors is 1500 hours, while in the United States it is 4000 hours; that is, our electric motors are used approximately 2.5 times less efficiently. Of course, it is not a matter of the electric motors themselves. What is involved is the use of machinery and mechanism equipment.

An analysis which has been performed for all branches has shown how many hours machine tools operate in every branch. If our electric motors operated at least 2,000 hours a year, this would make it possible not to increase the production of electric motors as intensively as has been planned in our country. Therefore, the basic question is the use of equipment, particularly of electric motors.

Today a number of foreign companies have produced electric motors which require approximately 20 to 30 percent more electrical engineering steel and copper, but which have higher energy indicators. They believe that

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the economy of electric energy will reimburse the expenditure of materials. This is also an important question, although in our country there is less use time of electric motors and electric energy is cheaper.

In our opinion, it is necessary to create not one but two series of electric motors for their more or less intensive use. For example, we know that in the textile industries electric motors operate 3 to 4,000 hours and more; this means that it is advisable to increase the expenditure of copper and steel and to obtain a large economy of electric energy. In certain other branches electric motors operate 800 hours. There it is advisable to use electric motors which, although they have somewhat poorer energy indicators, require less metal for their production. This will yield a large economy both of metal and of electric energy.

Enterprises today are not interested in reducing materials intensiveness and producing cheaper and lighter output. On the contrary, they strive to increase the expenditure of materials and of extremely expensive component products. There is one more question--the efficiency of various preparatory and auxiliary productions. Let us cite an example. An electric motor plant in the FRG is analogous to our Mogilev Plant in the amount of output it produces. However, there are three times fewer workers there. A comparison of production and labor intensiveness has shown that at the basic processes the technology is the same and, moreover, it is even better in our country for certain basic processes. But the auxiliary processes cannot be compared. In electric motor production 40 percent of our workers are employed in the basic operations, and 60 percent in auxiliary operations. There is an enormous expenditure of metal here. In fact, metal expenditures are not planned for the production of tools, non-standard equipment, and rigging. For this reason, the branch's basic task is mechanization and an improvement of the planning of auxiliary and preparatory productions.

T. S. Khachaturov. The reports provide us with valuable and sharp material whose publication in the periodical will be very useful.

The situation in the field of economizing material resources has been characterized and many successes and achievements have been noted. At the same time, criticisms were made during the course of the analysis and shortcomings were demonstrated.

It was correctly stated in the reports that in a number of cases the problem of economizing materials can and must be solved on the basis of an interbranch overall approach. It was said, for example, that construction workers economize construction materials, but the result is an enormous overexpenditure of fuel for the economy. It is absolutely clear that this is an interbranch problem. Or an increase in the shift coefficient. It follows from Comrade Radin's report that an increase in the shift coefficient can lead to an economy-wide savings of materials.

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The problem of economizing materials has to be solved not only on an intrabranch level through improving technology, and so forth. A national economic approach is required. A number of fundamental issues follow from this. Among them are the use of both production and consumption balances. A change in the structure of production was also discussed. This requires an improvement of economic planning.

It is hardly worth repeating all of the interesting ideas which we have heard today. The opinions and proposals which have been expressed on eliminating shortcomings will be printed in the periodical and it would be desirable for planning and economic agencies to take measures to carry out these proposals.

Some of the participants in the "Round Table" presented their proposals on the problem of reserves for economizing material resources in written form.

I. P. Zhavoronkova (candidate in economic sciences, senior scientific associate at the Institute of Economics of the USSR Academy of Sciences). The relationship between the extracting and processing branches of industry in gross output is one of the indicators which characterizes a decrease in the materials intensiveness of social production. Measures being carried out during the 10th Five-Year Plan to improve the use of raw material resources and decrease the materials intensiveness of production are creating the necessary preconditions for a further improvement of the structure of social production on the basis of decreasing the share of the capital intensive extracting branches in the total gross output of industry.

In this connection, note should be taken of the large reserves for economizing raw material resources which exist at the first stages of their involvement in economic turnover. A further increase in the overall use of raw materials is one of these reserves. In the future more than 30 percent of the need for all types of mineral resources can be covered through the overall use of raw materials. Substantial successes have been achieved in the development of the overall processing of raw materials; however, they have basically an intrabranch thrust.

Insufficient attention is still being devoted to interbranch problems of the overall use of raw materials and this is leading to substantial losses at the junctions of individual branches. For example, there is a lack of coordination in the work of the ferrous and non-ferrous metallurgy branches on the use of raw materials. Many large non-ferrous metallurgy deposits are characterized by a substantial iron content. And along with iron, iron-bearing deposits contain non-ferrous metals.

In order to expand the country's raw material base the use as secondary raw materials of the waste of processing branches and also of depreciated

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means and objects of labor is acquiring increasing importance.

There is an especially substantial effect from the utilization of sulphur discharges, secondary energy resources, scrap metal, and the processing of slag into construction materials. At the enterprises of ferrous metallurgy alone the total amount of additional output from slag processing now comes to around 90 million rubles, and the reimbursement periods on the capital investments for the creation of the relevant installations do not exceed two years.

As fuel intensive and energy intensive productions develop and as their concentration increases, the total production of secondary energy resources which are suitable for use increases. The high effectiveness of the utilization of secondary energy resources is characterized by the fact that the specific capital investments for salvage installations comes to 11 to 15 rubles per ton of salvaged fuel, while the capital investments for the construction of extracting enterprises are 5 to 8 times greater.

The development of utilization processes depends upon the planning and distribution of capital investments. The question arises: should these investments be directed toward searching for technical means and methods for fuller salvaging and processing, for example, of sulphur-containing discharges, or for geological surveying--for searches for sulphur deposits? In order to decide such questions use has to be made of the compensation possibilities which are contained in a fuller utilization of waste. In addition, the economic advisability of these measures cannot be regarded as the only criterion of their effectiveness. For example, under certain conditions the replacement of a primary raw materials production with a secondary one not only economizes the former, but also prevents environmental pollution. Thus, the use of one ton of metal scrap replaces natural raw materials at the level of 90 percent and decreases water pollution by approximately 7 percent, while it reduces the amount of waste by 2 times. Every ton of paper or cardboard not only completely saves raw materials, but also decreases air pollution and reduces the amount of solid waste by 40 to 50 percent.

For this reason, an improvement of the production preparation system and the introduction of effective technological processes for preparing secondary raw materials for subsequent processing should be regarded as leading directions of contemporary investment policy in the field of the use of secondary raw materials. This undoubtedly demands a redistribution of capital investments among the extracting and processing branches.

N. A. Medvedev (candidate in economic sciences, chief of the economic planning administration of the Ministry of Timber Industry USSR). The main task of the timber industry at the present time is an improvement of the structure of production on the basis of an overall use of timber raw materials. Compared to 1975, in 1980 it is planned to increase the procurement and shipment of round timber materials by only 6.9 million cubic

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meters, while the production of commercial timber will increase by 14.4 million cubic meters. The production of commercial timber substitutes which is planned for 1980 is equal to approximately 64 million cubic meters of timber materials. According to the calculations, this promises an economy of almost 1.1 billion rubles. The need for workers will decrease by 55,000 people, and the wage economy will be around 96 million rubles. The concentration of the production of commercial timber substitutes primarily in the European part of the country where this output is basically consumed will make it possible to do away with railroad shipments from Siberia which during the five-year period will make it possible to economize more than 50 million rubles.

The intensive development of the production of wood slabs--shavings and fiber (1 cubic meter of wood shavings slabs replaces almost 4 cubic meters of round timber)--plays an enormous role in a better use of timber raw materials. During the 9th Five-Year Plan an increase in the production of wood slabs made it possible to decrease the expenditure of commercial timber by almost 16 million cubic meters, to release around 30,000 workers, and to save more than 300,000 hectares of plantings from being felled. During the 10th Five-Year Plan there will have to be a substantial new increase in the production of wood slabs. In this connection, of paramount importance is the reconstruction of operating enterprises so as to bring their capacities to an average of 75,000 to 80,000 cubic meters (today the average plant capacity is 58,000 cubic meters), an improvement of the quality and widening of the assortment of slabs, the construction of new enterprises stipulated by the plan within the established schedules, and the most rapid mastery of newly created capacities.

Another important factor in economizing in the use of timber raw material resources is a substantial increase in the production of production chips for the cellulose and paper industry. Production chips are a universal raw material. The economic effectiveness of the use of capital investments for the creation of capacities for the production of chips is 2.5 times greater than with the construction of timber procurement enterprises. The cost of one cubic meter of production chippings at advanced enterprises does not exceed 10 rubles, while at a number of enterprises it is considerably lower.

A decrease in the expenditure norms at timber industry enterprises of only one percent would make it possible to economize more than 100,000 cubic meters of wood, around 30,000 cubic meters of wood shavings slabs, more than 400 tons of polyester varnish, and almost 90 million kilowatt-hours of electric energy. An economy of material resources means not only a decrease in expenditures, but also the possibility of substantially increasing the production of output and consumer goods. Thus, an economy of 400 tons of polyester varnish would make it possible to finish an additional 12 to 14 million rubles worth of first-category furniture.

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Losses of wood materials occur at all of the stages of industrial timber production. Solely by increasing the extraction of wood from one hectare by one cubic meter it would be possible to procure an additional 1.5 million cubic meters of wood from the existing areas. A great deal of wood is lost during storage, processing, and transportation. If we were to count all of the losses beginning with the height of the stump which is left by wood cutters (instead of the statutory five centimeters, a stump frequently reaches 15 centimeters and in some places more, especially during winter procurement), we would get a substantial figure. Simply by decreasing the height of the stump to the size stipulated by the technical specifications, it would be possible to increase the production of commercial timber by approximately 1-1.5 percent, and cutting the wood flush to the ground would make it possible to obtain an additional 7-8 million cubic meters of high quality wood.

The problem of so-called shortfalls, especially of leafy and also of defective trees and thin standing trees is also important. On the average, around 2 to 3 percent of the original wood remains on the root. In addition, wood with low consumption value is often left at felling areas (approximately 2 to 3 percent of the wood before felling). In shipping trunks, especially on the railroad, it is necessary to trim those which are too large for the cars. These losses comprise approximately one percent of the total shipments. During the cross-cutting of the trunks at down-river warehouses defective parts are cut away and chippings are made. In addition, cuttings which do not correspond to the standard assortment length are left over. As a result, losses from inefficient cross-cutting reach two percent of the total procurements. Timber procurers transfer a large amount of commercial timber into firewood because of machining damage.

Regrading also leads to losses. The existence of commercial timber in firewood stacks is a quite widespread phenomenon.

There are also large monetary losses from the underutilization of the timber felling fund. Payment by the stump for shortfalls and fines for violations alone sometimes come to 3 to 5 percent of cost. Losses of wood from shortfalls are increasing as a result of remnants of unshipped wood when transportation packets are formed at down-river warehouses.

Despite the annual increases in the production of wood slabs, with each passing year it is becoming increasingly difficult to supply the furniture industry, construction, and the economy as a whole with timber materials. Material expenditures occupy the largest share (more than 60 percent of total cost) of the output costs of furniture and woodworking industry enterprises. The expenditure of raw materials and basic materials per ruble of commodity output is growing every year at furniture enterprises, which is increasing the importance of economizing material expenditures. For example, the average enterprise expends 6 to 7 million rubles worth of raw materials and materials. Consequently, an economy of only one

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percent makes it possible to reduce costs by 60,000 to 70,000 rubles, or to increase furniture production by approximately 100,000 rubles. This kind of minimum economy can be achieved at every enterprise.

A decrease in the expenditure of timber for floors is an important reserve for economizing wood raw materials in other branches of the economy, for example, in construction. Every year around 250 million cubic meters of various materials are required for the laying and repairing of floors. In 1977, 80 million square meters of linoleum was produced, which even with imports included comes to no more than 30 to 35 percent of the floor area. Parquet covers around 55 percent of the need for floor materials (around 150 million square meters is met every year by floor boards) and it requires the expenditure of approximately 6.5-7 million cubic meters of sawn materials, or 10-11 million cubic meters of round timber. In view of the fact that every 1,000 square meters of linoleum replaces 45 cubic meters of sawn materials, its use has to be increased in the future.

It is also necessary to decrease the expenditure of timber materials for packing and packaging. During the last 12 years there have been marked improvements in the structure of packing materials: with an overall increase in the production of packing materials of 68 percent, the amount of wood packing increased by only 25 percent. The proportion of wood packing materials decreased from 86.7 percent in 1965 to 65.5 percent in 1977, while cardboard increased from 13.3 to 35.5 percent. (In the United States, England, and the FRG wooden packing materials come to only 5-7 percent of the total expenditure of materials for packing and packaging).

The use of one ton of cardboard for packaging output makes it possible to economize more than 10 cubic meters of fresh timber. For this reason, an increase in the use of cardboard packing is a very important reserve for economizing wood. Used wood packing is being utilized unsatisfactorily (the repeat use of wood packing increased from 29.7 percent in 1965 to only 42.7 percent in 1977, that is, by only 13 percent). Of the 45 million cubic meters of wood and packing which is in circulation, in 1977 only 19.2 million cubic meters, or 42.6 percent, was used for a second time. An enormous quantity of this packing material is burned. Meanwhile, the repeat use of wooden packing could be increased to 75 percent. The use of containers ensures a substantial economy of timber materials. According to the data of the Institute of Complex Transportation Problems of Gosplan USSR, container shipments of one million tons of freight will economize approximately 250,000 to 300,000 cubic meters of timber. With the shipment of 60-70 million tons of freight by the end of the 10th Five Year Plan from 15 million to 17.5 million cubic meters of timber could be economized.

Around three percent of our timber materials (in terms of round timber) of the highest grades is consumed in machine building for the production of agricultural machines, railroad cars, trucks, trailers, and containers.

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With a total consumption of 11.1 million cubic meters of timber materials (in terms of round timber), quality timber materials comprise 3,760,000 cubic meters, or 5,460,000 cubic meters in terms of round timber--51.2 percent of the total quantity, --and 1.1 million cubic meters of round ship-building timber. The need for these quality timber materials is not decreasing in the 10th Five-Year Plan and this is holding back the production of timber materials for export.

At the same time, in foreign countries quality sawn materials for the production of freight cars, trucks, and containers are replaced by formed plywood. For example, in the United States 90,000 cubic meters of this plywood is used in railroad transport alone. In order to replace one million cubic meters of quality sawn materials 300,000 cubic meters of wide-formed plywood are needed. It is necessary to sharply increase the production of large-size plywood for initial use in the production of containers, and then of railroad cars and truck cabs.

Every year around 9 million cubic meters of select coniferous timber is expended in our country for the production of 40 to 45 million railroad ties. The service life of wooden ties does not exceed 16 years, while the estimated service life of ferroconcrete ties is 40 years. Taking account of service life, expenditures for the production and use of ferroconcrete ties are 20 percent lower than for wooden ties. However, the production of these ties does not exceed 10 million units (and is hardly increasing), which covers only 25 percent of the need for them. Every year 4 million cubic meters of large coniferous timber is expended for wooden poles and, moreover, a large part of these poles goes to replace rotted ones. It is known that wooden poles are successfully replaced by ferroconcrete poles. These poles serve for 40 years, while wooden poles serve for only 16 to 18 years. Ferroconcrete poles are 30 percent cheaper to use than wooden ones; however, their production comes to only 1.3 million cubic meters and is increasing very slowly. It is necessary to increase the production of ferroconcrete ties to a minimum of 20 million units and of poles to 1-1.5 million cubic meters, which will economize a minimum of 5 million cubic meters of high-quality timber.

N. G. Feytel'man (doctor of economic sciences, Institute of Economics USSR Academy of Sciences). Scientific and technological progress is expanding the possibilities for discovering and making use of new mineral deposits (at deeper strata, under difficult geological mining and geographical conditions). At the same time, "poorer" deposits whose exploitation was previously unprofitable are being developed. In addition, the development of science is leading to the discovery of new types of raw materials and energy sources which are beginning to successfully compete with the previously known ones. For example, a substantial part of the world's petroleum stocks are connected with petroleum-bearing shale. Their amount in the United States and Canada is estimated at 153 billion tons. However, the extraction of this petroleum is connected with large capital investments (70,000 dollars per ton per day compared to .7 dollars

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per ton per day for the ordinary deposits of the Middle East). The limited nature of stocks of mineral raw materials is an economic category which is based on the maximum possible amount of expenditures to develop them within a given period of time.

An increase in the petroleum yield coefficient would make it possible to achieve the amount of petroleum planned for the 10th Five-Year Plan while, at the same time, curtailing the average annual commissioning of new capacities.

In a number of cases losses of minerals in the earth are the result of an endeavor by mining enterprises to decrease costs and increase above-plan profits and, on this basis, the economic stimulation funds. Frequently mines first work sections of a deposit which have an increased mineral content; after this the work is shifted to lower strata and substantial stocks of ore with a lower mineral content are left on the upper strata. The latter leads to a premature lowering of the level of mining work and to an increase in losses of minerals in the earth. Consequently, the cause is in the contradictions which exist between national economic interests and the cost accounting interests of individual mining enterprises:

Important losses of minerals during mining are also explained by the fact that investment and construction programs have an insufficiently overall nature and are insufficiently coordinated for amount and time. In many cases the construction of a gas refining plant begins 5 to 6 years after and ends 8 to 10 years after petroleum deposits have begun to be worked, when 50 percent of the petroleum gas has already been extracted and (due to the absence of consumers and also of gas storage units) has been largely burned in torches. On the other hand, the commissioning of gas refining plants only 8 to 10 years after a deposit has begun to be worked (that is, at a time when there has been a substantial exhaustion of the gas resources) often raises the problem of providing a raw materials workload for the newly built plants. Consequently, in addition to the gas losses before the construction of these plants which lower the efficiency of the capital investments for the prospecting, development, and construction of the deposits, the efficiency of the capital investments and the return on capital at the gasoline plants is also lowered. In these cases, it is advisable to use the petroleum gas for reverse pumping in order to increase the petroleum yield.

The rapid development of the mining industry in areas of pioneer development demands that the problems of the overall use of the natural resources of a region be posed more broadly. This necessitates the development and absolute fulfillment of overall investment and construction programs for new territorial production complexes. In our opinion, it would also be advisable to examine the question of expanding the territory of a territorial production complex with regard to the sphere of its influence on the development of the environment and of creating on their basis natural-

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production complexes, including in their composition not only technologically connected productions but also other ones, if they are based on the same raw material sources, and also recreation enterprises and organizations. This will make it possible to accelerate the development and facilitate the realization of the territorial overall environmental protection plans which were stipulated by the December (1978) Decree of the CC CPSU and USSR Council of Ministers.

It would be advisable to establish a wholesale price for minerals whose deposits are being developed by new methods at the level of the maximum price adopted in the branch which reflects the poorer conditions of working a deposit with ordinary methods. An improvement of economic stimulation for an efficient use of minerals will make it possible to sharply decrease losses in the earth and to provide for the economy's needs while sharply reducing expenditures for the development of the country's mineral-raw materials base.

P. G. Yakovlev (candidate in economic sciences, senior scientific associate at the Institute of Economics of the USSR Academy of Sciences). An increase in the efficiency of the use of mineral and technical resources in stocks and the relatively lower growth rates connected with this means the release of substantial resources for the economy. In five years beginning with 1970 the turnover rate of material working capital in industry accelerated from 61.3 to 56.5 days. This was occurring alongside an overall acceleration of the turnover rate of stocks of material and technical capital in the economy. However, by the end of the 9th and beginning of the 10th Five Year Plans there was already occurring a slowing down of the turnover rate of circulating capital and an increase in above-normal and surplus stocks of material resources and of installed equipment. During the years 1975-1976 almost an additional 2 billion rubles worth of physical assets were diverted into stocks. During the years 1976-1977 uninstalled equipment remainders increased by 1.6 times, with new imported equipment increasing by almost 2 times. At the construction sites which are supplied by Gosstab USSR alone warehouse stocks of uninstalled equipment came to 4.5 billion rubles at the end of 1977. To a large extent this is output which is in mass demand and which does not find use for a long time, despite the fact that it could be used at other projects. In our opinion, construction sites should be supplied with this kind of output only as they are ready for it. An improvement of the quality of supplies will be promoted by an expansion of the practice of enlisting regional material and technical supply agencies to participate in supplying construction sites and to shift to progressive forms of deliveries to industrial and agricultural consumers on the basis of contracts.

The mechanization of hoisting and transportation, loading and unloading, and warehouse work (HTLUW) is a large reserve for intensifying the processes of storing and moving stocks of material and technical capital. The mechanization of HTLUW work on a countrywide scale will make it possible to shorten the circulation time of stocks of production and technical

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output. The size of this kind of reserve can be judged from the fact that approximately two-thirds of our freight is now being processed by means of machinery and mechanisms at HTLUW work in the economy and that this work is performed by around 10 million people. It is obvious that technological progress in the field of HTLUW operations has the task of becoming one of the most important means of developing progressive changes in the technology of moving the means of production from the producer to the consumer. This requires an improvement of the structure of hoisting and transportation equipment and the satisfaction of our needs for warehouse equipment and, above all, for equipment for processing packaged piece freight--such equipment as shelving, stacker cranes, and also packing, trays, and containers, without which it is difficult to bring about a fundamental change in the technology of these operations. In contrast to liquid and loose freight, the processing of packaged piece freight is especially labor consuming. Of the total expenditures for the performance of loading and unloading and warehouse operations which at the present time come to more than 10 billion rubles a year in the sphere of distribution, expenditures for the processing of such freight amount to 75 to 80 percent, while its share and total freight turnover is estimated at 20-25 percent. Consequently, the processing time for such freight is also great. The development of packet and container shipments of packaged piece freight is a decisive means of shortening the time for moving material and technical capital. The shipment of a million tons of freight by containers ensures an economy of 4 million rubles, releases around 1500 transportation workers from heavy manual labor and 4,000 industrial workers employed in warehouse, packaging, and packing repair work, and accelerates turnover.

There are now more than 1 million containers in operation in general use transportation. Eighty percent of the pool consists of low-capacity containers (up to 3 tons), while according to the nature of our deliveries it should consist of 45 percent with a freight capacity of up to three tons, 25 percent--5 tons, and 30 percent more than 10 tons. Specialized and large-capacity containers are still not being used enough in turnover.

The development of warehouse work has developed into a major national economic problem. The existing warehouse network of sales and supply organizations is scattered. Many of the warehouses of this network are inconvenient to operate, have insufficiently high ceilings, and have a small capacity. A large part of the operations at these warehouses is performed manually and the buildings cannot be adapted for the introduction of mechanization. In the country as a whole economic losses in warehouse work as a result of excessive expenditures for the storage and processing of freight are estimated at 2 billion rubles a year.

The current state of warehouse work does not correspond to the level of development of basic production or to the possibility and requirements of scientific and technological progress. The shortage of warehouse capacities is still great. Thus, warehouse freight turnover in the state system of material and technical supply exceeds their planned capacity. Grain

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reception enterprises are still unable to accommodate the necessary amount of grain. The lagging in the development of the material and technical base of the grain reception and processing enterprises of the agricultural procurement system is still substantial.

At the present time the covered warehouse capacities of the State Committee for Agricultural Equipment does not provide for the necessary amount of storage for mineral fertilizers, agricultural tools and machinery, and so forth. So-called package-free shipments of mineral fertilizers have become widespread. However, the fact that many storage units are poorly adapted, the shortage of them, and also the shortage of specialized transportation and equipment for the overall mechanization of loading and unloading and warehouse work with unpacked fertilizers leads to losses whose amount is estimated at a minimum at 10 to 12 percent of the mineral fertilizers which are supplied to agriculture.

The process of storage is less labor and capital intensive than the process of production, and, consequently, from a national economic point of view an attempt to compensate for losses of output during storage by means of increasing production is ineffective. The optimal functioning of the sphere of the movement and storage of material and technical resources not only brings about a reduction in surplus time for the non-production function of distribution, but also rationalizes production time.

L. S. Bragina (candidate in economic sciences, junior scientific associate at the Institute of Economics of the USSR Academy of Sciences). According to the data of Gosstab USSR, the packing enterprise is valued at 10 billion rubles and consists of more than 1 billion units of various boxes, around 60 million barrels and drums, and more than 1 billion sacks. However, the USSR packing enterprise is lagging behind the economy's needs both quantitatively and qualitatively, which leads to substantial losses of output during its transportation and storage. At the present time the packing enterprise (as well as the production of packing) is represented only by scattered and insufficiently developed elements of the branch. Yet, an increase in the efficiency of social production demands an integration of the packing enterprise into a single specialized branch of the infrastructure, or into a subbranch of the system of material and technical supply.

In our opinion, the deconcentration of packing production and the lack of a single packing branch is the reason why for a long period of time the production of packing in the country has been developing without a single plan and technical direction. Capital investments for the expansion and construction of specialized packing enterprises is still not provided for by a single line in our plans.

The quantitative relationships between packing which is produced from various materials is of the greatest importance for the economy of our packing enterprise. The level of economic efficiency and technological

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progress in the packing enterprise can be judged from the relationships between the materials from which packing is produced. The consumption shares of various materials in the world production of packing and packaging are as follows: paper and cardboard--51 percent, metal--21 percent, plastic--10 percent, glass--9 percent, and wood, fabrics, and other materials--9 percent. However, these are only average figures and the relevant indicators in different countries vary greatly. For example, the cost structure of cardboard and paper packing is 16 percent, metal--12 percent, plastic--3 percent, and other types--17 percent.

An analysis of the current structure of the production and consumption of packing in our country shows that the traditional uneconomical types of packing made of wood and metal occupy the basic place in the country's packing balance, while progressive packing made of cardboard and polymer and combined materials comprises a negligible proportion. A change in the structure of the production of packing demands first of all the re-equipping of the packing industry, since as a result of a lack of equipment most of the packing assembly operations are performed by hand.

An improvement of the organization and management of the production and use of packing should be named as one of the possibilities for improving the structure of packing made of various materials. Three forms of production organization exists: in the subsidiary shops of consumer enterprises, in the specialized shops of enterprises which produce materials for packing, and at specialized packing enterprises. In view of the great importance of specialized enterprises in the economy of packing production, they should be regarded as the basic form of organization. It has also become necessary to single out a specialized branch for the use of packing.

The production of consumer packing is not planned and is not taken account of by a single organization. Only in the 9th Five-Year Plan was the Interdepartmental Council for Packing Work created--a coordination center for the production and use of packing. In the United States there is a special congressional committee which deals with the problems of producing and improving packing. A large amount of attention is given in foreign countries to the efficient use of packing and packaging. In a number of socialist countries special packing and packaging centers, commissions, or administrations have been formed in connection with government agencies (in the GDR the Division of Packing at Gosplan, in Poland--the Center for Packaging). In order to improve packing and packaging work in 1958 the European Federation for Packaging which consists of 19 European countries was created.

N. P. Ivantsova (candidate in economic sciences, senior scientific associate at the Institute of Economics of the USSR Academy of Sciences). The economical use of metal and a decrease in the metal intensiveness of output depends to a large extent upon the availability of metal of the appropriate quality and assortment. An expansion of the production and

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consumption of economical types of metal and an improvement of its structure is vitally connected with the overall solution of three interconnected problems: a rise in the technical level of the production and consumption of metal; the optimization of the organizational structure of ferrous metallurgy and of the the billet production of machine building; and an improvement of the system of planning and stimulating the production and consumption of economical types of metal.

An improvement of the structure of metallurgical production is connected with an increase in the proportion of rolled and finishing conversions, an intensification of the structure of steel production by means of a more rapid development of oxygen conversion and electro-steel smelting processes, continuous steel smelting, and various methods of vacuuming, and so forth. The realization of these directions in planning requires an optimization of the structure of capital investments in ferrous metallurgy. To this day the basic part of the capital investments in our country is assigned to increase the production of ferrous metals and, in insufficient amounts, to rolling and finishing production (45.7 percent in the 9th Five-Year Plan and 48.8 percent in the 10th Five-Year Plan of our capital investments for basic metallurgical production compared with 60 percent in the developed capitalist countries).

Reserve production capacities should also be created in ferrous metallurgy. The existence of a definite (optimal) reserve of production capacities is one of the basic conditions for the rapid mastery of new output and for the punctual satisfaction of consumers' needs. In the USSR there is a high (95-98 percent) actual workload on capacities, and sometimes enterprises do not have enough capacities even for the production of planned output. The reasons for this are the practice of planning production in tons, insufficient capital investments for an expansion of capacities, and the slow use of capital investments and new facilities.

The production of quality metal of the required assortment which is characterized by a low metal intensiveness demands the appropriate metallurgical equipment, especially for the fourth conversion. However, metallurgical machine building is not yet capable of providing for the growing needs of metallurgy for progressive equipment and of improving the quality of these machines. One of the reasons is the inadequate level of even item specialization. Metallurgical machine building produces machinery and equipment for 10 other branches of the economy. Of 17 plants, only at 4 is the proportion of profile output more than 60 percent. Metallurgical machine building enterprises work basically for the needs of "their own" branch--heavy machine building.

The amount of output produced, its products list and series nature, and the complexity group of parts exercise a direct influence upon the quality of billets and upon their metal intensiveness and cost. At the same time, today at almost every machine building enterprise there are small billet shops or sectors for the production of castings, stampings, and welded

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metal structures. The technical level of these shops, as a rule, is insufficiently high and there is a large products list of parts with the result that there is a low metal use coefficient and a cost of 1.5 to 3 times greater than at a specialized production. Even in one of the most specialized branches--tractor and agricultural machine building--the level of technological specialization in 1975 was only 1.6 percent. The proportion of centrally produced castings, stampings, and welded structures comes to only 3 percent of the output of machine building. For this reason, an intensive realization of specialization and the creation of the necessary large capacities for the centralized production of billets has to be considered one of the basic factors in improving the quality of machines, including decreasing their metal intensiveness and increasing labor productivity in machine building.

Yu. V. Sinyak (candidate in economic sciences, laboratory chief of the Working Consultative Group for the Development of the Future Prospects for the Development of Power Engineering Attached to the President of the USSR Academy of Sciences). In 1977 fuel and energy came to 6 percent of industrial expenditures and, for this reason, the problem of economizing energy as a factor in reducing materials intensiveness is very important. The limited nature of the stocks of organic fuel on our planet is no less important. And although the Soviet Union in this respect is in a better position than other countries, the basic auspicious deposits of organic fuel in the USSR are located in remote areas (western and eastern Siberia) with unfavorable climatic conditions, which results in a substantial increase in expenditures for prospecting, mining (including the development of the area), and transportation. During the period 1965-1975 the specific capital investments for an increase in the mining and transportation of petroleum increased by 30 percent and for natural gas by approximately 60 percent and now comes to around 140 rubles per ton for petroleum and 200 rubles per cubic meter of gas. The increase in expenditures will continue in the future (it is not excluded that it will be at accelerated rates). For the purpose of comparison it should be pointed out that the specific capital investments in measures to economize energy resources are estimated at 50 to 70 rubles per ton of conventional fuel, and although they will also increase, they will do so much more slowly than expenditures for the development of natural energy resources.

In the USSR the problem of economizing energy resources has always been one of the most important ones in the field of energy policy. During the 9th Five-Year Plan around 130 million tons of conventional fuel was economized. It is expected that during the 10th Five-Year Plan the economy of energy resources will be 150-160 million tons of conventional fuel.

The following basic ways of economizing energy may be singled out: an economy of organic fuel (above all, high quality fuel: petroleum, coke, and in the future natural gas) by means of replacing it with other energy resources--cheaper ones (coal and nuclear fuel); an economy by means of increasing the efficiency factor of the transformation of energy; an

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economy of energy at the final consumers; and an economy of energy connected with changing a style and way of life.

One of the general directions of economizing organic fuel is an increased use of practically inorganic sources of energy (nuclear and thermonuclear, hydraulic, solar, geothermal, and so forth). Moreover, the development of nuclear energy (and after the year 2000, perhaps, thermonuclear energy) is the basic factor in economizing organic fuel in the future, since a renewal of sources of energy even with maximum development will scarcely be able to provide for 10 to 15 percent of the world's energy needs.

The development of nuclear energy and the production of synthetic fuels is inevitably connected with an increase in energy losses during transformation. While at the present time losses resulting from the transformation of natural energy resources into electric energy come to approximately 22 percent in the energy balance, in the future as a result of an increase in the consumption of electric energy of 2.5-2.6 times they will increase to 28-30 percent. In addition, it should be kept in mind that an increase in the efficiency of energy transformation is limited and, on the average, can come to no more than 7 to 8 percent compared to the present level by the year 2000. If it is also considered that in the future the production of synthetic liquid and gas-like fuel from coal will begin to develop intensively (and the efficiency factor of this process does not exceed 60-70 percent), the overall losses during transformation may be even higher.

In order to compensate for the increased losses of energy in connection with the increased proportion of its transformed types, the efficiency of energy use by final consumers has to constantly be increased in the energy balance and this requires carrying out an active policy in the field of economizing fuel and energy in absolutely all branches of the economy. The share of energy consumption by industry which comes to 55 percent will probably be maintained in the future. Therefore, as is the case today, industrial power engineering will continue to play a leading role in economizing energy.

To date the problems of energy connected with production processes have not been given the necessary attention in designing industrial installations. However, the only acceptable future direction of the development of industry is the development of production processes which provide for society's needs for necessary products with minimum energy expenditures, that is, a shift from an extensive to an intensive use of energy.

The use of low-temperature plasma is another promising direction in the development of industrial power engineering. Also promising are metal heat generators which make it possible to increase the efficiency factor of fuel in low-and medium-temperature processes by 1.5-2 times and to increase the thermal tension of furnace volume by 1-2 times. This makes it possible to reduce the size of installations by dozens of times, to

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ensure the complete combustion of fuel without the discharge of the toxic products of high-temperature combustion, and to minimize the amount and temperature of waste gases. Catalytic heat generators can find a wide use in the processes of heating and vaporizing various liquids in heat-exchange apparatuses, of drying wet materials, and of water purification.

As a result of the increased costs of organic fuel, the field of application of heat pumps for low-temperature heat and cooling supplies for industry and municipal services is undergoing a substantial expansion. The use of this purpose of the heat of waters or rivers with a relatively constant temperature or of the heat-bearing discharges of production and municipal facilities, including the heat of ventilation discharges, is very promising. The economy which is achieved here comes to 20 to 40 percent depending upon the conditions of the extraction of low-potentiality heat and the efficiency of the system being replaced.

An increase in the unit capacity of equipment, an improvement of the quality of basic raw materials, and the accelerated decommissioning of obsolete equipment with low technical and economic indicators also exercises a large influence on energy consumption. The increase in prices for electric energy is taking place much more slowly than for hydrocarbon fuel. In the future, when nuclear energy sources will play a more appreciable role, a stabilization or even decrease in the cost of electric energy should be expected.

The basic factor in economizing energy in maritime transportation is the replenishment of the fleet with ships with modern economical diesel engines and the decommissioning of old steamships. In air transportation obsolete airplanes will be replaced with new, faster, and more comfortable ones. However, here the prospects for economizing energy are still unpromising as a result of the increased expenditure of aviation kerosene on new airplane models.

The reserves for economizing energy in the municipal sector are determined chiefly by the possibilities of reconstructing the construction base and by a shift to new norms in planning residential and industrial construction.

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